British Marine Aggregate Producers Association,
Historic England and The Crown Estate

Marine Aggregate Industry Protocol for the Reporting of Finds of Archaeological Interest

Annual Report to BMAPA 2020-2021

November 2021

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Prepared by

wessex archaeology

Protocol background

The Marine Aggregate Industry Archaeological Protocol (the Protocol) is in place to ensure the protection of submerged cultural heritage that may be discovered during marine aggregate industry dredging works.

Prior to a licence being granted to dredge an area, an intensive investigation is undertaken to identify potential archaeological material on the seabed. Using geophysical and geotechnical survey and analysis of available records from various sources archaeologists identify known and suspected sites of archaeological interest within proposed aggregate extraction regions. The known sites are protected through Archaeological Exclusion Zones (AEZs) to ensure that no harm comes to them through dredging activities. Even after this level of investigation, unidentified sites and especially individual artefacts may still be found within dredged cargoes. In response to this, the Protocol was developed to define a framework through which archaeological material could be identified, reported, investigated and, crucially, protected. The Protocol ensures that any items of potential heritage importance recovered during aggregate dredging, whether encountered on the seabed, on a dredging vessel or more commonly, at a wharf after a cargo is landed, can be properly reported, assessed, recorded and archived. In some instances, further mitigation or monitoring may be required.

Wessex Archaeology prepared the Protocol in 2005 on behalf of English Heritage (now Historic England) and the British Marine Aggregate Producers Association (BMAPA).

BMAPA member companies adopted the scheme voluntarily in 2006, though adherence to the Protocol is now a formal condition of consent for new marine licences and licence renewals. The Crown Estate joined BMAPA in 2009 to co-fund the Protocol Implementation Service.

When a find is encountered, it is reported through a Site Champion on the wharf or the vessel to a Nominated Contact of the company owning the wharf or vessel who alerts the Implementation Service, currently operated by Wessex Archaeology.

The Protocol has been overwhelmingly successful, with over **2200** finds reported since its inception.

This year, we're celebrating the 16th anniversary of the Protocol Implementation Service and this annual report covers the period from 1 October 2020 to 30 September 2021.

Access

Conditions relating to archaeology or the marine historic environment form part of all marine licences issued for aggregate extraction, which include a duty to publicise the results of archaeological investigations to the relevant bodies.

Once a find is reported to the Protocol Implementation Service, it is researched, and compiled into a report. Details of the dredged finds are then disseminated to:

- the Site Champion that reported it;
- the Nominated Contact;
- Historic England;
- BMAPA;
- The Crown Estate;
- the National Record of the Historic Environment (NRHE); and
- the appropriate local Historic Environment Record (HER).

If considered wreck material, finds are also reported to the Receiver of Wreck in compliance with the *Merchant Shipping Act* 1995 and they receive a unique droit number. All aircraft material is reported to the Ministry of Defence as it may relate to the *Protection of Military Remains Act* 1986.

In the past, once the finds had been reported to the NRHE at Historic England, they were uploaded to a publicly accessible database, PastScape[1]. Historic England is currently developing a new dataset specifically for marine heritage, the National Marine Heritage Record, which, when up and running, will be accessible by an online portal.

All finds, old and new are also published on the Marine Aggregate Industry Archaeological Protocol Facebook page[2] that was set up in March 2017.

Each annual report also publishes all the individual reports for finds that were made during that reporting year, and they are all available to download[3].

In addition, the discoveries and achievements of the staff involved with the Protocol are acknowledged through various publications produced by Wessex Archaeology, including the biannual *Dredged Up* newsletter, also available to download via the previous link.

1. www.pastscape.org.uk/default.aspx
2. www.facebook.com/marineaggregateindustryarchaeologicalprotocol/?ref=aymt_homepage_panel
3. www.wessexarch.co.uk/our-work/marine-aggregate-industry-protocol-reporting-finds-archaeological-interest

Raising awareness

The Protocol Awareness Programme is funded by BMAPA and The Crown Estate and implemented by Wessex Archaeology. Members of the Protocol Implementation Team promote awareness of the Protocol and keep awareness materials up to date, as well as visiting several wharves a year to maintain a close relationship with the staff. To have consistency, it is often the same member of the team visiting the wharves where possible. Emails between the Implementation Team and the wharf managers and Site Champions are encouraged throughout the year to keep a consistent flow of communication. Through e-mails, phone calls and during the visits, questions can be answered, and feedback is gathered so that we can further improve the delivery and content of the Protocol. Awareness is also promoted to the wharves and vessels through the biannual *Dredged Up* newsletter.

The Protocol Awareness Programme:

- delivers in-person training by an archaeologist during awareness visits to wharves, aiding industry staff to identify several different types of archaeological finds through interactive slides as well as the process of reporting and conserving finds of archaeological interest discovered on the wharf. As of 2020, the training also sets out guidelines on what to do if a find is suspected to contain asbestos;
- demonstrates the different types of finds from a range of various historical periods that can be encountered by providing a collection of finds that have been previously reported for the wharf staff to handle;
- produces the biannual *Dredged Up* newsletter which aims to publicise the Protocol and highlight recent finds and news. The newsletter is sent out to each Nominated Contact, wharf and vessel that implements the Protocol. The most recent issue, Issue 29 printed in Autumn 2021, and all previous *Dredged Up* newsletters, can be found online[4];
- raises Protocol awareness amongst third parties, such as geotechnical and environmental survey companies working on behalf of the marine aggregate industry;
- is available to support and train individual Site Champions to ensure that new and existing staff are familiar with the Protocol, either in person, over the telephone or via email;
- as of 2019, produces biosecurity awareness material and delivers basic training as an add on to the archaeological awareness training.; and
- as of 2019 and 2020, produces promotional material in the form of branded photo scale cards, mugs and pens delivered to each wharf and vessel enrolled in the scheme.

4. www.wessexarch.co.uk/projects/marine/bmapa/dredged-up

Visits to wharves

Since the 2019–2020 annual report was published, due to Covid-19, unfortunately, no Protocol Awareness Visits have been made this year. Contact has been maintained through emails.

The training sessions that take place usually last around 30 minutes each to minimise disruption to the work of the wharf and are often split in to two or three sessions so that the wharf can continue working with a rotation of staff. Each session is designed to be informal and involve an interactive presentation to explain the different ways archaeology can reach the seabed and what to do if it is found in the cargo landed at the wharf. The reporting process is also discussed as there have been instances where a Site Champion of a wharf may prefer to report the material directly to the Protocol Implementation Team rather than going through the Nominated contact. A member of the Implementation Team brings an array of archaeological finds previously reported through the Protocol that wharf staff can handle and discuss. The training also sets out guidelines on what to do if a find is suspected to contain asbestos. A member of the Implementation Team also brings handouts, laminated scale sheets and branded photo scale cards. Questions can be asked at any time during the training and an informal discussion is usually had at the end of the presentation. The handouts are designed to be left at the wharf to enable the Site Champions to induct future new employees or so that current employees can refresh their memories. The Protocol Implementation Team firmly believe that these visits are key to the success of the scheme as it promotes enthusiasm and resolves issues. As well as delivering the training, the visits allow Wessex Archaeology to maintain contact with wharves and vessels, keep the content fresh, boost interest in the Protocol and promote it to both new and existing staff.

All archaeological awareness materials can be accessed through the Protocol pages on Wessex Archaeology's website[5] and are available in English, Dutch and French.

Training certificates are sent out to the Site Champions to give to all wharf staff who receive the awareness training so that they may add them to their working portfolios. These are emailed to each Site Champion or wharf manager after a wharf has been visited. Additionally, a feedback form is also given to the attending wharf staff at the end of each visit (or emailed) to gather comments and suggestions so that we can continue to make improvements to Protocol Awareness and the way we deliver the training.

Contact is maintained through regular emails, the Facebook page, the annual report and the *Dredged Up* newsletter.

If you would like to arrange a Protocol Awareness Visit or would like to receive more advice on finds and finds reporting, please contact Wessex Archaeology via **protocol@wessexarch.co.uk**.

5. www.wessexarch.co.uk/projects/marine/bmapa/docs.html

Reporting process

Archaeological finds identified by wharf and vessel staff are reported through a Site Champion to the designated Nominated Contact of the company owning the wharf or vessel. The Nominated Contact uploads the images and information about the discovery, using the preliminary form, to the secure online console[6]. In some cases, the Site Champion will report finds directly to the console rather than through the Nominated Contact. The console alerts the Protocol Implementation Service operated by Wessex Archaeology and the find is added to the database. If the find is classed as wreck material, a Report of Wreck and Salvage form will be completed by the Implementation Service and returned to the Nominated Contact, who is asked to sign and send the form directly to the Receiver of Wreck's office. The find is investigated, and occasionally sent to external specialists to identify before a report is produced. Most of the reports are confined to an A4 page and will have an image of the object taken with a scale for reference.

The Implementation Team at Wessex Archaeology then communicates directly with the Nominated Contact and/or Site Champion regarding the archaeological importance of the discovery, and conservation and storage recommendations.

It has been positive that despite Covid-19, reporting through the console has still continued.

The Nominated Contacts for each company are detailed below.

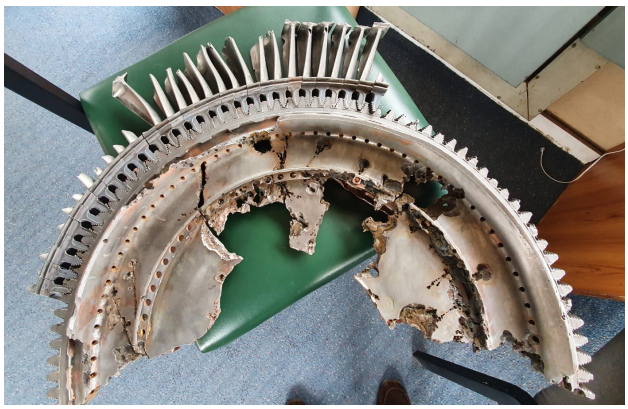
BMAPA company	Nominated Contact	Position
Britannia Aggregates Ltd	Richard Fifield	Marine Resources Manager
CEMEX UK Marine Ltd	Joseph Holcroft	Licence Manager
DEME Building Materials Ltd	Christophe Matton Tom Janssens	Marine Resources Manager General Manager
Hanson Aggregates Marine Ltd	Nigel Griffiths Bryn Lockwood	Principal Resources Manager GIS and Resource Coordinator
Isle of Wight Aggregates	Edward Skinner	Marine Resources Coordinator
Kendall Bros Ltd	Paul Stevens	Site Foreman
Tarmac Marine	Edward Skinner	Marine Resources Coordinator
Volker Dredging Ltd	Will Drake	General Manager

6. net.wessexarch.co.uk/bmapa/login.aspx?ReturnUrl=%2fbmapa%2findex.aspx

Protocol update

In 2020–2021, the Protocol celebrated its sixteenth year! During this year, 123 individual finds were reported through the Protocol (from 37 reports) including a Palaeolithic handaxe, munitions, an ensign flag, a Rolls Royce engine part and a ship log rotator. These have been added to a database of over 2200 finds reported since the launch of the scheme in 2005.

Without the reporting process, finds from marine aggregate would most likely never have entered the archaeological record as dredgers allow us to access areas of the seabed otherwise physically unexplored. The reporting procedure laid out in the Protocol is designed to allow users to follow a time-effective process of documenting and reporting finds to the Nominated Contact or Implementation Team at Wessex Archaeology. The team aim to identify and conduct research on the find before producing a short report and sharing the information with marine aggregate industry staff and the named authorities. In an instance when the team cannot identify the object, an in-house or external specialist will be contacted to ensure that the utmost is done to provide a background and relative age on the reported find.



***Top:** A middle-palaeolithic handaxe discovered at Dagenham wharf; **bottom:** Tarmac_0988, a Rolls-Royce engine part, discovered on board City of London.*

Further visits to the wharves to give the archaeological awareness training have been arranged for later this year and it is hoped that Historic England and the Receiver of Wreck will be able to come along on one of the visits.

The number of reports each year and the ongoing success of the Protocol confirms that it is as relevant now as it was in 2005. The support of the marine aggregate industry has once again been substantial, with the continued reporting of significant archaeological finds maintained at a high standard through the Protocol and the welcome received during wharf visits.

Through the implementation of the Protocol, the marine aggregate industry has demonstrated that this is a cost-effective mitigation option for protecting cultural heritage that is both fragile and finite. The Protocol Awareness Programme trains staff to recognise and report finds of archaeological interest discovered within cargoes without the need of an archaeologist being present. Because of the success of the Protocol, the model has been adapted and implemented for use in several other industries. The Offshore Renewables Protocol for Archaeological Discoveries (ORPAD), having commenced in 2010 was equally well-established for over nine years. In addition, 2016 saw a reinterpretation of the Protocol's principles for non-industry audiences, with the launch of the Marine Antiquities Scheme (MAS) aimed at encouraging coastal and marine users to report any finds they encounter. Wessex Archaeology also continues to run scheme-specific protocols for other commercial development projects based on the marine aggregate industry model.

Further information about the Protocol and the Protocol Implementation Service is available online[7].

To contact the Protocol Implementation Service, email **protocol@wessexarch.co.uk** or phone **01722 326 867**.

Training for the Implementation Team

During this year, members of the Implementation Team undertook additional refresher training in asbestos.

All members of the team attended a one day course on the Management of Asbestos with special reference to asbestos content and legislation compliance in civilian and military artefacts and vehicles presented by Simon Houghton of Brandon Envirtonmental.

7. www.wessexarch.co.uk/our-work/marine-aggregate-industry-protocol-reporting-finds-archaeological-interest

Dredged Up newsletter

In 2020–2021, two issues of the biannual *Dredged Up* newsletter were produced: issue 28 and issue 29.

Issue 28 was released in April 2021 while the digital copy was promoted on the Marine Aggregate Facebook page, Wessex Archaeology social media platforms and on the Wessex Archaeology website. The newsletter outlined some of the year's finds as well as publishing the winners of the annual Finds Awards. A guide for dealing and reporting munitions was also featured in this edition featuring a case study of a recently reported find.

Issue 29 was distributed in October 2021 and announced that awareness visits were back! It also featured a recent trip to Dagenham wharf with Phil Harding to look at Licence Area 240 prehistoric material. We also met some of the Nominated Contacts who help with the reporting of items from various registered companies and included a photography guide on how to take the best images of finds including some excellent examples we've had over the years.

The newsletters are distributed to every wharf, all vessels and BMAPA member companies as well as The Crown Estate, Historic England, the Receiver of Wreck and a variety of other organisations, individuals and the general public during conferences and events. A wider audience is reached with the digital copy of the newsletter that is downloadable from Wessex Archaeology's website[8] and relevant social media pages as well as LinkedIn.

The newsletters reach a wide audience to promote the operation of the Protocol and provide a positive showcase for the industry's activities. They are also an important tool for raising and maintaining awareness and interest by publicising dredged finds and the dredging process.

8. www.wessexarch.co.uk/our-work/marine-aggregate-industry-protocol-reporting-finds-archaeological-interest

Finds Awards

The 2019–20 Finds Awards were made to the following wharf and vessels, published in Issue 28 of *Dredged Up*.

Best Attitude by a Vessel

Thank you to each vessel that has reported finds through the Protocol over the past reporting year. This year we congratulated Hanson's *Arco Avon* for winning this award, and especially the finder, Darryl Mason.

Hanson's *Arco Avon* discovered a mammoth tooth (Hanson_0935) in Licence Area 240 in the East Coast dredging region, approximately 10 km east of Great Yarmouth.

The tooth is virtually complete with visible roots and measures 300 mm long by 160 mm wide. Images of the find were sent to Professor Adrian Lister at the Natural History Museum for further identification who said that it is a nice specimen of a mammoth tooth. He said it is the third (last molar) from a woolly mammoth (*Mammuthus primigenius*) that is about 35 years old and that dates, very probably, to the Late Pleistocene, although he would have to take measurements to rule out the earlier (Middle Pleistocene) *Mammuthus trogontherii*. He said much of the cement has been eroded, presumably through its time at the bottom of the sea, but the roots are so complete that he wouldn't be surprised to find the skull, or parts of it, still on the seabed. *Mammuthus primigenius* or woolly mammoth were in existence in Europe during the late Middle and Late Pleistocene, dating from 350,000 to 10,000 years ago, while the early Middle Pleistocene *Mammuthus trogontherii* (0.7 to 0.5 million years ago) (Lister and Sher 2001). Important changes can be seen in the teeth of the mammoths as each species evolves; there is an increase in the number of enamel bands (plates) in the molars and thinning of the enamel. The dental changes resulted in increased resistance to abrasion, which is believed to indicate a shift from woodland browsing to grazing in open grassy habitats of the Pleistocene.

The mammoth tooth is now being conserved and it is hoped that it will find a home in the Natural History Museum.

Reference: Lister, A M and Sher, A V 2001 The Origin and Evolution of the Woolly Mammoth. *Science* (volume 294, p1094-7).

Top: *Hanson Dagenham Site Champion, Aaron Chidgey with his finds;*

Middle: *Hanson_0937_001 Woolly Rhino scapula;*

Bottom: *new finds cabinet display material discovered at the wharf;*

Right: *new bay at Dagenham Wharf for isolating Area 240 cargoes.*

Best Attitude by a Wharf

In 2019-2020, the winner of the best attitude by a wharf was Hanson Dagenham Wharf. In November 2019, staff at the wharf discovered a collection of worked flints (including handaxes) and animal bones from Licence Area 240 in the East Coast dredging region. Within a few days of the reports being made, an Operational Sampling visit was carried out by a team of archaeologists alongside the wharf staff. During this visit, 30 flint artefacts including five handaxes dated to the Middle Palaeolithic, and 111 pieces of animal bone were recovered including a rhinoceros scapula with hyena teeth marks. Subsequently, the wharf has been visited frequently to monitor these cargoes and several more finds of handaxes and animal bones have been made. A designated shovel driver is assigned to the team so that the sampling is done efficiently by spreading the material thinly so that it can be inspected. The drivers also show their interest and assist the archaeologists with their work. A new bay was designed and constructed at the wharf of their own accord in order to isolate the desired cargoes to make the inspection element of the job easier. A large new finds cabinet has also been purchased in order to display all the material discovered at the wharf. The enthusiasm of the staff at the wharf and their attitude towards the archaeology and archaeologists alike has been exemplary and we can't thank them all enough. We would like to give our special thanks to Aaron Chidgey and Troy Porter.

Best Find

The best find of this reporting year goes to DEME_0957 for a post-medieval jug that was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Christophe Matton discovered it at DBM Wharf in Belgium.

This metal jug measures approximately 130 mm wide by 130 mm tall. It has an ornate decoration on the pouring spout in the design of a bearded man, a stamp in its centre and an oval cross section. The handle and spout appear to be made from a different metal to the body due to the corrosion visible on them. It is complete apart from damage to the reverse.

Images were sent to Wessex Archaeology's Senior Archives Manager, Lorraine Mepham, who said that she had never seen anything like it. She said it is definitely post-medieval and deliberately oval in cross-section rather than just squashed. The spout and handle appear to have some sort of plating which has differentially corroded. The details of the stamp aren't clear, but it is in script lettering and is probably a set of initials or a monogram, though whether this relates to the manufacturer or the owner is not clear, although it's probably the latter. Although there are no direct parallels to the jug, a similar spout was found on a mid-19th century English silver coffee pot. Similarly, a Dutch silver hot chocolate pot, dated to c. 1853–1859 was noted as having a bearded seaman on the spout. Lorraine suggested that the shape of the handle and the style of the script lettering on the stamp suggests that it is 18th or 19th century in date. The age of the pots displaying similar spouts also support this.

Images were also shown to Steve Beach, Project Manager at Wessex Archaeology, who said that the jug may be made of pewter. He said that different batches of pewter will corrode differently depending on its composition, which may explain why the handle and the spout are corroding differently to the body. Steve also said that the mark is reminiscent of an 'owners mark'.

Owners often applied their own marks to pewter. On plates, dishes and chargers these were usually just a simple triad of initials stamped on the rim, the centre initial being the surname and the other two the forenames of the husband and wife. Marks with two or four initials are also found while some owners had crests or shields engraved on their pewter, whilst institutional owners might stamp their name or symbol.

On drinking vessels such as this one, owners tended to engrave either a monogram or the full name and address. These are particularly common on pub pots of the 19th and 20th century as a deterrence against theft.

Reports: Protocol

During the 16th year of operation, Wessex Archaeology received 37 reports through the Protocol Implementation Service. These reports encompassed details of 123 separate finds. Further details of each discovery are shown below and included in the wharf reports appended to this report.

Finds reported in 2020–2021

Report ID	Licence Area	Region	Wharf/Vessel	Description	No.
Hanson_0972	240	East Coast	Wharf	Handaxe	1
Tarmac_0973	Unknown	Unknown	Wharf	Animal bone	1
Hanson_0974	460	East English Channel	Vessel	Metal plate	1
Clubbs_0975	512	East Coast	Wharf	Metal debris	3
Tarmac_0976	Unknown	Unknown	Wharf	Animal bone	1
Tarmac_0977	Unknown	Unknown	Wharf	Cannonball	1
Tarmac_0978	254	East Coast	Vessel	White Ensign flag	1
Tarmac_0979	240	East Coast	Wharf	Metal connector	1
CEMEX_0980	512	East Coast	Wharf	Shark tooth	1
Hanson_0981	240	East Coast	Wharf	Animal bone	1
Hanson_0982	240	East Coast	Wharf	Animal bone	1
DEME_0983	351	South Coast	Vessel	Munition	1
Volker_0984	461	East English Channel	Vessel	Cannonball	1
Tarmac_0985	509/3 or 460	Thames or East English Channel	Wharf	Machine gun	2
CEMEX_0986	137	South Coast	Wharf	Ejector	1
Volker_0987	351	South Coast	Vessel	Munition	1
Tarmac_0988	254	East Coast	Vessel	Rolls Royce Engine part	1
Tarmac_0989	395/1	South Coast	Vessel	Bullet	1
Hanson_0990	242/361	East Coast	Vessel	Copper bolt	1
Clubbs_0991	512	East Coast	Wharf	Metal file (concreted)	1
Hanson_0992	401/1-2b	East Coast	Wharf	Munitions and metal finds	68
CEMEX_0996	340	South Coast	Wharf	Grenade	1
CEMEX_0997	340	South Coast	Wharf	Munition	1
CEMEX_0998	340	South Coast	Wharf	Munition	1
CEMEX_0999	340	South Coast	Wharf	Munitions	6
CEMEX_1000	340	South Coast	Wharf	Metal cog	1
Hanson_1001	401/2 or 460	East Coast or East English Channel	Wharf	Pen knife	1
Hanson_1002	401/2 or 460	East Coast or East English Channel	Wharf	Cannonball	1
CEMEX_1003	137	South Coast	Wharf	Spoon	1
Hanson_1004	401/2	East Coast	Wharf	Aircraft/metal parts and munition	11
Hanson_1005	401/2 or 361	East Coast	Vessel	Fragment of ship log rotator	1
Hanson_1006	401/2	East Coast	Wharf	Ammunition clip	1
Hanson_1007	401/2	East Coast	Wharf	Metal plate with writing	1
Hanson_1008	401/2	East Coast	Wharf	Fragment of anchor	1
Hanson_1009	401/2	East Coast	Wharf	Two munitions	2
Hanson_1010	401/2	East Coast	Vessel	Potential engine fragment	1
Hanson_1011	493	Humber	Wharf	Rivet	1

Phil Harding visits Hanson Dagenham Wharf. Photo credit Matt Fowler.

Specialists

If a new find cannot be successfully identified by a member of the Protocol Implementation Service team at Wessex Archaeology, experts both in-house and from external companies and organisations are consulted. Occasionally, the experts are consulted to add additional information about objects, with regards to their age and possible source. Since the implementation of the Protocol in 2005, the collection of willing and valuable experts we consult has grown to include a range of fields. The table below provides a list of the specialists who gave advice during the 2020–2021 reporting year. Specialists that we have contacted in the past but not during this operational year are still included in Wessex Archaeology's internal lists but have been omitted from the table below. We are extremely grateful to all the specialists who have assisted in the identification of Protocol finds over the last 16 years.

Analysing Hanson_09371_001 at the Natural History Museum

Expert	Advice given concerning	Institution/organisation/role
Euan McNeil	Maritime artefacts	Wessex Archaeology
Alistair Byford-Bates	Maritime artefacts	Wessex Archaeology
Graham Scott	Maritime artefacts	Wessex Archaeology
Paolo Croce	Maritime artefacts	Wessex Archaeology
Toby Gane	Maritime artefacts	Wessex Archaeology
Lorrain Higbee	Zooarchaeology	Wessex Archaeology
Phil Harding	Flint artefacts	Wessex Archaeology
Lorraine Mepham	Pottery, vessels and cutlery	Wessex Archaeology
Cai Mason	Terrestrial artefacts	Wessex Archaeology
Dr Adrian Lister	Mammoth remains	Natural History Museum
Silvia Bello	Cut marks on bone	Natural History Museum
Charles Trollope	Cannonballs	Historical Ordnance Expert
Anthony Mansfield	Mechanics and engineering	Senior Naval Engineer
Trevor Parker	Ordnance	Ordnance Society
Mark Khan	Ordnance	Fellows International
Steve Vizard	Aircraft	Airframe Assemblies
Ewen Cameron	Aircraft	Royal Air Force Museum

Case Study 1: Flags

This year, Tarmac discovered and reported a White Ensign Flag (Tarmac_0978); a very unusual find for the Protocol.

It was discovered in Licence Area 254 in the East Coast dredging region, approximately 10 km north-east of Great Yarmouth. Jack Tate discovered it on board Tarmac's *City of London*.

This flag is the top left corner of a larger white ensign flag. The larger, whole flag would have comprised a white flag with a red cross, like the St George flag, with the addition of the union jack in the upper left corner and is believed to be relatively modern.

Only one other flag has ever been reported through the Protocol in 2010 by CEMEX. This flag was a Red Ensign Flag (CEMEX_0285) and was dredged from Licence Area 351 which lies to the east of the Isle of Wight. It was amongst cargo dredged by the *Britannia Beaver* which was delivered to Dover Wharf. The flag was discovered by CEMEX's Richard Cork and reported by Geoff Bucknell. When dredged, it was unrecognisable but staff at the wharf carefully removed the dirt in order to identify the find.

Captain Ken Hunter, Fleet Marine Manager at CEMEX, identified the Red Ensign as a current ensign from a British registered vessel and that the fixings on it are standard for flags of this type from modern vessels. Images of this find were sent to Richard Noyce at the Royal Naval Museum, who confirmed this view, and to Angela Middleton (nee Karsten), marine conservator for English Heritage (now Historic England).

Angela indicated that it was likely that this flag had become buried on the seabed sometime after it was lost. This would account for the dirt on it when found and for the relatively good level of preservation. As for how long it had been buried, it was not possible to determine. It was found to the east of the Isle of Wight which sees a lot of marine traffic. It is likely to have been lost by one of the many merchant vessels that use this popular sea route.

Royal Navy ships and submarines wear the White Ensign at all times when underway on the surface. The logo of the Royal Navy features a waving White Ensign at the top. The White Ensign is also flown on shore establishments including all Royal Marines establishments as well as on yachts of members of the Royal Yacht Squadron and by ships of Trinity House escorting the reigning monarch. The White Ensign is worn at the mastheads when Royal Navy ships are dressed on special occasions such as the Queen's birthday, and may similarly be worn by foreign warships when in British waters when dressed in honour of a British holiday or when firing a

Ensign Colour	Vessel Type
White	Naval vessel
Red	Merchant vessel
Blue	Vessel commanded by an officer of the Royal Naval Reserve

Top: *A White Ensign Flag (Tarmac_0978) discovered by Jack Tate;*
Middle: *A Red Ensign Flag (CEMEX_0285) dredged by the Britannia Beaver;*
Bottom: *the fixing on Red Ensign Flag (CEMEX_0285).*

salute to British authorities. The Ensign was first introduced in the 15th century when it consisted of a Tudor ensign, with the current version of flag developed in 1707.
The Red Ensign was first introduced in the early 17th century when it consisted of a red flag with the cross of Saint George in the top left hand corner. The Red Ensign design didn't develop until 1801 when the unification with Ireland, and earlier with Scotland and Wales, saw the creation of the Union Jack which was added to the first quarter of the Red Ensign. It became the official flag used for merchant vessels after an order-in-council in July 1864.

It is assumed that these flags were lost from vessels, possibly in high winds. Alternatively, they could have been discarded overboard due to being damaged as it is unclear whether either of the flags were damaged prior to being lost, although the Red Ensign is more complete. As the flags are made of fibres, they are classified as organic material. The survival of organic material in the archaeological context is often poor. They can be preserved in wet or waterlogged (anoxic) sites including seas, rivers, lakes and marshes, and therefore, it is likely that they both may have become buried on the seabed after being lost which would account for the relatively good level of preservation. This is especially true for the Red Ensign as it was covered in dirt when originally found. Waterlogged organic artefacts are unstable when found and sensitive to rapid changes in environmental conditions, which, if not carefully controlled, can lead to the deterioration of artefacts upon excavation. Uncontrolled drying of organic materials and outbreaks of mould can lead to the total loss of archaeological material (Historic England 2018).
Although no other flags have been discovered, a Flag Pole Finial (UMA_0177_a) was dredged by the *City of Chichester* in May 2008 from Licence Area 395/1, approximately 15 km south-east of Bembridge, Isle of Wight. It was discovered at Southampton Wharf by D. Davies.

The Flag Pole Finial (UMA_0177_a) dredged by the City of Chichester.

The artefact was approximately 7 cm high, and the base has a diameter of four cm. It was thought that the object was made of a copper alloy, suggested by the green patina on the surface of the artefact.

It was described by wharf staff as a flag pole top or finial. Photographs of the find were shown to Wessex Archaeology finds specialists Bob Davis and Lorraine Mepham, and to shipwreck specialists Steve Webster and Graham Scott. It was agreed that the artefact was probably a flag pole finial, and after a thorough examination of the photographs, no other suggestions were offered.

Although the very top of the finials on vessels with Ensign Flags are in the shape of a crown, it may be that this part of the finial is from the section underneath. Despite this not being discovered with a flag, it is thought that it belongs to a vessel flagpole as it is the most logical reason for it being discovered on the seabed.

Notably, both the finial and the red ensign flag originated from the South Coast, in proximity to the Isle of Wight, although from different licence areas.

References: Historic England 2018 *Waterlogged Organic Artefacts: Guidelines on their Recovery, Analysis and Conservation*. Swindon: Historic England.

Case Study 2: HMT *Pelton*

This assemblage of munitions and metal finds was discovered in Licence Area 401/1-2b in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King and Clint Cambridge discovered them at Greenhithe Wharf.

A total of 56 munitions and 12 metal finds were recovered from a single cargo, dredged from lane E4 in Licence Area 401/1-2b. The lane is approximately 1 km from the location of the wreck of HMT *Pelton*, a trawler requisitioned during the Second World War, and there was a suspicion by Hanson that the finds had travelled from the wreck site. Data was therefore requested form the United Kingdom Hydrographic Office (UKHO), the NRHE and the Receiver of Wreck.

Euan McNeil, Alistair Byford-Bates, Graham Scott, Ben Saunders and Toby Gane of the Coastal & Marine team at Wessex Archaeology agreed that the ordnance recovered all resemble 6-pounder ammunition. This would fit with the armed trawler idea – they were reused as deck guns during the early Second World War years on coasters and naval trawlers.

Trevor Parker from the Ordnance Society said that they are all unfired 2-pounder Pom-Pom and that the brass cases are all flattened due to the water pressure from being immersed for a length of time. It also appears that the nose fuzes have corroded away.

Images were also sent to Mark Khan, UXO Research Manager at Fellows International, who said that without the benefit of scale in the images but using shape and form from images, that they are all Naval 2-pounder ammunition. There seems to have been some significant trauma to some of the rounds resulting in crushing/flattening. The key is the undamaged, mostly complete, round which evidences the deep securing cannelure crimp associated with 2-pounder ammunition. Also, on a couple of rounds the remains of the steel links can be seen from where the ammunition was supplied in belts[9].

Before each Licence Area is dredged, geophysical surveys are conducted and the results analysed. The results of the survey of Area 401 were assessed by Wessex Archaeology in 2004 in preparation for a licence renewal. The report was revisited once these finds were reported to aid in determining whether they originated from HMT *Pelton* of from another source.

The known maritime archaeological resource within the licence area was characterised in 2004 as 11 recorded shipwreck and seabed obstructions. Of these, one is an obstruction, eight shipwrecks are listed as 'live' by the UKHO and two wrecks are listed as 'dead'. Of the eight live wrecks, six have been identified and two are unknown. An analysis of the location of the 'live' maritime sites is shown in the table below.

HMT *Pelton* was a requisitioned trawler built of steel by Cook, Welton and Gemmell Ltd, Beverley, Hull, with the engine supplied by Holmes C.D. and Company Ltd, Hull. The ship was launched on 6 August 1925. Prior to its requisition it was owned by Ross, Francis and Thomas Ltd and the Hull Ice Company Ltd. The ship was not built to a specific class design, as it was built as a trawler and later requisitioned, rather than being built as an armed trawler. The ship's profile, deck plan and midship section drawings are available from the Lloyds Registry Foundation listing the vessel by its yard number 474. The ship's IMO/Off. No. 149024 and port number H228 appear in the records, and on the one image currently identified to be the Pelton, predating the ships conversion to an armed trawler in August 1939[10].

The ship is described in the Lloyd's Register records as a single decked steam powered vessel with one 3-cylinder triple expansion engine, with direct acting vertical inverted cylinders, which drove a single shaft, single screw propellor. It had a single boiler. The engine generated 96 h.p (rhp). No auxiliary engine or refrigeration was fitted. There was also no machinery aft, and no donkey boiler fitted. The ship had electric lighting installed, with the generator on the starboard

The location of the 'live' maritime sites (Wessex Archaeology 2004)

WA ID	Name/Type	Area
2001	Obstruction	Marine Study Area
2002	Wreck Unknown	Dredging Area
2003	Fidelio	Marine Study Area
2004	Wreck Unknown	Marine Study Area
2005	HMT *Pelton* (?)	Dredging Area
2006	Scotia	Dredging Area
2007	Bovey Tracy	Marine Study Area (very close to edge of Dredging Area)
2008	HMS Exmoor	Dredging Area
2009	Mirella	Marine Study Area (very close to edge of Dredging Area)
2010	Breydel	Dredging Area
2011	Woodbine	Marine Study Area (very close to edge of Dredging Area)

9. www.navweaps.com/Weapons/WNBR_2pounder_m8.php (accessed May 2021)
10. https://historyfordessert.files.wordpress.com/2013/03/pelton.jpg (accessed May 2021)

side of the engine room supplying a direct current circuit. The ship was 358 gross registered tons (grt) and its dimensions were 140.4 ft (42.8 m) x 24 ft (7.3 m) x 13.2 ft (4 m). The vessel was ketch rigged and was not sail assisted. There were two masts fitted. The ship was clinker built with an elliptical stern and straight stem, no water ballast tanks, and with four bulkheads fitted.

Armed trawlers and drifters were used for tasks such as mine clearance, convoy duties and reconnaissance during the Second World War. On 24 December 1940, the ship, which had been converted to the role of minesweeper, was torpedoed and sunk by E-boat S-28, of the 1st S-flotilla operating out of Ostend, in the North Sea alongside No. 5 buoy off Aldeburgh, Suffolk. All 20 crew were lost in the sinking. As the trawler is a wartime loss, it is possible that it could be protected under the *Protection of Military Remains Act* 1986 in the future if specifically designated.

Skipper of HMT *Pelton*, John Alexander Sutherland DSC, RNR gave this statement on the ship's engagement with a German aircraft in early 1940[11]:

> "I have the honour to submit the following report on an engagement which took place between HM Trawler *Pelton* and a JU88 K at 1655 on 10 January 1940. Whilst at anchor off Scroby Elbow Buoy, the anchor was found to be dragging at 1645 it was weighed preparatory to taking up a new berth. Whilst taking up this position an enemy aircraft was sighted on the port beam steering east.
>
> Ship's company immediately went to action stations and opened fire with the 12 pounder and Lewis gun as the aircraft turned to attack. Four bombing and machine gun attacks were carried out, salvos consisting of 3 bombs, except the last in which six were dropped. No casualties were sustained. The attacks were made from starboard to port at a height of two to three hundred feet. The Lewis gun jammed after about eight bursts and four rounds were fired from the 12-pounder, no hits were observed. Based on this the calibre and type of weapons on board have been provisionally identified."
>
> All bombs dropped except two were small and did no damage when burst alongside. During the third and fourth salvos, however, two heavy bombs were dropped apparently with delayed action fuses. One burst close to the starboard beam and the other very close on the port quarter. These two bombs caused all the damage. During the last two the dynamo was put out of action and the first engineman reported the ship making water fast, full of steam and having lost the vacuum he must stop the main engines. I requested the services of a lifeboat and tug by signal. Our own lifeboat was carried away by the enemy action. Ship was anchored off Yarmouth harbour, the crew having been taken off as a precaution."

Based on the PRO reference to the ship being in action in 1940 and armed with a 12-pounder gun and Lewis light machine guns the munitions shown in the images from the wharf appear to be from two different weapons, based on

Some of the munitions discovered in the cargo

their approximate scale to each other. The 12-pounder guns in general use on British vessels at this time, dependant on model, used either fixed or a separate cartridge and shell system, with the two held together by a separate holder[12] for their loading in the case of the latter. All the shells visible in the images appear to be missing their fuzes.

Lewis guns are an air-cooled light machine gun invented in 1911, firing a .303 (7.7 mm) calibre cartridge, amongst other calibres. The gun used a pan magazine mounted on the top of the weapon capable of holding 47 or 97 rounds dependant on size, firing at a cyclic rate of 500-600 rounds per minute. It was the Royal Navy's standard close air defence machine gun at the start of the Second World War and was frequently carried in twin mountings. In the case of HMT *Pelton* the Lewis guns were probably fitted to either side of the bridge, with the 12-pounder gun on a specially built mount between the foremast and forecastle.

According to the UKHO data, HMT *Pelton* is intact and upright on the seabed and now lies in 27-31 m of water. The wreck has been swept clear at 23.5 m. Two pieces of wreckage lie close by to the main wreck. HMT *Pelton* lies on a flat bottom with some scour present. The ship is thought to be largely intact and partially buried by a sandwave. The local UKHO chart shows the ship lies very close to an unknown wreck on mud/sand/pebbles. According to the NRHE data, this second wreckage is unlikely to be part of HMT *Pelton* due to its size. The UKHO states that during an investigation in 2017, the second wreck was 35 m in length, 13.8 m in width and had a height of 10 m with a note saying that the second wreck is intact and partially buried.

The Receiver of Wreck stated that one other find had been discovered that is related to the wreck. This find was a steam whistle measuring 700 mm long with a diameter of 100 mm.

From all the data gathered, it is likely that the munitions reported do not originate from HMT *Pelton* as they are a different calibre to the guns that are reported as being on the vessel. As the links are still visible on some of the shells, Mark Khan said that the most likely reason that these munitions are on the seabed is as a result of the belt being ditched or that it has simply fallen overboard.

Alternatively, it could be the unknown wreck (WA ID 2002) that lies close to that of HMT *Pelton*. The description of the wreck was as follows:

> "This wreck site was detected in 1969 and last examined in 1994. It is described as a small vessel, intact and upright on the seabed. The site measures 40 m by 10 m. The wreck is only 250 m away from the site of HMS Pelton and within the dredging area. The side-scan data shows a shipshape structure with visible internal elements, seemingly half covered by sediment and lying in east-west orientation. The wreck is likely to be casualty of the World Wars."

As the second wreck in the vicinity has not been identified through the various avenues of data collected, it cannot be ruled out that these munitions originated from that wreck. Should it come to light that the wreck in question carried 2-pounder ammunition, a more positive link could be made.

Wharf staff should be vigilant when observing cargoes processed from this area as further finds could lead to the identification of the wreck in the vicinity.

Munitions

In the event that items are assessed to be blind or live munitions they will need to be rendered safe either by military Explosive Ordnance Disposal (EOD) or an appropriate third-party commercial EOD contractor with equivalent competence defined as Level 2 trained.

Retaining live/blind munitions at a site beyond 24 hours of discovery is an offence under the Manufacture and Storage of Explosives Regulations 2005 unless held in a licensed store.

Further information on dealing with munitions in marine sediments published by The Crown Estate and Mineral Products Association in 2010 can be found online: www.bmapa.org/documents/Dealing-with-munitions-in-marine-sediments.pdf

References: Wessex Archaeology 2004 *Yarmouth Dredging Area 401/2 Aggregate Dredging License Application Archaeological Assessment Technical Report*. Salisbury, unpublished report reference 56230.02

Other sources:
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0042-p (accessed May 2021)
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0043-p (accessed May 2021)
https://plimsoll.southampton.gov.uk/shipdata/pdfs/40/40b0402.pdf (accessed May 2021)
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0034-r (accessed May 2021)
https://plimsoll.southampton.gov.uk/shipdata/pdfs/30/30a0365.pdf (accessed May 2021)
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0031-f (accessed May 2021)

11. https://historyfordessert.wordpress.com/tag/hmt-pelton/ (accessed May 2021)
12. www.navweaps.com/Weapons/WNBR_3-40_mk1.php (accessed May 2017)

Liaison and accessibility

Details of each discovery have been sent to:

Mark Russell British Marine Aggregate Producers Association
Stuart Churchley Historic England, Marine Planning Archaeological Officer
Neil Guiden Historic England, Data and Analysis Manager
Andrew Cameron The Crown Estate
Nick Everington The Crown Estate
Mark Wrigley The Crown Estate

Details of discoveries regarded as wreck under the *Merchant Shipping Act* 1995 have been forwarded to the Receiver of Wrecks, Camilla Moore and Graham Caldwell. In 2020–2021 the following reports that have droit numbers were deemed to represent items of wreck:

Report ID	Droit number
Hanson_0974	193/20
Clubbs_0975	195/20
Tarmac_0977	200/20
Tarmac_0978	201/20
Tarmac_0979	216/20
CEMEX_0980	216/20
DEME_0983	008/21
Volker_0984	009/21
Tarmac_0985	015/21
CEMEX_0986	019/21
Volker_0987	020/21
Tarmac_0988	024/21
Tarmac_0989	025/21
Hanson_0990	032/21
Clubbs_0991	040/21
Hanson_0992	048/21
CEMEX_0996	052/21
CEMEX_0997	053/21
CEMEX_0998	054/21
CEMEX_0999	055/21
CEMEX_1000	056/21
Hanson_1001	057/21
Hanson_1002	058/21
CEMEX_1003	094/21
Hanson_1004	107/21
Hanson_1005	127/21
Hanson_1006	135/21
Hanson_1007	136/21
Hanson_1008	137/21
Hanson_1009	142/21
Hanson_1010	161/21
Tarmac_1011	162/21

This year, two reports may have been related to aircraft, Hanson_1004 and Tarmac_0985. Hanson_1004 was a mixture of munition and metal finds. Images of the metal fragments were sent to an external aircraft specialist, Steve Vizard, who said that one item certainly appears aviation related while a couple of the other pieces with multiple holes, suggesting rivet lines, might also be parts of aircraft. Unfortunately, the parts are in a badly corroded condition, which preclude any real chance of finding serial part numbers or inspection stamps. He said that it can be assumed that these parts are general detritus from an open area, as opposed to a suspected or specific aircraft crash site. Tarmac_0985 was identified as a Browning 0.303 machine gun that is likely to have originated from an aircraft crash site although no other material was discovered within the cargo.

Although the Protocol received a number of reports of artefacts which may relate to vessels considered to be wreck material, none of them were thought to directly relate to unknown and uncharted wreck sites. Consequently, no reports were forwarded to the UKHO in the 2020–2021 reporting year.

Information on each find has been forwarded to each county's HER relevant to the location of the archaeological discovery. In the case of a discovery where the original location is known, this will be the HER closest to the dredging licence area. Discoveries made at wharves where the licence area is unknown are reported to the HER nearest to the wharf.

Further details of liaison and the dissemination of data to interested parties are included in the wharf reports appended to this report.

Tarmac_0985, a Browning 0.303 machine gun, discovered by Jamie Wallis at Greenwich Wharf.

Discussion

Re-introduction of wharf visits after Covid-19

Wharf visits normally take place between April and August and we aim to visit 10 wharves a year. Due to Covid-19, none took place during the 2020-2021 reporting year, however, visits took place in October 2021 at Brett Cliffe Wharf and Hanson Frindsbury Wharf and a further four are arranged in November and December this year. It is our hope that the Receiver of Wreck and Historic England will join one visit each.

Importance

Thirty seven individual reports were raised during the 2020–2021 reporting year, which is greater than the number of reports last year and although less than the Protocol Implementation Service's expectation of around 50 reports a year, the reports comprised 123 individual finds.

The finds reported through the Protocol this year represent a diverse range of periods, emphasising that previous awareness training is successful in providing background information from all periods. The various archaeological material and the amount that is still reported re-iterates the importance of the Protocol and demonstrates the wealth of archaeological material still on the seabed. Investigations into these finds expand our knowledge of the past and contribute to our understanding.

Success

Reports were made this year from Hanson, Tarmac, CEMEX, Clubbs marine, Volker and DEME.

Hanson Dagenham wharf have bought a second display case; this time for the main offices, used for visitor access at the wharf, to house the finds discovered at the wharf from Licence Area 240 which illustrates their enthusiasm for the finds. Phil Harding also visited the wharf as part of the Operational Sampling in September 2021 demonstrating how important this material is.

Phil Harding visits Hanson Dagenham Wharf. Photo credit Matt Fowler.

Timely reporting

The Receiver of Wreck must be notified of any wreck-related material within 28 days of it being removed from the seabed. Wreck-related finds include any artefacts that have come from a ship or aircraft. The reporting time limit is a legal requirement of the *Merchant Shipping Act* 1995 that exists regardless of the presence of a Protocol, and this is why the Protocol Implementation Team urges all finds to be reported through the console as soon as they are found. There have been instances in the past when material was being kept together to be reported in one go or due to the busy nature of the job roles of the Nominated Contacts. The longer the items are kept without being reported, the more detail is lost. We therefore ask that all material is reported to the Protocol Implementation Team in a timely fashion. The Protocol Implementation Team will notify the Receiver of Wreck with the positional details of the find as soon as possible and will follow up with additional information once the find is assessed and a Wharf Report is produced. Recently, the reporting of finds has been soon after the items are discovered which is a great improvement.

Key issues

The Protocol has not been rewritten since its inception in 2005 and has only had minor addendums appended to it relating to the handling of specific finds, demonstrating the robustness and effectiveness of the scheme. During each year of Protocol implementation, minor operational situations are recognised, and the Protocol Implementation Service develops and adapts to overcome these. This year the following points have been raised for discussion:

- **Companies with nil return.** It is unfortunate that no finds have been reported from Kendalls during the 2020-2021 reporting year. One image of a bone was sent to a member of the Implementation Team via email, however emails back from the Implementation Team asking for more details and more images for our specialist were overlooked.

- **Less use of the discoveries form.** There has been a decrease in the number of finds reported directly through the console, with images being emailed to the Implementation Team instead. This manner of reporting is more than acceptable; however, a discoveries form is needed so that the Team can upload the find on to the console with as much detail as possible. Details such as finder, date found and originating Licence Area are all needed for this to be successful. If you do not have a copy of the discoveries form or have misplaced it, please email **protocol@wessexarch.co.uk** and we will be happy to send you a digital copy.

- **Regions with nil return.** This year, there were no reports of finds among material dredged from the North West or South West regions.

Artefact patterns and distribution

Through the use of a Geographical Information System (GIS; ArcMap 10.6), patterns and trends such as artefact discovery location and concentration can be studied. During the reporting process, the Site Champions or Nominated Contacts are asked to give the licence area number of the object, if known. This allows us to assess finds on a regional basis, which is helpful when considering future licence applications within existing dredging regions. Patterns in artefact concentration can potentially identify sites of archaeological interest or debris fields or alternatively, licence areas which are more likely to yield finds of archaeological interest in the future. When a large concentration is discovered from one area, it is useful to look back at previous years to compare what that particular licence area has yielded in the past.

Archaeological Exclusion Zones (AEZs) are also visible within the GIS map, which is useful when plotting finds of a contentious nature to note the distance of discovery from a previous AEZ as tides are able to move lighter objects from within these zones. The GIS map is updated every time a new AEZ is put into place.

Archaeological material is not distributed evenly on the seabed. Some areas have a higher potential than others to contain material that entered the archaeological record either accidentally or deliberately. Some areas, such as the East Coast are known to have had Palaeolithic activity when sea levels were lower than the present day. Other areas are known to be post Second World War dumping grounds which has become apparent from artefact type and quantity in that area. We also know which licence areas tend to yield more munitions and should be approached with caution.

The kind of dredger used to dredge the seabed material may also play a role in the quantity of archaeological material recovered. Charter vessels are larger and have a greater dredging capability, therefore they usually dredge deeper into the seabed. This may result in more material being discovered in the cargo which is why information of the delivering vessel is requested.

The survival of artefacts will depend on the marine environment in which they lie. Most of the finds reported this year, as in previous years, are modern and made of metal which is not unusual as it tends to be more durable within a harsh underwater environment in comparison to organic finds. Finds such as wood or bone and teeth from the submerged prehistoric landscapes or shipwrecks may be poorly preserved unless they are buried beneath fine grained sediments, which may account for the low percentage of finds received of this material, although animal bones have been reported this year both independently and in conjunction with operational sampling. For finds to be discovered, the high potential for loss or discard must coincide with a high potential for the preservation of archaeological materials.

Based on potential and survival, some licence areas will therefore contain more archaeological finds than others and may be associated with more specific time periods than others. Other factors, such as whether finds are discovered in isolation or grouped with similar items, also add to their context. In most cases, objects are reported as single isolated finds, but we do occasionally receive reports of multiple items found in the same location; this year aircraft material and munitions being prime examples. The significance of a find can therefore depend on its location as much as the nature of object in itself.

Distribution of artefacts by dredging region

There are seven dredging regions around the UK:

- Humber;
- East Coast;
- Thames Estuary;
- East English Channel;
- South Coast;
- South West; and
- North West.

In 2020-202 18 out of the 37 reports came from the East Coast with a further two possibly coming from the area as they originated from a mixed cargo.

A total of 10 of this year's 35 reports came from the South Coast and one from the Humber region. Three reports came from a mixed cargo that included the Thames Estuary and therefore they are documented as being from an unknown region, with a further three reported as unknown regions. No reports were received from cargoes dredged from the North West or South West regions.

References: www.bmapa.org/documents/23rd-Area-of_Seabed-Dredged-Report-2021.pdf

Region	Millions of tonnes of construction aggregate dredged in 2020 (2019 quantity)	Number of finds reported in 2020–2021 (2019–2020 number)
Humber	3.52 (3.48)	1 (4)
East Coast	2.87 (4)	98 (174)
Thames Estuary	1.35 (1.3)	0 (0)
East English Channel	4.07 (4.3)	2 (0)
South Coast	3.18 (3.3)	15 (19)
South West	1.27 (1.37)	0 (0)
North West	0.15 (0.23)	0 (0)
Unknown		7 (5)
Totals		123 (202)

Distribution of artefacts by date and archaeological typology

Palaeolithic finds

During the 2020–2021 reporting year, four finds were deemed to be Palaeolithic in date (Hanson_0972, CEMEX_0980, Hanson_0981 and Hanson_0982), with most originating from Licence Area 240 which has previously produced significant finds of this date.

Medieval artefacts

No medieval artefacts were confirmed this year, although one cannonball (Tarmac_0977) may belong to this period.

Maritime artefacts

Over half of the finds reported this year are believed to be maritime including Hanson_1005: Ship log rotator, Volker_0984: Cannonball and CEMEX_1003: Spoon.

None of the finds were thought to be related to a wreck site; all of the finds appear to be isolated discoveries, which could have been lost overboard, purposely dumped at sea, or have been moved along the seabed from wreck sites elsewhere.

Ordnance and munitions

Several munitions were reported through the Protocol this year ranging from 30 mm Aden heads (Hanson_1009) to .303 Browning machine gun (Tarmac_0985).

It is always advised that wharf staff should ensure that company health and safety policies are undertaken before any ordnance is reported through the Protocol.

Aircraft

Although no aircraft fragments were discovered this year, it is thought that the .303 Browning machine gun (Tarmac_0985) originated from an aircraft and therefore it was reported to the Ministry of Defence. Hanson_1004 was a mixture of Munition and Metal Finds, some of which were thought could be aircraft related, however, they were too small and corroded to be made out and therefore were not reported to the Ministry of Defence.

Top: *Hanson_0972, a Palaeolithic flint;* ***middle:*** *cannonball Tarmac_0977, possibly dating to the medieval period;* ***bottom:*** *CEMEX_1003.*

Conclusion

The Marine Aggregate Industry Archaeological Protocol continues to be a relevant mitigation programme for offshore aggregate works. It also continues to be a model from which other industries draw inspiration as a framework for reporting archaeological material. It remains a successful and applicable template for preserving heritage on the seabed, for gaining understanding about the unexpected discoveries and for reaching audiences within the aggregate industry to improve their knowledge and understanding of archaeology. This is reiterated by the reports received this year from wharf and vessel staff and the contact that has been maintained with Nominated Contacts and Site Champions.

The application of the Protocol ensures that archaeological information is preserved through recording and timely reporting and is disseminated as widely as possible, so that everyone can enjoy and explore our underwater cultural heritage. The fact that reports and images are uploaded to the website and on to social media platforms and that *Dredged Up* is handed out at several engagement events has targeted a wider audience than just the aggregate industry. When work experience students visit the Coastal & Marine team, the work they do with us often revolves around the Protocol and the finds that have been reported. Recently, photogrammetry models were made of some previous finds that a student found most interesting, and the results have been published on Wessex Archaeology's social media platforms.

The enthusiasm and diligence of wharf and vessel staff ensures the success of the Protocol. This was particularly true this reporting year when new staff at Angerstein contacted the team for advice with regards to aircraft material that had been found (see case study 1). Everyone's support has ensured that the Protocol has become embedded in commercial processes, which in turn reduces the impact of dredging on underwater cultural heritage, by making the archaeological record available for future generations. At the end of each wharf visit, there are always discussions between a member of the Implementation Team and wharf staff during which questions are asked and answered, and ideas gathered on how to make the Protocol more relatable or easier to use. It is because of such informal discussions that the mugs were developed - an idea that became a reality this reporting year and which were greatly received by all the staff.

The Protocol Implementation Service Team would like to thank everyone who has helped to support the Protocol during the 2020–2021 reporting year.

The future

Protocol Implementation continues to be run by Wessex Archaeology and finds are reported regularly. If you have any questions about finds reporting and the Protocol, please contact us via **protocol@wessexarch.co.uk**.

Hanson_0972: Handaxe

This handaxe was discovered in lane F10 in Licence Area 240 in the East Coast dredging region, approximately 10 km south-east of Great Yarmouth. Aaron Chidgey discovered it at Dagenham Wharf.

Hanson_0972 is a handaxe measuring approximate 95 mm long, 63 mm wide, 29 mm thick and weighs 168 g. It was recovered from lane F10 before that lane became part of the archaeological exclusion zone in Area 240 which means no more dredging can take place in the lane.

The images were shown to Phil Harding at Wessex Archaeology who said that he would need to see the handaxe in the flesh to be able to analyse it. During an Operational Sampling visit, the handaxe was retrieved and bought back to the offices in Salisbury. Phil Harding examined the handaxe and said:

In most respects, this handaxe follows the now established pattern for all other handaxes dredged from Licence Area 240. It is a Middle Palaeolithic cordiform implement in a sharp condition. Traces of post depositional impact, which characterise most of the implements from the area, are relatively few and are restricted to isolated incipient cones of percussion. The edge damage on this example is negligible. As with most of the other tools, there is nothing to indicate the form of the blank from which the handaxe was made. The flint is light grey in colour, which grades to a darker grey immediately beneath the cortical remnants, which indicate the natural ‘rind’ of the nodule.

The handaxe is therefore apparently unremarkable; however, it seems very likely that the implement represents an unfinished handaxe, which was discarded before the final phase of flaking. Newcomer (1971) identified three main episodes of flake removals in the production of a typical handaxe: roughing out, thinning and shaping, and finishing. Each stage was represented by increasingly controlled flaking and reduced flake size which culminated in refinement of the edges. The handaxe described here has markedly sinuous edges and protrusions, which the knapper has made little or no attempt to remove. The flake scar count is also lower than might be expected for a finished implement, eight scars on one side, approximately 10 on the other. Although this might be taken to show laudable economy of effort it seems more appropriate to consider that it represents bold removals which served the vital function of forming and thinning the handaxe. The edges are similarly undressed.

These comments in no way detract from the implement, indeed in many ways it makes the handaxe more interesting as a witness to the manufacturing process and confirming that handaxes were being made on the site.

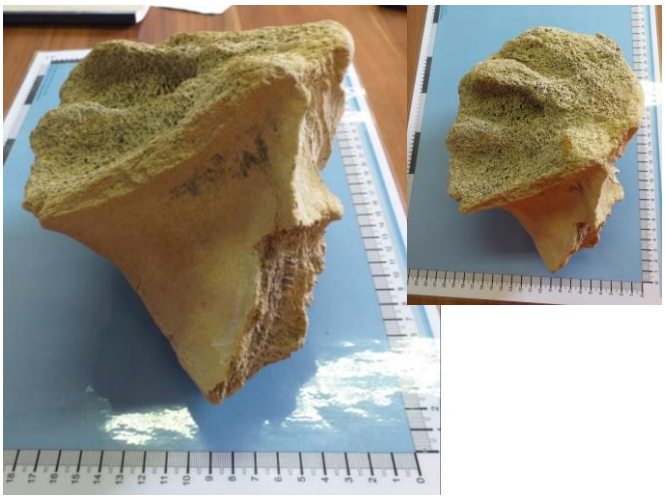
This handaxe has been dated to the Middle Palaeolithic period when the seabed around the United Kingdom was dry land due to water being 'locked' in the ice sheets that covered much of North Western Europe. During these periods of low sea levels, the current North Sea and the English Channel were exploited by humans and animals. If the provisional dating proves to be correct, these tools were made by Neanderthals (*Homo neanderthalensis*). The discoveries being made are therefore helping us to understand how this environment was exploited by early humans.

References:

Newcomer M H 1971 Some quantitative experiments in handaxe manufacture *World Archaeology*, 3:1, 85-94, DOI: 10.1080/00438243.1971.9979493

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk



Tarmac_0973: Animal Bone

This animal bone was discovered by Mark Evans at Marchwood Wharf in Southampton. The Licence Area it came from is unknown.

This large animal bone fragment measures 230 m by 200 mm. The bone marrow is exposed along several surfaces.

Images of the bone were sent to Wessex Archaeology's senior Zooarchaeologist, Lorrain Higbee, who said that it is difficult to identify from the photos alone. She said that based on the size, it could either belong to a mammoth or woolly rhino and that the bone could possibly be a proximal humerus or distal radius.

Although there are three different species of mammoth, remains of woolly mammoth are most commonly found. *Mammuthus primigenius* or woolly mammoth were in existence in Europe during the late Middle and Late Pleistocene, dating from 350,000 to 10,000 thousand years ago (Lister and Sher 2001). The woolly rhinoceros (*Coelodonta antiquitatis*) has been widely regarded as having been a 'fellow traveller' of the woolly mammoth as their remains commonly occur together in deposits. Woolly rhinoceros disappeared from Britain around 35,000 years ago, when they became extinct.

Due to the bone being broken and the bone marrow being visible, this bone may have been exposed on the seabed for some time. The remains of prehistoric animal bones may end up in marine contexts having been washed from terrestrial deposits by rivers or eroded from cliffs or beaches. Alternatively, they may date to a time where large ice sheets covered much of Britain and most of the North-west European Peninsula. During these times, the seabed was dry land and was available to humans and animals.

References
Lister, A. M and Sher, A. V., 2001. The Origin and Evolution of the Woolly Mammoth. *Science* (volume 294).

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire

Hanson_0974: Metal Plate

This metal plate was discovered in Licence Area 460 in the East English Channel dredging region, approximately 14 km south of Hastings. Malcolm O'Neill discovered it on board *Arco Beck* after it fell from the draghead.

This metal plate measures 570 mm by 560 mm and is 10 mm wide. The object has a series of holes along its edges meaning it was likely attached to a larger structure when it was in use. We would like to thank *Arco Beck* for such good photographs with the use of two scales!

Images were sent to Anthony Mansfield, a senior naval engineer who said that it is a corner brace from a riveted structure, likely from a ship because it was found in the sea, however it could be from a wide range of structures. He said that a hundred years ago this was how they built anything and everything made of steel. Similar images were also provided as a comparison.

This object may have entered the marine environment via a number of routes. The item appears to be broken along its longest axis and as a result, may have been thrown overboard as discarded material. Alternatively, it may be from a modern metal wreck, however the material was found in isolation and no material belonging to a vessel structure was discovered.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 193/20)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

Clubbs_0975: Metal Debris

Three pieces of metal debris were discovered in Licence Area 512 in the East Coast dredging region, approximately 14.5 km east-north-east of Lowestoft. Kevin Cruickshank discovered it at Clubbs Marine Aggregates Wharf.

Three metal pieces were reported and thought to belong to aircraft due to the visible rivets and rivet holes on all of the pieces. The measurement of the largest piece is unknown however the second longest piece measures approximately 300 mm in length and has a curved profile. The object shaped like a cross is 260 mm at its widest point.

Images of the possible aircraft related pieces were sent to external aircraft specialist, Steve Vizard, who said that despite the rivet holes, these parts do not appear to be aircraft related. He said that the shape and form of the cross shaped part does not look like any aviation item that he is familiar with, and the longer section looks to have steel rivets or fasteners in the aluminium section which is not usual. Steel rivets were sometimes used in high stress areas on the aircraft, but it wasn't normal practice. Despite this, he said he would be inclined to conclude that these are not airframe components. Instead, they could be related to a more modern wreck site as rivets were used to join iron or steel components together in ship building and other construction works before the use of welding in shipbuilding during the Second World War. However, images were sent to Senior Naval Engineer, Anthony Mansfield who said he does not recognise them as part of a ship, therefore their origins are unknown.

As the finds are not thought to be aircraft fragments, the remains are not considered to be contentious, although the discovery of further remains from the same area should be reported immediately as they could provide clues to identify the type of site that these finds derived from. Although the finds were not determined to be aircraft related, the staff at the Clubbs Marine should be commended for recognising that the rivet holes on the debris could have meant that they belonged to aircraft.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 195/20)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

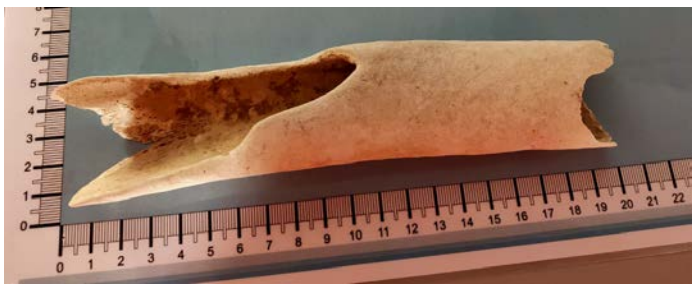
Tarmac_0976: Animal Bone

This animal bone was discovered by Barry Gardner at Marchwood Wharf in Southampton. The Licence Area it came from is unknown.

This animal bone fragment measures 200 mm long by 40 mm wide. It has been broken at both ends but whether the damage happened before or after entering the marine environment is unclear. The bone marrow has completely gone from the inside of the fragment.

Images of the bone were sent to Wessex Archaeology's senior Zooarchaeologist, Lorrain Higbee, who said that it is difficult to identify the bone from the photos alone. She said that it looks like it could be a cattle or red deer femur or tibia, but that it is very eroded so can't be certain.

The femur and tibia are both bones that belong to the upper quadrant of the hind legs of a 4-legged animal.



Due to the bone being so eroded, it may have been exposed on the seabed for some time. The remains of prehistoric animal bones may end up in marine contexts having been washed from terrestrial deposits by rivers or eroded from cliffs or beaches. However, if the bone is post-medieval, it may be the result of the live animals being carried on vessels to be consumed on board before the bones were discarded overboard.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire

Tarmac_0977: Cannonball

This cannonball was discovered by Barry Gardner at Marchwood Wharf in Southampton. The Licence Area it came from is unknown.

Tarmac_0977 is a small cast iron cannonball with a diameter of 45 mm or 1.8 inches. No weight was given. The surface is heavily degraded and has pitted in places and has at least 2 flattened edges.

Charles Trollope, an expert in historical ordnance, studied the images of the find and based on the measurements provided with the scale, said that the cannonball would seem to measure for an 18-pounder English but could be Dutch or French 16-pounder. A sign of a mark on the surface, for example, a Broad Arrow could narrow the possibilities down.

The 18-pounder long gun was an intermediary calibre piece of artillery mounted on warships of the Age of Sail (mid-16th to the mid-19th centuries). They were used as main guns on the most typical frigates of the early 19th century. As the 18-pounder calibre was consistent with both the French and the British calibre systems, it was used in many European navies between the 17th and the 19th century.

The Canon de 16 Gribeauval was a French cannon and part of the Gribeauval system developed by Jean Baptiste Vaquette de Gribeauval during the 18th century. It was part of the siege artillery. The canon de 16 Gribeauval was used extensively during the wars following the French Revolution, as well as the Napoleonic wars.

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard, however, the flattened edges indicate it may have been used in combat.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 200/20)
- The National Record of the Historic Environment
- The Historic Environment Record for Hampshire

Tarmac_0978: White Ensign Flag

This white ensign flag was discovered in Licence Area 254 in the East Coast dredging region, approximately 10 km north-east of Great Yarmouth. Jack Tate discovered it on board Tarmac's *City of London.*

This flag is the top left corner of a larger white ensign flag. The larger, whole flag would comprise a white flag with a red cross, like the St George flag with the added addition of the union jack in the upper left corner. This find is believed to be relatively modern.

Royal Navy ships and submarines wear the White Ensign at all times when underway on the surface. The logo of Royal Navy features a waving White Ensign at the top. The white ensign is also flown on shore establishments including all Royal Marines establishments as well as yachts of members of the Royal Yacht Squadron and by ships of Trinity House escorting the reigning monarch. The White Ensign is worn at the mastheads when Royal Navy ships are dressed on special occasions such as the Queen's birthday, and may be similarly be worn by foreign warships when in British waters when dressed in honour of a British holiday or when firing a salute to British authorities.

The Ensign was first introduced in the 15th century when it consisted of a Tudor ensign, with the current version of flag developed in 1707. Other versions of the ensigns are also used. A red ensign is the official flag used for merchant vessels while the Blue Ensign indicates a ship commanded by an officer of the Royal Naval Reserve.

It is assumed that the flag was lost from a vessel, possibly in high winds. Alternatively, it could have been discarded overboard due to being damaged. It is likely that it may have become buried on the seabed sometime after it was lost which would account for the relatively good level of preservation. It is unclear whether the flag was damaged prior to being lost.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 201/20)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Tarmac_0979: Metal Connector

This metal connector was discovered in Licence Area 240 in the East Coast dredging region approximately 10 km south-east of Great Yarmouth. Andy McBride discovered it at Thurrock Wharf.

This object was reported as metal object with a diameter of approximately 150 mm and a height of 110 mm. The find caused curiosity as wharf staff were unable to identify it due to having not seen anything like it before.

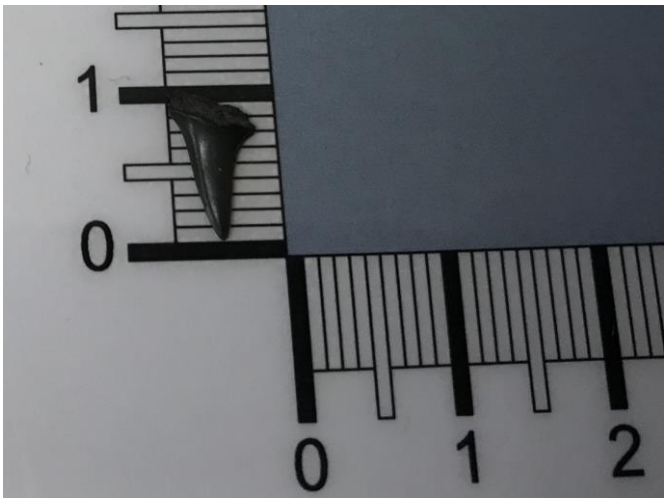
Images of the object were sent to Anthony Mansfield, a senior naval engineer who said that he suspects that this object is a connector for an armoured underwater cable. The central circle on the top is the actual cable and then there is a ring of protective armour cables around it. The flanged bracket probably connected into a housing of a shore station or repeater or some other terminal device.

Anthony suggested that The Telegraph Museum at Porthcurno should also be contacted in order to find out more about the object. Collections Manager, Alan Renton, confirmed that the object is a connector. He said that where a fault occurred at sea and a section of cable was replaced, this was normally a splice rather than a connector. Where the cable emerged on land, usually in a cable house connected to landlines, a terminal block such as the one in the photograph was typical. The protective steel wire sheathing of the cable was stripped back and held by the block to enable the copper communications wires to connect to the network. Alan said that if the correct number of armour wire strands is identified (and the gauge of the wire), they could probably tell us when the cable was laid and the cable ship that did the job!

Alan also said that he was curious about how the connector had been discovered so far offshore. These connectors are usually found in the cable hut, securely attached to the cable end and even if separated before being discarded, he said it is doubtful that it could be swept so far out to sea by currents, so the most likely explanation is that it was accidentally lost or discarded from the deck of a cable repair ship.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 216/20)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk



CEMEX_0980: Shark Tooth

This shark tooth was discovered in Licence Area 512 in the East Coast dredging region, approximately 14.5 km east-north-east of Lowestoft. Andrew Lingham discovered it at Northfleet Wharf.

This tooth was reported as a possible small shark tooth and measures 10 mm by 7 mm.

Images of this find were sent to the Natural History Museum where they were shown to the shark specialist, Charlie Underwood. He said that this is clearly a shark tooth, and the dark colour of the specimen shows it is not modern. He said that as it is was found off Suffolk, it is almost certainly from the London Clay formation and possibly reworked through Plio-Pleistocene crags. He said that the tooth is not identifiable, but the general shape fits with a lateral tooth of *Striatolamia*, the commonest larger shark in the London Clay.

The London Clay formation is a British marine deposit that is significant in the history of palaeontology generally, and palaeoichthyology (the scientific study of prehistoric fish) specifically (Lagerstätten Friedman *et al.*, 2015). *Striatolamia* is an extinct species of sharks belonging to the family *Odontaspididae*. These extinct sharks lived from the Early Paleocene to Late Miocene (61.7 to 10.3 Million years ago). The Latin genus name *Striatolamia* refers to the striations on the surface of the teeth. *Striatolamia* species could reach a length of about 3.5 m. The anterior teeth have elongated crowns, with striations on the lingual face and small lateral cusplets. The lateral teeth, such as the one discovered are smaller and broader, with weaker striations.

Finds like this one, whilst very interesting, are not technically archaeological as archaeology covers only the human past, and people have lived in Britain for around only around 900,000 years. This find is palaeontological in origin, however, and every credit should be given to the wharf for finding such a small object and for reporting it.

References

Lagerstätten Friedman, M, Beckett, H. T, Close, R. A and Johanson, Z., 2015. *The English Chalk and London Clay: two remarkable British bony fish*. Geological Society 430 (1): 165

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

Hanson_0981: Animal Bone

This animal bone was discovered in Licence Area 240 in the East Coast dredging region, approximately 10 km south-east of Great Yarmouth. Aaron Chidgey discovered it at Dagenham Wharf.

This curved animal bone is approximately 330 mm long and 40 mm wide. It was discovered in the oversize left over from an Operational Sampling visit that examined a mixed cargo from lanes F8 and F9.

Images of the bone were sent to Wessex Archaeology's senior Zooarchaeologist, Lorrain Higbee, who said that based on the photographs, it is a rib fragment from something about the size of a woolly rhinoceros or mammoth, but it is difficult to be precise from the images alone. As the bone was discovered in the same cargo as (Hanson_0982), it may be from the same animal.

Although it's not possible to determine the type of rib, it is interesting to note that recently, it was found that Late Pleistocene mammoths (*Mammuthus primigenius*) from the North Sea have an unusually high incidence of abnormal cervical vertebral numbers, approximately ten times higher than that of extant elephants. Abnormal numbers were due to the presence of large cervical ribs on the seventh vertebra, indicating a change from a cervical rib-less vertebra into a thoracic rib-bearing vertebra. The high incidence of cervical ribs indicates a vulnerable condition and is thought to be due to inbreeding and adverse conditions that may have impacted early pregnancies in declining populations. A recent study found that the incidence of cervical ribs is present in another extinct Late Pleistocene animal, the woolly rhinoceros (*Coelodonta antiquitatis*).

Lane F8 and F9 in Area 240 have previously yielded worked flints including handaxes and animal bones belonging to several species, including mammoth and woolly rhinoceros. Due to the amount of bones and worked flints originating from these two lanes, it is believed that this material dates to the glacial periods when the seabed in Area 240 was dry land. The discoveries being made from this area are therefore helping us to understand how this landscape and environment was exploited by both early humans and animals.

References

Alexandra A.E. van der Geer1,2, Frietson Galis 2017 *High incidence of cervical ribs indicates vulnerable condition in Late Pleistocene woolly rhinoceroses. PeerJ* 5: e3684

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_0982: Animal Bone

This animal bone was discovered in Licence Area 240 in the East Coast dredging region, approximately 10 km south-east of Great Yarmouth. Troy Porter discovered it at Dagenham Wharf.

This curved animal bone is approximately 260 mm long and 50 mm wide. It was discovered in the oversize left over from an Operational Sampling visit that examined a mixed cargo from lanes F8 and F9.

Images of the bone were sent to Wessex Archaeology's senior Zooarchaeologist, Lorrain Higbee, who said that based on the photographs, it is a rib fragment from something about the size of a woolly rhinoceros or mammoth, but it is difficult to be precise from the images alone. As the bone was discovered in the same cargo as (Hanson_0981), it may be from the same animal.

Lane F8 and F9 have previously yielded worked flints including handaxes and animal bones belonging to several species, including woolly mammoth and woolly rhino. Woolly rhinoceros remains are a lot less common than those of woolly mammoth and the most common sort of discoveries relates to those of animals in colder climates, frozen in permafrost (https://www.nationalgeographic.com/news/2018/01/sasha-woolly-rhino-mummy-siberia-ice-age-spd/ accessed January 2021), therefore the fact that both these lanes have produced remains is significant in understanding how these animals lived and moved.

One of the bones previously recovered has cut marks consistent with either skinning or filleting (Hanson_0958: Horse tibia) while another displays evidence of being chewed by hyenas (Hanson_0937_001: Rhinoceros' scapulae), although there appear to be no marks on this example. Due to the amount of bones and worked flints originating from lanes F8, F9 and F10, it is believed that this material dates to the glacial periods when the seabed in Area 240 was dry land. The water was 'locked' in the ice sheets that covered much of North Western Europe. The discoveries being made from this area are therefore helping us to understand how this landscape and environment was exploited by both early humans and animals.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

DEME_0983: Munition

This large munition was discovered in Licence Area 351 in the South Coast dredging region, approximately 12 km south-east of the Isle of Wight. Gochev Nikolay discovered it on board *Charlemagne*.

This large munition was caught in the draghead of a dredger. Images of the find showed a grooved band around the base, indicating it had been fired, as well as a brass circle on the base. A similar large munition discovered in 2020 was recorded as being a Palliser shell, and it was assumed this one was the same. The munition was disposed of by the EOD.

Images of the object were sent to Trevor Parker, from the Ordnance Society who said it is not a Palliser shell, which were usually of a much larger calibre and had rifling studs or a copper 'plate' fixed to the base. Most of them, if not all did not have a base fuse like this munition does. He said that the base fuse on this shell is either a No. 11 or a No. 12, but almost certainly the latter. The diameter of a No.12 fuse of this type is either 52 mm or 58 mm. He therefore identified the shell as a British 5-inch Common-Pointed Projectile with a No. 12 Fuse. He also said that it may be a practice round with a dummy fuse, but that it is doubtful.

Trevor said that it would have been fired from a 5-inch B.L Gun. These guns, Mk I – Mk V, were early British 5-inch rifled breechloading naval guns, used after the Navy switched from rifled muzzle-loaders in the late 1870s, as seen on HMS *Gannet* (https://www.flickr.com/photos/9977224@N06/5030197959/in/album-72157715780403712/ accessed January 2021). They were originally designed to use the old gunpowder propellants.

It is believed that this ordnance potentially relates to the First World War, meaning it could have lain undisturbed for over 100 years. Licence Area 351 may be indicative of an area where naval warfare or training took place.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 008/21)
- The National Record of the Historic Environment
- The Historic Environment Record for the Isle of Wight

Volker_0984: Cannonball

This cannonball was discovered in Licence Area 461 in the East English Channel dredging region, approximately 49 km south of Eastbourne. Stephan Bekkema discovered it on the beach at Hythe during the recharge campaign from cargo dredged by *Vox Amalia*.

This cast-iron cannonball has a diameter of 140 mm and was estimated to weigh around 10 kg. The cannonball was observed as having a coating of a grey material which was suspected as being lead and has mostly corroded away.

Charles Trollope, an expert in historical ordnance, studied the images of the find and said that based on the diameter of 5.5 inches, it is an English 24 pounder shot. It is quite an early iron shot as it has a casting flat, so he said it is most likely from the 17th century. Charles said that the lead coating is interesting. The Dutch and French pounds are slightly heavier than the English pounds, and therefore the shot would have needed to be enlarged to make it a fair fit at 27 pounds English for the Dutch and French 24 pounder guns. He said that this is only a hypothesis but is a reasonable answer.

The 24-pounder long gun was a heavy calibre piece of artillery mounted on warships of the Age of Sail (1571–1862), as well as on coastal defences. 24-pounder cannons were in service in the navies of France, Spain, Great Britain, the Netherlands, Sweden, and the United States.

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether it was fired during training, battle or perhaps just lost overboard, however, this cannonball has potentially been modified to fit a Dutch or French gun. How the cannonball came to be in the possession of the Dutch or French in the first instance is unknown, however it may have been used in combat on both sides!

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 009/21)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex

Tarmac_0985: Machine Gun

This machine gun was discovered from a mixed cargo deriving from Licence Area 509/3 in the Thames Estuary and Licence Area 460 in the East English Channel. Jamie Wallis discovered it at Greenwich Wharf. The gun was reported to the police.

This machine gun was reported in two parts and displayed several markings including a serial number “B194.466” that the wharf took excellent close-up photographs of.

Images were sent to Graham Scott of the Coastal & Marine team who provisionally identified the gun as a Browning .50 calibre ANM2 fixed aircraft machine gun. He also said that the calibre was questionable and could be a .30 or .303 –as the 0.50 calibre barrel seems to have had a different part number from the one on this example.

Images were also sent to Jonathan Ferguson, Keeper of Firearms & Artillery at the Royal Armouries Museum, Leeds. He said that this is a Browning .303 and the B prefix on the serial number denotes manufacture by Birmingham Small Arms Company (BSA). Through comparison of other guns, Jonathon estimated a date of 1941 for this machine gun. The barrel of the gun is Mk. III while the breech casing is a Mk. II*, and the only way to know whether this was built as a Mk. II and converted or not would be via production information.

As the gun is known to be from an aircraft, the images were sent to external aircraft specialist, Steve Vizard in order to determine what kind of aircraft it may have originated from. He said that is very difficult to even begin to guess at aircraft type for a Browning like this. Unfortunately, the vital clues are not there. It’s the mounting attachments that would provide evidence of type (the lug bracket with the two holes on the bottom of the gun body). These were reasonably distinctive as to what aircraft the guns were fitted to, for example, quite different for static fixed in a fighter wing, as opposed to a gun turret in a bomber. And invariably this attachment bracketry would have part numbers denoting manufacturers. It’s a bit like trying to identify a particular car model just by looking at a generic engine block fitted to a variety of cars when it is actually the attachments and ancillaries that are specific to a particular model and the difference is in the installation and attachment. It is just the same with the standard Mk II Browning, fitted in dozens of different types, but differentiated by attachments. The only other clue is the fluted end to the muzzle of the barrel, as opposed to the flash eliminator. That can sometimes denote fighter or bomber, but sadly is completely missing from this example.

The .303 Browning was an adaptation of an American design adopted by the RAF in 1937. During the Second World War the Browning armed a variety of British aircraft, either mounted in the wings or in power-operated turrets. The eight-gun armament of the Hurricane and Spitfire was predicated by the perceived need to deliver a sufficient volume of fire to destroy and enemy bomber in a burst lasting not more than two seconds. The eight guns could deliver 320 rounds in this time. In reality, the dispersion of this fusilade still made it difficult to bring down a large aircraft, meaning that cannon-armed fighters became the norm from 1941 onwards (https://www.iwm.org.uk/collections/item/object/30034660 accessed February 2021).

Although this is an isolated find, its relation to an aircraft means that staff at the wharf should be vigilant for any other type of wreckage that may be related as it may be related to an aircraft crash site in one of the areas that was previously unknown.

As per the *Firearms Act 1968*, the machine gun was reported to the police as a Section 5 firearm (https://www.legislation.gov.uk/ukpga/1968/27/section/5 accessed March 2021) as withholding it would be an offence. Although the gun is in two pieces and not functioning, it is still viewed as a weapon as it could be used for parts. The police are now in possession of the find.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 015/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Greater London

CEMEX_0986: Ejector

This ejector was discovered in Licence Area 137 in the South Coast dredging region, approximately 6.5 km south-west of the Isle of Wight. Michael Pettitt and Mark Nichols discovered it at Shoreham Wharf.

This small find is hollow and measures approximately 160 mm in length and has a diameter of 65 mm. There is a thread on the tapered end in order to attach it to another object. The brass ring around the wider end is covered with inscriptions including the Navy broad arrow. The material in the centre of the circle is thought to be some sort of thin metal material. The letters "CTOR" are visible.

Images of the munition were sent to Trevor Parker, from the Ordnance Society. He said that the find is ordnance related and believes it was made in Canada, but “filled” (although unknown what with) at the Royal Ordnance Factory (ROF) in Chorley in 1943. The object is a Mk III and has a batch number of 213. The "crow's foot" confirms that it is a British military item, but the marking which is the main clue has impact damage.

Images were also sent to Mark Khan, UXO Research Manager at Fellows International who in conjunction with Lieutenant colonel (retired) Norman Bonney and Major (retired) Ian Jones MBE concluded that this object is an ‘Ejector’ and is designed to eject the contents of a carrier rocket (e.g illuminating flare). From its size and markings, it is most likely from a 2” Rocket Flare. They said that this object can be identified as a component part of a British Naval rocket. British Naval rockets were employed on ships for different purposes. The rockets were launched from projectors and were simple unguided and un rotating in type. They were used in the anti-aircraft role with explosive warheads and as carriers for illuminating purposes where a flare suspended on a parachute was ejected from the rocket. The illuminating flare burned with great brilliance and could illuminate a wide area showing the presence of enemy craft. Other types of rocket were used for air defence. Rockets were fired into the path of an attacking aircraft trailing a wire that was designed to bring the aircraft down or damage it when it flew into the wire. Another type of anti-aircraft rocket projected aerial mines suspended by parachutes.

The word on the ring is in fact “EJECTOR” and it is believed that this piece of ordnance dates to the Second World War, meaning it could have lain undisturbed for over 70 years. A similar object (CEMEX_0908) was discovered and reported by Shoreham wharf in 2019 from Licence Area 137. That find was believed to be a

Submarine Emergency Identification Signal, Star, Mk 2 Mod 2 or Mk 3 Mod 0. On rising to the surface of the water, Submarine Emergency Identification Signals Mk 2 Mod 2 and Mk 3 Mod 0 project a Single Star Grenade Mk 5 to a height of 250 feet (76 m), where a parachute would open to support the star, which would burn for approximately 13 seconds. The complete signal was available in one of three colours, red, green or yellow.

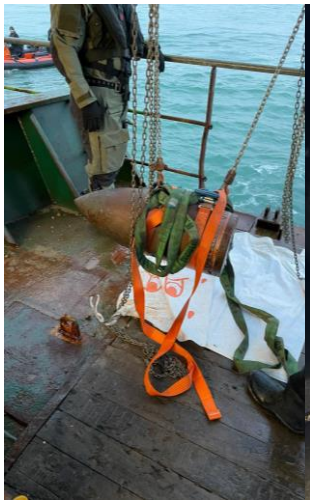
It is not thought that these two objects are related as one would have originated from a ship while the other from a submarine. None the less, Licence Area 137 is likely representative of an area that saw training or combat during the Second World War.

References:

B.R 932 1945 Handbook on Naval Ammunition. Admiralty, Naval Ordnance Department

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 019/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight.



Volker_0987: Munition

This large munition was discovered in Licence Area 351 in the South Coast dredging region, approximately 12 km south-east of the Isle of Wight. Master Pieter Smedts discovered it on board *Mellina*. The find was disposed of by the EOD.

This large munition of an unknown measurement was observed caught in the draghead of the aggregate dredger *Mellina*. The driving band was still visible at the base of the munition and was grooved, indicating that it had been previously fired.

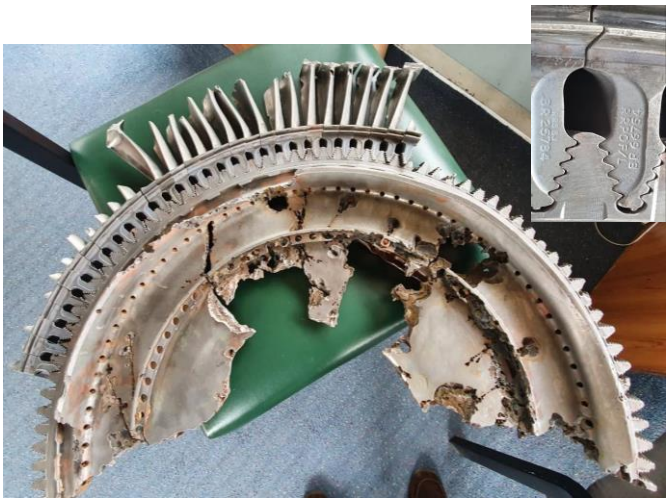
Images of the objects were sent to Trevor Parker, from the Ordnance Society, who said that the markings are on a fired 12-inch Mk I shell. There will be other stampings present on the shell, but they aren't visible from the photographs. He said that it will date from the early Dreadnought class of Battleships, from 1906 onwards and it may be a practice shell, or a nose-hardened, base-fused armour-piercing shell that either missed its target, or went straight through the target, without exploding! As there is corrosion covering the base recess, it is impossible to tell whether it is a 'plug', or fuse as appropriate (practice or AP with explosive). If it was exposed, it would be easy to tell the difference.

The BL 12-inch Gun Mark X was a British 45-calibre naval gun which was mounted as primary armament on battleships and battlecruisers from 1906. A Vickers design used on the famous British battleship HMS *Dreadnought*, which was the first battleship completed with an "all big gun" main armament. In addition to their use on capital ships, a further three guns with four spares were mounted as coastal artillery in Belgium during the First World War (http://www.navweaps.com/Weapons/WNBR_12-45_mk10.php accessed March 2021).

It is believed that this ordnance potentially relates to the First World War, meaning it could have lain undisturbed for over 100 years. Previous munitions have been found in Licence Area 351 (DEME_0983) and therefore it may be indicative of an area where naval warfare or training took place.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 020/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight



Tarmac_0988: Engine Part

This engine part was discovered from Licence Area 254 in the East Coast dredging region, approximately 10.5 km east of Great Yarmouth. Stuart Willis discovered it on board *City of London.*

This unusual find was reported as a “metal engine part that looks like a turbine from either a jet or steam engine”. The vessel also identified an “RR” that could possibly stand for Rolls Royce. The part measures over 610 mm.

Images were sent to external aircraft specialist, Steve Vizard, who said that it is undeniably a section of jet engine turbine/impeller and that whatever it was had suffered a catastrophic engine failure. He said that this is a relatively small piece of what is undoubtedly a large engine but that it was not his area of expertise therefore, he could not shed any further light on it.

Ewen Cameron, Curator of the Royal Air Force Museum Stafford, also saw the images and said that it looks like part of the compressor stage of a Rolls Royce, axial flow engine. He said the excellent photos which include a part with the prefix BR may point towards a connection with Bristol Siddeley (a British aero engine manufacturer) who were bought by Rolls Royce in 1966 and that it may be possible to match the part numbers to a drawing number in order to try and discover more details about the engine once relevant documents can be accessed with regards to Covid-19.

In 2006, four fragments of aluminium aircraft wreckage including one with traces of black paint (UMD_0059) were recovered from the same Licence Area (254) by the same vessel (*City of London).* At the time of the discovery, Andy Simpson at the RAF museum said that traces of black paint on some of the wreckage indicated that this was a plane which predominantly operated at night. Both British and German aircraft operating at night during the Second World War had black undersides and partially or totally black fuselage sides.

Ewen Cameron re-looked at the photographs from 2006 to determine whether they may be related. He said that the fasteners on one of the pieces were interesting as they were used to secure removable panels to the aircraft. There were different types of fasteners used by different manufactures, the most famous being Dzus. After research, Ewen concluded that the fasteners on the 2006 example are in fact Dzus which does not help in identifying the sort of aircraft the parts came from as these were a very common form of fastening.

The aircraft parts from 2006 with the Dzus fasteners (UMD_0059)

Ewen also said that he would be surprised if the parts from 2006 were from same site as the bit of jet engine as this style of fastener wasn't used on many jet powered aircraft past the early 1950s and it is suspect that the earliest our engine part would be dated to would be the late 1960s.

Dr Mark Pacey, Chief Project Engineer, and John Wagstaff at Rolls Royce were kind enough to offer their views on the part. Their first thoughts on seeing the photos was that we have the remains of a bladed turbine disc from quite a small engine, which implies that it is probably from a military engine. Fortunately, the part numbers were still clearly readable in the blade picture, so they were passed on to the configuration team, who confirmed that they are high pressure (HP) turbine blades from a Rolls-Royce Avon engine.

The Avon powered a wide range of military aircraft from introduction in 1950, including the English Electric Canberra and Lightning, the Hawker Hunter and the Vickers Valiant, and also had two civil applications – the de Havilland Comet (the world's first jet powered civil airliner) and the Sud Aviation Caravelle. Rolls-Royce ceased production of the Avon aero-engine in 1974 and withdrew in-service support in 2006. However, an industrial variant of the Avon was also produced and is still available today, although Rolls-Royce sold its industrial gas turbine business to Siemens in 2016 and Siemens Energy are responsible for current production. In total, it is believed that Avon production was in excess of 11,000 engines.

Dr Mark Pacey said that he had passed the details to the defence team and asked if they have any records showing why an Avon might have been in the sea near Great Yarmouth. However, it is quite likely that this was an industrial engine, in which case Rolls-Royce would not necessarily have a record of any loss. When the BR prefix was queried, he said that the part number has no particular significance and part numbers series are randomly issued to the various Rolls-Royce design sites. These part numbers actually came from a series allocated to East Kilbride near Glasgow, which is where the design work would have been done. The Avon engine was a Rolls-Royce design although responsibility for it was later transferred to the Bristol site; early design work was done in Barnoldswick and completed in Derby.

All crashed military aircraft are protected by law under the *Protection of Military Remains Act* 1986. However, this is likely to be an industrial engine, and it is not

thought that it relates to a coherent aircraft site although the damage would indicate that the object may have crashed into water. This is an isolated find and therefore, not thought to be contentious, although any further parts relating to this engine should be reported immediately.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 024/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Tarmac_0989: Bullet

This bullet was discovered from Licence Area 395/1 in the South Coast dredging region, approximately 11 km south-west of Selsey Bill. Rhys Jones discovered it on board *City of Cardiff.*

This heavy lead bullet measures approximately 80 mm in length, has a diameter of 25 mm and has two distinct grooves running around the circumference. The bullet was also reported as having a brass end cap. Thank you to the Master of the vessel for such high quality images.

Images of the bullet were sent to Trevor Parker from the Ordnance Society, who said that it is an unfired 1-inch bullet from an 'Aiming Rifle'. The aiming rifle was fitted inside the breech and barrel of a much larger Naval gun. This enabled the gun crew to practice aiming the gun and then firing this sub-calibre device to see where the larger shell would have gone. It also saved wearing out the barrel of the gun.

Trevor attached pictures of a fired and re-assembled round, and also a drawing of the round from which the 'Aiming Rifle' was developed, which was an early, large machine gun known as a 1-inch Nordenfelt gun. The 1-inch Nordenfelt gun was an early rapid-firing light gun intended to defend larger warships against the new small fast-moving torpedo boats in the late 1870s to the 1890s. The brass case is the same size as this example, but the bullet was iron, then steel, with a brass jacket. This example is lead-antimony with the version having a copper cup on the base.

It is believed that this ordnance relates to the Second World War, meaning it could have lain undisturbed for over 70 years. Two examples of ordnance have previously been discovered and reported from Licence Area 395/1 in the form a steadying band fitted to a large projectile (Tarmac_0310), possibly from a BL 14 inch Mk VII naval gun and a First World War service revolver – a Webley Mark VI (Tarmac_0297). There are no recorded enemy engagements in Areas 395/1 so the find could be the result of firing practice.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 025/21)
- The National Record of the Historic Environment
- The Historic Environment Record for West Sussex

Hanson_0990: Copper Bolt

This copper bolt was discovered in Licence Area 242/361 in the East Coast dredging region, approximately 26 km east of Great Yarmouth. Darryl Mason discovered it on board *Arco Avon*.

This bolt appears to be made from copper, has a head diameter of 15 mm and is 260 mm long. It is possible that it derived from a ship, as bolts provided a technique for fastening or securing components together in shipbuilding traditions.

Bolts have many different purposes and appear in many different forms in the construction of watercraft. Bolts found out of context, such as this find, are best considered under two subdivisions; 'short fastenings' and 'through fastenings' (McCarthy 1996). This copper bolt may be best described as a 'short fastening' – a bolt which is fairly short in length and does not extend through the material it intends to connect. More specifically, due to its length, solid head and tapered point, it is possible that the bolt represents a 'dump bolt'. Dump bolts were often used in plank fastening (Thearle 1874). Dump bolts appear in documentary sources from the late 19th century (McCarthy 1996) although they are thought to have been in use prior to this date. As a copper bolt, it is possible that this find predated the early 19th century when the use of iron in ship construction predominated over copper, although a later date cannot be discounted.

As the bolt appears to comprise an isolated find, it is not feasible to identify its function or origin conclusively. It may have been a result of waste disposal or lost overboard rather than the indication of a wreck. Moreover, the bolt may not derive from a vessel at all.

References:

McCarthy M 1996 'Ship fastenings: a preliminary study revisited' in *The International Journal of Nautical Archaeology* 25 (3 and 4): 177-206

Thearle S. J. P. 1874 N*aval Architecture: a Treatise on Laying off and Building Wood, Iron and Composite Ships*. London

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 032/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Clubbs_0991: File

This metal file was discovered in Licence Area 512 in the East Coast dredging region, approximately 14.5 km east-north-east of Lowestoft. Tom McKenna discovered it at Clubbs Marine Aggregates Wharf.

This object believed to be a file measures 260 mm long and has a lump of concretion at one end and is tapered towards the other end.

A file is a piece of hardened steel with many small sharp teeth cut into its surfaces which can cut into, smooth, sharpen and shape any material. Files only cut or smooth in one direction. From the images, it would appear that this is a half-round file which means that it is two-sided, featuring a rounded face on one side, and a flat face on the opposite side. These half-round files are ideal for rounding out holes and can be used on concave, convex, or flat surfaces.

The Romans were the first recorded civilization to use files of different shapes. Most were flat, but some were half round (semi-circular) in shape. In the UK, Sheffield was a major centre for file manufacturing. By the late 1700s crucible cast steel was being used by a number of trades to produce tools which needed high quality steel to give good cutting edges. The file trade grew in the 1700s and 1800s and the quality of Sheffield files became world famous. Until the mid-1800s all files were cut by hand using a hammer and chisel. File cutting machines were not introduced in the UK until the 1900s and some files continued to be hand cut in people's homes into the mid-1900s.

The age of this file is unknown; however, it is believed to date from the 20th century onwards. This object may have entered the marine environment via a number of routes. It may have been discarded purposely or accidentally lost overboard or if the item originated from a dock or port, this licence area may be indicative of a debris field. Though considered an isolated find, further finds should continue to be reported, as they could provide more information about the marine usage of this area over time.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 040/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Suffolk

Hanson_0992: Munitions and metal finds

This collection of munitions and metal finds was discovered in Licence Area 401/1-2b in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King and Clint Cambridge discovered them at Greenhithe Wharf.

A total of 56 munitions and 12 metal finds were recovered from a single cargo, dredged from lane E4 in Licence Area 401/1-2b. The lane is approximately 1 km from the location of the wreck of His Majesty's Trawler (HMT) *Pelton*, a requisitioned trawler and there was a suspicion that the finds had travelled from the wreck site. Data was therefore requested form the United Kingdom Hydrographic Office (UKHO), the National Record of the Historic Environment (NRHE) and the Receiver of Wreck.

Euan McNeil, Alistair Byford-Bates, Graham Scott, Ben Saunders and Toby Gane of the Coastal & Marine team at Wessex Archaeology agreed that they all resemble 6-pounder ammunition. This would fit with the armed trawler idea – they were reused as deck guns during the early Second World War years on coasters and naval trawlers.

Trevor Parker from the Ordnance Society said that they are all unfired 2-pounder Pom-Pom and that the brass cases are all flattened due to the water pressure from being immersed for a length of time. It also appears that the nose fuzes have corroded away.

Images were also sent to Mark Khan, UXO Research Manager at Fellows International, who said that (without the benefit of scale in the images) but using shape and form from images, that they are all Naval 2-pounder ammunition. There seems to have been some significant trauma to some of the rounds resulting in crushing/flattening. The key is the undamaged mostly complete round evidencing the deep securing cannelure crimp associated with 2-pounder ammunition. Also, on a couple of rounds the remains of the steel links can be seen from where the ammunition was supplied in belts (http://www.navweaps.com/Weapons/WNBR_2pounder_m8.php accessed May 2021).

HMT *Pelton* was a requisitioned trawler built of steel by Cook, Welton and Gemmell Ltd, Beverley, Hull, with the engine supplied by Holmes C.D. and Company Ltd, Hull. The ship was launched on 6 August 1925. Prior to its requisition it was owned by Ross, Francis and Thomas Ltd and the Hull Ice Company Ltd. The ship was not built

to a specific class design, as it was built as trawler and later requisitioned, rather than being built as an armed trawler. The ship's profile, deck plan and midship section drawings are available from the Lloyds Registry Foundation listing the vessel by its yard number 474. The ship's IMO/Off. No. 149024, and port number H228 appear in the records, and on the one image currently identified to be the *Pelton*, predating the ships conversion to an armed trawler in August 1939 (https://historyfordessert.files.wordpress.com/2013/03/pelton.jpg accessed May 2021).

The ship is described in the Lloyd's Register records as a single decked steam powered vessel with one 3-cyl. triple expansion engine, with direct acting vertical inverted cylinders, which drove a single shaft, single screw propellor. It had a single boiler. The engine generated 96 h.p (rhp). No auxiliary engine or refrigeration was fitted. There was also no machinery aft, and no donkey boiler fitted. The ship had electric lighting installed, with the generator on the starboard side of the engine room supplying a direct current circuit. The ship was 358 gross registered tons (grt) and its dimensions were 140.4 ft (42.8 m) x 24 ft (7.3 m) x 13.2 ft (4 m). The vessel was ketch rigged and was not sail assisted. There were two masts fitted. The ship was clinker built with an elliptical stern and straight stem, no water ballast tanks, and with four bulkheads fitted.

On 24 December 1940, the ship, which had been converted to the role of minesweeper, was sunk by E-boat S-28, of the 1st S-flotilla operating out of Ostend, in the North Sea alongside No. 5 buoy off Aldeburgh, Suffolk. All 20 crew were lost in the sinking.

Skipper of HMT *Pelton*, John Alexander Sutherland DSC, RNR gave this statement on the ship engagement with a German aircraft in early 1940:

> "I have the honour to submit the following report on an engagement which took place between HM Trawler *Pelton* and a JU88 K at 1655 on 10th January 1940. Whilst at anchor off Scroby Elbow Buoy, the anchor was found to be dragging at 1645 it was weighed preparatory to taking up a new berth. Whilst taking up this position an enemy aircraft was sighted on the port beam steering east.
>
> Ship's company immediately went to action stations and opened fire with the 12 pounder and Lewis gun as the aircraft turned to attack. Four bombing and machine gun attacks were carried out, salvos consisting of 3 bombs, except the last in which six were dropped. No casualties were sustained. The attacks were made from starboard to port at a height of two to three hundred feet. The Lewis gun jammed after about eight bursts and four rounds were fired from the 12-pounder, no hits were observed. Based on this the calibre and type of weapons on board have been provisionally identified.
>
> All bombs dropped except two were small and did no damage when burst alongside. During the third and fourth salvos, however, two heavy bombs were dropped apparently with delayed action fuses. One burst close to

> the starboard beam and the other very close on the port quarter. These two bombs caused all the damage. During the last two the dynamo was put out of action and the first engineman reported the ship making water fast, full of steam and having lost the vacuum he must stop the main engines. I requested the services of a lifeboat and tug by signal. Our own lifeboat was carried away by the enemy action. Ship was anchored off Yarmouth harbour, the crew having been taken off as a precaution." (https://historyfordessert.wordpress.com/tag/hmt-pelton/ accessed May 2021).

Based on the PRO reference to the ship being in action in 1940 and armed with a 12-pounder gun and Lewis light machine guns the munitions shown in the images from the wharf appear to be from two different weapons, based on their approximate scale to each other. The 12-pounder guns in general used on British vessels at this time, dependant on model, used either fixed or a separate cartridge and shell system, with the two held together by a separate holder (http://www.navweaps.com/Weapons/WNBR_3-40_mk1.php accessed May 2017) for their loading in the case of the latter. All the shells visible in the images appear to be missing their fuzes.

Lewis guns are an air-cooled light machine gun invented in 1911, firing a .303 (7.7 mm) calibre cartridge, amongst other calibres. The gun used a pan magazine mounted on the top of the weapon capable of holding 47 or 97 rounds dependant on size, firing at a cyclic rate of 500-600 rounds per minute. It was the Royal Navy's standard close air defence machine gun at the start of the Second World War and was frequently carried in twin mountings. In the case of HMT *Pelton* the Lewis guns were probably fitted to either side of the bridge, with the 12-pounder gun on a specially built mount between the foremast and forecastle.

According to the UKHO data, HMT *Pelton* now lies in 27-31 m. The wreck has been swept clear at 23.5 m. Two pieces of wreckage lie close by to the main wreck. HMT *Pelton* lies on a flat bottom with some scour present. The ship is thought to be largely intact and partially buried by a sandwave. The local UKHO chart shows the ship lies very close to an unknown wreck on mud/sand/pebbles. According to the NRHE data, this second wreckage close by is unlikely to be part of HMT *Pelton* due to its size. The UKHO states that during an investigation in 2017, the second wreck was 35 m in length, 13.8 m in width and had a height of 10 m with a note saying that the second wreck is intact and partially buried.

The Receiver of Wreck replied to the droit request to say that one other find had been found that related to the wreck. This find was a steam whistle measuring 700 mm long with a diameter of 100 mm.

From all the data gathered, it is likely that the munitions reported do not originate from HMT *Pelton* as they are a different calibre to the guns that are reported as being on the vessel. As the links are still visible on some of the shells, Mark Khan said that the most likely reason that these munitions are on the seabed is as a result of the belt

being ditched or that it has simply fallen overboard.

In an archaeological assessment done by Wessex Archaeology in 2004. The unknown wreck was given the ID WA 2002. The description of the wreck was as follows:

> "This wreck site was detected in 1969 and last examined in 1994. It is described as a small vessel, intact and upright on the seabed. The site measures 40 m by 10 m. The wreck is only 250 m away from the site of HMS *Pelton* and within the dredging area. The side-scan data shows a shipshape structure with visible internal elements, seemingly half covered by sediment and lying in east-west orientation. The wreck is likely to be casualty of the World Wars."

As the second wreck in the vicinity has not been identified through the various avenues of data collected, it cannot be ruled out that these munitions have not originated from that wreck. Should it come to light that the wreck in question carried 2-pounder ammunition, a more positive link could be made. Wharf staff should be vigilant when observing cargoes processed from this area as further finds could lead to the identification of the wreck in the vicinity.

References:

Wessex Archaeology 2004 *Yarmouth Dredging Area 401/2 Aggregate Dredging License Application Archaeological Assessment Technical Report* Reference 56230.02

Other sources:

https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0042-p [accessed May 2021]
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0043-p [accessed May 2021]
https://plimsoll.southampton.gov.uk/shipdata/pdfs/40/40b0402.pdf [accessed May 2021]
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0034-r [accessed May 2021]
https://plimsoll.southampton.gov.uk/shipdata/pdfs/30/30a0365.pdf [accessed May 2021]
https://hec.lrfoundation.org.uk/archive-library/documents/lrf-pun-w1137-0031-f [accessed May 2021]

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 048/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

CEMEX_0996: Grenade

This hand grenade was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Ricardo Plummer discovered it at Leamouth Wharf.

CEMEX_0996 is a hand grenade that measures approximately 110 mm by 90 mm. It has been heavily corroded in the marine environment and has a large piece of concretion attached to it.

Images of the munition were sent to Trevor Parker, from the Ordnance Society. He said it is a Mills Hand Grenade, but with all the concretion around it, it is difficult to say whether it is a First World War No.5 or Second World War No. 36.

Images were also sent to Mark Khan, UXO Research Manager at Fellows International who confirmed it was a Mills bomb and said that these were issued on ships. He said they were used to signal to submarines when practicing (to indicate simulated depth charge attack) and also in vulnerable harbours to prevent enemy sabotage divers.

The 1945 Ammunition pocket book describes the No. 36M grenade as an anti-personnel bomb with a danger zone on detonation of approximately 400 yards. The grenade had a cast iron body which was filled with a high explosive. The body was oval and its exterior was grooved to provide a grip to the hand and also to assist fragmentation. The centre piece was screwed into the base and retained by a base plug. The high explosive filling, Baratol 20/80, was filled into the body through the filling hole in the shoulder, which was closed by a screw-threaded plug. The centre piece was made of aluminium or tinned brass and comprised of two adjacent chambers. The smaller chamber received the detonator and was empty until the grenade was primed. The larger or Stricker Chamber was positioned in the centre of the body and contained the Striker and Striker Spring; the head of the striker protruded through the circular hole at the top; the opening in the base received the cartridge end of the Igniting Set. The Igniting Set comprised a Detonator, Safety fuse, 0.22-inch Rim-fire, cap and a zinc alloy cap chamber. The cap sat in the cap chamber with one end of the fuse attached. The fuse was formed into a U-shape to suit the Centre piece into which the set fit and its other end was crimped into the detonator. There were two types of Igniting Set that varied in time of burning of the fuse; 7 second fuses were coloured yellow while 4 second fuses were coloured white and had

a rubber band around them which was never to be removed as it provided the means of identification at night.

The find was reported to the police and removed from site by the Explosive Ordnance Disposal team. Unexploded ordnance (UXO) pose a significant risk as degradation of the detonator or fuse can render them unstable and an impact could potentially detonate the device. Most ordnance found in British waters relates to the First or Second World War meaning that unexploded ordnance could have lain undisturbed for 70-100 years.

References

Admiralty Handbook on ammunition B.R. 932 (1945) (Restricted – For official use only)

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 052/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

CEMEX_0997: Munition

This munition was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Ricardo Plummer discovered it at Leamouth Wharf.

This large casing measures approximately 350 mm in length and appears to be made of brass. It has sustained some damage within the marine environment.

Images of the munition were sent to Trevor Parker, from the Ordnance Society. He said that the CEMEX_0997 is a 40 mm L/70 Bofors case, probably dating from the mid- 1950s onwards. Images were also sent to Mark Khan, UXO Research Manager at Fellows International who confirmed that the case belongs to a 40 mm Bofors shell.

The L/70 is an anti-aircraft gun 40 mm caliber designed and manufactured by the Swedish Company Bofors from 1951 onwards. The Bofors L/70 40mm is intended for engaging high speed aircraft flying at low altitude, its chief characteristics being high speeds of elevation and traverse combined with a high rate of fire. The L/70 was used by many Western nations and was widely exported to Asia, the Middle East, Africa and South America and is still in service although often replaced by missiles (https://www.armyrecognition.com/sweden_swedish_military_army_light_heavy_weapons/l/70_l70_l-70_bofors_40mm_automatic_anti-aircraft_gun_air_defence_system_technical_data_sheet.html accessed July 2021).

The L/70 fires different 40 mm rounds than the earlier L/60. The new rounds are slightly lighter and have a much higher velocity, making it much more effective against fighter jets (https://weaponsystems.net/system/932-Bofors%20L/70 accessed July 2021).

It is unknown how this shell casing entered the marine environment. This shell casing is dated to post 1951 and therefore not associated with either World War, however, Licence Area 340 commonly produces munitions which may indicate a training area or a dumping ground for ordnance.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 053/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

CEMEX_0998: Munition

This munition was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Ricardo Plummer discovered it at Leamouth Wharf.

This large munition has been heavily concreted in the marine environment which may mean that it has been on the seabed for some time. The shell measures approximately 350 mm and 110 mm in diameter.

Images were sent to Mark Khan, UXO Research Manager at Fellows International who said that due to the corrosion, he could not identify it. Images of the munition were also sent to Trevor Parker, from the Ordnance Society. He said that CEMEX_0998 is a separate loading shell of probably a 4-inch to 4.7-inch calibre. He said that without seeing the base, he can't tell if it is a solid shot practice head or an armour-piercing explosive head with a base fuse. Trevor said that it doesn't appear to have been fired although it is very corroded!

Based on the measurements given by Trevor, the shell could belong to a BL 4-inch gun Mk I – Mk VI which were a family of early British breech-loading 4-inch naval guns that entered into service during the late 1880s. Alternatively, the shell could belong to QF 4.7-inch Mk I – IV naval gun which were a family of British quick-firing naval and coast defence guns of the late 1880s that served with the navies of various countries until the 1920s. They were also mounted on various wheeled carriages to provide the British Army with a long-range gun. By the First World War, the guns were obsolete for warship use, but many were re-mounted on merchant ships and troopships for defence against enemy submarines and commerce raiders.

As this munition cannot be dated closely, it may have lain undisturbed for over 100 years. Licence Area 340 has produced several munitions meaning it could be an area where training took place or where ordnance was dumped after the war.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 054/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

CEMEX_0999: Munition

This munition was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Ricardo Plummer discovered it at Leamouth Wharf.

These six munitions comprise five shells and one brass shell case. All appear to have been fired as the rings on their bases appear to be notched. Some are heavily concreted and all shells are dark in colour.

Images of the munitions were sent to Trevor Parker, from the Ordnance Society and Mark Khan, UXO Research Manager at Fellows International. They both said that the shell case is a Hispano 20 mm and the fired 20 mm heads are probably Hispano, but possibly Oerlikon.

The Hispano-Suiza HS.404 20 mm calibre automatic cannon was one of the most widespread aircraft weapons of the 20th century, used by British, American, French, and many other military services. It delivered a useful load of explosive from a relatively light weapon, making it an ideal cannon for use onboard fighters. A small number of Spitfire fighters were fitted with the 20 mm cannon in the latter stages of the Battle of Britain but a tendency for the gun to jam during combat, frequently after only one shot, meant that the RAF Squadron soon demanded that they be replaced.

Oerlikon autocannons were based on an original German design that appeared very early in the First World War. It was widely produced and by the Second World War and various models were employed by both Allied and Axis forces. The shell would have been filled with High Explosives such as TNT and the contractors initial or trade mark along with the year of manufacture would have been present on the base.

It is unknown whether these particular shells were fired from a vessel or an aircraft, but it is believed that they relate to the Second World War, meaning they have lain undisturbed for over 70 years.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 055/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

CEMEX_1000: Cog

This cog was discovered in Licence Area 340 in the South Coast dredging region, approximately 8.5 km south-east of the Isle of Wight. Ricardo Plummer discovered it at Leamouth Wharf.

This cog measures approximately 260 mm in diameter. It is assumed that the part once belonged to a larger mechanism. Some of the teeth appear to be worn indicating this piece has been used.

Images of the object were sent to Anthony Mansfield, a senior naval engineer, who said that unfortunately it is a fairly generic piece. It is a spur gear so therefore it is not likely to be part of a transmission gearbox as they use helical gears. It is more likely from a deck winch of some sort.

A deck winch is an important item of deck machinery designed for different purposes, such as anchoring, mooring, towing as well as lifting and pulling heavy objects on to the boats. Winches use two sets of levers to increase force. The winch handle is the lever arm; the longer it is, the greater its effect. It rotates the internal levers (gears) to generate torque.

Winches come in seven major types: electrical winches, mechanical drum-style winches, mechanical capstan-style winches, hydraulic winches, mechanical hand-operated winches, mechanical portable winches and hybrid winches. The first commercially known electric winch appeared in 1959 and was named as the Belleview Winch, therefore it is assumed that this find post-dates 1959 and is modern.

It is unsure how this cog entered the maritime environment although it is assumed that it came from a vessel. It may have been replaced with a newer part and discarded overboard or it may be from a larger component that was discarded at sea. As the find is isolated, it is not thought to be from a wreck site.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 056/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

Hanson_1001: Pen knife

This pen knife was discovered from a mixed cargo from Licence Area 401/2 in the East Coast approximately 23 km east of Lowestoft and Licence Area 460 in the East English Channel dredging region approximately 14 km south of Hastings. Aaron Chidgey discovered it at Dagenham Wharf.

This pen or "jack" knife measures 140 mm by 60 mm. It has a regular blade, a marlin spike and a flat head screwdriver at one end.

Whereas most British soldiers were issued with a simplified version of this knife, the Royal Navy were issued one with a marlin spike on the opposite side to the blade, intended for rope work. The wide flat screwdriver at the end was used for anything from assisting in the stripping down of a self-loading rifle to prising the lids off paint tins. A metal loop appears to be missing from one end.

There were four different knives issued to the British forces. Each had its own Nato Stock Number (NSN). These were:

- NSN 5110-99-301-0301 (with locking blade and can opener)
- NSN 5110-99-794-0491 (without can opener)
- NSN 7340-99-975-7402 (with can opener and no marlin spike)
- NSN 7340-99-975-7403 (with can opener and marlin spike)

(https://threepointsofthecompass.com/2019/01/20/a-blast-from-the-past-the-british-army-knife/ accessed July 2020).

A British army knife would have also had a marlin spike, however the Royal Navy knife is distinguished by a lack of can opener (https://www.youtube.com/watch?v=cZKeX9BnGoM accessed July 20201). There were a variety of blade makers that would have been stamped on one side of the base of the blade. The other side may have had a series of number that related to the Royal Navy stores. A strip of metal was also present along the side of the knife that could be inscribed with the owner's name and a date. The staff at Dagenham did remove some of the concretion in order to see whether there was a NSN, broad arrow stamp, date or name but unfortunately, none were found.

The chequered grip pattern on the knife is paralleled with knives issued to the Royal Navy 1939 to 1986 (https://www.youtube.com/watch?v=qF9rfld3h4Y accessed July 2021), however, in the video, it is said that the design of a Royal Navy knife has not changed much since the First World War.

Due to the parallels between this knife and those issued from 1939 until 1986, especially in the chequered pattern on the handle, it is thought that this object may date to the Second World War. This blade may have been accidentally lost overboard, possibly from a Royal Navy vessel from a crew member.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 057/21)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex and Suffolk

Hanson_1002: Cannonball

This cannonball was discovered from a mixed cargo from Licence Area 401/2 in the East Coast approximately 23 km east of Lowestoft and Licence Area 460 in the East English Channel dredging region approximately 14 km south of Hastings. Aaron Chidgey discovered it at Dagenham Wharf.

Hanson_1002 is a small cast iron cannonball with a diameter of 70 mm. No weight was given. The surface is heavily degraded and has pitted in places.

Charles Trollope, an expert in historical ordnance, studied the images of the find and said that based on the measurements provided with the scale, the cannonball would seem to measure as a 4 Pounder. He also said that he believed that he can decern an “O” in one of the photographs. This could be “BO”, Board of Ordnance which was an anti-theft measure from 18th century onwards.

The Board of Ordnance was a British government body, established in the Tudor period, with its headquarters in the Tower of London.

Based on the cannonball being a 4 pounder and the estimation of it dating to the 18th century, it is though that it may have originated from an Armstrong pattern gun https://www.arc.id.au/ArmstrongPattern.html accessed July 2021). These guns became the standard issue for the Royal Navy through the later years of the 18th century, with the 4 pounder used in 1794 and fired from a gun 5.5 to 6 feet in length (1.7 to 1.8 m). A 4 pounder Armstrong pattern gun was present on Cook's HMS *Endeavour* (https://www.arc.id.au/Cannon.html accessed July 2021).

Cannonballs are a common find around the coast of England as, with an extensive naval history, military training and battles have taken place along this stretch of coastline for hundreds of years. It is not possible to say whether this cannonball was fired during training, battle or perhaps just lost overboard, however, the flattened edges indicate it may have been used in combat.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 058/21)
- The National Record of the Historic Environment
- The Historic Environment Record for East Sussex and Suffolk

CEMEX_1003: Spoon

This spoon was discovered in Licence Area 137 in the South Coast dredging region, approximately 6.5 km south-west of the Isle of Wight. Steve Bomber discovered it at Leamouth Wharf from cargo dredged from *Sand Heron.*

This metal spoon measures approximately 180 mm in length and 60 mm at its widest point. Letters are visible on the handle with one word spelling “Stainless”. The spoon has sustained damage; whether on the seabed or through the dredging process is unknown.

After seeing the images, Senior Archaeologist Cai Mason said that the upper word could be “Firth”, which was a stainless steel manufacturer from Sheffield.

Firth Brown Steels was initially formed in 1902, when Sheffield steelmakers John Brown & Company exchanged shares and came to a working agreement with neighbouring company Thomas Firth & Sons. In 1908 the two companies came together and established the Brown Firth Research Laboratories.

The development of stainless steel was the brainchild of Harry Brearley. He experimented with varying proportions of chromium and finally produced a stainless steel with 12.8% chromium. He moved to Thomas Firth & Sons in 1914 and commercial production of stainless steel cutlery began (http://www.steelcitycutlery.com/stainless.html accessed August 2021). The companies continued under their own management until they formally merged in 1930 becoming Firth Brown Steels. The company is now part of Sheffield Forgemasters.

How this object entered the maritime environment, may include an unknown wreck, but more likely it was lost or thrown overboard during everyday shipboard operations. Some theories are that cutlery were thrown overboard on a return journey to avoid washing them up!

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 094/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Isle of Wight

Hanson_1004: Munition and Metal Finds

This assemblage of finds was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King and Clint Cambridge discovered them at Greenhithe Wharf.

This assemblage of finds is made up of one large munition and ten separate pieces of metal. As some of the metal is riveted, they were reported as potential aircraft material.

Images of the metal fragments were sent to an external aircraft specialist, Steve Vizard who said that it is difficult to say what are definitely aircraft parts. He said the one item in the centre of the photograph certainly appears aviation related while a couple of the other pieces with multiple holes, suggesting rivet lines, might also be parts of aircraft. Unfortunately, the parts are in a badly corroded condition, which preclude any real chance of finding part numbers or inspection stamps. He said that he assumes that these parts are general detritus from an open area, as opposed to a suspected or specific site.

Images of the shell were sent to Mark Khan, UXO Research Manager at Fellows International, who said that it may be a 4-inch British Naval shell. He said that he suspects it had a base fused or was a practice shell. The QF 4 inch Mk XVI gun was the standard British Commonwealth naval anti-aircraft and dual-purpose gun of World War II in service from 1936 until the 1950s. The driving band on the munition is notched meaning it has previously been fired.

It is not thought that the metal fragments relate to the shell in any way. While some of the fragments may relate to aircraft, others appear to belong to corrugated sheet metal that could indicate that material has been dumped together. As this is not believed to be related to a specific aircraft site, it is not thought to be contentious, although staff should be vigilant of any other finds.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The MOD
- The Receiver of Wreck (Droit 107/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1005: Ship Log Rotator

This ship log rotator was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth or 361 in the East Coast dredging region, approximately 26 km east of Great Yarmouth. Darryl Mason discovered it on board *Arco Avon.*

This object was reported by the vessel as a gold-coloured metal piece measuring 150 mm long and tapers from 40 to 15 mm with a cast pointed, ornate top. It was reported as being heavy and believed to be made of brass and in good to moderate condition but with some dents/crushing at base.

Euan McNeil, a senior manager of the Coastal & Marine team at Wessex Archaeology identified the find as a fragment of a ship log rotator. This is the upper section where the ring would be connected to the rope and the fins of the rotator would be attached to the lower half.

This brass instrument is a mechanical log recorder dating to the early 20th century and was used to measure the distance travelled from which the vessel's speed could be calculated. The ship-log would have had a fixing plate and would have been mounted to a suitable part of the vessel, usually the taffrail, the rail at the stern of the ship. The recorder was connected to a rotor that was towed behind the ship and the revolutions of the rotor were registered by the ship-log dial to measure the distance travelled.

This piece is in the style of a Walker Cherub log rotator which was was first patented by Thomas Ferdinand Walker in 1878. The later very successful Cherub Mark III series was produced in great numbers between 1930 and 1994 (https://collections.rmg.co.uk/collections/objects/42945.html accessed August 2021).

This was likely to have been lost over the side of a vessel perhaps during stormy weather or if the rotor snagged on something. Alternatively, it could have been thrown over board if damaged.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 127/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1006: Munition Clip

This ammunition clip was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King discovered it at Greenhithe Wharf.

This ammunition belt links clip measures 55 mm by 45 mm and is inscribed with “ALK” “M9” “F”. It has sustained some damage as one section has broken off and it has been slightly crushed.

Images were sent to Mark Khan, UXO Research Manager at Fellows International, who said that the clip is from a .50 calibre machine gun belt. He also said that it is fairly modern as it is the M9 type and not very corroded.

These ammunition belt links clips are feeding devices for the machine gun with the bullets slotting through the links in a neat row. Research showed that the ALK M9 ammunition links were from the US Military. The M1 and M9 links were pull-out designs where rounds are extracted by pulling them rearward out of the link. The M9 link was designed for .50 Browning Machine gun ammunition. The Browning M2 .50 is a Second World War era automatic, belt-fed, recoil operated, air-cooled, crew-operated machine gun (https://fas.org/man/dod-101/sys/land/m2-50cal.htm accessed August 2020). At the outbreak of the Second World War, the United States had versions of the M2 in service as fixed aircraft guns, anti-aircraft defensive guns (on aircraft, ships, or boats), infantry (tripod-mounted) guns, and as dual-purpose anti-aircraft and anti-vehicular weapons on vehicles (Dunlap 1948).

This object was most likely lost overboard during combat or training after a bullet was fired from a Browning Machine gun. Alternatively, it could have been dumped with other ammunition after the war.

References

Dunlap, Roy F., 1948 *Ordnance Went Up Front* Samworth Press p. 225

FAS Military Analysis network: https://fas.org/man/dod-101/sys/land/m2-50cal.htm (accessed August 2020)

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 135/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1007: Metal Plate

This metal plate was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King discovered it at Greenhithe Wharf.

This object was reported as a metal serial plate, potentially related to aircraft with writing visible on its surface. One of the sections was identified as being stamped with “k08mag”.

Images were sent to external aircraft specialist, Steve Vizard who said that it is definitely not related to aircraft and that it is not made of aluminium. He said it is more likely made of lead or zinc.

Senior Maritime Technical Specialist Graham Scott suggested that it may be a fragment of a baggage or goods tag for someone or something that goes by the name “Damson” or “Adamson” as the name appears twice on the fragment of metal.

Senior Marine Archaeologist Alistair Byford-Bates said that the 'I N' and 'NO' that are reversed could suggest something else. Material wise it looks like an aluminium or zinc plate that has been bonded onto another metal.

If this is a baggage or goods tag, it may have fallen overboard from a vessel transporting goods or passengers. Alternatively, it could be as a result of a dumping of material at a later stage. The object may have been broken prior to entering the marine environment and therefore disposed of.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 136/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1008: Anchor

This anchor was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King discovered it at Greenhithe Wharf.

This anchor fragment is heavily corroded and broken in several places. The remains measure 570 mm by 290 mm.

Senior Maritime Technical Specialist, Graham Scott looked at the image and said that this broken fragment more than likely belongs to a small anchor. He also said that it is quite rounded and has quite a flat crown. The section is obscured by the amount of material lost, but the arms and the bottom of the shank may have a flattened oval section with signs of possible transition to a rounded shank above that, but this could equally be due to misleading effects of corrosion. There is also a probable lifting/buoy eye at tip of crown.

He said that it presumably was a stocked type of anchor. The small size and eye suggest that it is probably a kedge, of the 'fisherman's type' of an unknown date. The design is a non-burying type, with one arm penetrating the seabed and the other standing proud. The anchor is ancient in design and has not changed substantially over time. It has a good reputation for use in rock, kelp, and grass (https://www.visitmyharbour.com/articles/1426/anchor-types accessed August 2021).

Anchors are important symbols of the maritime world and are common artefacts found on the seafloor. There are a number of reasons why an anchor may end up on the seabed such as being lost during a storm, being fouled, as part of a shipwreck event or lost due to broken chains or ropes. Whatever the reason they came to be there anchors are important to record and can tell us a great deal about the history of an area, where an anchorage was located, areas of danger to ships and the location of shipwrecks.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 137/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1009: Munitions

These munitions were discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Stuart King discovered them at Greenhithe Wharf.

Both these shells are corroded, with one showing evidence of concretion attached to it. Both had a notched copped band which is indicative of the shells being fired. The nose cones on both shells seem to be made of different materials.

Images were sent Trevor Parker, from the Ordnance Society, and Mark Khan, a UXO Research Manager at Fellows International, who both said that both shells are 30 mm Aden heads, fired from (jet) aircraft. Mark said that they could be practice shells and added that they may be from a number of aircraft including: Hunter, Jaguar, Harrier and Lightning.

The Aden is a 30 mm revolver cannon, developed by the UK Royal Armament Research and Development Establishment at Fort Halstead and the Royal Small Arms Factory at Enfield Lock (https://archive.is/20130126203931/http://www.janes.com/articles/Janes-Air-Launched-Weapons/ADEN-30-mm-cannon-United-Kingdom.html#selection-53.300-53.464 accessed August 2021). The gun was used on many military aircraft, particularly those of the British Royal Air Force and Fleet Air Arm. It was developed post-Second World War primarily to meet British Air Ministry's requirement for increased lethality in aircraft armament. The cannon was fired electrically and is fully automatic once it is loaded (https://web.archive.org/web/20170424092422/http://www.hawkerhunter.com/6787/ accessed August 2021).

It is unknown whether these particular shells were fired from an aircraft during combat or practise, but it is believed that they relate to post Second World War.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 142/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Hanson_1010: Engine Fragment

This engine fragment was discovered in Licence Area 401/2 in the East Coast dredging region, approximately 25.5 km east-south-east of Great Yarmouth. Darryl Mason discovered it on board *Arco Avon*.

This object was reported as possibly a part of a machine of made of brass, showing some threads. It measures 90 mm long by 70 mm wide with a thickness of 80 mm.

Images of the object were sent to Anthony Mansfield, a senior naval engineer, who said that the suggestion of part of an engine is as good a guess as anything considering how broken and deformed it is.

Alistair Byford-Bates of the Coastal & Marine team at Wessex Archaeology said he wondered whether it was the shattered remains of a munition fuse, though with no visible text or markings to help identify it, it is difficult to tell. Images were sent to Trevor Parker from the Ordnance Society to confirm or deny this. He said that the part does not resemble anything he could pinpoint and therefore he does not think it is ordnance related.

Toby Gane also from the Coastal & Marine team suggested it may be a small flywheel. A flywheel is a mechanical device that stores energy as kinetic energy of motion in a rotating mass. A typical energy storage flywheel has a shaft with a rotor attached and a motor generator that can both drive the shaft and extract energy from it. Flywheels continue to be used in all reciprocating engines and in all machines that require very high power for a small part of their working cycles.

As it believed that the most likely purpose of this piece is as part of an engine, it could have originated from a vessel. It may have been thrown overboard due to being broken or alternatively, it belongs to a larger piece of engine or wreck on the seabed and has broken free.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 161/21)
- The National Record of the Historic Environment
- The Historic Environment Record for Norfolk

Tarmac_1011: Possible Rivet or Bar Shot

This metal object was discovered in Licence Area 493 in the Humber dredging region, approximately 25 km south-east of Kilnsea. Wayne Stafford discovered it at Thurrock Wharf.

This iron object measures 370 mm long and widens at each end to a width of 130 mm.

Images of the find were sent to several specialists. Bob MacKintosh of the Coastal & Marine team suggested that it may be the central part of a bar shot. Bar shots are a type of cannon projectile formed of cannonballs, or half-balls, joined by a solid bar. Images were sent to Charles Trollope, an expert in historical ordnance, who said that there is a very good chance that this is a bar shot. He said that the measurements are about right to fit a Culverin cannon and that The Royal Armouries have a bar shot of this style in their collection. With regards to the date, it could belong to the 17th Century. Bar shot was used at close range to slash through the rigging and sails of an enemy ship. The weight on either end of the bar would cause it to partially rotate after it was fired out of a cannon, inflicting maximum damage on sails and rigging.

Conversely, Graham Scott, Paolo Croce, Toby Gane and Alistair Byford-Bates of the Coastal & Marine team all agreed that it was a rivet. They said that it appears to have the form of a snap or pan-headed rivet with a countersunk point. However, if it is a rivet then it must have had a special purpose, as its obviously much bigger than what would be needed to join ordinary plate. Rivets were used on wooden vessels (Viking ships used iron rivets), and it's possible this item was used to clench two timbers together or was a larger rivet for iron/steel elements (other than plate). However, given that there is no evidence of other iron/steel material, this is more likely to have come from a wooden vessel whose timbers have rotted away sufficiently to leave this object behind.

If this object is a rivet, it is thought that it may have come from a timber that found it's way to the seabed and was eroded in the marine environment, leaving it behind. It definitely thought to be from a wooden vessel, however whether it is from a wreck site is unknown at this time. If the object is the central part of a bar shot, it is likely to have been fired and broken as a result of striking a vessel during combat.

Information about this discovery has been forwarded to:

- Historic England
- BMAPA
- The Crown Estate
- The Receiver of Wreck (Droit 162/21)
- The National Record of the Historic Environment
- The Historic Environment Record for East Riding of Yorkshire

email: protocol@wessexarch.co.uk
www.wessexarch.co.uk/projects/marine/bmapa/index.html

Gillingham House
38–44 Gillingham Street
London SW1V 1HU

Tel 0207 963 8000
bmapa@mineralproducts.org
www.bmapa.org

1 St James's Market
London
SW1Y 4AH

Tel 0207 851 5000
marineminerals@thecrownestate.co.uk
www.thecrownestate.co.uk

4th Floor, Cannon Bridge House
25 Dowgate Hill
London EC4R 2YA

Tel 0207 973 3000
customers@HistoricEngland.org.uk
www.historicengland.org.uk

Portway House
Old Sarum Park
Salisbury, Wiltshire SP4 6EB

Tel 01722 326867
info@wessexarch.co.uk
www.wessexarch.co.uk