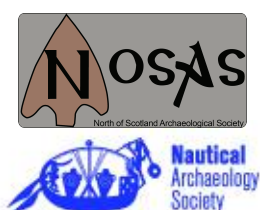




# Scotland's Coastal Heritage at Risk Project Loch Fleet boat graveyard

July 2017

Data Structure Report





<i>Period of fieldwork</i>	8 <sup>th</sup> February – 9 <sup>th</sup> March 2014
<i>Local Authority</i>	Highland
<i>Parish</i>	Dornoch
<i>NGR</i>	NH 79760 94968

The project was run and supervised by Joanna Hambly and Ellie Graham of the SCAPE Trust as part of the Scotland's Coastal Heritage at Risk Project (SCHARP). Anne Coombs of the North of Scotland Archaeological Society (NoSAS) assisted with the organisation and coordination of the project. Training was provided by Joanna and Ellie of SCAPE and Steve Liscoe of the Nautical Archaeology Society (NAS). Eddie Martin (E M photo) carried out a low-level aerial survey and stitched the images together to create a photomosaic. Site recording was undertaken by volunteers from NoSAS and the NAS. Additional site survey was carried out by Tom Dawson (SCAPE), Sarah Salem (Highland Council) and Andrew Wright.

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Acknowledgements:

The SCHARP Project is funded by Historic Environment Scotland, the Heritage Lottery Fund and the Crown Estate and is supported by the University of St Andrews.



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## Abstract

As part of the Scotland's Coastal Heritage at Risk Project (SCHARP), a survey was carried out of a boat graveyard at Loch Fleet in partnership with the North of Scotland Archaeological Society (NoSAS) and the Nautical Archaeology Society (NAS).

Site recording included a drone aerial survey and the creation of detailed written, photographic and drawn records of the remains of 17 wooden fishing boats as well as wood species identification of samples recovered from the vessels. Historical research was undertaken, archival materials were consulted and oral histories were collected.

The project created a record of the vessels and their condition for future monitoring and identified the boats as the remains of the herring fishing fleet which belonged to the village of Embo. The results corrected an erroneous interpretation which stated that the fleet had been deliberately scuttled and burned following the First World War, and instead has shown that abandonment of the vessels at the regular winter safe haven was due to their obsolescence following the introduction of steam power and larger boats to the herring fishing industry which occurred in the two decades prior to the First World War.

The results of the work have been shared at conferences and disseminated through SCHARP networks and will be submitted for publication to the International Journal of Nautical Archaeology in due course.

## Background to the project

In Spring 2013, a group of North of Scotland Archaeological Society (NoSAS) members walked the coast between Golspie and Dornoch to carry out ShoreUPDATE surveys of archaeological sites for the Scotland's Coastal Heritage at Risk Project (SCHARP) run by the SCAPE Trust. In the course of the walk, they came across the fragmentary remains of a number of wooden boats on the shore of Loch Fleet (Figure 1) and submitted them to the project as new sites, highlighting them as worthy of further investigation by nominating the site as a ShoreDIG project. Initial research by NoSAS members showed that the site was recorded as a fishing boat graveyard with a single entry in the Highland Historic Environment Record (HER). This was based on a 1995 newspaper article written by local historian Richard Easson, and recorded a local story that "after the war (1914-1918, I presume) ... the boats constituting the fleet were taken round to Loch Fleet and burned".

Following a site visit in September 2013, NoSAS members and SCAPE staff developed a project to survey and record the vessels in partnership with the Nautical Archaeology Society (NAS).

## Project aims and objectives

- Create a detailed and comprehensive record of the vessels before they deteriorate further;
- Create a record of the vessels' condition which can be used as a basis for future condition monitoring;
- Research the history of the vessels which comprise the boat graveyard;
- Provide an opportunity for learning and involvement for the local community, SCHARP volunteers, and NAS members;
- Share the results with the Highland Council HER and Canmore;
- Publicise the results of the project through the SCHARP networks.

## Project organisation and participation

A total of 14 volunteers were involved in planning and organising the project and in undertaking the fieldwork. Training in the principles of recording and site survey was delivered at the start of the fieldwork and the partnership with the NAS allowed volunteers the opportunity to gain an accredited qualification. Thanks to support from Historic Environment Scotland, eight volunteers completed the Introduction to Nautical Archaeology course.

A community drop in event was held during the fieldwork to collect oral history about the site and the history of fishing locally. This resulted in the identification of contemporary photos of the vessels on the shore at Loch Fleet. Historical research was continued by NoSAS members who visited the Caithness Archives along with SCAPE staff and also undertook local history research in the local community.

Five volunteers also received training in illustration software and digitised the drawings of the vessels.

Around 40 members of the local community attended an evening talk by SCAPE and the NAS which presented the initial results of the survey and research.

SCAPE staff and NoSAS members presented the project at the NAS Annual Conference 2014, and at the Highland Archaeology Festival Conference 2015. NoSAS members delivered a talk about the project at the SCHARP Conference 2016.

Loch Fleet is protected as a SSSI, SPA, Ramsar and NNR, permission to carry out work was secured prior to the fieldwork commencing.

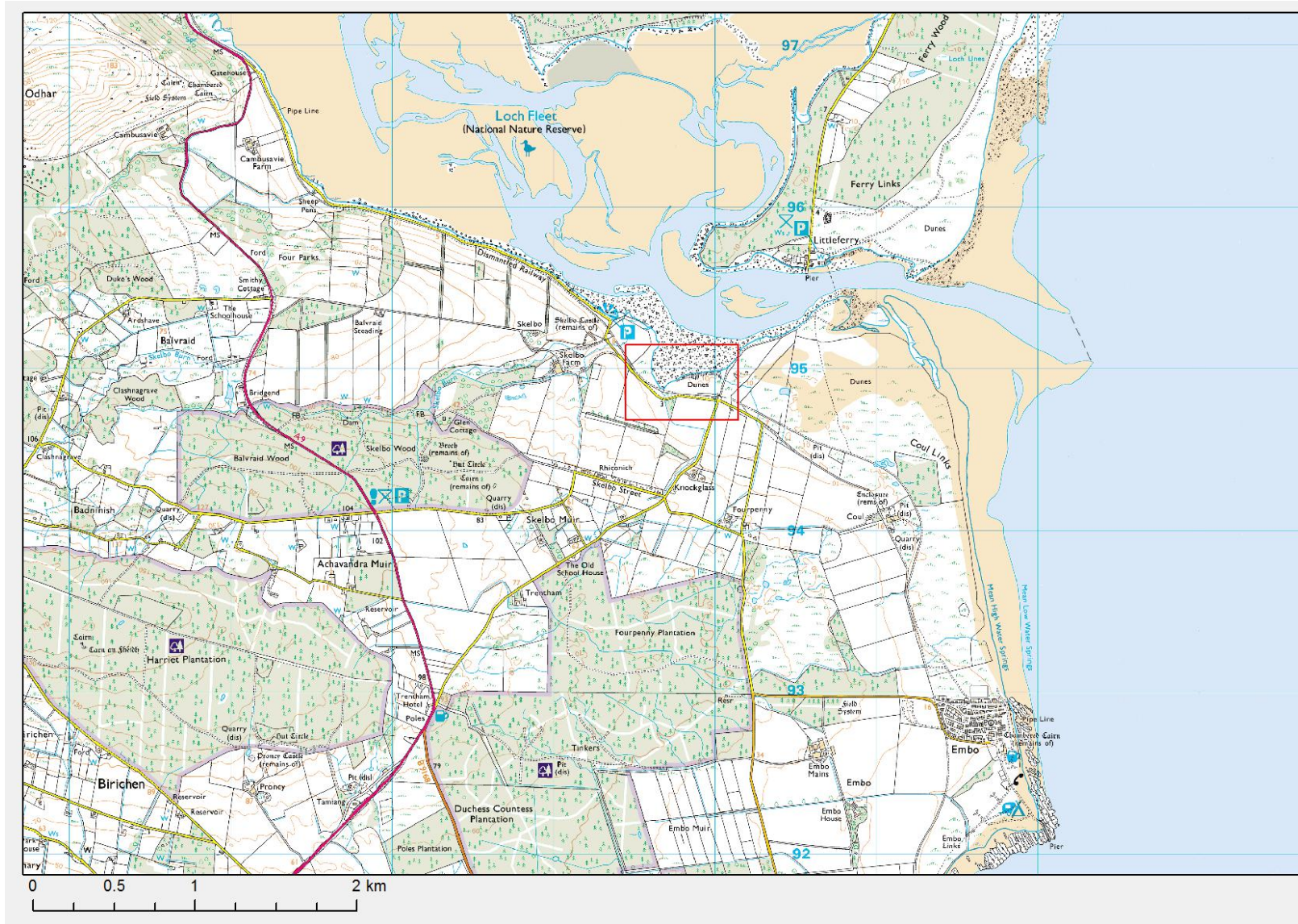


Figure 1: Location map. © Crown Copyright/database right 2014. An Ordnance Survey/EDINA supplied service.

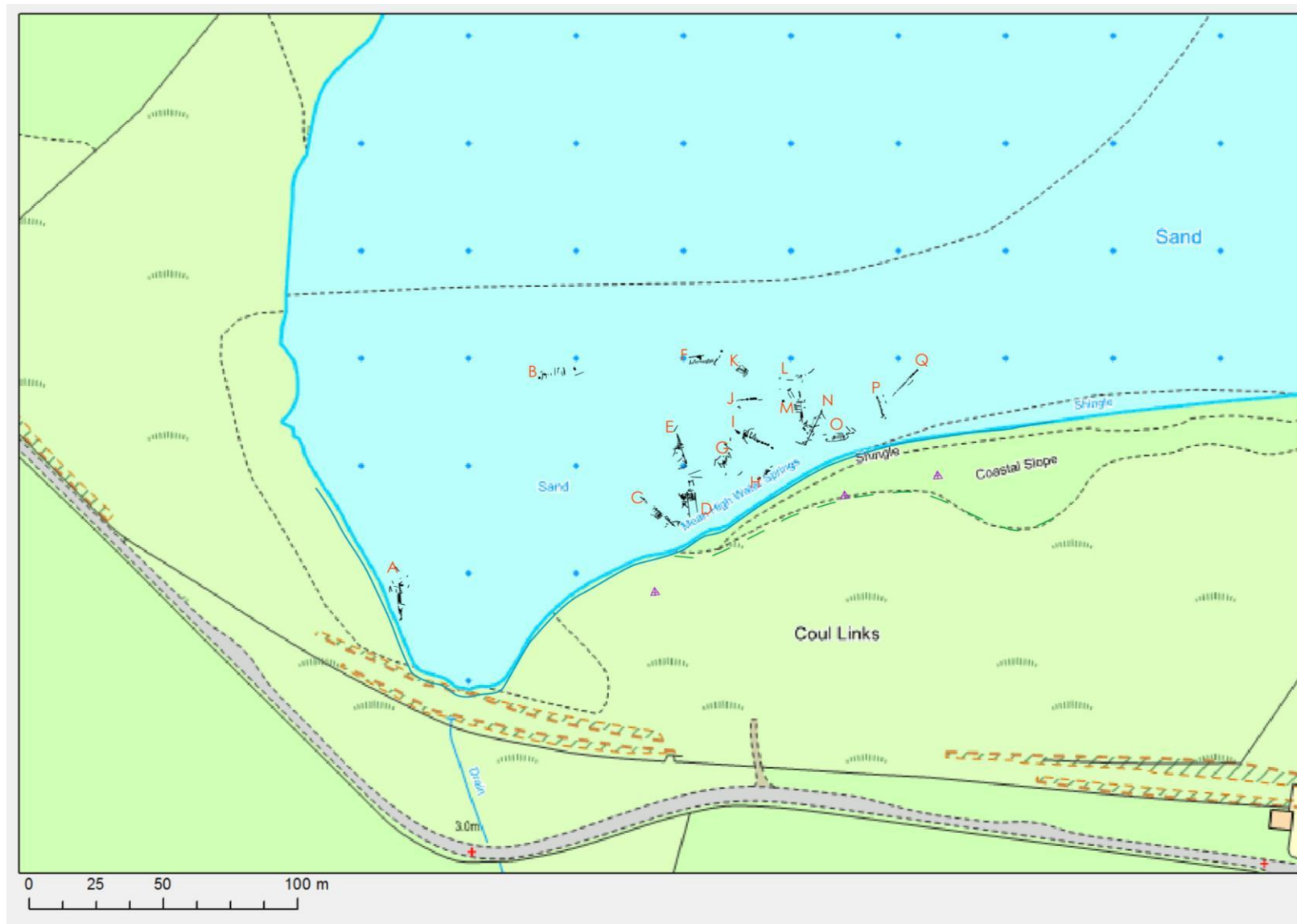


Figure 2: Site map. © Crown Copyright/database right 2014. An Ordnance Survey/EDINA supplied service.

## Site location and remains

The site comprises a group of at least 17 vessels lying across an area of 200m x 80m of a sandy sheltered embayment on the south side of Loch Fleet, centred on NH 79760 94968 (Figure 2).

The vessels are partially buried in sand and beach sediment and are visible as wooden elements including both keels and collapsed fragments of hull structures as well as occasional upstanding timbers, including the remains of frames, stem posts and stern posts. Exposed timbers are largely obscured by seaweed growth. Some timbers retain metal fastenings, and a single capstan lies adjacent to one of the boats. Small localised spreads of rounded stones associated with the vessels are the remains of their ballast.

## Methodology

### Preparation

An initial site visit was undertaken in November 2013 in order to identify specific survey targets. At this stage, each vessel was assigned a letter as a unique identifier, and a further three vessels/survey targets added to the 14 initially recorded by NoSAS. A site survey was undertaken with a Leica TC407 total station theodolite and tied in to the national grid using identifiable points on current OS mapping. At least two nails were attached to each vessel to allow future records to be related to this survey. At the same time seaweed was cleared from the exposed elements in order to reveal details of the vessels for recording.

Eddie Martin carried out a drone survey of the site, and created a geo-rectified, highly detailed photomosaic of the whole site (Figures 3 & 4, also available online at <http://www.gigapan.com/gigapans/159738>).

### On-site survey and recording

The survey methodology comprised three elements; completion of a pro-forma wreck recording form, photographic recording and a scale drawing of each vessel. The NAS hulk recording form was used with on-site guidance from the NAS tutor. The photographic record for each vessel included both general views of the remains and specific diagnostic details, and a photo board was used for identification. General shots showing the overall site and working shots were also taken. Each vessel was drawn at a scale of 1:20 using a baseline and offsets with planning frames used for details where appropriate. Drawings included the nails which had been surveyed relative to the OS national grid, allowing them to be accurately located. Where present and appropriate, upstanding elements were drawn as elevations. Other than seaweed removal, minimal clearance was undertaken in specific areas to resolve particular questions about a vessel, as the beach sediment which had built up in and around the boats was judged to be protecting the wooden structures. As a result, the site record is of the partial visible remains of the vessels. In most cases, more elements survive beneath the loch sediment. The majority of on-site recording was undertaken by volunteers. Less experienced volunteers were teamed with more confident and experienced members of NoSAS, with advice and guidance from SCAPE and NAS staff in addition to the training delivered prior to the start of the fieldwork.

The survey weekend recorded the majority of the vessels, and NoSAS members returned to the site independently when tides allowed in order to complete the records of the other remains.

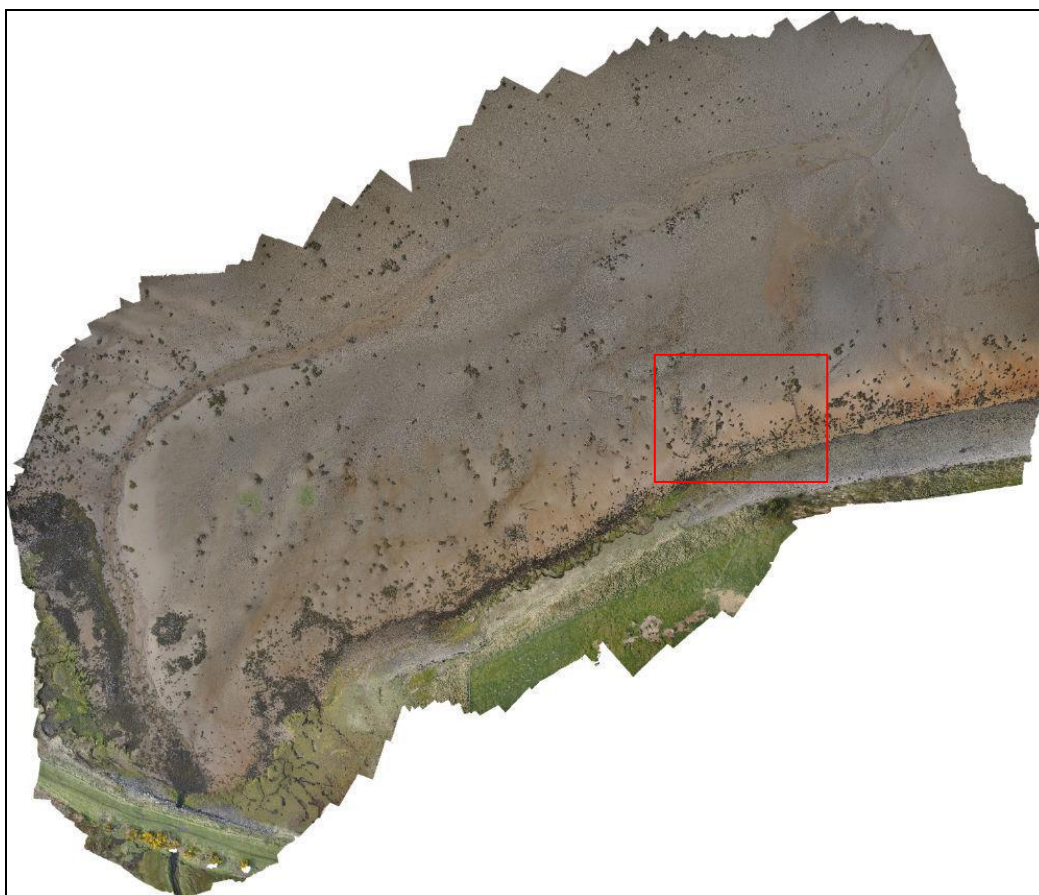


Figure 3: Georeferenced photomosaic generated from aerial photography. Created by Eddie Martin.



Figure 4: Detail showing vessels M, N, O and P.

## Post-excavation and research

The records, drawings and photos for each vessel were checked and digitised. Volunteers digitised the majority of the drawings in the free illustration package Inkscape, following a brief introduction and training in the use of the software which was delivered during the fieldwork weekend.

After completion of the on-site recording, a follow up site visit was carried out with NoSAS in March 2015 to check the records and recover timber samples for species identification. Some timbers were identified by eye on site, and nine samples were recovered for microscopic analysis by volunteer Michael Sharpe (Table 1).

Archival research was undertaken by NoSAS volunteers and SCAPE staff into the history of the Embo fishing fleet.

Copies of the Mariner's Almanac and the Annual Report of the Fishery Board for Scotland were consulted at the Scottish Fisheries Museum, Anstruther. The registers of fishing boats at Caithness Archive Centre in Wick were consulted; and a series of historic photos in the care of the University of St Andrews Special Collections were brought to SCAPE's attention by a member of the Embo community, which show several vessels with identifiable registration marks on the shore at Loch Fleet.

Anne Coombs, a NoSAS member who lives locally, carried out interviews with Embo residents who had a connection with the fishing heritage of the village.

## The historical context

### The development of the herring fisheries in North East Scotland

The development of the herring fisheries in East Sutherland was closely tied to the Highland clearances of the early 19<sup>th</sup> century. Prior to this, fishing was a small-scale and dispersed activity in Sutherland; with the First Statistical Account for Dornoch (in the 1790s) recording a single crew of (notably unsuccessful) fishermen in the parish. During the clearances initiated by the Sutherland Estate in the early 19<sup>th</sup> century, the resettlement of tenants cleared from the inland agricultural townships to specially-constructed coastal settlements was a key policy, with tenants given incentives to turn to fishing.

The village of Embo however, lies in a small parcel of land which was not originally part of the Sutherland estates, but belonged to the closely-related Gordon family. It was founded by the Gordons and predates the estate clearances. By 1834, the date of the Second Statistical Account, a small fishing industry is recorded at Embo, focused on the white fishing (haddock, cod and flounders) with the recent addition of herring fishing, organised through fish curers. Although Embo did not become part of the Sutherland Estate until 1835, it appears to have undergone a similar transformation to the other coastal settlements on the estate, with significant reorganisation into a planned commercial fishing village during the first part of the 19<sup>th</sup> century. The pier at Embo, however, was not constructed until 1895/6, and according to local sources (A Coombs, pers. comm.) was difficult and vulnerable to damage in specific storm conditions; with local demand eventually leading to refurbishment and upgrading in 1934.

The herring fisheries became the main focus of the fishing activity, which developed into a major national industry. The secondary activity of line fishing for white fish could be carried out from smaller boats in more local waters, allowing crews to return home every day. This generally gave a lower return than the herring fishing but provided a more stable source of food and income (Dorian 1980, 65).

The introduction of Government subsidies on larger fishing boats and bounties on overseas sales of herring led to a new emphasis on the economic importance of fishing, enabled by the development of the railways which facilitated the transport of the catch to a wider market. To meet this need, new wooden sailing drifters were developed designed specifically for herring fishing.

#### The development of the herring fishing boats

Herring fishing involved long seasons at sea following the shoals, and fleets sailed around the Scottish coast to the Western Isles, west coast and Shetland before returning to the east coast over the course of the summer season; boats often also sailed south for a second season in the autumn around Yarmouth (Dorian 1980, 56).

This required the development of new styles of boats, and herring fishing was carried out from large sailing boats built for speed and manoeuvrability. By the latter part of the 19<sup>th</sup> century, east coast herring fleets were predominantly comprised of Zulus (Tanner 2010, 15-16). Zulus were sailing herring drifters developed in Lossiemouth on the Moray coast in 1879, a hybrid design incorporating elements of the two main types of vessel in use on the east coast; the fifie and the scaffie.

The scaffie was mostly used on the Moray coast; beamy, clinker-built with a curved stem and a raking stern. The fifie was common on the other areas of the east coast of Scotland, and in Orkney with a straight stem and stern (March 1952, 234-5). The Zulu combined elements of these two designs with a straight stem and raked stern, designed for speed, strength and manoeuvrability, and rapidly became the most popular design for sailing drifters due to its speed and ability to deliver catches to market ahead of rivals (March 1952, 253, Figure 5). Wooden fishing boats such as these herring drifters had a working life of around 20 years, beyond which it became uneconomical to repair and maintain them; these generational improvements in the herring fleet may reflect the lifespan of the boats (Colin Martin, pers. comm).



Figure 5: Zulu Muirneag drawn by Kathy Bray, from <http://glennmci.brinkster.net/mng/mng.html> (23/03/2017)

## Historical research

### Archival research

The Annual Reports of the Fishery Board for Scotland, held in the Scottish Fisheries Museum in Anstruther, were consulted. These record the number of boats and the number of resident fishermen and boys in each fisheries district. From 1882 the district figures were divided at village level. Embo fell within the Helmsdale fishery district and from this point onwards, the figures for Embo can be compared against those for the other creeks in the district and as a proportion of the district as a whole.

From 1874 these records divide the fishing fleet into three size classes:

1<sup>st</sup> class boats with keels of 30ft and over. This is subdivided from 1894 onwards into vessels with keels of 30-45ft and 45ft and over;

2<sup>nd</sup> class boats with keels of between 18 and 30ft;

3<sup>rd</sup> class boats with keels of under 18ft.

The Registries of Sea Fishing Boats in Scotland for the port of Wick, held in the Wick Archives, list details about the size and mode of fishing of the vessels, and demonstrate that the larger 1<sup>st</sup> class boats used nets and worked in the herring fishing, and that the smaller 2<sup>nd</sup> and 3<sup>rd</sup> class boats were generally employed in the line fishing, used for white fish (Figure 6).

A

Port Wick Letters ✓

Name of Boat Elizabeth and Isabella

(If other than Letters of Port.)

Name and Address of Builder

Registered Number			Port or Place to which Boat belongs	Description of Boat		If Registered under Merchant Shipping Act		Length of Keel	Breadth	Depth	Tonnage	Net	Measure
1st Class	2nd Class	3rd Class	When and where built	How propelled, Rig and Sail used	Mode of Fishing	Official Number	Port Number and Year	Feet	Feet	Feet	Gross	Net	Min.
73			Embo	Sailing	Net			52	18	5	7	3 1/4	3 1/4
			as known 1895	Lug rigged									
			Louisburgh	Fore and Aft									

Names, Residences, and Description of the Owners and Number of Shares held by each Owner.

Hugh Ross and others of Embo in the county of Lutherland fishermen.

Registering Officer.

Dated 20th February 1906

B. BILLS OF SALE, MORTGAGES, AND TRANSMISSIONS.

Port Wick

Name of Boat "Sophia"

(If other than Letters of Port.)

Name and Address of Builder

Registered Number			Port or Place to which Boat belongs	Description of Boat		If Registered under Merchant Shipping Act		Length of Keel	Breadth	Depth	Tonnage	Net	Measure
1st Class	2nd Class	3rd Class	When and where built	How propelled, Rig and Sail used	Mode of Fishing	Official Number	Port Number and Year	Feet	Feet	Feet	Gross	Net	Min.
58			Embo	Sail	lines			21	8	1	2		
			unknown	Lug rigged									
				Lug									

Names, Residences, and Description of the Owners and Number of Shares held by each Owner.

Mr James Buchanan, Embo in the county of Lutherland

Registering Officer.

Dated 28

B. BILLS OF SALE, MORTGAGES, AND TRANSMISSIONS.

A

Port Wick Letters ✓

Name of Boat Nelly

(If other than Letters of Port.)

Name and Address of Builder

Registered Number			Port or Place to which Boat belongs	Description of Boat		If Registered under Merchant Shipping Act		Length of Keel	Breadth	Depth	Tonnage	Net	Measure
1st Class	2nd Class	3rd Class	When and where built	How propelled, Rig and Sail used	Mode of Fishing	Official Number	Port Number and Year	Feet	Feet	Feet	Gross	Net	Min.
381			Embo	Sail	lines			16	7	2	8	1 1/2	1 1/2
			1906 (re built)	Lug									
			Liverpool	as Lug sail									

Names, Residences, and Description of the Owners and Number of Shares held by each Owner.

Alexander Grant of 5 Back Street, Embo in the county of Lutherland

Registering Officer.

Dated 30th April 1906

B. BILLS OF SALE, MORTGAGES, AND TRANSMISSIONS.

Figure 6: Entries for Embo boats in the Registries of Sea Fishing Boats in Scotland, held in the Wick Archives, showing:

- A: 1st class vessel Elizabeth & Isabella, net fishing, 52 foot keel, owned by Hugh Ross and others of Embo  
B: 2nd class vessel Sophia, line fishing, 21 foot keel, owned by Peter Francis of Embo  
C: 3rd class vessel Nelly, line fishing, 16 foot keel, owned by Alexander Grant of Embo

The Fishery Board reports (Figure 7) show that in the later 19<sup>th</sup> century and prior to the First World War, Embo's fleet was mostly comprised of 1<sup>st</sup> class boats, with keels between 30 and 45ft in length. Of the villages which comprised the district of Helmsdale, Embo had the largest number of 1<sup>st</sup> class vessels.

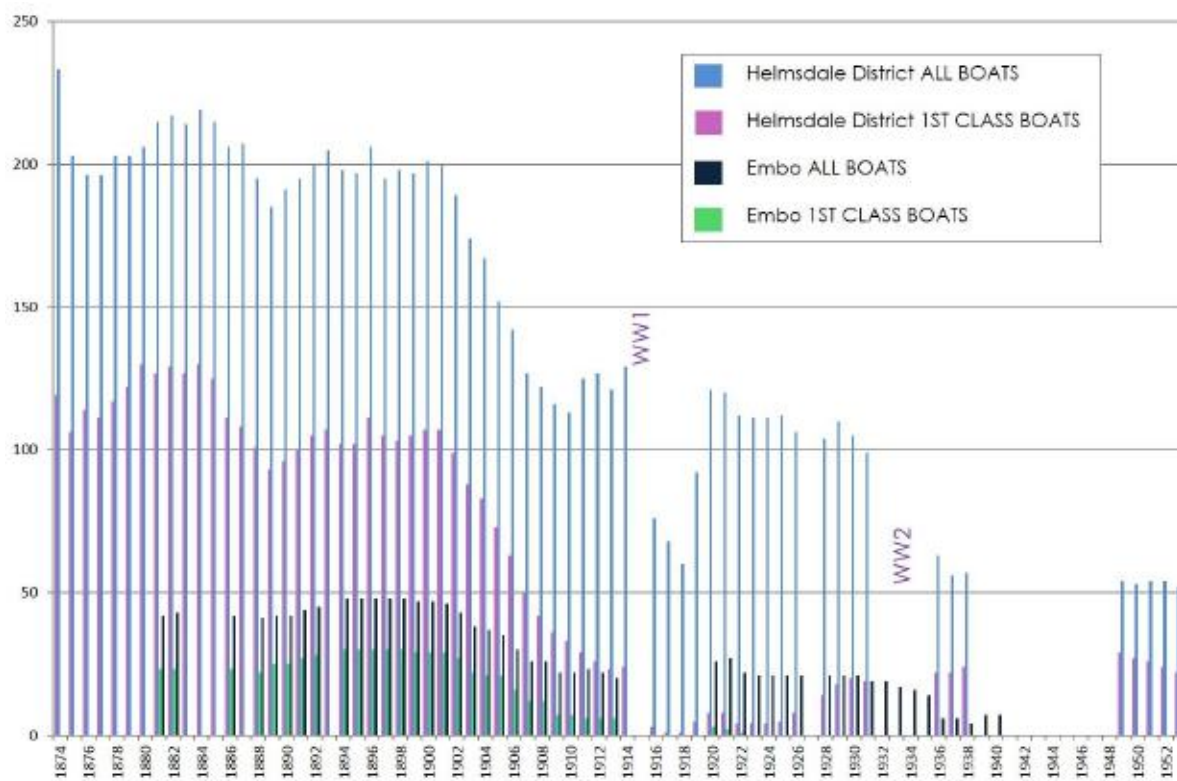


Figure 7: Data from the Annual Reports of the Fishery Board showing the total number of boats and the number of 1st class boats for the district and for Embo. The gaps are due to the 1st and 2nd World Wars, other gaps reflect volumes missing from the collection of the Scottish Fisheries Museum.

These figures show that number of 1<sup>st</sup> class vessels in Embo peaks at the turn of the 20<sup>th</sup> century, with 30 1<sup>st</sup> class boats between 1894 and 1898. This slowly declines from then onwards. However, from 1908, the number of 1<sup>st</sup> class vessels drops to single figures and by the hiatus in the records caused by the war from 1914, Embo has only six 1<sup>st</sup> class fishing boats.

This echoes a broader pattern seen across the district from the turn of the century onwards; the overall number of boats declines, with the 1<sup>st</sup> class vessels employed in the herring fishing showing a more severe drop. It appears that from this time, it was the class 2 and class 3 vessels engaged in the white fishing for local markets, which played a more important role in the fishing industry of the district.

Reflecting the development of new technology with the introduction of larger boats, and, later, steam power, the larger 1<sup>st</sup> class subdivision of 45ft and over is introduced in 1894. However, although Embo retains 29 boats in its 1<sup>st</sup> class fleet, only one of these falls within the new larger 1<sup>st</sup> class category until 1902 when the report records five Embo boats of 45ft or over.

The registers often, but not consistently, record the dates and circumstances of the end of each vessel's registration. Where the dates are recorded, 1<sup>st</sup> class vessels often fall out of use in the first decade of the 20<sup>th</sup> century, generally ceasing use for fishing, or being declared unseaworthy or broken up prior to the start of the First World War. Some are sold, with sales mostly taking place post-war. Conversely, the end dates for the use of the 2<sup>nd</sup> and 3<sup>rd</sup> class boats are generally later, in

the 1920s, 1930s or up to the 1940s, reflecting the continuation of the line fishing much later than the demise of the local herring fishery.

The Fishery Board Reports also record the numbers of resident fishermen and reflect the same situation (Figure 8). The overall numbers of resident fishermen in Embo and the district are more or less maintained up to 1914, while numbers employed in the herring drop from the turn of the century and have tumbled by middle of first decade. Resident fishermen were either working in white fishing on the smaller boats or with very small numbers hiring their labour out on larger non-local boats.

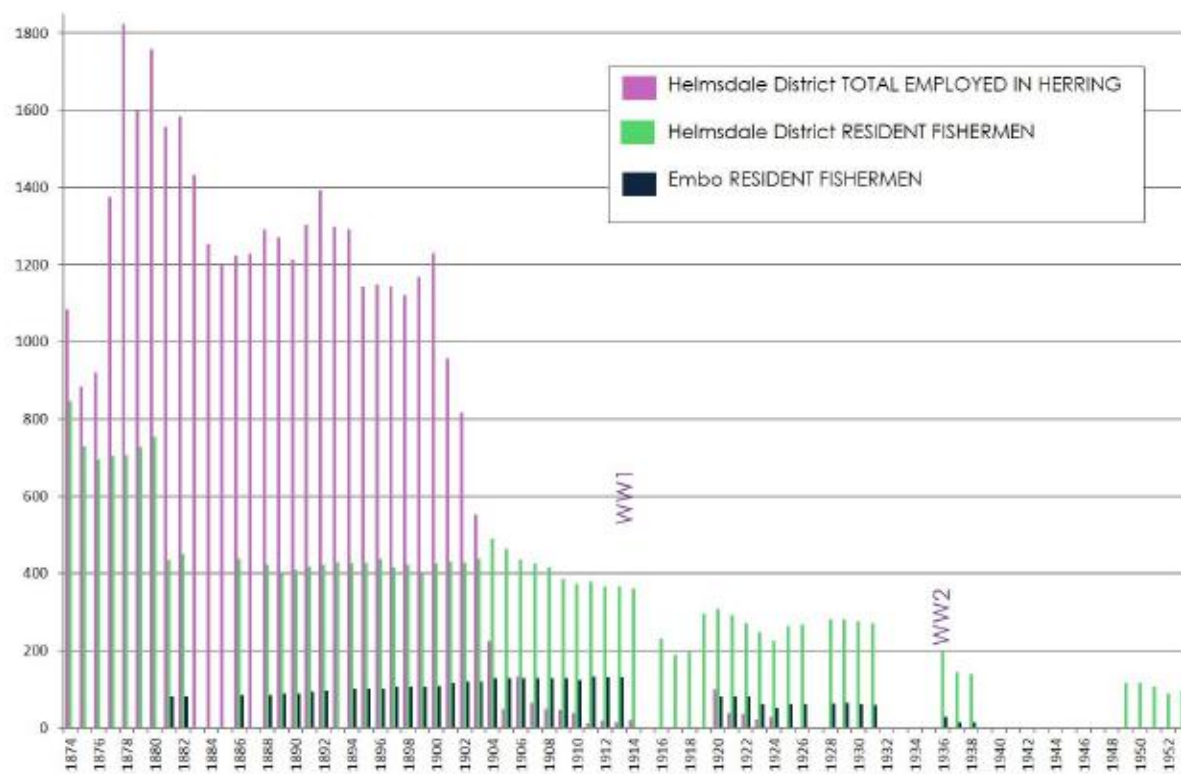


Figure 8: Data from the Annual Reports of the Fishery Board showing the numbers employed in fishing at District and village level

The figures recorded in the Fishery Board Reports and the Registries of Sea Fishing Boats show that Embo's herring fleet dwindled through the first decade of the 20<sup>th</sup> century, and was almost non-existent by the outbreak of the First World War.

### Oral history

Oral history research was carried out by Nancy Dorian in the 1970s amongst Golspie residents who remembered the local fishing industry in the early 20<sup>th</sup> century. This states that by the beginning of the century, the East Sutherland fishing industry had already begun to decline, and that increasing numbers were finding employment in other occupations. Finding a 'shore job' was perceived as desirable and a measure of success (Dorian 1980, 8, 31).

Dorian records that the herring drifters were often owned in shares by the crew, with the boats run along democratic lines and experience; the principal factor in ascribing seniority (*ibid*, 29). The hazards of the east coast harbours are described, and the importance of safe havens, including Loch Fleet. This sheltered loch was not only used as a safe place to moor over a spell of bad weather lasting several days by both the Golspie fleet on the north shore and the Embo boats on the south,

but also served as the winter haven where boats were hauled up outside of the fishing season(s) both because of the dearth of locally available suitable harbour facilities and to avoid paying harbour fees. Given that the pier at Embo was not constructed until 1895, there was likely a tradition of using the loch shores as a safe haven, while the apparently problematic conditions even after the pier was built until its refurbishment in 1934 would have necessitated the use of another site as a safe winter haven.

With the introduction of steam power, the purpose-built sailing drifters, especially the Zulu with her raked stern and narrow beam, proved unsuitable for conversion to steam, and were quickly rendered obsolete. Shares in the larger steam powered boats were too expensive for small village crews, and with the change in the patterns of boat ownership, fishermen hired themselves out on non-local boats (*ibid*, 58). With the arrival of steam, there was no market for resale of the wooden sailing drifters and Dorian records that redundant vessels were sometimes abandoned on the shores of Loch Fleet in the places where they were usually hauled up out of the herring season by the fishermen of Embo and Golspie (*ibid*, 57).

#### Historical photos

During the drop-in event run at the same time as the fieldwork, members of the local community brought in photos dating to 1932 showing both the north and south shores of Loch Fleet.

Figure 9, a view of the south side, shows vessels which appear to be in use at the pier, one with the identifiable registration mark WK 74.

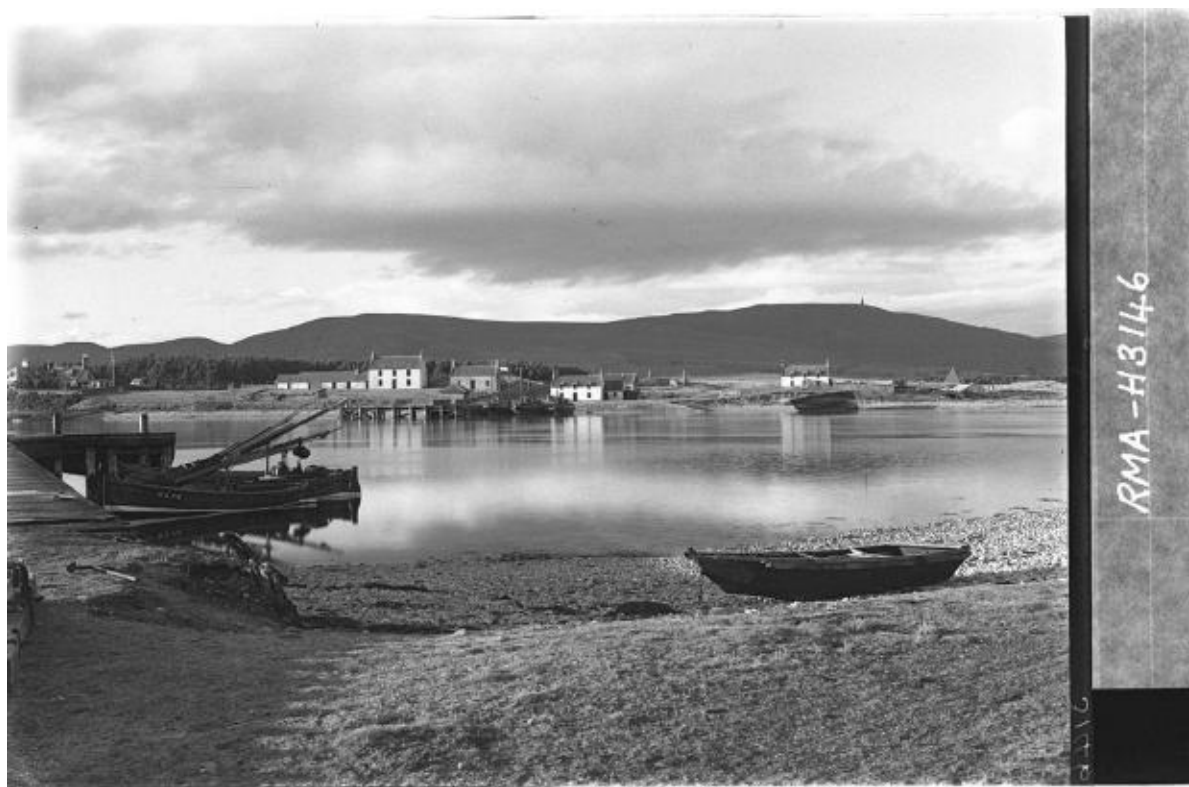


Figure 9: The Evelyn Mould at the pier on the south shore of Loch Fleet. University of St Andrews Special Collections RMA-H3146

The view depicted on Figure 10, taken from the site of the boat graveyard shows two larger abandoned 1<sup>st</sup> class boats; one smaller boat, WK 58, which appears to be in use and retains a mast and rigging, and two further small boats hauled out, one of which is identifiable as WK 482.



Figure 10: Abandoned 1st class vessels and serviceable smaller boats on the south shore of Loch Fleet. University of St Andrews Special Collections RMA-H3147

The Mariner's Almanac records the names and registrations of boats belonging to each port, though small vessels are not included before 1932, and allows us to name the vessels in these photos:

WK 74 is the *Evelyn Mould*, first registered in Embo in 1933 and owned by Paul Mackay

WK 58 is the *Breadwinner*, first registered in Embo in 1932 and owned by John Ross

WK 482 is the *Georgina Isabella*, first registered in Embo in 1932 and owned by David Fraser. The Registers held at the Caithness Archives state that she was broken up in 1941.

These vessels were in use at the time the photograph was taken, and are all of 2<sup>nd</sup> or 3<sup>rd</sup> class size, i.e. line fishing boats. The larger 1<sup>st</sup> class vessels do not appear to be in seaworthy condition and have apparently been abandoned by this time, reinforcing the conclusion that the herring fishing had finished in Embo by this time. These photos show that the use of Loch Fleet as a haven for the smaller line fishing boats continued, alongside the redundant hulks of the bigger vessels. The registration mark of the larger boat on the right is not wholly legible, but that on the left may be WK 28, the *Spartan*, a 1<sup>st</sup> class sailing lugger with a 42 ft keel, built in 1886 and owned by Hugh Ross of Embo. Unfortunately, the Register doesn't record an end date for the vessel's registration; but it is likely that it is the boat depicted on the photograph, and therefore almost certainly one of the vessels recorded in this survey.

## Results

Full descriptions of the individual boats recorded are in the gazetteer below. The wooden fishing boat graveyard at Loch Fleet comprises 17 individual vessels (identified by the letters **A-F** and **H-Q**). Of these, six (**A, C, E, I, N, Q**) can be described as Zulus with a degree of confidence. A further nine vessels (**B, Di, Dii, F, H, J, K, L, M, O, P**) can only be described as wooden sailing fishing boats, as too few diagnostic features were identified on site to clearly indicate the type; though it is considered

likely that these are also Zulus, based on their historical context and through group association. A discrete spread of detached elements likely represents at least one further wooden fishing boat (**G**) of which too little survives to be positively identified, but includes a broken rudder and possible fragment of stern post.

Although many of the vessels are fragmentary, 10 (**A, C, D, E, I, L, M, N, O, Q**) can be identified as 1<sup>st</sup> class boats with some confidence based on the visible length of the keel, the distance between (approximately *in situ*) visible stem and stern elements or the area over which elements are visible. Of four further boats (**B, F, J, P**) either too little is visible or too little survives to indicate the likely original size of the vessel. Two (**H, K**) appear to be the remains of smaller boats, and one feature (**G**) is little more than a scatter of timbers from which it is impossible to determine the size of the vessel or even whether these represent a single boat.

All are wooden sailing vessels, none have any evidence of conversion to steam power. A capstan adjacent to one boat (**J**) would have been employed on the sailing drifters to assist in handling the sails and nets (Anson 1930; March 1952). Capstans were introduced from c.1884 to sailing drifters, and the additional power they provided for handling gear, sails and nets allowed the size of fishing boats to increase further. This example was made by a company called R Tindall & Sons, ironmongers based in Fraserburgh. It would have required a small boiler to supply steam, but no evidence of this was found; presumably it was salvaged from the hulk or was moved by the natural action of the sea after abandonment. Possible evidence of salvaging of timber was recorded on the cut ends of the futtocks of vessel **F** and the sawn end of the rudder in group **B**.

Edgar March's authoritative book on Sailing Drifters (1952) describes in detail the construction of a Zulu and the wood selected for each element. As part of this project, selected samples were recovered from identifiable elements of the vessels for wood species identification undertaken by Michael Sharpe and presented in Table 1. The results generally corroborate March's information. March records that beech was used for the keel. This is substantiated by the results of species identification for boats **A** and **N**. However for two further vessels (**D** and **E**), the keels were identified as larch. March states that stem and stern posts were oak, and that oak was also mostly used for frames, though in some vessels larch was selected. This is corroborated by species identification undertaken for the stern and frames of vessels **A, L** and **Q**; the stern posts of **B** and **M**, and the frames of boat **E**. One vessel (**B**) had a frames towards the midship which was identified as beech. Where samples of planking were recovered (**A, O** and **Q**) the identification corroborated March's information that larch was used.

WRECK	BOAT COMPONENT	SAMPLE NUMBER	MICROSCOPIC WOOD IDENTIFICATION	ON-SITE WOOD IDENTIFICATION
A	Stern post	001	Oak ( <i>Quercus</i> sp.)	
A	Keel? Near bow	002	Beech ( <i>Fagus sylvatica</i> )	
A	Plank, starboard	003	Larch ( <i>Larix decidua</i> )	
A	Two frames	-		Oak
A	Floor	-		Oak
B	Frame, midships	004	Beech ( <i>Fagus sylvatica</i> )	
B	Stern post	-		Oak
L	Stern post			Oak

WRECK	BOAT COMPONENT	SAMPLE NUMBER	MICROSCOPIC WOOD IDENTIFICATION	ON-SITE WOOD IDENTIFICATION
L	Two frames?			Oak
M	Stern post			Oak
M	Mast step			Oak
N	Keel	005	Beech ( <i>Fagus sylvatica</i> )	
Q	Planking	006	Larch ( <i>Larix decidua</i> )	
Q	Stern post			Oak
Q	Three floors			Oak
O	Planking	007	Larch ( <i>Larix decidua</i> )	
E	Keel	008	Larch ( <i>Larix decidua</i> )	
E	All visible frames			Oak
D	Keel	009	Larch ( <i>Larix decidua</i> )	

Table 1: Wood species identification, Michael Sharpe

## Discussion

Of this boat graveyard, a significant proportion of the vessels appear to be of the size and shape that were engaged in the herring fishing. Documentary and oral history research has indicated that this fleet was gradually rendered obsolete by technological developments with the introduction of larger boats and steam power over the first decade of the 20<sup>th</sup> century and that by the time of the 1<sup>st</sup> World War Embo's herring fleet had already largely ceased to operate. Furthermore, given the 20-year lifespan of wooden sailing drifters, it is likely that the majority of the Zulu fleet was reaching the end of its economically viable working life at this time. Neither Embo, nor the other small fishing villages in the Helmsdale district adopted the new bigger boats which were developed and superseded the Zulu sailing drifters but were too expensive for local crews and too large to be accommodated in the village harbours. The shores of Loch Fleet were long established in use as a winter haven for boats outside of the herring season and it seems likely that the obsolete vessels were simply abandoned there as they ceased to be useful.

Photographs taken in the 1930s of boats laid up at Loch Fleet appear to show both abandoned unseaworthy vessels and smaller boats used in the local line fishing which remained in use at this time. The boat graveyard likely developed over time, with the smaller vessels continuing to use Loch Fleet to haul up out of season, alongside the larger abandoned hulks of the obsolete herring fleet. Some of the smaller boats recorded by this project (**H & K**) may be the remains of the line fishing boats which continued in use into the 1940s and beyond.

The wreck recording and the research undertaken by this project has shown that there is no evidence to substantiate the local story recorded in the newspaper and subsequently in the HER, of the deliberate scuttling and burning of the fleet following the First World War. It is likely that useful elements of the vessels – both machinery and large timbers – may have been stripped out and reused (**F, G, & J**) but no evidence of burning was found on any of the vessels, though the presence of pitch for waterproofing may have been mistaken for charring in the past.

The First World War certainly caused major social upheaval and was a catalyst for major change in the fishing villages of the east coast of Sutherland, as everywhere; with widespread emigration and

diversification of occupation. However, as demonstrated by Dorian's research, and manifested in the official documentation, the decline of the herring fleet of Embo, and other fishing small villages, took place prior to the outbreak of war.

The boat graveyard at Loch Fleet is the result of various factors, principally to the obsolescence of the Zulus in the face of the introduction of steam power for which the sailing drifters were unsuitable for conversion and with which they couldn't economically compete. Coupled with this, the local harbour facilities were also inadequate for the new, much bigger steam drifters. Furthermore, the steam boats were financially beyond the reach of the local crews who had previously owned shares in the sailing boats. Herring fishing declined in the small villages, and became concentrated in fewer, larger ports; which were mostly located in Aberdeenshire. These factors contributed to the new socio-economic model of fishermen hiring their labour out on the new boats based in the few big main ports, which rendered the old sailing herring fleet obsolete and led to their piecemeal abandonment at Loch Fleet.

### Future work

Local research continues, and is focused on the local history of Embo and the fishing families of the village. This research, combined with the information about boat ownership contained in the Registers can allow the biography of a boat to be traced, and linked to the family who owned it. Combining this with census records could result in the reconstruction of the social history of Embo as an exemplar small fishing village of the east coast of Scotland. This research will be incorporated into a paper along with the results of the survey and research into the history of the Findhorn Bay boat graveyard to be submitted for publication to the International Journal of Nautical Archaeology.

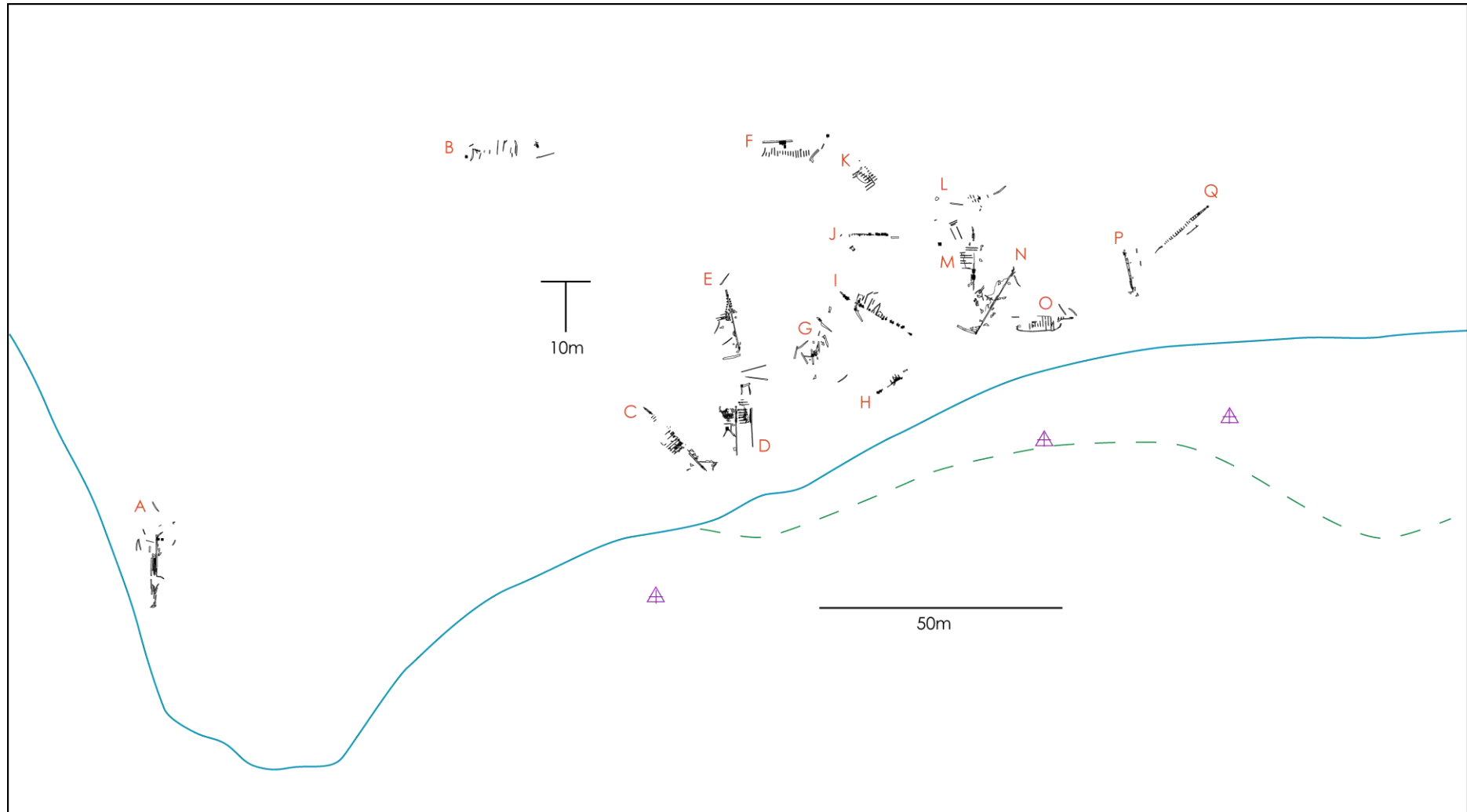


Figure 11: Site plan showing locations of wrecks A-Q on foreshore



*Figure 12: General view across site*



*Figure 13: Working shot of volunteers recording boats*



*Figure 14: Embo harbour, first constructed in 1895, refurbished due to local demand in 1934, and derelict in 2014.*

## Bibliography

Anson, P., 1936. *Fishing Boats and Fisher Folk on the east coast of Scotland*. London.

Dorian, N., 1985. *The Tyranny of Tide: an oral history of the East Sutherland fisherfolk*. Ann Arbour.

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## Gazetteer of vessels



Vessel ID                      A

Dimensions (m): length 12                      Breadth:                      Height:

Vessel type:                      Zulu                      Propulsion: Sail                      Construction:                      Clinker

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes		12m	Stern post:	Yes		
Keelson:	Yes			Rudder:	Yes		
Planking:	Yes			iron bolts:	No		
Stem post:	Yes			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	4		Other visible elements:			
Floors:	Yes	1					stem deadwood
Knees:	No						?chimney stay
							port garboard strake
Frame spacing (centre to centre):			0.4-0.45m				
Fastenings:			Iron				
Waterproofing:			pitch				

Description:

The remains of a 1st Class Zulu fishing boat, 12m in length. The keel (beech) is visible for much of its length. Surviving areas of planking (larch) and a notched floor indicate that this was of clinker construction. The garboard strake survives in situ on the port side. Only the base of the stem post (oak) has survived where it meets the keel, along with the stem deadwood, indicating a straight stem. The oak stern post survives to a height of 0.7m, indicating the original raked angle of the stern. No in-situ frames or floors survive, but several loose futtocks (oak) and one loose floor (oak) lie immediately around the vessel. Pitch survives on the inside of the planking, the gaps in the pitch indicate the original position of the frames and the frame spacing. A large piece of timber with Fe fittings next to the stern post may be the detached rudder. An Fe object comprising an O-shape with a straight attached Fe rod lying close to the vessel may be a chimney stay.

Surveyor name:    Jonie & Richard Guest

Date of survey:    25/02/2014

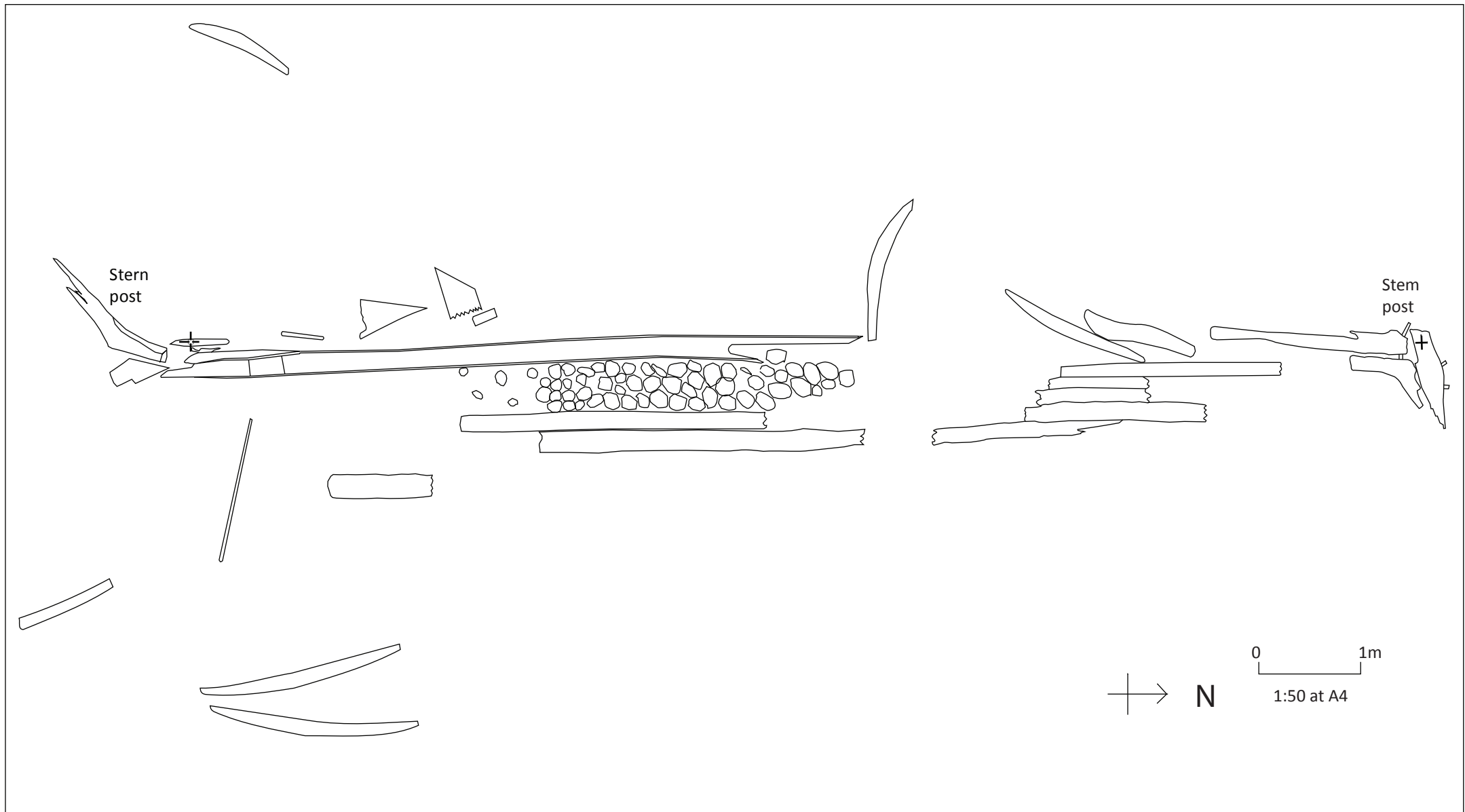


Figure 15: Wreck A. Drawn by Richard & Jonie Guest, 25th February 2014.



Figure 16: Wreck A, view along keel.



Figure 17: Wreck A, detail of planking showing clinker build and gaps in pitch showing frame spacing.



Figure 18: Wreck A, detail of base of stem post and stem deadwood.



Vessel ID B

Dimensions (m): length 9 Breadth: 3 Height: 0.7

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Clinker

#### Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		1.8x0.6m
Keelson:	No			Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	No		
First futtock:	Yes	6		Other visible elements:			
Floors:	No						
Knees:	No						

Frame spacing  
(centre to centre):

Fastenings: Iron

Waterproofing:

#### Description:

Remains of a wooden fishing boat. Few visible elements comprise stern post, futtocks, some detached, some possibly in situ (one midships frame identified as beech), and small piece of planking. Stern post (oak) survives standing to 0.7m above the level of the foreshore at a raked angle. Too few frames survive in situ to gauge the frame spacing.

Surveyor name: Jonie & Richard Guest

Date of survey: 24/02/2014

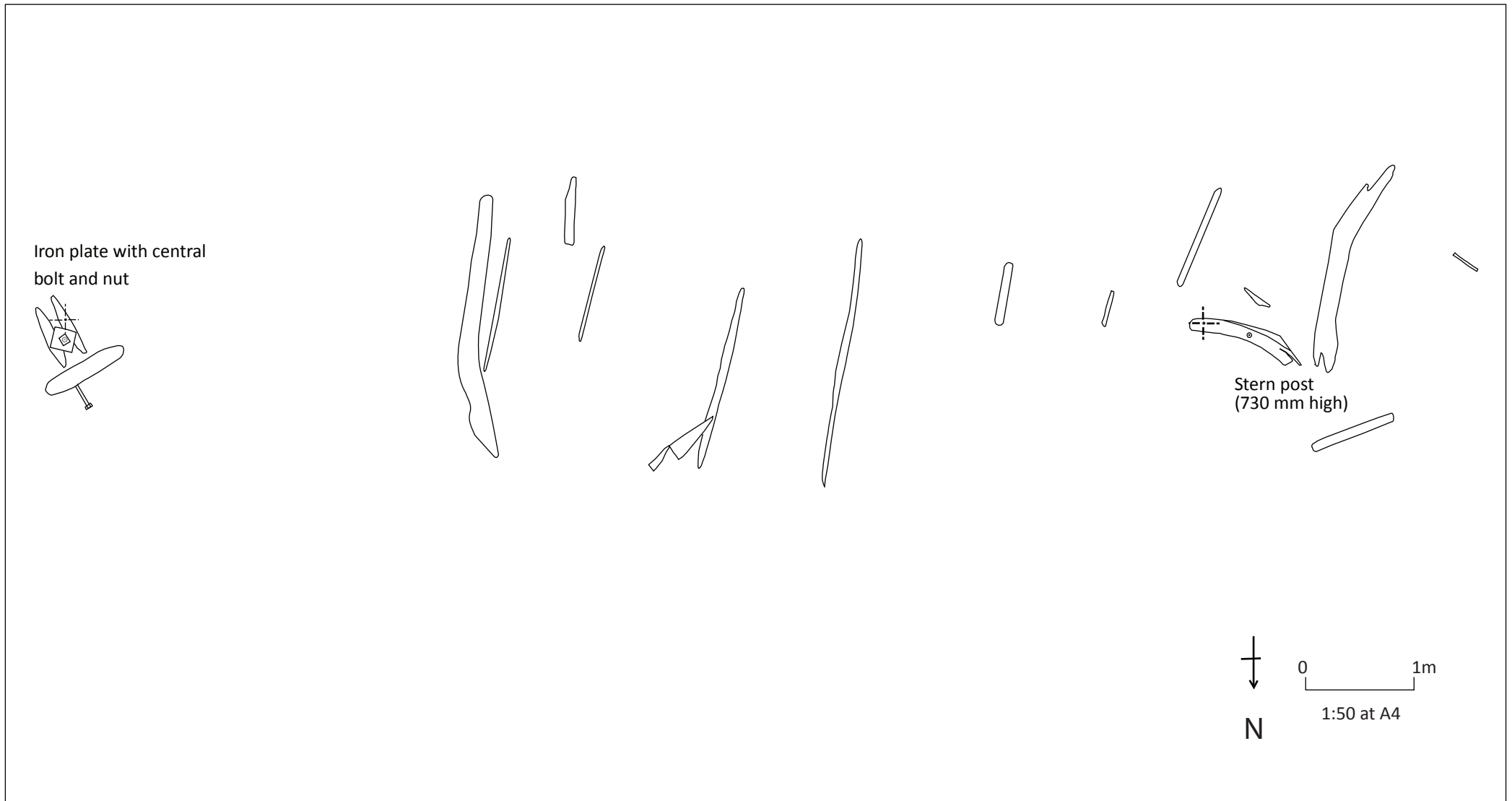


Figure 19: Wreck B. Drawn by Richard & Jonie Guest, 24th February 2014.



Figure 20: Wreck B



Figure 21: Wreck B, stern post

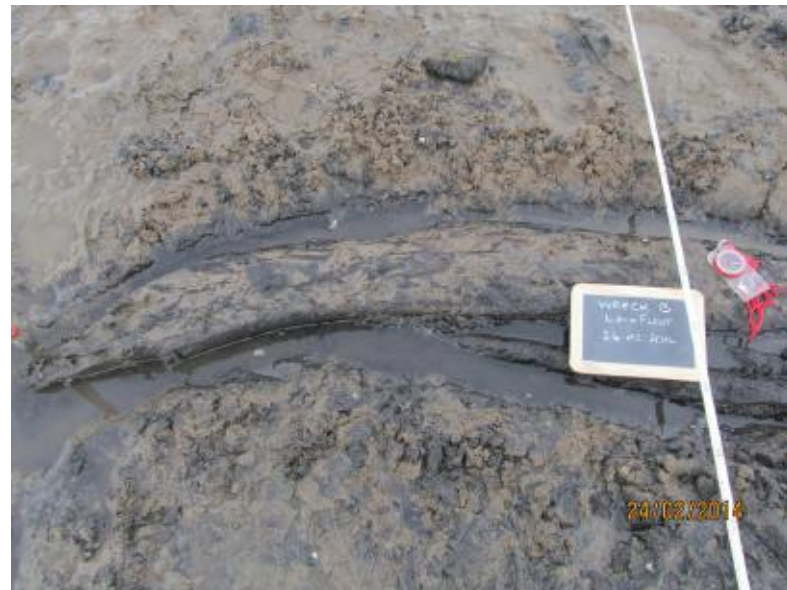


Figure 22: Wreck B, detail of frame



Vessel ID C

Dimensions (m): length 16.25 Breadth: 5 Height:

Vessel type: Zulu Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes		partly buried	Stern post:	Yes		partially survives
Keelson:	Yes		partly buried	Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	Yes		broken	Gudgeons:	Yes		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	12	up to 2.5m survives	Other visible elements:			
Floors:	Yes	3	1m	bow deadwood			
Knees:	Yes	1	0.7m	starboard garboard strake			
Frame spacing (centre to centre):			0.5m				
Fastenings:			Iron				
Waterproofing:			pitch				

Description:

Remains of a 1st Class Zulu, lying on its starboard side. The original length of keel appears to survive, though partly buried. Lower part of stem post and attached stem deadwood survive detached from keel, indicating the vessel had a straight stem. Lower part of stern post survives in situ, with evidence of an Fe gudgeon, and indicates the original raked angle of the stern. Twelve in situ first futtocks on the starboard side, the lower ends lying over the in situ floors, three further detached floors, and one cut timber knee in the immediate area. One small fragment of planking visible on the starboard side, but it is likely that more survives buried beneath mud and the other elements of the hull. Further starboard elements likely also survive buried in the mud of the foreshore.

Surveyor name: James McComas  
Date of survey: 09/02/2014

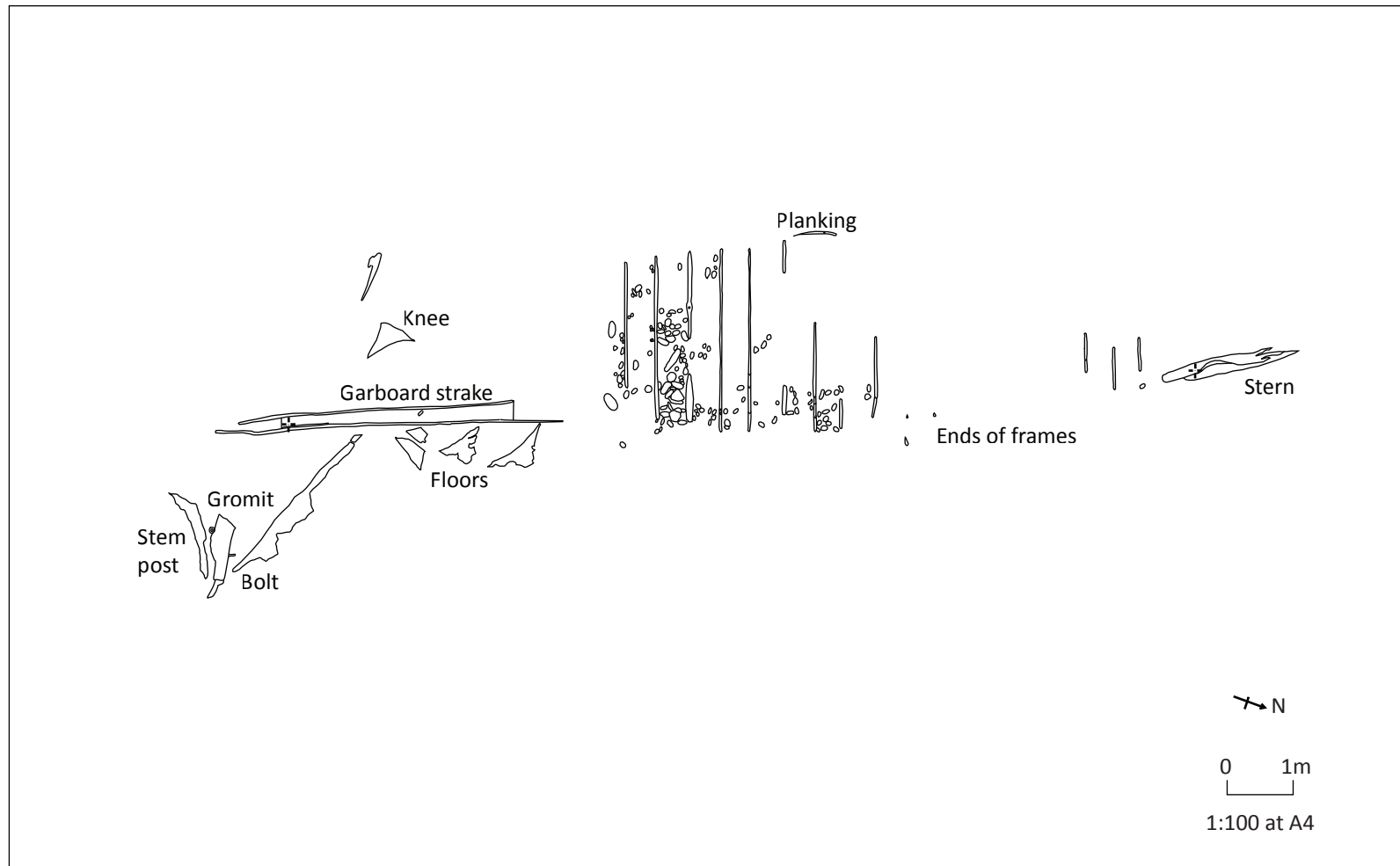


Figure 23: Wreck C. Drawn by James McComas & Lee Gibbon, 9th February 2014.



Figure 24: Wreck C, general view along keel



Figure 26: Wreck C, detail of floor timber with limber holes



Figure 25: Wreck C, frames on starboard side



Figure 27: Wreck C, detail of detached part of stem deadwood



Vessel ID	D					
Dimensions (m): length	15	Breadth:	12	Height:	0.56	
Vessel type:	2 wooden fishing boats	Propulsion:	Sail	Construction:	Clinker	
Visible elements:						
	Present:	no.:	Dimensions:	Present:	no.:	Dimensions:
Keel:	Yes			Stern post:	Yes	partial
Keelson:	Yes			Rudder:	Yes	? Very broken
Planking:	Yes			iron bolts:	No	
Stem post:	No			Gudgeons:	No	
Rams horns:	No			Pintles:	No	
Mast step:	No			Ballast:	Yes	
First futtock:	Yes	16		Other visible elements:		
Floors:	Yes	1				
Knees:	No					
Frame spacing						
(centre to centre):						
Fastenings:			Iron			
Waterproofing:						
			pitch			

#### Description:

Likely two vessels recorded as one due to close proximity and for ease and speed of recording. Two wooden fishing vessels lying parallel side by side c.3m apart, both apparently lying on their starboard sides.

The eastern keel (larch) survives to a length of 7m, possibly indicating a 2nd Class vessel, though more may be buried. There is a scarph joint halfway along its exposed length. Ten first futtocks survive in situ on the starboard side (on the assumption that these are associated with this keel and not the western one). Although no planking is associated with this vessel, the sawtooth edge to the frames indicates it was of clinker construction, with square-section Fe bolts which attached the frames to the planking. The base of the stern post is visible and protrudes above the level of the beach at a raking angle. One gudgeon survives on the post, with a possible pintle attached, possibly indicating the broken up remains of the rudder still in situ on the stern post. Fragments of the garboard strakes on either side of the keel. A scatter of ballast is associated with this vessel.

The western keel is 9m indicating that this is likely the remains of a 1st class vessel. Six first futtocks lie in situ on the starboard side of the keel. Several loose and unidentified timbers lie scattered on the starboard side, along with one floor. A scatter of ballast is associated with this vessel.

Several separate timbers lie to the north of the main bodies of the wrecks, one approx 1.3m long and rounded may be the remains of a mast.

Surveyor name: Jonie & Richard Guest  
Date of survey: 08/02/2014

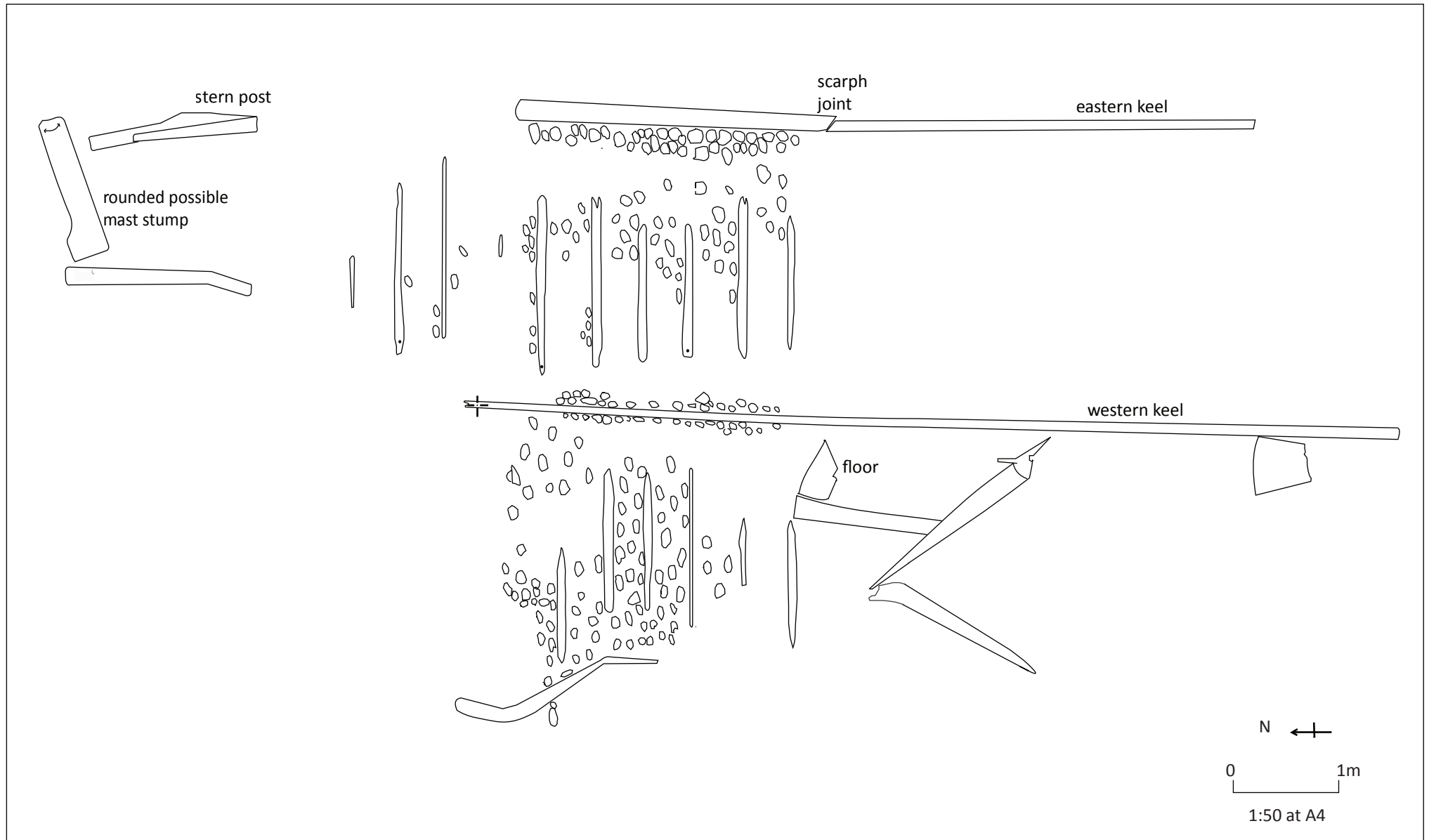


Figure 28: Wreck D. Drawn by Jonie & Richard Guest, 8th February 2014.



Figure 29: Wreck D, two parallel keels



Figure 30: Wreck D, stern post of eastern vessel standing vertically



Vessel ID E

Dimensions (m): length 11 Breadth: 3.5 Height: 00

Vessel type: Zulu Propulsion: Sail Construction: Clinker

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes		11m	Stern post:	Yes		
Keelson:	Yes			Rudder:	No		
Planking:	No			iron bolts:	Yes		
Stem post:	Yes			Gudgeons:	No		
Rams horns:	Yes			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	3		Other visible elements:			
Floors:	Yes	2					
Knees:	No						
Frame spacing (centre to centre):			0.4m				
Fastenings:			Iron				
Waterproofing:			pitch				

Description:

Remains of a wooden fishing vessel, probably a Zulu based on the detached stem post and stern post. Keel/keelson (larch) c.11m long, appears to be almost complete length, indicating this was a 1st class vessel. Stem post with ramshorn survives detached, and three first futtocks (oak) on the starboard side. Two possible floors lie adjacent to the keel. Timber c.2.5m long with Fe plating may be detached stern post. Several other unidentified timbers lie around keel.

Surveyor name: James McComas & Karen Clarke  
Date of survey: 26/02/2016

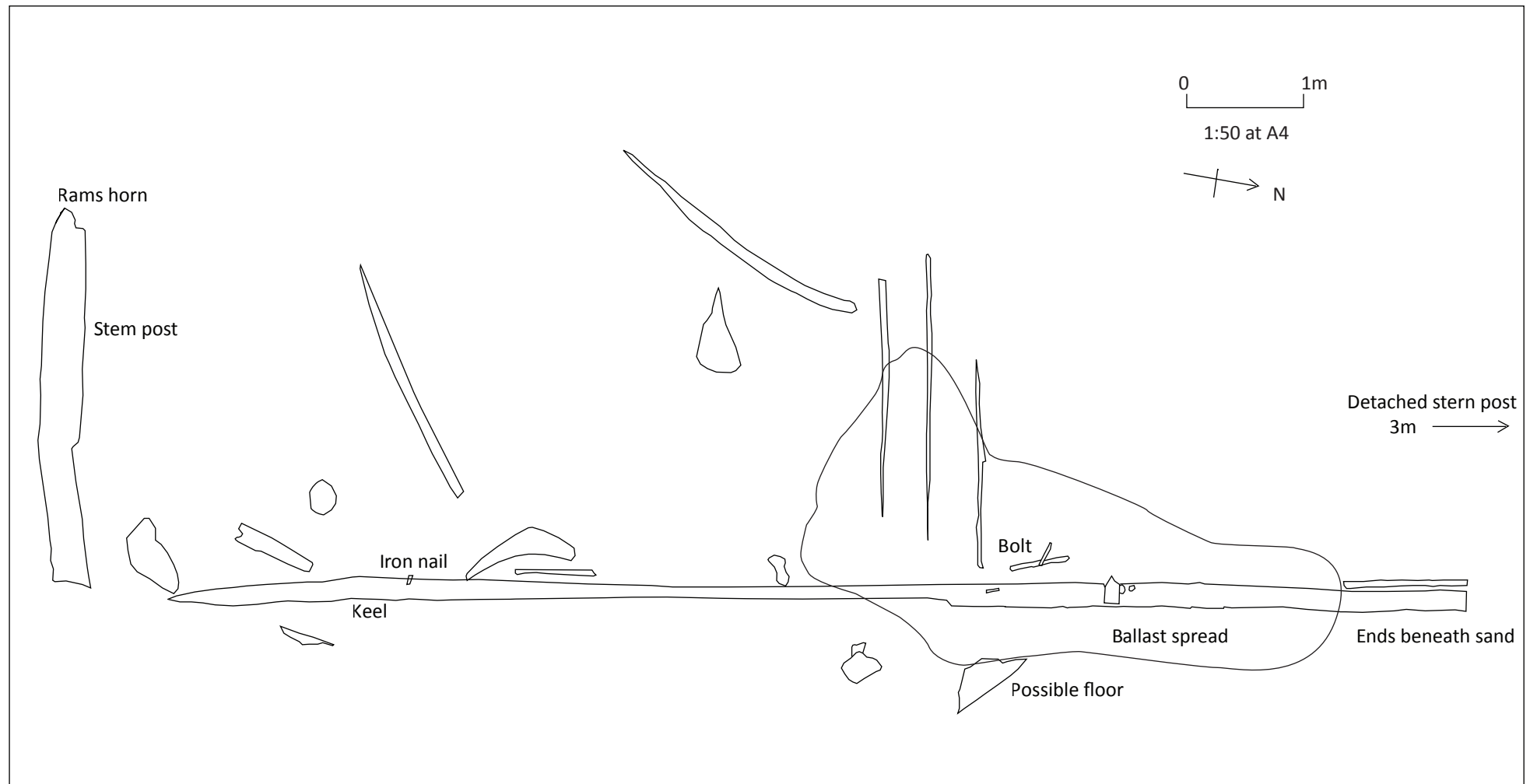


Figure 31: Wreck E. Drawn by James McComas & Karen Clarke, 26th February 2014.



Figure 32: Wreck E, general view of keel, starboard frames and collapsed stem post



Figure 34: Wreck E, view along keel



Figure 33: Wreck E, keel and starboard frames



Figure 35: Wreck E, detail of rams horns on collapsed stem post



Vessel ID F

Dimensions (m): length 10.5 Breadth: 3.5 Height: 0.252

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Clinker

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes			Stern post:	Yes		
Keelson:	Yes			Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	No		
First futtock:	Yes	17		Other visible elements:			
Floors:	Yes	?1					
Knees:	No						

Frame spacing 0.47m  
(centre to centre):

Fastenings: Iron

Waterproofing:

Description:

Remains of a wooden fishing boat, possibly a Zulu on the basis of group association with the rest of the Loch Fleet boat graveyard. The ?keel and keelson lie just beneath the level of the foreshore mud, visible as outlines, with Fe fittings standing proud, length of the keel is uncertain as full extent obscured by mud, width 0.15m. 17 futtocks, longest 1.4m in length, lie on the ?port side. Lower ends of futtocks may continue beneath the sand, upper ends may have been cut. One roughly triangular timber, ?floor, partly protrudes from the mud between the frames and keel, lying at an angle, with two Fe fastenings attached. A detached timber with a curve at one end may be the remains of the stern post. If so the angle suggested by the curve would support the identification of the vessel as a Zulu.

Surveyor name: Anne Coombs  
Date of survey: 24/02/2016

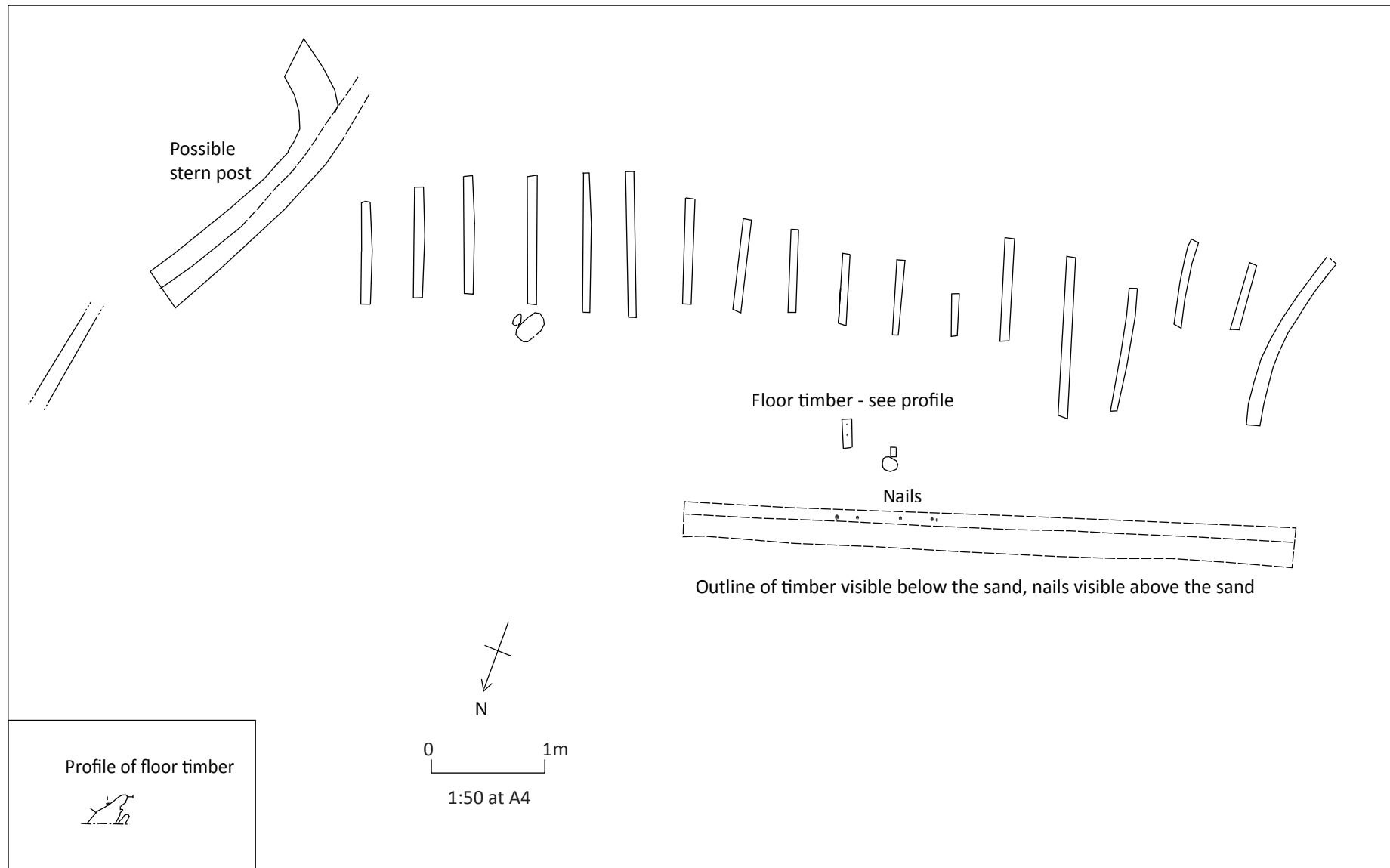


Figure 36: Wreck F. Drawn by Anne Coombs, 24th February 2014.



*Figure 37: Wreck F, outlines of frames visible in foreshore mud*



*Figure 38: Wreck F, outlines of frames and floor timber*



Vessel ID: G

Dimensions (m): length: 13 Breadth: 9 Height:

Vessel type: Unknown wooden boat Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		? 2.6m
Keelson:	No			Rudder:	Yes		
Planking:	No			iron bolts:	Yes		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	Yes	1	
Mast step:	No			Ballast:	No		
First futtock:	No			Other visible elements:			
Floors:	No						
Knees:	No						

Frame spacing  
(centre to centre):

Fastenings: Iron

Waterproofing:

Description:

A spread of wooden boat elements, scattered over an area of 13m by 9m. Possibly from more than one vessel, no obvious form. Many of the elements remain unidentified, apart from a piece of rudder c.1.2m in length, with attached pintle, possibly sawn off at one end. Long timber c.2.6, adjacent to this may be the remains of a stern post, angle of end of this timber would indicate a raked stern.

Surveyor name: Jonie Guest

Date of survey: 26/02/2014

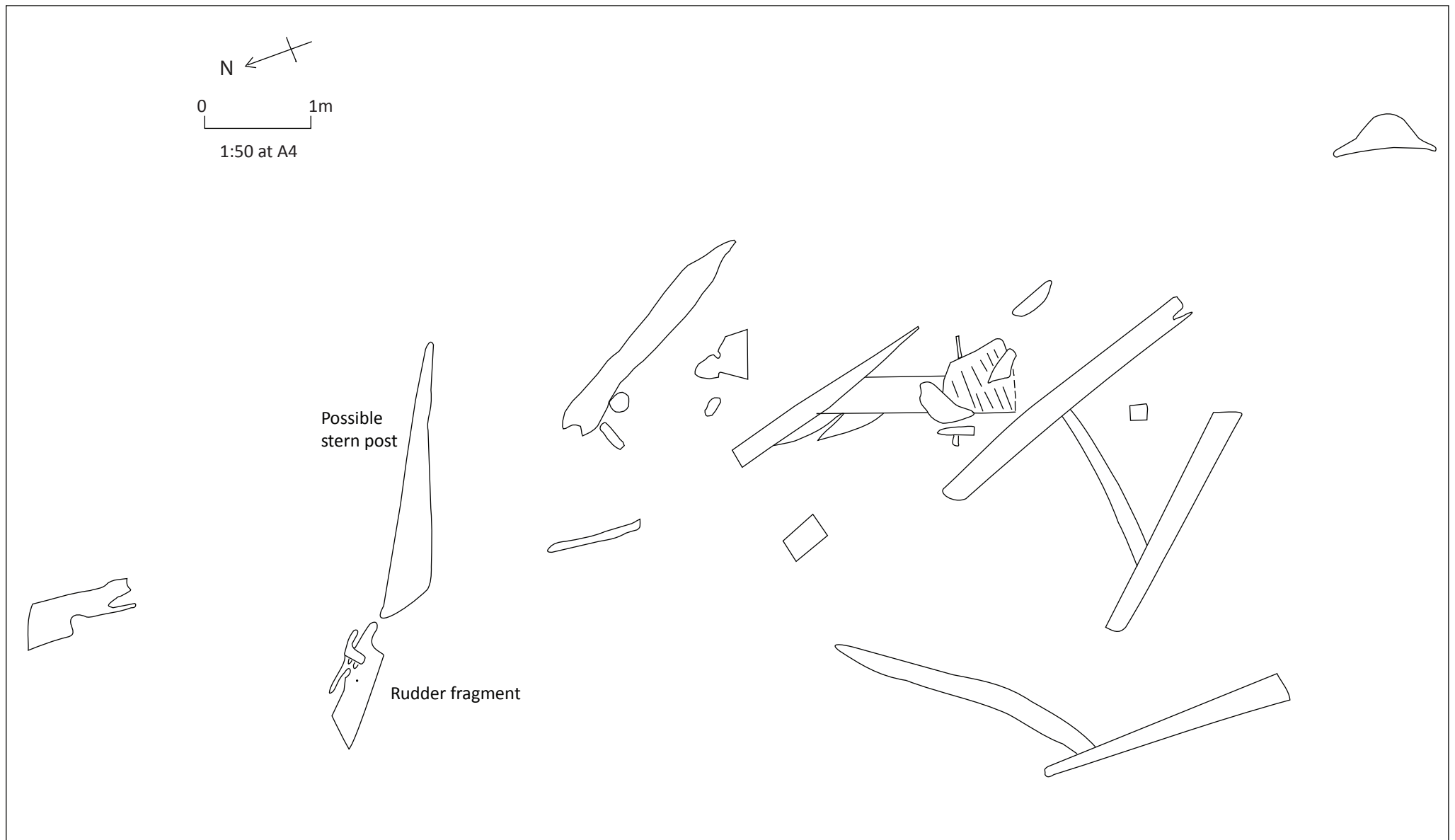


Figure 39: Wreck G. Drawn by Anne Coombs, Jonie Guest & Richard Guest, 26th February 2014.



*Figure 40: Wreck G, detail from photomosaic showing spread of timbers*



*Figure 41: Wreck G, detail of rudder*



Vessel ID H

Dimensions (m): length 7.8m Breadth: 1.6m Height:

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Clinker

#### Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	No		
Keelson:	Yes			Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	5		Other visible elements:			
Floors:	Yes	5					
Knees:	No						

Frame spacing 0.45m

(centre to centre):

Fastenings: Iron

Waterproofing: pitch

#### Description:

Fragments of a wooden fishing boat. Keel overlain by 5 frames and floors (oak) (appear to be formed of one timber) and ballast. A small patch of external planking survives indicating that this was of clinker construction. A small spread of ballast lies between the floors above the keelson.

Surveyor name: Marion Ruscoe & Beth Blackburn

Date of survey: 09/02/2014

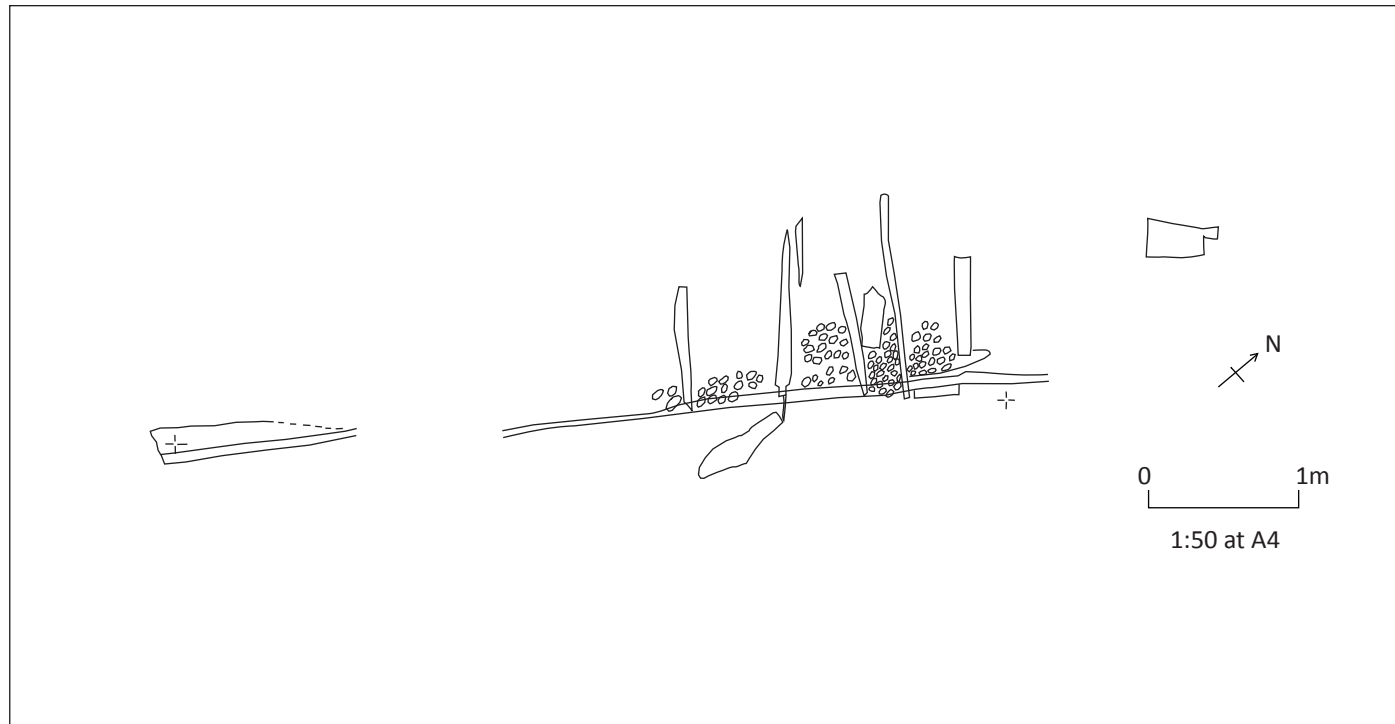


Figure 42: Wreck H. Drawn by Marion Ruscoe & Elizabeth Blackburn, 9th February 2014.



Figure 43: Wreck H, view along keel showing frames and ballast



Figure 44: Wreck H, detail showing floors and frames made from single timbers



Vessel ID: I

Dimensions (m): length: 16 Breadth: 6 Height: 0.8

Vessel type: Zulu Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		
Keelson:	No			Rudder:	No		
Planking:	No			iron bolts:	Yes		
Stem post:	Yes			Gudgeons:	Yes	3	
Rams horns:	Yes			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	19		Other visible elements:			
Floors:	Yes	19					starboard garboard strake
Knees:	No						

Frame spacing: 0.45m  
(centre to centre):

Fastenings: Iron

Waterproofing:

Description:

Remains of a 1st class Zulu fishing vessel, visible as a line of 19 port side floors/frames (oak) in situ protruding from the mud of the foreshore, with a raked stern post standing to a height of 0.8m at one end and the base of the stem at the other end. The detached stem post lies adjacent with one rams horn visible. The stern post (oak) is in situ; its angle indicates that this was a Zulu, and three gudgeons survive on the post. The floors are likely attached to the keel and keelson buried beneath the mud, possibly further frame timbers and planking survive buried in the beach sediment.

Surveyor name: Miranda Richardson & Anne Coombs  
Date of survey: 09/02/2014

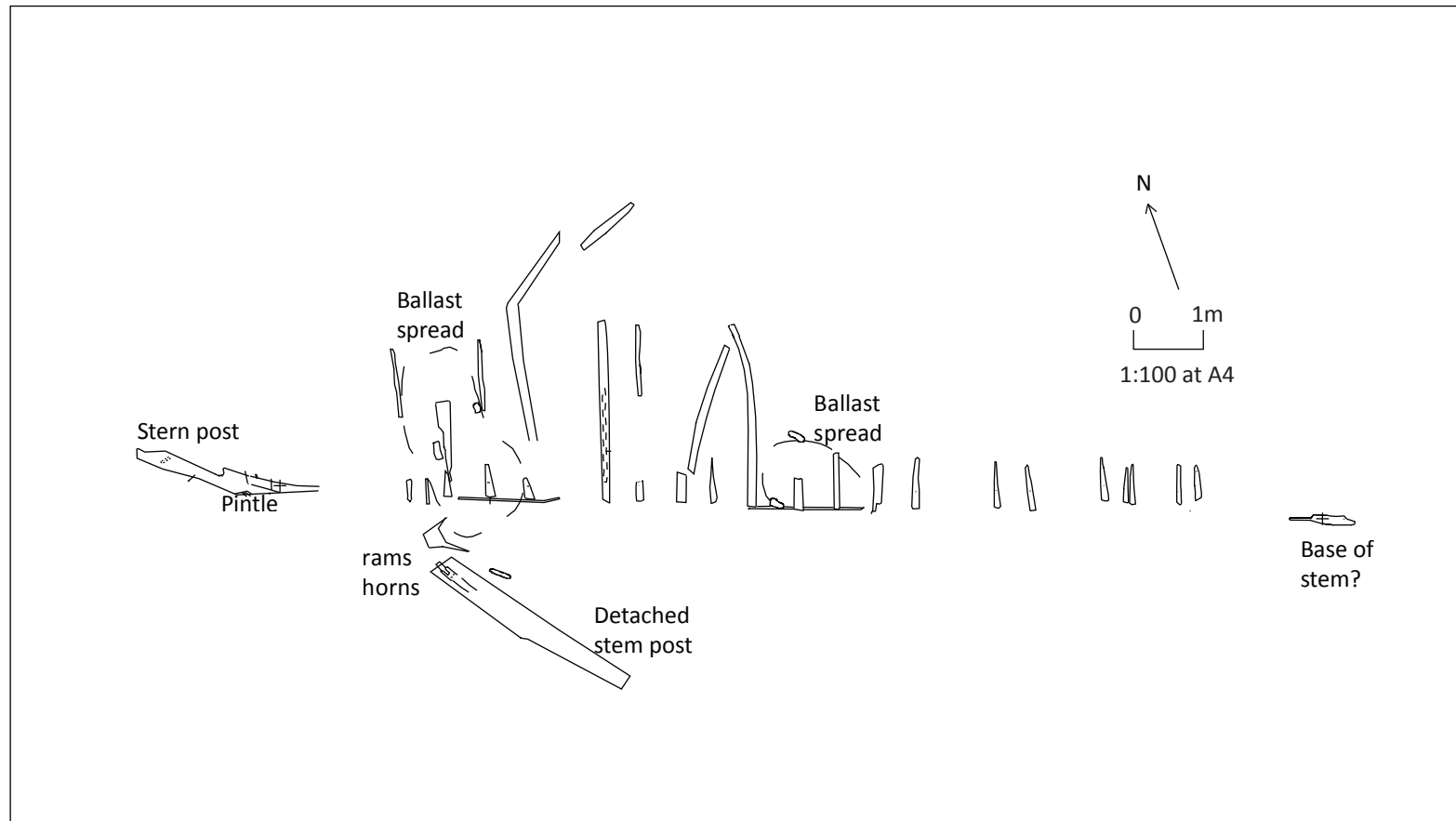


Figure 45: Wreck I. Drawn by Anne Coombs, 9th February 2014.



Figure 46: Wreck I, general view along keel



Figure 48: Wreck I, stern end of vessel showing stern post, detached stem and floors



Figure 47: Wreck I, upstanding stern post



Figure 49: Wreck I, detached stem post with rams horns



Vessel ID J

Dimensions (m): length 10.5m Breadth: 0.4m Height: 0.2m

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes			Stern post:	No		
Keelson:	No			Rudder:	No		
Planking:	No			iron bolts:	Yes		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	No		
First futtock:	No			Other visible elements:			
Floors:	Yes	9		capstan			
Knees:	No						

Frame spacing 0.5m  
(centre to centre):  
Fastenings: Iron

Waterproofing:

Description:

Remains of a wooden fishing boat, visible as a keel/keelson with attached Fe bolts and 9 floors protruding from the sand along part of its length. Immediately adjacent and thought to be related is a steam capstan, with a plate reading 'R Tindall & Sons, Fraserburgh'.

Surveyor name: Joanna Hambly & Ellie Graham  
Date of survey: 09/02/2014

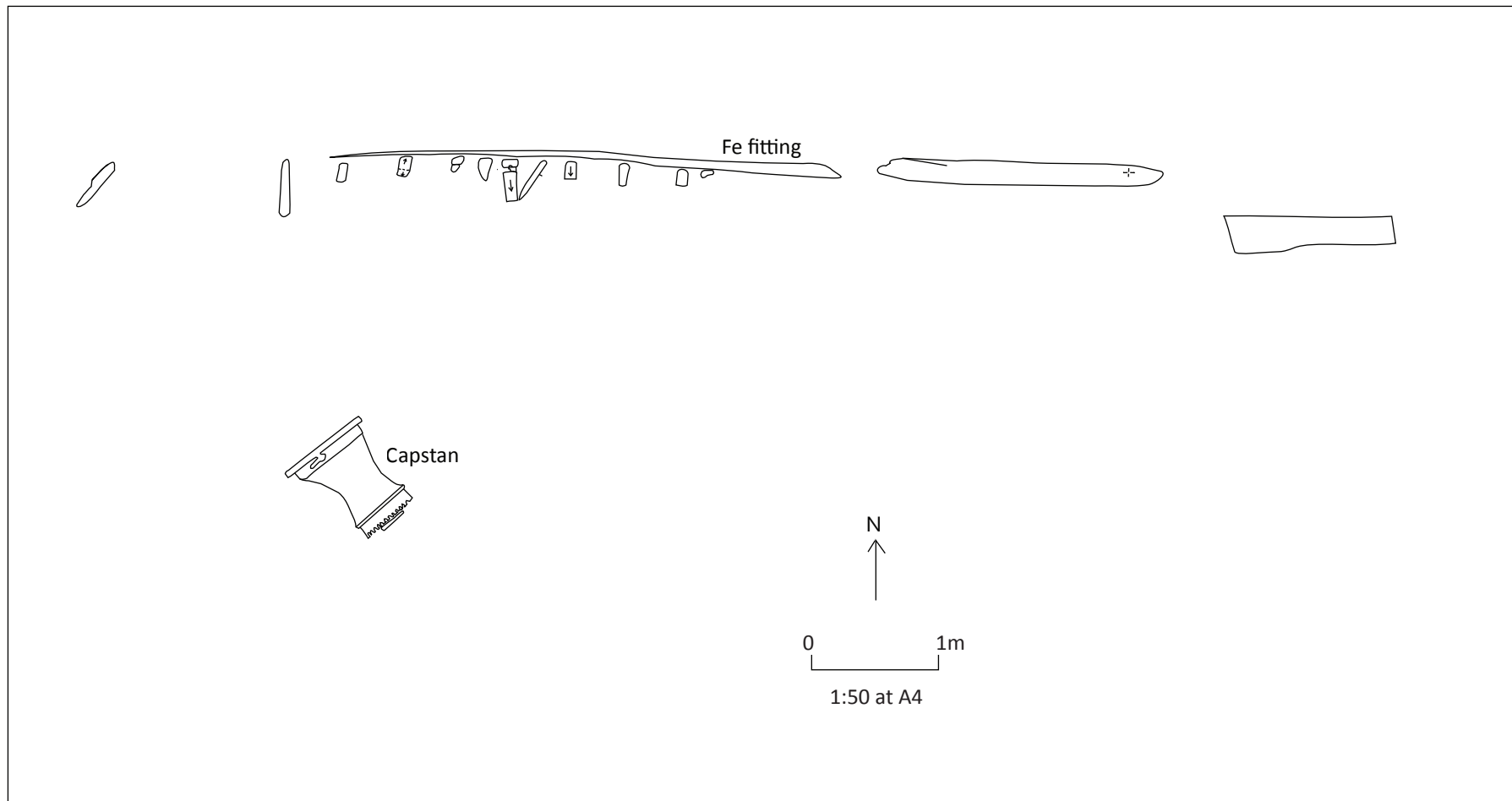


Figure 50: Wreck J. Drawn by Joanna Hambly & Ellie Graham, 9th February 2014.



Figure 51: Wreck J, general view of floors.



Figure 52: Wreck J, floors and capstan



Figure 53: Wreck J, detail of capstan with manufacturers name



Vessel ID K

Dimensions (m): length 3.8 Breadth: 3.4 Height: 0.3

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes			Stern post:	No		
Keelson:	No			Rudder:	No		
Planking:	No			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	8		Other visible elements:			
Floors:	No						
Knees:	No						

Frame spacing 0.45m  
(centre to centre):  
Fastenings:

Waterproofing:

Description:

Remains of a wooden fishing boat. A central timber (probably keel or keelson) with 8 frames lying on west side, and 7 on east side. The outer ends of the frames show an upward curve. More elements may survive buried in the beach sediment. Scatter of stones around the timbers are likely the remains of ballast from the vessel.

Surveyor name: Anne Coombs  
Date of survey: 25/02/2014

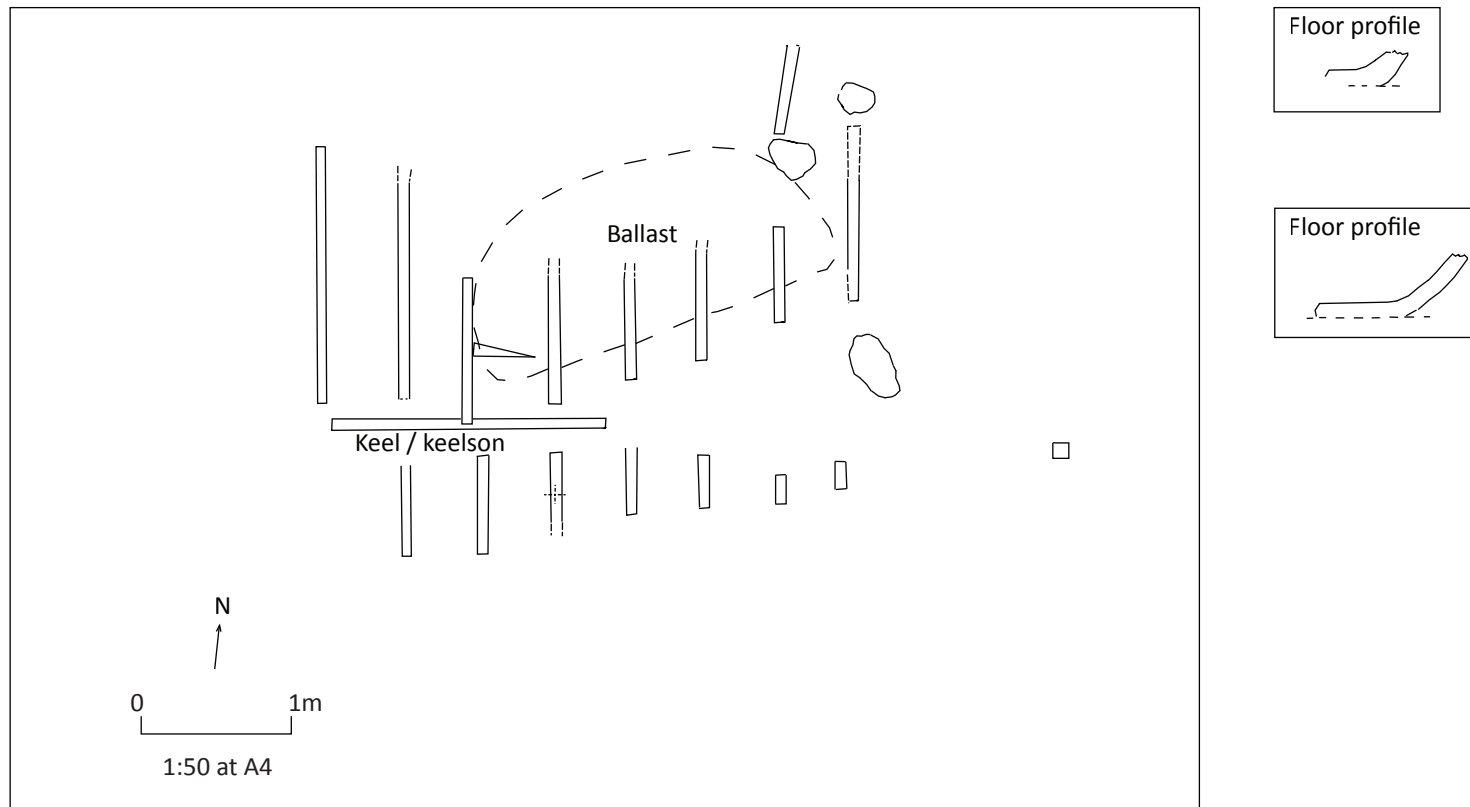


Figure 54: Wreck K. Drawn by Anne Coombs, 25th February 2014.



*Figure 55: Wreck K, general view*



*Figure 56: Wreck K, detail showing frames*



Vessel ID L

Dimensions (m): length 13.5 Breadth: 8.5m Height: 1.2m

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		
Keelson:	No			Rudder:	No		
Planking:	No			iron bolts:	Yes		
Stem post:	No			Gudgeons:	Yes	1	
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	6		Other visible elements:			
Floors:	No						
Knees:	No						
Frame spacing (centre to centre):			0.45m				
Fastenings:			Iron				
Waterproofing:			pitch				

Description:

Remains of a wooden fishing boat, probably 1st Class based on size of area remains are spread over, though keel not seen. Remains of 6 futtocks/floors (oak) visible. Upstanding stern post (oak) at raked angle with attached gudgeons, may indicate that this was a Zulu, though stem post not seen. Short length of pipe protruding from sand of foreshore around midship may be an exhaust pipe or part of a bilge pump. Two unidentified timbers buried on foreshore in area of wreck, one 2m long, rounded at one end and flat-topped, roughly squared at the other, with a patch of pitch. The second is c.1m by 0.4m, flat-topped, with a rounded base, with two sub-square indentations on the flat face, also with a small patch of pitch - possibly a setting for equipment? Likely further parts of the vessel survive buried in the beach sediment.

Surveyor name: Anne Coombs  
Date of survey: 25/02/2014

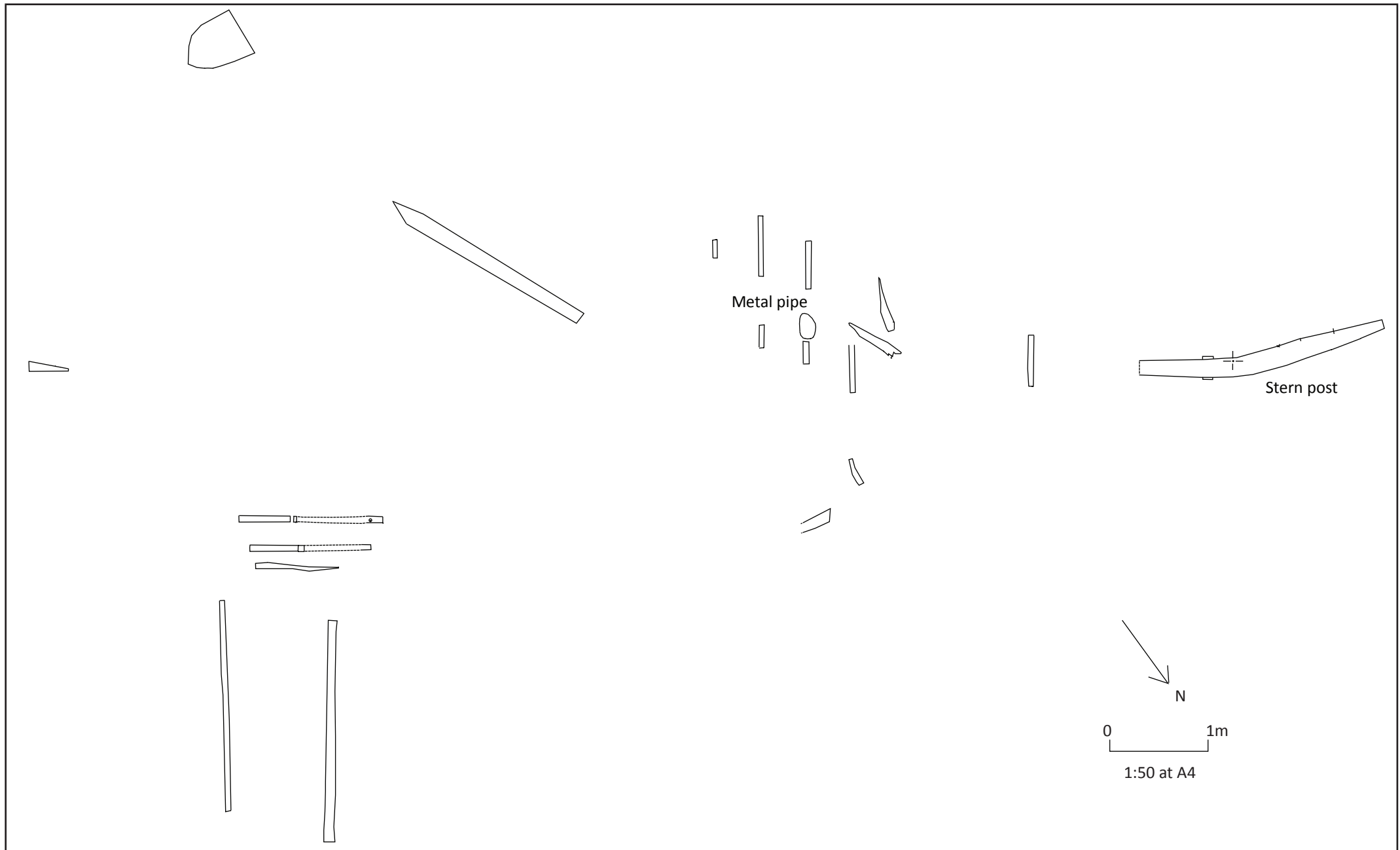


Figure 57: Wreck L. Drawn by Anne Coombs, 25th February 2014.



Figure 58: Wreck L, general view



Figure 60: Wreck L, upstanding stern post



Figure 59: Wreck L, floor timbers and metal pipe



Figure 61: Wreck L, detail of unidentified timber with indentations



Vessel ID M  
Dimensions (m): length 15m Breadth: 3m Height:  
Vessel type: Wooden fishing boat Propulsion: Sail Construction: Clinker

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes			Stern post:	Yes		
Keelson:	Yes			Rudder:	Yes		
Planking:	No			iron bolts:	Yes		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	Yes			Ballast:	Yes		
First futtock:	Yes	8		Other visible elements:			
Floors:	Yes						
Knees:	No						

Frame spacing  
(centre to centre):  
Fastenings: Iron

Waterproofing:

Description:

Remains of a wooden fishing boat probably 1st Class based on area of scattered elements, though bow end not seen. Possibly a Zulu based on group association and the raked angle of the surviving base of the stern post. Keel/keelson intermittently visible, with collapsed frames (oak) on starboard side. Although external planking not seen (possibly survives buried beneath frames and ballast) the saw-tooth edge of the frames indicates that this was clinker-built. Cast Fe block lies along line of keel adjacent to stern post. Possible rudder fragment lies next to stern. Patches of tar/pitch visible on timbers. Mast step (1.4m by 0.5m) (oak) lies adjacent and has Fe staining on upper face.

Surveyor name: Miranda Richardson & Joanna Hambly  
Date of survey: 08/02/2014

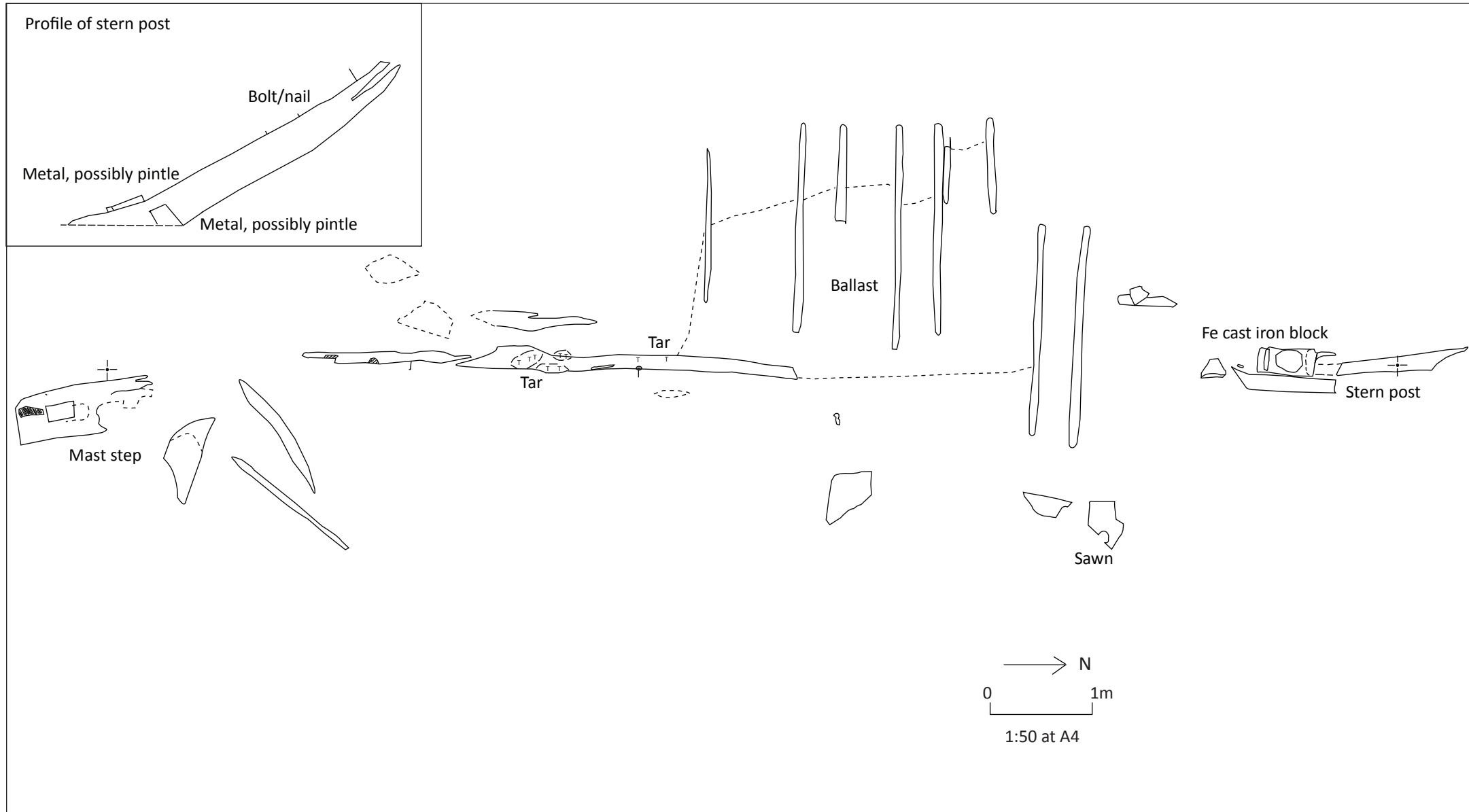


Figure 62: Wreck M. Drawn by Meryl Marshall & Naomi Lloyd, 8th February 2014.



Figure 63: Wreck M, general view



Figure 64: Wreck M, view along keel facing stern



Figure 65: Wreck M, frame on starboard side



Figure 67: Wreck M, detail of stern end



Figure 66: Wreck M, detail of mast step



Figure 68: Wreck M, detail of rudder

Vessel ID N

Dimensions (m): length 14.2m

Breadth: 6m

Height: 0.5

Vessel type: Zulu

Propulsion: Sail

Construction: Clinker

#### Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	Yes		13.2m	Stern post:	Yes		
Keelson:	Yes			Rudder:	No		
Planking:	Yes			iron bolts:	Yes		
Stem post:	Yes		3.5m	Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	1		Other visible elements:			
Floors:	Yes	7					stem deadwood
Knees:	Yes	1	?				

Frame spacing  
(centre to centre):

Fastenings: Iron

Waterproofing: pitch

#### Description:

The remains of a 1st Class Zulu fishing boat. Elements scattered over an area 14.2m by 6m. Keel/keelson (beech) survives for full original length of 13.2m, with stem post collapsed in situ with deadwood riser indicating straight stem, and base of raked stern post attached. One starboard frame lies collapsed in situ, other possible frame timbers scattered in immediate vicinity. 7 probable floors (oak) with limber holes lie scattered on both sides of the keel, notched sides indicate vessel was clinker built. Scattered fragments of planking observed, likely further planking buried beneath ballast and mud.

Surveyor name: Naomi Lloyd, Sheila Clark, Colin Heape

Date of survey: 09/02/2014

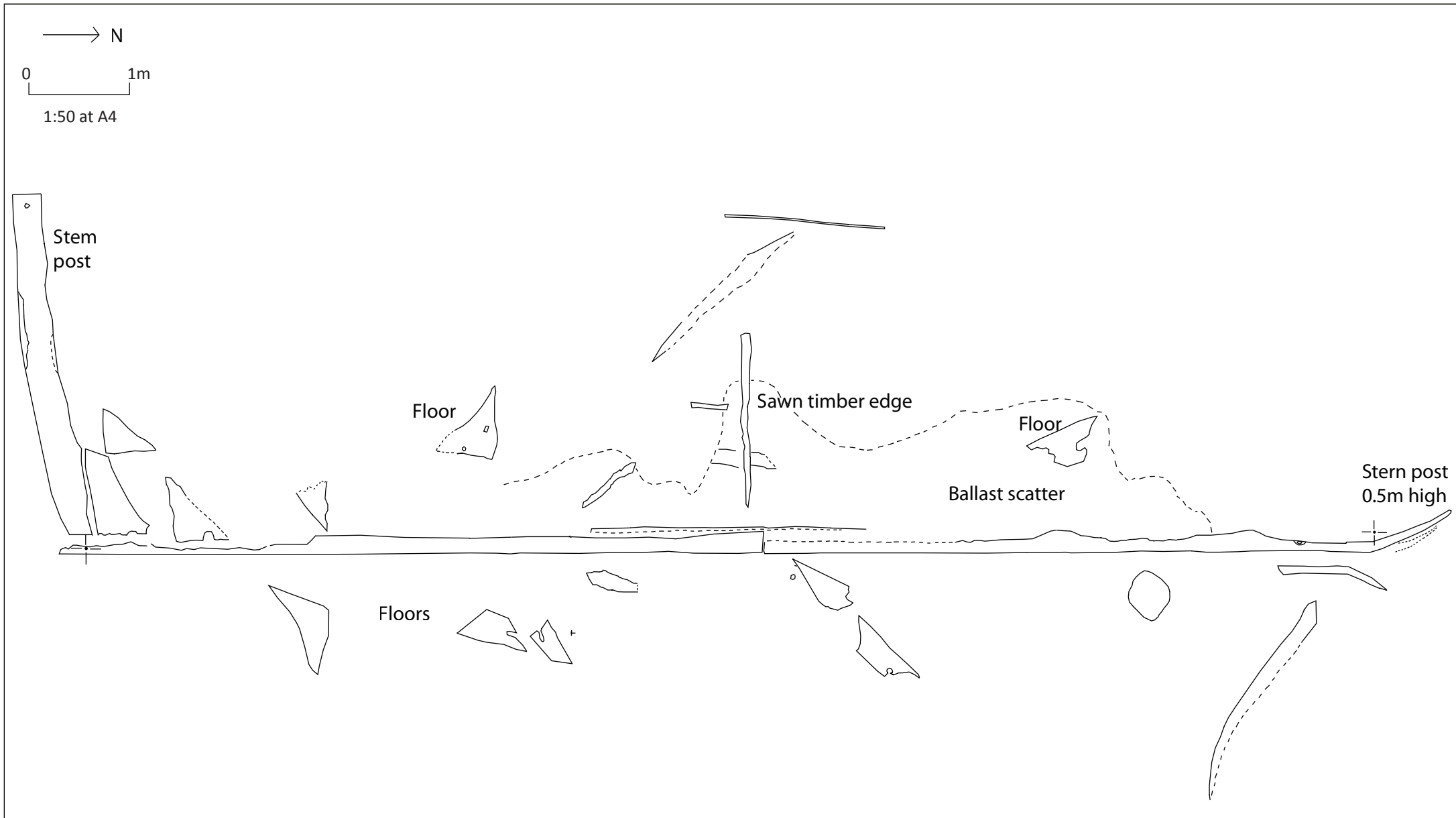


Figure 69: Wreck N. Drawn by Naomi Lloyd, Sheila Clarke & Colin Heape, 9th February 2014.



Figure 70: Wreck N, general view along keel with collapsed stem post to front



Figure 72: Wreck N, detail of detached floor timber



Figure 71: Wreck N, detail of stern post



Figure 73: Wreck N, detail of collapsed stem post showing stem deadwood



Vessel ID O

Dimensions (m): length 11.4m Breadth: 4.5m Height:

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Clinker

#### Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	No		
Keelson:	Yes			Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	No		
First futtock:	Yes	11		Other visible elements:			
Floors:	Yes	4					block pulley
Knees:	No						

Frame spacing 0.5m

(centre to centre):

Fastenings: Iron

#### Waterproofing:

#### Description:

Remains of a wooden fishing boat. Remains scattered over an area of 11.4m by 4.5m but original length not seen; keelson intermittently visible. 10 in situ frames, 1 detached frame, 4 in-situ floors (oak). Near-continuous line of external planking (larch) visible protruding above sand c.2.5m to ?starboard side of keelson, further patch of (clinker) planking visible, likely more buried beneath frames. Ironwood pulley block recovered from sediment overlying between frames. Likely further elements survive buried in the beach sediment.

Surveyor name: Michael Sharp & Karen Clarke

Date of survey: 09/02/2014

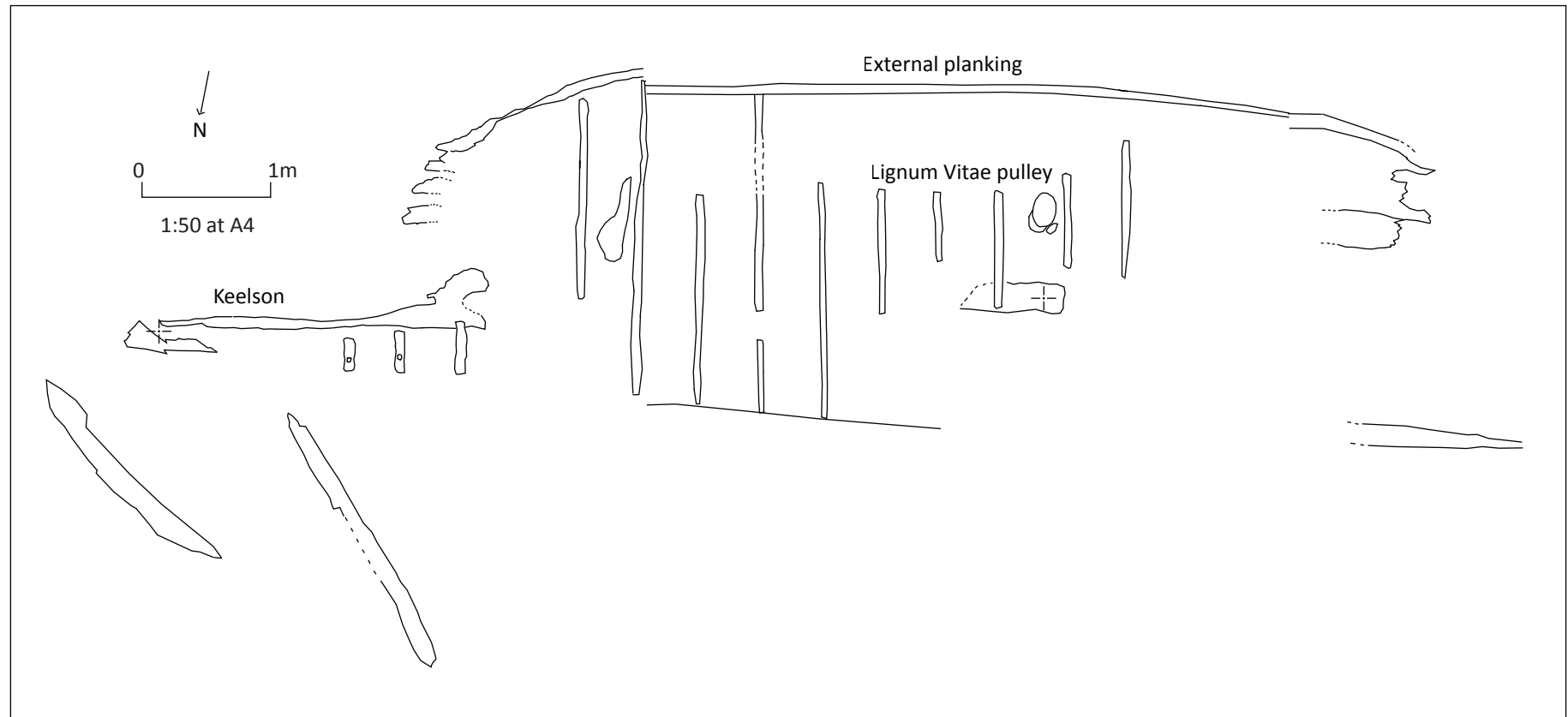


Figure 74: Wreck O. Drawn by Michael Sharpe, 9th February 2014.



Figure 75: Wreck O, general view showing frames and external planking



Figure 76: Wreck O, general view of frames



Figure 77: Wreck O, detail frames and external planking



Vessel ID P

Dimensions (m): length 7.5m Breadth: 1.6m Height:

Vessel type: Wooden fishing boat Propulsion: Sail Construction: Unknown

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		
Keelson:	No			Rudder:	No		
Planking:	Yes			iron bolts:	No		
Stem post:	No			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	No			Other visible elements:			
Floors:	No						port garboard strake
Knees:	No						starboard garboard strake

Frame spacing  
(centre to centre):  
Fastenings:

Waterproofing:

Description:

Remains of a wooden fishing boat, little is visible other than garboard strakes on port and starboard sides max.0.35m apart. Keel and keelson presumably buried beneath these and beach sediment. Possible base of stern post survives attached to surviving body of vessel indicating raked angle. Three timber floors lie immediately surrounding the stern. Scattering of stones in and around may be remains of ballast.

Surveyor name: James McComas & Lee Gibbon  
Date of survey: 08/02/2014

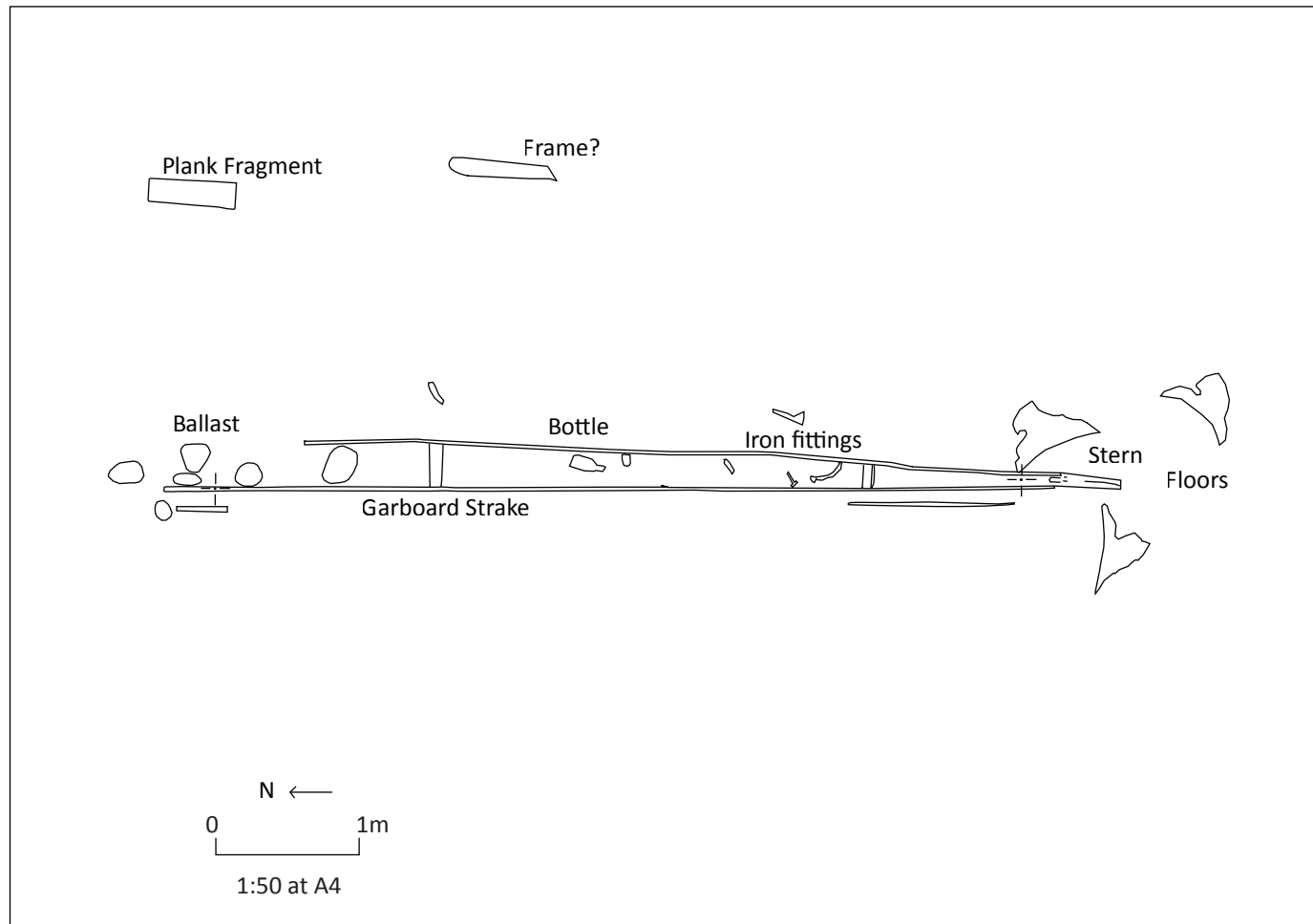


Figure 78: Wreck P. Drawn by James McComas & Lee Gibbon, 8th February 2014.



Figure 79: Wreck P, general view along visible length of garboard strakes



Figure 80: Wreck P, detail of stern end with three detached floor timbers



Figure 81: Wreck P, general view



Vessel ID Q

Dimensions (m): length 13.4m Breadth: 2m Height: 0.6m

Vessel type: Zulu Propulsion: Sail Construction: Clinker

Visible elements:

	Present:	no.:	Dimensions:		Present:	no.:	Dimensions:
Keel:	No			Stern post:	Yes		
Keelson:	No			Rudder:	No		
Planking:	Yes			iron bolts:	Yes		
Stem post:	Yes			Gudgeons:	No		
Rams horns:	No			Pintles:	No		
Mast step:	No			Ballast:	Yes		
First futtock:	Yes	1		Other visible elements:			
Floors:	Yes	22					port garboard strake
Knees:	No						starboard garboard strake
Frame spacing (centre to centre):			0.5m				
Fastenings:			Iron				
Waterproofing:			pitch				

Description:

The remains of a Zulu fishing boat, with a partially collapsed stem and raked stern in situ, apparently a 1st class boat based on extent of visible remains. 22 in situ floors (oak where examined) - possibly all floors present. External planking (possibly garboard strakes?) attached and in situ; keel and keelson presumably buried beneath these and ballast stones. Small patch of pitched planking (larch) with attached futtock exposed c.1m from ?starboard garboard. Planking appears to be clinker, and gaps in internal pitch indicate settings for further frames. Further external planking and frames likely buried in beach sediment.

Surveyor name: Michael Sharpe  
Date of survey: 08/02/2014

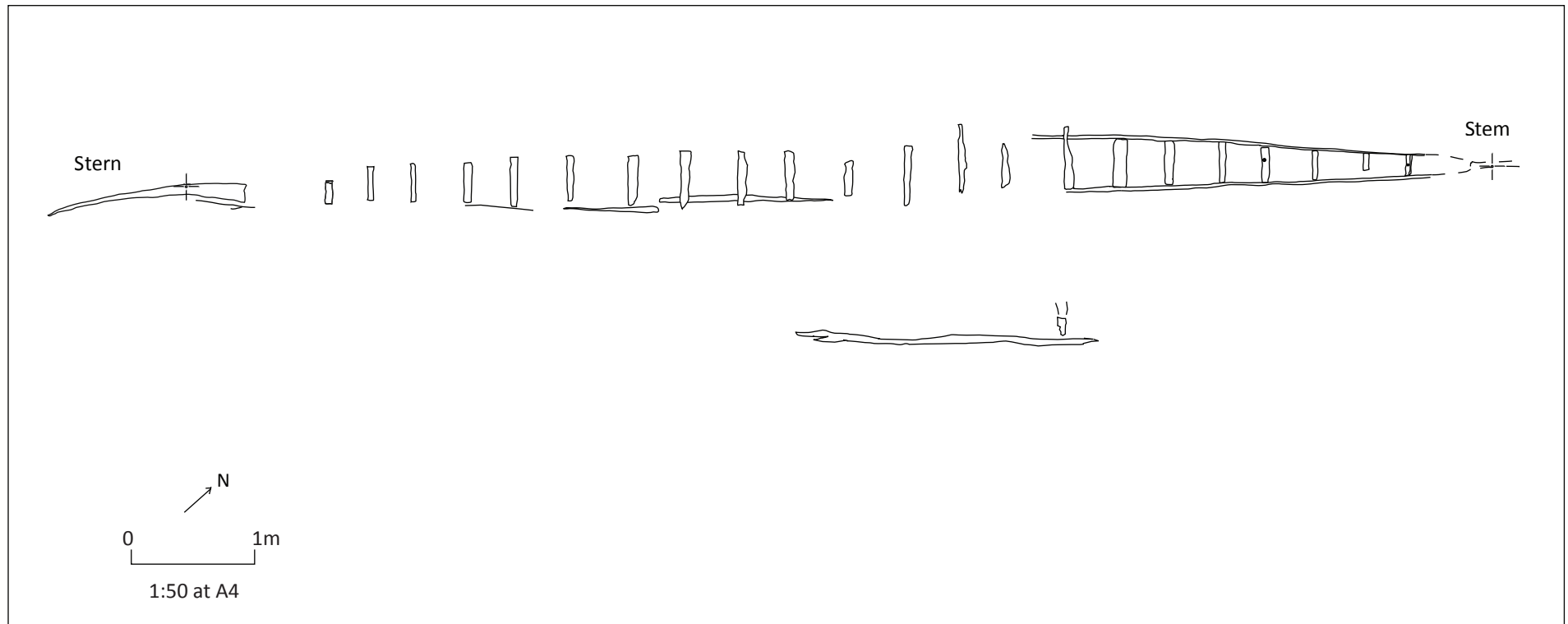


Figure 82: Wreck Q. Drawn by Michael Sharpe, 8th February 2014.



Figure 83: Wreck Q, general view with stem post to front



Figure 85: Wreck Q, general view with stern post to front



Figure 84: Wreck Q, detail of stern post



Figure 86: Wreck Q, detail central floors