



# Beyond bycatch

## *The prehistoric archaeology of Doggerland*

*U vindt een Nederlandse samenvatting aan het eind van de tekst.*

LUC AMKREUTZ  
NATIONAL MUSEUM OF ANTIQUITIES  
(RIJKSMUSEUM VAN OUDHEDEN/  
RMO)  
PAPENGRACHT 30  
2301 EC LEIDEN  
FACULTEIT ARCHEOLOGIE  
UNIVERSITEIT LEIDEN  
EINSTEINWEG 2  
2333 CC LEIDEN  
L.AMKREUTZ@RMO.NL

MARCEL NIEKUS  
STICHTING STONE/FOUNDATION  
FOR STONE AGE RESEARCH  
IN THE NETHERLANDS  
ACACIALAAN 51  
9741 KW GRONINGEN /  
HUMAN ORIGINS GROUP  
FACULTEIT ARCHEOLOGIE  
UNIVERSITEIT LEIDEN  
MARCELNIEKUS@GMAIL.COM

DIMITRI SCHILTMANS  
ROTTERDAM MUNICIPAL

ARCHAEOLOGICAL SERVICE  
(ARCHEOLOGIE ROTTERDAM/BOOR)  
CEINTURBAAN 213B  
3051 KC ROTTERDAM  
DEA.SCHILTMANS@ROTTERDAM.NL

BJØRN SMIT  
CULTURALHERITAGE AGENCY  
OF THE NETHERLANDS  
(RIJKSDIENST VOOR HET CULTUREEL  
ERFGOED/RCE)  
SMALLEPAD 5  
3811 MG AMERSFOORT  
B.SMIT@CULTUREELERFGOED.NL



*Abstract* | The prehistoric archaeology of the North Sea documents the past occupation of what is popularly known as Doggerland. It provides an increasing and highly qualitative source of information for both the Palaeolithic and Mesolithic occupation of this area, covering more than 200.000 square kilometers and almost a million years. In particular the intact preservation of sites and landscapes as well as organic remains, provides a rich source of information. The increasing activities in the North

Sea, in the aggregates industry and in offshore infrastructural projects call for an intensification of investigation and protection and highlight the role of citizen science investigators.

### Introduction

It is well-known that in addition to the bones of Pleistocene and Holocene mammals, human remains and prehistoric tools can be found on the Dutch beaches, or in the nets of fishermen. We and our close hominid relatives were part of the rich fauna in the landscape that lies in front of the current coast of the Netherlands. Although there were isolated publications of finds, their study as a group was never undertaken from a specific archaeological perspective. Partly as a result of an initiative by Archeologie Rotterdam (BOOR), a group of researchers united to more intensively research prehistoric finds from the North Sea (Peeters and Momber, 2014; Amkreutz *et al.*, 2016). An important

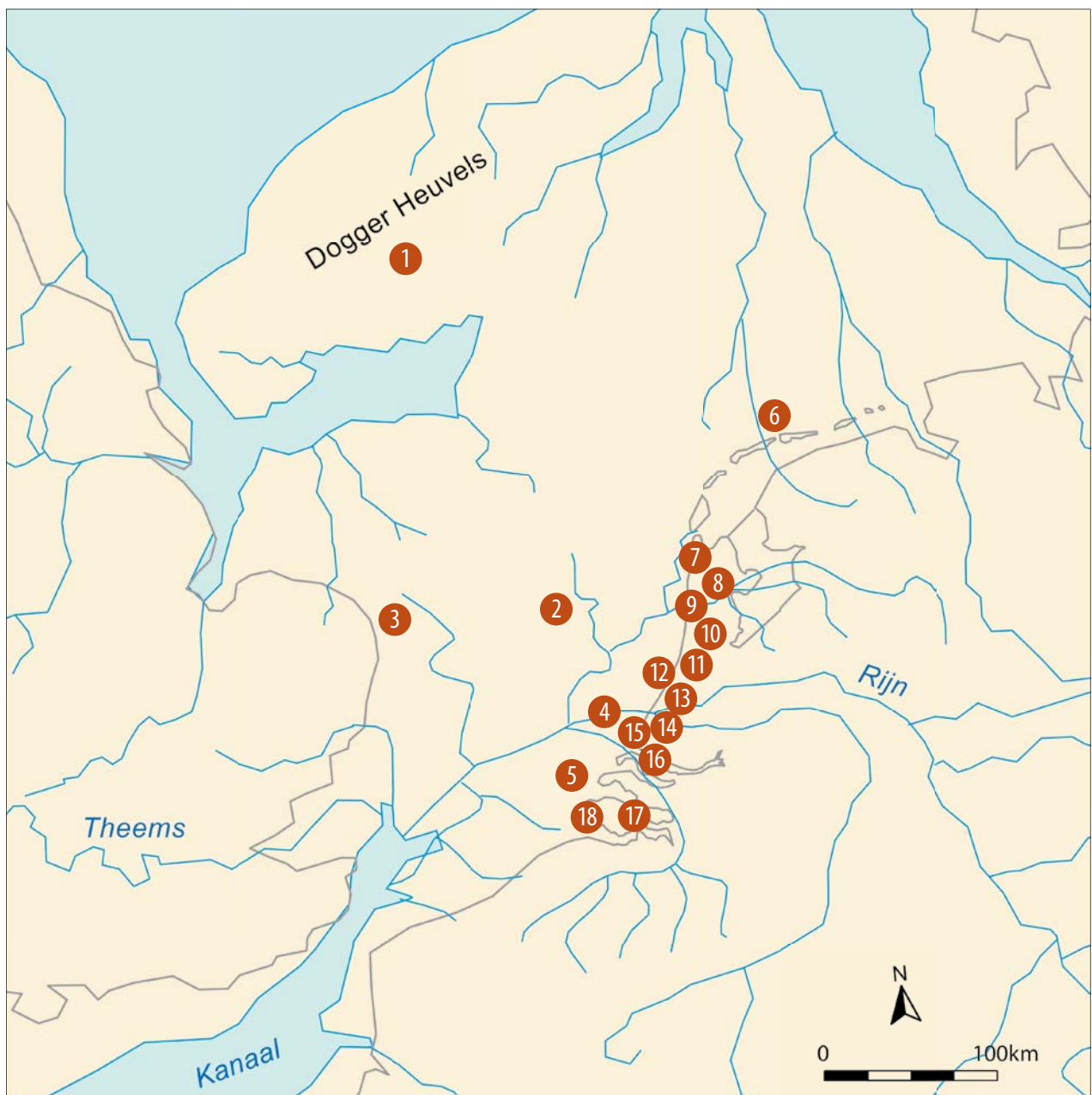


FIGURE 1. | Northwest Europe around 8000 BC. The ongoing sea level rise turns the Dogger Hills into an island in the North Sea, and swallows them whole around 6250 BC (after: Moree and Sier [eds.], 2015).  
 Sites: 1. Doggerbank 2. Bruine Bank 3. Great Yarmouth (Norfolk) 4. Eurogeul 5. Zeelandbanken 6. Waddeneilanden 7. Petten 8. Schoorl 9. Heemskerk/Castricum 10. Zandvoort 11. Katwijk 12. Zandmotor 13. Monster 14. Hoek van Holland 15. Maasvlakte 1 en 2, en Yangtzehaven 16. Rockanje 17. Yerseke 18. Vlissingen.



incentive formed the increase in artefacts and human remains that have been found on the Dutch beaches in recent years, mainly thanks to large-scale projects such as Maasvlakte 2 and the Zandmotor (or Sand Engine). The increased investigations in 2021 led to the NWO-funded 'Resurfacing Doggerland' project, which has a multi-disciplinary focusing on the human occupation in the post-glacial period. In the same year the National Museum of Antiquities (RMO) hosted the first exhibition on this lost area: *Doggerland. Verdwenen wereld in de Noordzee* (Amkreutz and Van der Vaart-Verschoof [eds.], 2021)<sup>1</sup>. There is therefore currently a lot of attention for this important cultural heritage, its implications and potential. In this chapter we will present a recent summary of the broad spectrum of finds and their potential for further research and discuss in some aspects of prehistoric North Sea archaeology. With this contribution we hope to expand the attention for archaeological finds from the North Sea<sup>2</sup>.

### Why prehistoric North Sea archaeology?

The current North Sea area, like its dry hinterland, encompasses the remains of former prehistoric landscapes (Peeters and Cohen, 2014). This is demonstrated by numerous finds from beam trawling (Mol *et al.*, 2006; 2008), and more recently sand replenishments for coastal reinforcement. Every year millions of cubic meters are 'rainbowed' on our beaches. In particular Maasvlakte 2 and the natural coastal reinforcement of the Zandmotor near Kijkduin are rich findspots. However more and more finds turn up from other parts of the Dutch coast as well. Finds deriving from the beaches and occasionally wharfs of gravel and shell material, are often found by enthusiasts who apart from Pleistocene fauna, occasionally picked up human skeletal remains and artefacts that occur quite frequently among the faunal material. Notifications on social media platforms such as the Naturalis Oervondstchecker ([www.oervondstchecker.nl](http://www.oervondstchecker.nl)) and with the authors confirm this. There is now a growing group of amateur palaeontologists increasingly acquiring knowledge of human skeletal material, artefacts of bone and antler and lithic material. The archaeologists and specialists from, among others, BOOR, the RMO, the Cultural Heritage Agency of the Netherlands (RCE) and STONE Foundation, united in the WSN, the *Werkgroep Steentijd Noordzee* (English: Doggerland Research Group or DRG) and now (also) part of the NWO-funded 'Resurfacing Doggerland' project, led by Hans Peeters (GIA) aims to document this prehistoric archaeological heritage of the drowned North Sea landscape and make them available for future research. Our attention focuses on the finds and data from the Palaeolithic (Old Stone Age) – this is the period of the Pleistocene glacials and interglacials between about 700,000 and 10,000 BP – and the Mesolithic (Middle Stone Age), when the North Sea area, after climate amelioration in the Holocene, again gradually flooded between about 9000 and 6000 BC. The most important findspots in this respect are listed in Figure 1. While this contribution focuses on the invaluable information from these finds and discoveries, this information should ultimately be recombined and recontextualized with analysis of geological information (among others from corings and geophysical and geotechnical surveys) as well as faunal material in order to arrive at an idea of past human occupation in this lost landscape.

### A brief history of research

The realization that there was a drowned landscape in the North Sea and that it could have been inhabited by people originated in the nineteenth century. Darwin's famous works on the evolution of species and that of the geologist Lyell on the time depth of the earth created a climate in which there was an increasing realization that the current land and sea division could be a fairly recent phenomenon. Other discoveries were subsequently made within that new conceptual framework. An example is formed by the drowned forests on the east coast of England, researched by the English geologist Clement Reid at the beginning of the last century, which already hinted at human occupation (Gaffney *et al.*, 2009). In 1931 a large lump of peat fell on the deck of the trawler Colinda off the Norfolk coast and yielded a beautiful object: the Leman and



FIGURE 2. | Large, perforated pickaxe (length 30.4 cm), made from the distal end of an aurochs radius. Collection RMO (Rijksmuseum van Oudheden).

Over banks point (Evans, 1932). This piece, later dated to the Late Palaeolithic (11,740 ± 150 BP), was an important incentive for the archaeologist Grahame Clark to investigate the postglacial, Mesolithic habitation of Europe in which the North Sea now increasingly became known as an inhabited area (Clark, 1936). Also in the Netherlands fossil bones (or 'bonken') in fishing nets already from the nineteenth century onwards demonstrated the existence of a drowned landscape. These were collected by the Royal Zeeland Society of Sciences (*Koninklijk Zeeuws Genootschap der Wetenschappen*) and from 1964 by the National Museum of Geology

<sup>1</sup> An English translation of Amkreutz and Van der Vaart-Verschoof [eds.] is forthcoming.

<sup>2</sup> This paper is an altered and updated version of an article in Dutch that was published in *Cranium* (Amkreutz *et al.*, 2017).



and Mineralogy (*Rijksmuseum van Geologie en Mineralogie*), currently Naturalis (Mol *et al.*, 2008).

The corpus of prehistoric artefacts from the North Sea steadily grew in the second part of the twentieth century. An important overview of bone and antler artefacts was published by Louwe Kooijmans (1971), at the time curator at the RMO in Leiden. Often finds ended up in the collection of the museum through Kortembout-Van der Sluijs, of the aforementioned *Rijksmuseum van Geologie en Mineralogie*. The initial overview comprised 24 pieces, including pieces of waste from working bone and antler, (perforated) axes and mattocks and a large pick made from the distal part of the radius of an aurochs (Fig. 2). The finds mainly originate from the area south of the Brown Bank. In the years that followed Leo Verhart, who in the meantime had succeeded Louwe Kooijmans, carried out research into (barbed) points of bone and antler (Verhart,

1988; 2000), found mainly on the sand deposits of Maasvlakte 1 in the Euro-poort area. On the other side of the Channel, these discoveries further substantiated the idea of an inhabited and subsequently drowned Mesolithic landscape. The British archaeologist Bryony Coles coined the name 'Doggerland' after the Dogger Bank which became a popular and useful term for the drowned pre-



FIGURE 3. | *Frontal bone of first Dutch Neanderthal, from the Zeeland coast. Photo: Erik de Goederen/Rijksmuseum van Oudheden.*



FIGURE 4. | *Bottom trawling. The beam scrapes the seabed for catching flatfish. Sometimes chunks of peat and fossil bones get caught in the nets. Photo: Luc Amkreutz/Rijksmuseum van Oudheden.*



historic North Sea landscapes (Coles, 1998). It further created high expectations regarding the potential of this archaeological landscape (Peeters, 2011). Excavations of rich Mesolithic sites such as those at Hardinxveld (Louwe Kooijmans, 2003) in the wet sediments of the Rhine–Meuse delta supported this picture. At the same time there was the realization that the archaeologically relevant layers in the sea would often be difficult to reach (Verhart, 1995). The intensive contacts that began in the 1980s between palaeontologists, collectors and fishermen in several Dutch ports, however, proved that the prospects for collecting and research remained interesting (Glimmerveen *et al.*, 2004, 2006; Mol *et al.*, 2008). Further knowledge was obtained by amateur palaeontologists searching for fossils in the dump heaps of gravel and shell processing companies. In this way, important sites were documented and pinpointed (as far as possible), for instance the Eurogeul and the Brown Bank, and collections grew thanks to a very active community of enthusiasts. This continuous flow of information and the scientific interest in the Netherlands and abroad have in recent years led to initiatives that at a European level have tried to map the archaeological heritage in the North Sea in order to better manage and protect it (Maarleveld and Peeters, 2004; Peeters, 2011; Cohen and Peeters, 2014; Cohen *et al.*, 2017). One example of this is the ‘North Sea Prehistory Research and Management Framework’ (NSPRMF) and its revision (Peeters *et al.*, 2009; 2019), which creates a framework for research and economic activities in order to promote heritage management relevant to the North Sea.

Important finds such as the 33 Palaeolithic handaxes that Jan Meulmeester discovered at a North Sea gravel facility in Vlissingen eventually led to the discovery of a submerged Palaeolithic landscape off the coast of Great Yarmouth, Norfolk (Tizzard *et al.*, 2014). The spectacular discovery of an eyebrow ridge of a Neanderthal (the first in the Netherlands) off the coast of Zeeland

(Hublin *et al.*, 2009) stimulated further research (Fig. 3) focusing on creating a context for these kinds of finds, in particular by extensive geological research on site and in the wider region. This is also very much the focus on the other side of the English Channel. A research group around British professor Vince Gaffney of the University of Bradford has been working for years to map the topography and geology of Doggerland by means of 3D seismic research (Gaffney *et al.*, 2009). A major new research project entitled ‘Europe’s lost frontiers’ also distinctly involves the climate in relation to the history of this disappeared area. The research group for instance also uses bulk samples of aDNA (Smith *et al.*, 2015). Recently (2018) geological mapping of the Brown Bank area was undertaken by a joint team from the Universities of Bradford, Ghent, the Flanders Marine Institute (VLIZ) and Dutch TNO (Netherlands Organisation for Applied Technological Research). Groningen University,



FIGURE 5. | Beach replenishment with a Trailing Suction Hopper Dredger at The Zandmotor. Courtesy Beeldbank rws.nl, Joop van Houdt/Rijkswaterstaat.





FIGURE 6. | A Havelte point (length 53 mm). This type of flint point dates to the Late Upper Palaeolithic Hamburgian tradition, and was found on the North Sea beach of Vlieland, by Michael Horn. Photo: Martin de Leeuw/Groninger Museum.

University of Utrecht and the RCE amongst others are involved as well. This research aims at pinpoint sampling and coring of specific target areas based on extensive geophysical survey and analyses of the former landscape in search of sites. Also, the RCE, TNO and Deltares are working on improving the existing Holocene sea level curve (also see Cohen, 2017). The earlier mentioned multi-stranded NWO-project ‘Resurfacing Doggerland. Environment, humans and material culture in a postglacial drowning landscape.’ is the first actual project focusing on the Doggerland finds in particular for the post-glacial period.

In general, but in particular for this project, our beaches and large-scale infra-structural projects such as Maasvlakte 2 and the Zandmotor are an important source of information. The number of Palaeolithic and Mesolithic archaeological finds from these areas is considerable. Importantly, it may be possible to use this information in the designation of zones of interest with potential submerged sites as well as for the designation of zones that may need to be protected from further development. To achieve this, a good overview of finds and surviving prehistoric sediments and landforms is necessary so that the scientific potential of the archaeology of the North Sea can be properly assessed. Below we want to provide a concise overview of the findspots and their archaeological finds and consider some of the research that has taken place or will be implemented. The focus of this overview lies with the artefacts. Information on landscape scale like the British research is published elsewhere (e.g. Cohen and Peeters, 2014; Cohen *et al.*, 2017).

### Findspots and finds: a journey along the Dutch coast

Over the entire length of the Dutch coast archaeological artefacts are found on a regular basis. In many instances it concerns prehistoric (mainly Middle Palaeolithic and Mesolithic) flint or stone objects, but also pieces of worked bone and antler (i.e. with cutmarks, chopmarks, grooves etc.) or even tools like perforated antler or bone axes and barbed points. Some parts of our coastline are particularly rich in Stone Age finds. Generally speaking, the further south along the coast the more finds, with the majority at the Zandmotor and Maasvlakte 2. These two findspots are also the locations that attract most amateur palaeontologists and archaeologists. The chances of finding prehistoric artefacts are of course dependent on several factors such as the intensity of sand replenishments, the geological layers exploited, the number of active searchers and so on. Additionally, the presence of Middle Palaeolithic artefacts is also determined by

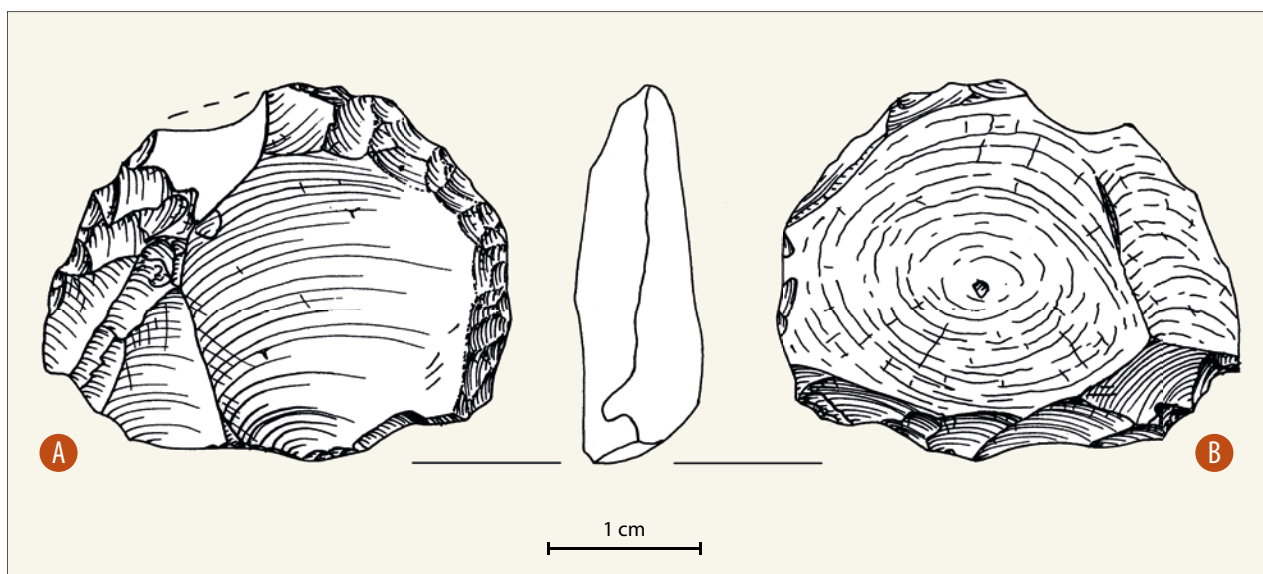


FIGURE 7. | Levallois core from Vlieland, which was secondarily used as a scraper. The core dates to the Middle Palaeolithic. Courtesy Lykke Johansen.



the possibilities for hominin occupation in relation to climatic circumstances during (inter)glacial periods. The climate was not always suitable for occupation in these northern latitudes resulting in intermittent hominin presence during warmer and temperate phases (Verpoorte *et al.*, 2016). Finds dating to the Late (Upper) Palaeolithic are overall quite rare (Peeters and Momber, 2014; see Amkreutz *et al.*, 2018 and below for some important finds).

Since the inventorying work of the Doggerland Research Group (DRG) and recently the 'Resurfacing Doggerland' project, is work-in-progress, we will suffice here in presenting a brief overview of the most important findspots, sites and finds.

We can distinguish three different find contexts: 1. Objects fished from the seabed for which there is sometimes geographical information on the exact findspot (Fig. 4); 2. Objects found on the beach (or shell grit heaps), so clearly in secondary context, but of which the original findspot can be (more or less) traced (larger inaccuracies). This for example consists of finds from sand replenishments (usually 10–20 km out of the coast) (Fig. 5); 3. Objects found on the beach which are more or less 'local'. This context consists of finds from reworked beach barriers and other sand dunes from the coastal plain, artefacts from the 'Texels Rough' (see below) and so on. Broadly speaking it seems that finds from contexts 1 and 2 are usually (Middle) Palaeolithic and Mesolithic, while most from context 3 are considerably younger (Neolithic/Bronze Age). At some of the findspots such as the Wadden Islands Texel and Vlieland, we are dealing with a combination of replenished and reworked finds resulting in a mixing of artefacts from different contexts.

### The northern part of the coast and the Wadden Islands

Starting in the North, Vlieland and Texel are especially known for their Stone Age finds, but prehistoric flint artefacts have also been found further east. After

severe storms erratic stones and flints, sometimes including artefacts, are often washed ashore or are dumped on the beach in the course of sand replenishment for coastal reinforcements. Besides the German Wadden Islands where prehistoric artefacts are sometimes found as well like on Baltrum, we know of artefacts (from east to west) from Schiermonnikoog, Ameland and Terschelling. For example, a large fragment of a bifacial flint tool, probably a handaxe, was found on the beach of Ameland (Stapert *et al.*, 2013a; 2013b). As far as we are aware this find is the most northern Middle Palaeolithic artefact from the Netherlands. It most probably ended up on the beach during sand replenishments from a lot 13 km offshore. Later prehistoric (Late Palaeolithic, Mesolithic and Neolithic) flint artefacts are occasionally found as well on the beaches of these islands.

The North Sea beach of Vlieland, particularly the 'Vliehors' on the western part of the island, is quite



FIGURE 8. | A Mesolithic core axe from the Zandmotor. Found by Dick Duineveld. Photo: Frans de Vries/ToonBeeld, Oosterwolde, (after Niekus *et al.* 2021a: afb. 76-1).



rich in lithic artefacts, especially from the Neolithic and/or the Early Bronze Age. These finds include a ground stone axe, a fragment of a flint sickle blade, a 'Bell Beaker' knife and (pre-forms of) arrowheads (Stapert *et al.*, 2011). Some artefacts possibly date to the Mesolithic. At least two pieces, a Havelte-point (Stapert *et al.*, 2013b: note 6) (Fig. 6) and a blade core (Stapert *et al.*, 2011: Fig. 2) are attributed to the Hamburgian culture and represent the most northerly Late Upper Palaeolithic finds from the Netherlands. Four artefacts from Vlieland are definitively Middle Palaeolithic: a Levallois core which was secondarily used as a scraper (Fig. 7, see also Stapert *et al.*, 2011: Fig. 3 top), a fragment of a bifacial tool (*ibid.*: Fig. 3 bottom), possibly a *Keilmesser*, and two flakes (Stapert *et al.*, 2013a: Fig. 7).

From the beach of Texel we know of at least one certain Middle Palaeolithic artefact, a retouched Levallois flake (from an area known as *Eierland*),

and several possible Middle Palaeolithic artefacts (Stapert, 1983; Stapert *et al.*, 2013a; personal observations Niekus). The majority of finds, including flakes and blades, is attributed to the later Stone Ages (Late Palaeolithic, Mesolithic



FIGURE 9. | *Flint knife hafted in tar dating to 50.000 BC, found by Willy van Wingerden at the Zandmotor. Photo: Courtesy Rijksmuseum van Oudheden.*



FIGURE 10. | *Detail of a red deer mandible with an embedded flint 'point' found by Donny Chrispijn at Hoek van Holland. Photo: Frans de Vries/ToonBeeld, Oosterwolde.*





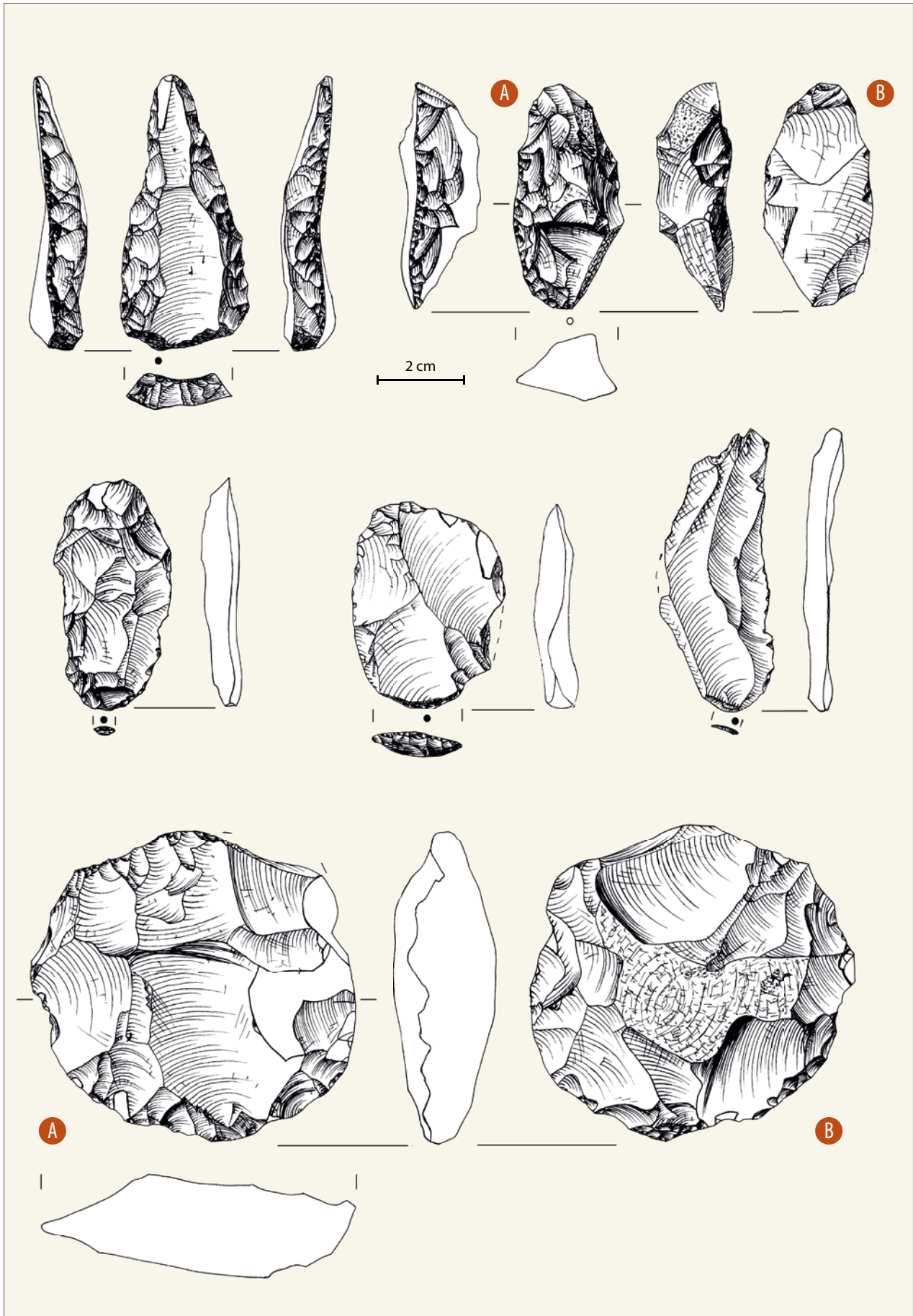


FIGURE 11. | Selection of Middle Palaeolithic artefacts from Maasvlakte 2: a Moustérien point and scraper (top row), two Levallois flakes and a blade-like Levallois flake (middle row) and a Levallois core (bottom). Found by Walter Langendoen and Gideon de Jong. Courtesy Lykke Johansen/BOOR.



and Neolithic/Bronze Age) based on typomorphological characteristics and/or postdepositional surface modifications. Some of the artefacts from Texel and Vlieland, particularly the older pieces, may derive from the so-called ‘Texels Rough’, areas within the North Sea that contain moraine gravels, washed out remains of glacial till from the Saalian. Some of the later Stone Age finds may derive from drowned coversand ridges.

Along the western part of the North Sea coast, in the province of Noord-Holland, artefacts have been found near the coastal defences of Petten (Middle and Upper Palaeolithic and probably later), Schoorl and Camperduin (among other artefacts a flint sickle dating to the Bronze-Iron Age and a Mesolithic blade core), Heemskerk-Castricum (e.g. a flint sickle and a surface retouched knife dating to the Early Bronze Age). An atypical Late Middle Palaeolithic flint handaxe or *Blattförmiger Schaber* (e.g. Bosinski, 1967) was found in 2015 between shells on a footpath only 10 meters in front of archaeological museum ‘Huis van Hilde’ in Castricum. These shells were dredged from the North Sea but the original findspot is unknown. At the beaches of Zandvoort (Verhart, 2003) and Katwijk (Verhart, 2000) respectively a fragment of a Mesolithic antler axe and a fragment of a bone point, also Mesolithic, were found. At Scheveningen part of an antler axe was found as well (see remark in Verhart, 2003). In recent years dozens of finds, mostly of Middle Palaeolithic age, have become known from the beaches of Egmond and Bergen. It is however noteworthy that the beaches of Noord-Holland seem to be devoid of large numbers of finds as compared to the coast further south (see below). This may simply be caused by lower survey intensity as compared to other parts of the coast. As is known geological characteristics of this part of the Southern North Sea also form a factor of influence, less intact landscapes appear to be preserved or are covered up, yielding less finds, a topic which needs to be addressed in the future.

### The richer ‘south’: the Zandmotor, Maasvlakte 1 and 2 and Rockanje

The artificial beach of the Zandmotor (or Sand Engine), between Kijkduin

and Ter Heijde, but also the beaches further south at Monster (e.g. Verhart, 1988) and Hoek van Holland are rich in archaeological finds, especially from the Middle Palaeolithic and the Mesolithic (Niekus *et al.*, 2021a). At the Zandmotor hundreds of Middle Palaeolithic artefacts have been found, including Levallois flakes and cores, different types of scrapers, notched and retouched pieces, backed knives and Mousterian points. In addition a small handaxe and a few truncated-faceted pieces were found. Most of the Middle Palaeolithic artefacts date to MIS 3, but similar to Maasvlakte 2 (see below) there is a small number of earlier Middle Palaeolithic artefacts, tentatively dated to MIS 7-early MIS 6. Besides a small number of artefacts that *might* date to the earlier Upper Palaeolithic (Gravettian?) there is one fragment of a backed point reminiscent of *Federmesser*- or Tjonger-points and a few possibly Late Palaeolithic blades. Overall, evidence for Late Palaeolithic occupation is virtually absent from this part of the Dutch coast. A backed point from Hoek van Holland was initially classified as a Late Palaeolithic Tjonger-point or *Federmesser* (see Amkreutz *et al.*, 2017: 38) but in retrospect the rather small size is more indicative of a Mesolithic point, a so-called ‘a-point’ or unilaterally backed point.

The Zandmotor is well-known for Mesolithic finds. These consist not only of hundreds of flint artefacts but also bone points, pieces of bone and antler with cut- and chopmarks and human remains (particularly cranial fragments). Some of the latter, as well as some from the beach further to the south, bear clear cutmarks. Among the flint artefacts there are bladelet cores and blades, but also scrapers, points and trapezes and dozens of core axes (Fig. 8) (Niekus *et al.*, 2021a). The trapezes and regular blades, and possibly the core axes – a few flake axes are present as well –, point to a significant Late Mesolithic occupation (i.e. c. 7300 BP; see the discussion in Niekus *et al.*, 2021a), shortly before the final inundation of the southern North Sea basin. Some of the dates on human remains from the Zandmotor seem to corroborate Late Mesolithic presence



FIGURE 12. | Hand-axe made of Wommersomquartzite from Maasvlakte 2. Found by Remco Mouthaan. Photo: Frans de Vries/ToonBeeld, Oosterwolde.



(Van der Plicht *et al.*, 2016; Table 1; unpublished data). Two exceptional finds originate from respectively the Zandmotor and Hoek van Holland. The first is a flake hafted in tar (Fig. 9). It was found in 2016 and C<sup>14</sup>-dated to at least 50.000 years BP. Chemical analysis of the tar composition identified it as birch bark tar and yielded important information on a complex manufacturing method including an oven and reservoir (see Niekus *et al.*, 2019). The rarity of this piece (there are only four comparable finds in Europe) and its implications make it a very important European find. At Hoek van Holland a fragment of a red deer mandible with an embedded pointed unretouched flint blade was found. The find is a fine example of the degree of preservation in Doggerland (Fig. 10).

Maasvlakte 1 is well-known for archaeological finds, especially for the hundreds of predominantly Mesolithic bone points (Verhart, 1988; 1995; Amkreutz and Spithoven, 2020). At Maasvlakte 2 (Carmiggelt and Schiltmans [eds.], 2021), the recent extension to the port of Rotterdam, bone points have also been found in lower numbers, in addition to human remains, worked bone and antler, a few bone tools and for instance a number of perforated beads. Noteworthy are the hundreds of flint artefacts that are assigned to the Middle Palaeolithic based on typological and technological criteria – the Levallois-technique is clearly in evidence –, and like the Zandmotor assemblage to a certain extent postdepositional natural surface modifications (Niekus *et al.* 2021b). These finds include (blade-like) flakes, blades, cores and retouched tools such as a scrapers including several Quina-type scrapers, points (Levallois and Mousterian), a dozen (mostly *subcordiforme*) handaxes, including small specimens or *Fäustel*, and a few *Keilmesser* (Niekus *et al.*, 2021b) (Fig. 11). An exceptional find is a small handaxe made of Wommersomquartzite or GQW (Niekus *et al.*, 2017; see Fig. 12). The only known source of this very specific raw material is found near the hamlet of Tienen in Belgium, 160–175 km to the southeast of the sand dredging lot in the North Sea. Except for a small number of finds that



FIGURE 13. | *Small, late Middle Palaeolithic handaxe (length 7.1 cm). Found by Theo Lambrechts. Used as the campaign image for the 2021 Doggerland exhibition at the Rijksmuseum van Oudheden. Courtesy Rijksmuseum van Oudheden.*



FIGURE 14. | *Some of the 33 handaxes from Great Yarmouth (Norfolk, UK). Found by Jan Meulmeester at a gravel wharf in Vlissingen. Courtesy Rijksmuseum van Oudheden.*



Palaeolithic finds from Maasvlakte 2 likely date to one of the Late (MIS 3?) Middle Palaeolithic traditions such as different facies of the Mousterian and the *Keilmesser-Gruppen*. Both Late Middle Palaeolithic ‘cultures’ seem to be represented in the wider region and as stated by Verpoorte *et al.* (2016: 160) the Netherlands “forms a border zone for the Late Middle Palaeolithic, where distributions of *Keilmesser*, MTA-like bifaces, bout coupé hand-axes, and a small biface component reminiscent of the *Moustérien à petits bifaces dominants* overlap.” Occupation during MIS 3 (*Blattspitzengruppen* and the Lincombian-Ranisian-Jerzmanowician) is attested by a leaf point of Mauern type and a fragment of possibly a Jerzmanowice (blade) point. A few artefacts such as a proximal blade fragment with retouched sides may date to the Early Upper Palaeolithic (Aurignacian and/or Gravettian).

Late Palaeolithic artefacts include a point with two retouched sides (‘Kremser-point’), a shouldered point (*Federmessergruppen* or Creswellian) and a large fragment of possibly an Ahrensburgian tanged point. Several relatively large blades, burins and a scraper likely date to the Ahrensburgian-tradition. Mesolithic finds are relatively easy to identify due to their very fresh appearance and the occurrence of dozens of (micro) blades and

blade fragments. A few bladelet cores and scrapers are present, as well as a flint core secondarily used as a hammerstone. Several core axes are present.

The beach at Rockanje is known as a site for quite some time. Dozens of bone points, worked antler and bone were found (e.g. Hendriks, 2008). Replenishment with younger sediments has seen dwindling numbers of finds. At Hoek van Holland the enthusiastic use of a beach cleaner has a similar result.

### Province of Zeeland

In the province of Zeeland there are several beaches where sand replenishments have taken place and where archaeological finds can be collected. These locations include Westkapelle-Domburg where Middle Palaeolithic artefacts



FIGURE 15. | *Perforated macehead (11.6 x 8.9 cm). This drilled stone was possibly used as weight on digging sticks. Brown Bank area. Courtesy Rijksmuseum van Oudheden.*



FIGURE 16. | *Large Mesolithic core axe (length 20 cm), found in a fishing net near the Brown Bank in 1988. Courtesy Rijksmuseum van Oudheden.*



can be found. From this location and Zoutelande we also know of several presumably Mesolithic perforated antler axes. These finds probably originate from eroded prehistoric beach barriers. A large handaxe (length nearly 18 cm) was found on the mudflats of Serooskerke (Schouwen); it possibly originates from a deep gully close to the shore (Anonymus, 2010). Furthermore there is a perforated antler axe from the beach of Westerschouwen near Burgh-Haamstede. Noteworthy are several Neolithic finds such as a blade scraper from the beach at Vrouwenpolder. At the beach 'De Kaloot' near Borssele several Middle Palaeolithic artefacts, but also human remains, were found. In the 1950s a human mandible was dredged from the Westerschelde off the coast at Ellewoutsdijk. Unfortunately the mandible itself is missing but some plaster casts have survived. It is unclear whether the jaw belonged to a Neanderthal or an AMH (Storm and Lambers, 2017). A Levallois flake is also known from the Westerschelde (Modderman, 1959). Traditionally the beach at Cadzand is famous for fossil shark teeth, but quite early on Palaeolithic and Mesolithic artefacts were found as well (e.g. Veerman, 1972; Stapert, 1981).

### Offshore sites

Most of the finds mentioned in the previous sections originate from locations offshore and ended up on the mainland through sand replenishments or transport of raw materials (sand, gravel, shells). Examples are 'Onrust' and 'Roompot' of the Zeeland coast. The so-called 'Middeldiep', approximately 15-20 km offshore from the Zeeland coast, is well known for 'Krijn', the first Neanderthal from Dutch territory (Hublin *et al.*, 2009). His parietal bone was found among grit at an Yerseke based company. At the same company several Middle Palaeolithic handaxes (e.g. Mol *et al.*, 2008; Johansen *et al.*, 2009) from the same general findspot were collected (Fig. 13). These 'sites' are part of the Zeeland ridges, a series of SW-NE oriented sand ridges parallel to the coast that contain (re-worked) sediments with faunal remains from the Early Pleistocene, Eemian, Weichselian and the Holocene (Hublin *et al.*, 2009). Several Middle Palaeolithic artefacts, including a handaxe and a fragment of a scraper, and a human mandible (Amkreutz *et al.*, 2017: 40) found on the beach at Westkapelle-Domburg originate from the same general area. Unfortunately after <sup>14</sup>C-dating it turned out the mandible is Mediaeval in age. Another example is the gravel processing facility near Vlissingen. At this facility Jan Meulmeester discovered 88 flint artefacts including 33 handaxes in 2007 and 2008 (Fig. 14). In addition over 100 faunal remains were found including woolly rhinoceros, mammoth, bison, reindeer and horse. These finds originate from 'Area 240' off the coast of Great Yarmouth in Norfolk (Tizzard *et al.*, 2014). This brief overview shows that besides beaches, companies processing raw materials from the North Sea may also be important 'sites'. Unfortunately access to these facilities is often prohibited and archaeologists are in need of a covenant to ensure monitoring of the quarried sediments.

Other offshore sites are known primarily from fishing nets. One of these sites is the Brown Bank, an elongated sand ridge with a length of approximately 35 km situated c. 80 km from IJmuiden (Mol, 2016). Most of the finds there date to the (Early) Holocene. These include worked pieces of bone and antler, perforated adzes, axes and production waste. Some of these pieces bear evidence of the so-called *groove-and-splinter technique* (Louwe Kooijmans, 1971: 35-45) which was widely used during the Late Palaeolithic and Mesolithic in northern latitudes for producing long strips of bone that could serve as preforms for bone points. Bones with gnaw marks of dogs suggest that campsites were present in the area (Verhart, 1995: 95). Special finds are perforated mace-heads or *Geröllkeule* (Fig. 15) which were possibly used as weights for digging-sticks (Drenth and Niekus, 2009). Another example is a large core axe that was donated to the RMO by fisherman Aart Wolters (Fig. 16). Noteworthy is the fair amount of human remains from 'De Stekels', a location south of the Brown Bank. Other finds include several polished Neolithic flint and stone axes. These were found in the Brown Bank area. They may have been fallen overboard accidentally, but their size and design point to the fact that it may also be depositions, perhaps in an area that was long recognised as a remnant of the drowned land.



FIGURE 17. | Large perforated Mesolithic antler axe (length 17.2 cm), fished from the Eurogeul in 2013 by OD50. Collection RMO. Photo: Dick Mol.

Another important site is the Eurogeul, a deepened channel which provides access to the port of Rotterdam. Regular maintenance of the gully by hoppers and fishing by beam trawlers usually results in many fossils of both Pleistocene and Holocene age, as well as artefacts such as antler axes (Fig. 17) (Mol *et al.*, 2013). It appears that Pleistocene and Holocene sediments from the Eurogeul are reworked and the finds apparently originate from secondary contexts. Closer to the present-day shore the primary context is better preserved (Hijma *et al.*, 2012), as testified by the excavation in the former Yangtze harbour described below.

As is shown above by this brief survey, the Southern North Sea holds a vast and in a way a hidden archaeological record dating from the Middle Palaeolithic to Late Mesolithic. Based on 'drowning' models of this basin this vast area of land mass was almost completely submerged by the end of the Mesolithic period. After that moment the Southern North Sea



more or less has its shape and appearance as we see today. This also means that younger finds like the famous polished Neolithic flint axes dredged from the bottom of the North Sea, two of which were found near the Bruine Bank (Amkreutz and Glimmerveen, 2021) are reminiscent of the use of this area when it was a sea, not so much an indication of habitable land during the Neolithic period.

### Highlighted research

The above overall (and incomplete) overview of finds and find locations gives us insight into the potential and the amount of finds from the submerged prehistoric landscapes of the North Sea. In the following sections we will discuss a few specific topics to show that these generally attractive finds possess an important potential to learn more about prehistoric human behaviour in these drowned landscapes.

### Research in the former Yangtze harbour

One of the few places on the Dutch coast where actual underwater re-

search into the Stone Age was performed is the former Yangtze harbour (the current Yangtze canal) in the Maasvlakte area (Fig. 18). Here, by the end of 2011, a Mesolithic site at a depth of some twenty meters was investigated. The fieldwork and analysis were carried out by an interdisciplinary team of specialists. It is precisely this integrated approach that led to important insights into the landscape, habitation and use of the Meuse estuary during the Early and Middle Mesolithic (Moree and Sier [eds.], 2015). The remains were situated on the top of a river dune, formed by aeolian action at the beginning of the Holocene. With the help of a dredging pontoon and a grab the river-dune was sampled, leading up to a total of 316 big bags filled with river-dune sand which were brought to the surface (Fig. 19).

Tens of thousands archaeological finds emerged from the sifted sand. Based on the analyses of the finds (Fig. 20) it followed that groups of hunter-gatherers regularly visited the river dune in the former Yangtze harbour from about 8400 to 6500 BC (Peeters *et al.*, 2015). The large number of flint artefacts point to on site flintknapping and the manufacture of tools such as scrapers, microlithic points, burins and borers (Niekus *et al.*, 2015). The presence of a small number of artefacts made of Wommersomquartzite from the vicinity of Tienen in Belgium points to long-distance contacts or exchange. The inhabitants of the river dune hunted, among others, red deer, roe deer, wild boar and fur animals such as otter and beaver and possibly also polecat, weasel and wild cat. In addition, birds were hunted, and fishing is exemplified by the many remains of pike, perch, carp, salmon, eel, Atlantic sturgeon, spotted ray and turbot (Zeiler and Brinkhuizen, 2015). Archaeobotanical research yielded a wealth of information about plant foods (Kubiak *et al.*, 2015). Among other things, the use of starchy tubers and roots was demonstrated. Water chestnut, hazelnuts and acorns provided the necessary vegetable fats. Oil was probably extracted from the seeds of redwood. Fruit and berries were also collected on the river



FIGURE 18. | Impression of the 'excavation' in the former Yangtze harbour. Photo: Bjørn Smit/Rijksdienst voor het Cultureel Erfgoed.





FIGURE 19. | *Sampling of the river-dune sediments in 316 bulk bags. Photo: Dimitri Schiltmans/BOOR.*

dune and young shoots and leaves of many herbaceous plants were probably eaten as vegetables. It was the first time in the Netherlands that a Mesolithic settlement was found this far west and at such a great depth. The sites would never have been discovered without the extensive systematic (geo) archaeological research that preceded the ‘excavation’ (Vos and Cohen, 2015).

### Barbed points of bone and antler

One of the most famous Dutch artefacts from the North Sea are the barbed points of bone and antler (Fig. 21). Points is a neutral term as they could have been arrowheads, spearheads or harpoon points. Often, but not always, they are barbed. Meanwhile, about a thousand are now known, making this one of the largest find groups for the European Mesolithic (Amkreutz and Spithoven, 2019). These finds are important because they are informative on Mesolithic hunting techniques, prey and technology. Different ‘groups’ can be distinguished based on their shape, size and style characteristics. These stylistic groups may have had a chronological, social or functional origin, a discussion which is far from settled (see Amkreutz and Spithoven, 2019). Most ‘Dutch’ points originate from the beach and therefore ultimately from sediments off the coast where sand is extracted. A large group of about 400 artefacts was collected at Maasvlakte 1 in the 70s and 80s and originates from the Europoort area. In Scandinavia, Germany and England in particular, there have been quite a few points that were found in excavations at famous sites such as Star Carr or Hohen Viecheln (Elliott and Milner, 2010; Gramsch, 2016). In those places there was a lot of information available, verifiably excavated, that provided insight into the use of this find category. In the Netherlands, that context is unfortunately hard to find. Some examples are known from the former peat lands in the Pleistocene hinterland (including Drenthe) (Louwe Kooijmans, 1971). No points are known from the Yangtze harbour research (Moree and Sier [eds.], 2015) or the excavation of the Late Mesolithic Hardinxveld site (Louwe Kooijmans, 2003). This makes the artefacts from the North Sea itself the most important source of information. The collections of points were first studied by Leo Verhart (1988; 1995) who compared various metric and qualitative aspects. He arrived at a division into a group of large points (at least 94 mm) and small points (maximum 85 mm) with a simpler cross-section (Verhart, 1988). According to Verhart, the smaller points were particularly suitable as arrowheads, for example for the hunting of birds and fish, and the larger as a

spear or lance point. The smaller points have no good parallels internationally and may be ‘unique’ for our area: Dutch design!

### New research

After the 1980s, points were occasionally still found, but the construction of Maasvlakte 2 and the Zandmotor really gave a new impulse to their numbers. Every few weeks new ones are found (Fig. 22). This indicates it is time for a new analysis. This is being undertaken within the ‘Resurfacing Doggerland’ programme by Merel



FIGURE 20. | *First finds from the soil cores; charcoal, flint flake and bone. Photo: Gilbert Kempenaar/BOOR.*



Spithoven (Spithoven, 2016; Amkreutz and Spithoven, 2019). Her research also recognizes certain groups as there are now multiple find locations where points are found. It appears that points with a certain shape, or type of barb, occur more often at one location than another. Arguably various extraction sites of sand may represent spatio-temporally different deposits. In the future more points will be dated. Meanwhile a number of points has been investigated using the ZooMS method. This research technique uses the ‘molecular

barcode’ in the collagen of bone to determine animal species. This yielded a spectacular result as apart from red deer two points were actually made of human bone (Dekker *et al.*, 2020). This most probably has ritual connotations, such as ‘hunting with the ancestors’.

### Not just scoring points

Other artefacts of bone and antler are regularly found on the beaches as well. These include waste products from the processing of bone and antlers, butchering waste and artefacts such as bone chisels, spears, needles and fishing hooks (Zeiler, 2021). Because these types of artefacts are even rarer, it is important to document them as completely as possible. A particular spectacular example is the decorated metatarsal of a bison and dates to c. 13,500 BP (Amkreutz *et al.*, 2018) (see Fig. 23 and 24). The bone had been worked to create flat facets on top of which a stacked ‘chevron-design’ was executed. Only four of these artefacts are known in Europe at large distances from each other (Poland,



FIGURE 21. | Selection of larger and smaller barbed points from Maasvlakte 1. The largest is 14,5 cm. Courtesy Rijksmuseum van Oudheden.





France and Wales). The find from the Brown Bank area fills a gap. It points to the long-distance interaction that must have existed and that led to similar designs on objects situated hundreds of kilometres apart. It also indicates an important shift from figurative designs to abstract motifs in the Late Palaeolithic. A few other decorated pieces from Doggerland were published by Niekus and Amkreutz (2021).

### Human remains

Another advantage of the North Sea basin as archaeological resource, besides the presence of organic artefacts and palaeoenvironmental data, is the fact that a large number of prehistoric human remains are known (Fig. 25). On dry land bone material remains are poorly preserved due to dry and acidic soils. The North Sea basin alternatively provides a fairly robust dataset which holds information about the health status, food supply and living patterns of Mesolithic hunter-gatherers. The discovery of a Neanderthal skull fragment and a parietal bone of a Late Palaeolithic human (Hublin *et al.*, 2009; Amkreutz *et al.*, 2010; 2018) shows that (in a few cases) even older remains are possible. First results show that in several human bone fragments found on the Dutch beaches there is a good chance of finding intact DNA material, also with regard to the prehistoric material (aDNA: ancient DNA).

To indicate the archaeological and scientific relevance  $^{14}\text{C}$  dating and or aDNA analysis is indispensable. Only in this way age can be determined. Physical aspects of bone material such as form (robustness: see Storm, 2010), patination, weathering or the presence of bryozoans can give only limited indications on the potential age of these pieces. Fortunately, the North Sea has produced an extensive corpus of prehistoric human skeleton material. This is due to many

finds from private individuals on beaches, but also, for example, the cooperation between North Sea Fossils and the fishing fleets. Several of these human remains have been donated to the RMO over the past years. Interestingly some skull pieces demonstrate cut-marks that probably were also related to funerary rituals.

### Diet

In total, more than fifty fragments of human bone have been dated by means of  $^{14}\text{C}$  dating. More than thirty are Mesolithic in age and one piece turned out to be Late Palaeolithic, older than 13,000 years (Amkreutz *et al.*, 2018) (Fig. 26). It was found off the coast of Rotterdam by trawling. This currently is the oldest 'Dutch' find of a modern human and dates to the time of the *Federmessergruppen* (somewhat contemporaneous with the decorated bone mentioned above). Regularly there are also fragments that date to more recent periods (Iron Age, Roman period or later). As far



FIGURE 22. | Groundshot of a barbed point. Photo: Merel Spithoven.



as prehistory is concerned, the Mesolithic dataset makes an important contribution to our knowledge.

The dated fragments cover the entire Mesolithic (between 9000 and 6000 BC). This means that we are dealing with a population from a period in which the landscape gradually changed due to the sea level rise and the resulting environmental changes. Recent research has focused on the measurement of the stable isotopes of carbon 13 and nitrogen 15 in addition to carbon 14 isotopes (standard for dating research) (Van der Plicht *et al.*, 2016). These stable isotopes provide some information on the diet from the individual from which the bone fragments derive. In short, a person with a predominately protein rich menu derived from land animals has a different isotope signature than someone who eats sea fish or someone who gathers food in a freshwater area.

The research of the bone fragments showed that most individuals had a fresh-water signal that corresponds to an important proportion of freshwater food, especially fish, but one could also think of other freshwater species like otters and beavers. Furthermore, it seems that in the course of the Mesolithic there was a shift from a terrestrial diet to a diet based on freshwater sources. It is hypothesized that this shift is somehow related to the drowning landscape between the

Netherlands, England and Denmark. For a long time it was thought that sea level rise was a dominant push factor which forced inhabitants further inland, or forced a marine diet. Current insights show now, however, that for a long time people adapted to the vast wetlands that arose in the delta of Meuse, Rhine and Thames. These kinds of landscapes are rich in food sources and thus offer a good place to dwell as a hunter-gatherer (Fig. 27).

Human remains can also provide information about the nature of populations and about pathology and health. The isotope study of the eyebrow fragment of 'Krijn', the first Neanderthal man in the Netherlands, showed that this specimen was a real meat eater, and physical anthropological research indicated a cavity which was a relic of a subcutaneous tumour, the first to be discovered for Neanderthals (Hublin *et al.*, 2009). Also the Late Palaeolithic bone that was found in the Eurogeul area did reveal well-healed pathological evidence of what may have been anaemia, trauma or for example shortages in nutrition at an early age (see Amkreutz *et al.*, 2018). The aforementioned aDNA, which can be well preserved, especially in bones from the North Sea, also offers a unique opportunity to learn much more about the genetic characteristics of the hunters-gatherers who inhabited this area.

The presence and preservation of prehistoric human remains also provides other research opportunities like evolutionary studies and studies of the morphological changes in skeletal material over time (Storm, 2010; Storm *et al.*, 2014a; 2014b). For example, the jaw of the Mesolithic man appears to be much more robust than that of later specimens (Storm, 2010).

Furthermore some pieces of human material have even been found on which cut marks are visible. These traces offer the possibility to hypothesize about rituals and traditions around life and death. In addition, it is interesting to see how many fragments come from specific locations, and insights can be derived about the context of the fragments (settlement debris, burials, etc.). Within the 'Resurfacing Doggerland' project the physical anthropological research as well as isotope (carbon, nitrogen and strontium) and aDNA analysis will be continued and intensified.

In addition to human material, animal bones remain crucial. On the one hand these provide information on landscape and environment, and on the other hand also more directly provide insight into ways of hunting and slaughtering waste (often with cut or chop marks) and tools of bone and antlers.



FIGURE 23. | *Decorated metatarsal of a bison found near the Brown Bank area, dating to c. 13.500 BP. Clearly visible are the facets on top of which the zigzag decoration was executed. Collection Glimmerveen. Courtesy Rijksmuseum van Oudheden.*





FIGURE 24. | *Detail of the stacked chevron zigzag decoration on the bison bone. Note how the decoration patterns starts out in a controlled manner, but gets 'sloppier' towards the end. Collection Glimmerveen. Courtesy Rijksmuseum van Oudheden.*

### Conclusions and future plans

The aim of this contribution was to provide a global overview of the recent developments surrounding the collection and investigation of prehistoric finds from the Dutch sector of North Sea. It is clear that this submerged landscape plays an important role in the understanding of the prehistoric occupation and land use of Northwestern Europe and that it is a valuable source of information. The finds we now know came to light mainly through fishing, and in recent years increasingly and in much larger numbers through large-scale industrial activities, such as coastal defence and reinforcement, projects such as Maasvlakte 2 and the Zandmotor and in resource extraction. This means that the finds from these areas have their own problems with regard to interpretation. Unfortunately, as with an excavation, we do not have control over the manner of research and detailed insight into the original find context(s). Especially the lack of a direct context is problematic. At the same time, organic preservation and the increasing availability of data on extraction and reclamation sites and their circumstances, make it increasingly possible to reconstruct this context. Because the number of finds increases, this offers the possibility to base new interpretations or hypotheses about human habitation on larger numbers of finds instead of on the basis of only one or a few pieces. For example, the section on the Mesolithic

diet could simply not have been written if we only had a handful of dated human remains. In short, in this case there is certainly “more data offers more possibilities”.

For the future a number of developments should be noted. The Doggerland exhibition at the RMO, the first of its kind, received an enormous amount of attention nationally and internationally and created a large base of enthusiasts. Also through the catalogue and children’s book that appeared. The museum as such also aims to coordinate and facilitate the collection and assessment of finds through beach days, expertise days and cooperation with other institutes such as Naturalis, Natural History Museum Rotterdam, BOOR and the Oervondstchecker. The exhibition will travel in smaller form until 2024 to several museums, like FutureLand. The research for the post-glacial period will be largely continued within the multi-disciplinary framework of the ‘Resurfacing Doggerland’ project, which will document and investigate lithic and organic finds as well as human and faunal remains in the context of the changing landscape. Finally the renewed ‘North Sea Prehistory Research and Management Framework’ (NSPRMF) provides a much needed starting document, enabling future coordination of economic and heritage aspects in the exploitation of the North Sea.



FIGURE 25. | *Mesolithic bones; mandible, cranium and humerus, from fishing nets and the beach. Collection and courtesy Rijksmuseum van Oudheden.*



With this contribution, we hope to expand the attention for archaeological finds from the North Sea even further. This is important because in this way we get a better grip on all the material that is found and thus achieve the most complete assessment possible. We also would like to appeal to the community of fossil collectors for archaeological finds from the beaches or in other ways from the North Sea, as well as additions to the overview of sites that we have presented here, to the authors or to the address [Doggerlandarcheologie@gmail.com](mailto:Doggerlandarcheologie@gmail.com) to report.

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## Samenvatting

De prehistorische archeologie van de Noordzee betreft de vroegere Steentijd bewoning van wat ook wel bekend staat als Doggerland. Dit gebied



FIGURE 26. | Fragment of a cranium (*Os parietale*) of the oldest Dutchman, found off the coast of Rotterdam. Collection and courtesy Rijksmuseum van Oudheden.

vormt een reusachtig landschap dat tijdens zijn grootste uitbreiding meer dan 200.000 vierkante kilometer besloeg en bijna een miljoen jaar menselijke bewoning documenteert. De intacte conservering van vindplaatsen en landschappen, maar ook van organische artefacten maken het een ideaal onderzoeksterrein. De toenemende activiteiten op de Noordzee, in de grondstofwinning, visserij en energiemarkt vragen om intensivering van opsporing en bescherming en benadrukken de rol van *citizen science* onderzoekers.

De laatste jaren worden er steeds meer pleistocene en holocene vondsten bekend, afkomstig van de Nederlandse stranden en uit vissersnetten. Enkele jaren geleden leidde dat tot de vorming van de Werkgroep Steentijd Noordzee die met name de prehistorische archeologie wilde documenteren. Uit die groep vloeide in 2021 een grootschalig multidisciplinair NWO-onderzoekproject o.l.v. het Groninger Instituut voor Archeologie getiteld 'Resurfacing Doggerland' voort. Tevens vond er een eerste tentoonstelling over 'Doggerland' plaats in het Rijksmuseum van Oudheden te Leiden. De hernieuwde aandacht duidt op het grote potentieel van dit gebied en vormt een goede aanleiding hier een recente samenvatting van de stand van kennis te geven en enige perspectieven aan te duiden.

Het onderzoek naar Doggerland komt vooral van de grond in de twintigste eeuw. De verdronken bossen en vondsten in vissersnetten, waaronder de beroemde Leman and Ower banks speerpunt leidden tot een besef van het bestaan van dit reusachtige verdwenen gebied en hoe rijk het geweest moet zijn. Toch blijft lang de tendens, ook aan Nederlandse zijde, dat losse vondsten zonder context niet meer dan 'aardig' zijn. Verandering komt pas van de grond met de intensivering van suppleties die met name bij Maasvlakte 2 en de Zandmotor tot een grootschalige toename van vondsten leiden. Daarnaast maken nieuwe technieken zoals isotopen en aDNA-analyse het mogelijk om veel informatie aan de vondsten te onttrekken. Tevens vindt er, met name aan Engelse zijde een intensieve kartering van de postglaciale landschappen plaats op zee en in minder gedetailleerde mate is dat ook het geval voor de pleistocene landschappen. Tenslotte vormden ontdekkingen, zoals 'Krijn' de eerste Neanderthaler van Nederland, een verdere impuls. Niet te onderschatten is ook de rol van de naam Doggerland die een Britse onderzoekster aan het gebied gaf, vrij naar de Doggerbank.

De toename van vondsten en kennis is de laatste jaren sterk gestegen maar dat geldt ook voor de activiteiten op de Noordzee. De rol van huidige projecten is daarom ook te komen tot een wetenschappelijke documentatie van de vele vondsten, deze te reintegreren en re-contextualiseren in het verleden landschap om zo tot meer kennis en een betere bescherming te komen. Indien we met dit in ons achterhoofd een reis langs de kust maken dan zijn er vondsten die met een verschillende gradatie van nauwkeurigheid terug te plaatsen zijn in het landschap. De vindplaats van een artefact uit een vissersnet is vaak preciezer te lokaliseren dan een losse vondst van het strand waarvan niet duidelijk is bij welke suppletie deze hoort. Verder is er een trend waarneembaar waarbij de vondsten in het zuiden talrijker zijn. Dit heeft met name te maken met de grote infrastructurele werken van de Zandmotor en Maasvlakte 2 waar veel vondsten gedaan worden en een grote gemeenschap van zoekers en *citizen scientists* actief is. Daarnaast ligt de begraven geologie eraan ten grondslag.

Vondsten kunnen echter in het gehele gebied gedaan worden. In het noorden zijn er verschillende pleistocene en holocene vondsten bekend van de Waddeneilanden. Paleolithische en in mindere mate mesolithische artefacten worden ook gedaan in Noord-Holland, met name bij Petten, Camperduin en Schoorl. Maar vondsten komen ook voor in bijvoorbeeld een perkje met schelpengrit in Castricum. Verder naar het zuiden zijn geïsoleerde vondsten bekend van vele stranden, maar het is met name de Zandmotor bij Kijkduin die een rijke oogst levert. De meest spraakmakende vondst daar is een 50.000 jaar oud vuurstenen mesje gevat in berkenpek. Een van slechts vijf vergelijkbare stukken in Europa. Op de Zandmotor worden daarnaast veel neolithische vondsten gedaan, terwijl Midden- en Laat-Paleolithicum juist weer meer typerend is voor Maasvlakte 2.





FIGURE 27. | *Artist impression of cleaning a pike in the current Maasvlakte area. Based on current aDNA analyses the skin colour of the individuals would probably have been significantly darker. Courtesy Martin Valkhoff/BOOR.*

Verschillende midden-paleolithische artefacten en vondstgroepen worden daar herkend, maar ook laat-paleolithische materiaal is er aangetroffen. Verder zuidelijk zijn vondsten bekend van de Zeeuwse stranden en werven. In Vlissingen werden bij een grindverwerkingsbedrijf maar liefst 33 vuistbijlen en andere artefacten aangetroffen. Een schelpengritbedrijf in Yerseke leverde onder meer de eerste Neanderthaler van Nederland op: een gefossiliseerde wenkbrauwboog van een jong mannelijk individu. Naast de kustvondsten zijn er ook specifieke vindplaatsen op zee. Met name de Zeelandbanken voor de kust van Zeeland, de Bruine bank en de Eurogeul zijn bekend.

Naast de documentatie van oude en nieuwe ontdekkingen vindt er ook gericht onderzoek plaats naar vindplaatsen en landschappen. De Britse collega's onderzoeken in Europees samenwerkingsverband het Bruine Bank gebied op zoek naar vindplaatsen, door middel van bodemkartering en bemonstering. In de Rotterdamse Yangtzehaven en in de Britse Solent werden onder water mesolithische kampementen onderzocht. Daarnaast is er veel specifiek materiaalgericht onderzoek met name naar de vondstgroepen. Zo is er nieuw onderzoek naar inmiddels bijna 1000 getande spitsen van been en gewei en leverde collageonderzoek hier de ontdekking op dat sommige van menselijk bot zijn gemaakt. Van belang is ook het isotopen en aDNA onderzoek naar menselijk botmateriaal. Dat blijft elders zelden bewaard, maar levert uit de Noordzee spectaculaire resultaten op die veel over de toenmalige bewoners, hun gezondheid, afkomst en dieet kunnen vertellen. Hetzelfde geldt voor de fauna die natuurlijk een integraal deel van deze verdronken wereld uitmaakt.

Er gebeurt dus momenteel veel op het gebied van de Doggerlandarcheologie en het lijkt erop dat dit belangrijke landschap steeds meer gewaardeerd wordt als een locatie van zeer goed bewaarde vindplaatsen en vondsten. De regelmatige discrepantie tussen de context en de objecten zelf lijkt daarin minder problematisch te zijn geworden, vooral omdat de kans bestaat vondsten als het ware bij benadering 'terug te plaatsen' in het originele landschap. Die herwaardering is noodzakelijk omdat de Noordzee economisch intensief wordt benut. Dat levert vele bedreigingen op. Juist de inzet van amateurarcheologen en paleontologen, de *citizen scientists*, is daarbij cruciaal om zoveel mogelijk te documenteren. Bij deze roepen we dan ook eenieder op om nieuwe ontdekkingen bij het project of de betrokken instanties zoals het Rijksmuseum van Oudheden, danwel via [Doggerlandarcheologie@gmail.com](mailto:Doggerlandarcheologie@gmail.com), te melden.

