Putting things in (un)usual places

Analysis of the physical and cultural landscape context of Late Neolithic and Bronze Age selective depositions in the Bourtanger Moor, the Netherlands

Jelle Izaäk Maarten Moree MSc

jelle.moree@gmail.com

MA thesis
In partial fulfilment of the degree of
Master of Arts in Archaeology

Department of World Archaeology
Faculty of Archaeology
Leiden University

Version:
Final

Supervisor:
dr. Q.P.J. Bourgeois

Universiteit Leiden
The Netherlands

De lucht in de aarde
De grond in het vuur
Het dempen Het doordrenken
Het bezinksel in de pigmenten
van de tijd

(Roland Jooris – Bladgrond)

"[...] geography and history are consubstantial. Placeless events are inconceivable, in that everything that happens must happen somewhere, and so history issues from geography in the same way that water issues from a spring: unpredictably but site-specifically."

(Robert MacFarlane – The Old Ways: A Journey on Foot, page 147)

Statement of originality of the MA thesis

I declare that:

1. this is an original report, which is entirely my own work,
2. where I have made use of the ideas of other writers, I have acknowledged the source in all instances,
3. where I have used any diagram or visuals, I have acknowledged the source in all instances,
4. this report has not and will not be submitted elsewhere for academic assessment in any other academic course.

Student data:

Name: Jelle Izaäk Maarten Moree

Registration number: 1763253

Date: 03 / 02 / 2021

Signature: 

Abstract

Selective deposition – the intentional deposition of specific objects at particular locations in the landscape without the aim to later retrieve these objects – is a widely studied phenomenon from the Neolithic until the Early Middle Ages in Europe. Apart from the study of the socio-cultural mechanisms and impacts of this practice, the siting of selective depositions in the (paleo)landscape has been studied in many recent publications from north-western and northern Europe.

In the Netherlands particularly the siting of selective depositions in the area of the Bourtanger Moor (a former raised bog landscape) and the adjacent Hondsrug (a subglacially-formed ridge from the Saalian glacial) was investigated meticulously for the Middle Neolithic (Wentink 2006) and the Iron Age (De Vries 2015; 2016). However, a landscape-scale analysis of the siting of selective depositions from the Late Neolithic and Bronze Age had not been conducted yet.

Hence, this thesis research was aimed at identifying spatio-temporal patterns in the siting of selective depositions in the Bourtanger Moor and adjacent Hondsrug from the Late Neolithic and Bronze Age and to examine how these patterns related to the physical and cultural characteristics of the landscape.

To conduct this research selective depositions from a dataset compiled by dr. Marieke Doorenbosch (postdoc at Leiden University) were plotted on national-scale palaeogeographic maps by Vos et al. (2020) and a local-scale palaeogeographic map by Casparie et al. (2008) to assess spatial relations between the selective depositions themselves and between the depositions and palaeogeographic landscape units (*i.e.* raised bogs, subglacially formed ridges, cover sands, and stream valleys). Different spatial data were considered to be 'close' to each other when they were within a 500 m range from each other. This distance was based on the 'meso-scale' for landscape context analyses of bog bodies proposed by Chapman et al. (2019) and the landscape-scale formulated by Rundkvist (2015).

Analysis of the patterns in the associations indicates that more selective depositions from the study area are associated with stream valleys and the Runde brook river than would be expected when a normal distribution of all selective depositions across all landscape types would be assumed.

Namely, the total area of the stream valleys on the 1500 BCE palaeogeographic map is much smaller than the total areas of the raised bog, subglacially-formed ridge and coversand landscape units, whilst the order of magnitude of the number of depositions that is associated with each unit is the same. Hence, the number of selective depositions associated with a given landscape unit is not proportional to that unit's size, which implied that the depositions are not normally distributed across the landscape units.

Thus, it was found that selective depositions were intentionally deposited in or near (ephemeral) waterways within or close to the borders of the Bourtanger Moor from the Late Neolithic until the Late Bronze Age.

In addition, two distinct concentrations of selective depositions were identified. One in the area where a Middle Iron trackway crossed the Runde, the other at the location of a stream valley on the edge of the Hondsrug, where the same trackway entered the Bourtanger Moor just north of the Barger-Oosterveld 'temple' was found. Both deposition zones are argued to have been transition zones, as the stream valley and the Runde at the same time divided and connected different physical and socio-cultural domains. Moreover, the association with the same trackway (and potential older precursors), indicates that there was probably also a strong association between bog trackways and selective depositions. Not only were selective depositions found along these trackways, but the trackways also connected different deposition zones to each other. Hence, they probably had a special or ritual character for the inhabitants of the area.

The custom of selectively depositing objects near stream valleys was rooted in the preceding Middle Neolithic (Wentink 2006), continued into the Late Neolithic and Bronze Age (this thesis) and Iron Age (De Vries 2015; 2016). Deposition in or close to the Runde and other brook streams in the Bourtanger Moor had already been noted by Van der Sanden (2004), but was not identified by Wentink (2006), Fontijn (2012), or De Vries (2015; 2016). However, the maps of Iron Age selective depositions by De Vries (2016) seem to indicate that also during the Iron Age deposition took place in or close to the Runde. Deposition close to the bog trackways took place from the Late Neolithic to the Iron Age.

The identified associations between waterways and trackways and selective depositions in the study area are in line wider north-western and northern European traditions of depositing objects in or near (flowing) water. However, the association between waterways *within* bog and on their borders has not been investigated in other north-western and northern European bog landscapes yet, and thus deserves further attention in future research.

Finally, a new hypothesis is proposed for the preference behind the selective deposition in or near to stream valleys and brook streams in the Bourtanger Moor. It is argued that because of the relatively high morphodynamic activity of the stream valleys and brook streams (compared to *e.g.* raised bog domes), which induced relatively fast and frequent geomorphological change, these landscape units might have been preferred as locations for selective depositions.

To test this hypothesis, more study into the landscape siting of selective depositions in other north-western and northern European bog landscapes is needed. Such studies should ideally be carried out by applying a ‘best practice’ approach, in which a distinction is made between specific landscape units within bogs, rather than that selective depositions are merely associated with overarching categories such as ‘bog’ or ‘river’. By doing so, potential motivations behind the siting of selective depositions based on differences in temporal landscape change between landscape units can be assessed.

Content

Statement of originality of the MA thesis ii

Abstract iii

List of figures and tables vii

Figures vii

Tables vii

1. Introduction 1

1.1 Problem definition 1

1.1.1 Knowledge gap 1

1.1.2 Research question 2

1.2 Relevance 2

1.2.1 Academia 2

1.2.2 Archaeological practice and preservation 2

1.3 Approach 3

2. Theoretical framework: What entails selective deposition? 5

2.1 Socio-cultural aspects of selective depositions 5

2.1.1 What constitutes selective deposition? 5

2.1.2 The ‘right way of depositing’ 5

2.2 The receiving landscape context 6

2.2.1 Episodic, semantic, and collective memory 6

2.2.2 Dwelling perspective & relational depositional landscapes 7

2.2.3 Depositional places: a predictable logic 8

3. Methodological framework: Study of the siting of depositions 9

3.1 Spatial and chronological research scales 9

3.1.1 Micro-scale resolution 9

3.1.2 Meso-scale resolution 9

3.1.3 Macro-scale resolution 10

3.2 History of the study area 12

3.2.1 Geology & paleo-ecology 12

3.2.2 Earlier studies into the siting of selective depositions in the Northern Netherlands 16

3.2.3 Other archaeology from the study area 17

3.3 Case studies of the siting of prehistoric selective depositions 20

3.3.1 Great Britain 20

3.3.2 Sweden 22

3.3.3 Estonia 24

3.3.4 Ireland 24

3.4 Recurrent patterns in north-western & northern Europe 25

4. Materials & Methods 26

4.1 Materials 26
4.1.1 Archaeological data 26
4.1.2 Earth scientific data 27
4.1.3 Data limitations 28
4.2 Methods 29
5. Results 33
5.1 Late Neolithic & Early Bronze Age 33
5.1.1 Palaeogeography 33
5.1.2 Archaeology 33
5.2 Middle Bronze Age 36
5.2.1 Palaeogeography 36
5.2.2 Archaeology 37
5.3 Late Bronze Age 39
5.3.1 Palaeogeography 39
5.3.2 Archaeology 39
6. Discussion 42
6.1 Patterns in the physical landscape siting of selective depositions 42
6.1.1 Associated selective depositions per landscape unit 42
6.1.2 Association with the Runde and the stream valleys 43
6.1.3 Significance of waterways for selective deposition in the study area 44
6.2 Patterns in the cultural landscape siting of selective depositions 46
6.2.1 Deposition zone near the stream valley north of the Barger-Oosterveld 'temple' 46
6.2.2 Deposition zone near the Runde & Middle Iron Age trackway XV 47
6.2.3 Significance of trackways for selective deposition in the study area 49
6.3 Implications 51
6.3.1 (Dis)continuity in the siting of depositions in N-Netherlands? 51
6.3.2 Depositions from the study area in a north-western & northern European context 53
6.4 Outlook 53
6.4.1 Recommendations for future research in the Bourtanger Moor 54
6.4.2 A new hypothesis & suggestions for future research approaches 55
6.4.3 Extension to other bog landscapes & network analysis 56
7. Conclusions 58
Bibliography 59
Appendices 68
Appendix 1: Selective depositions 68
Appendix 2: Wooden trackways 72

List of figures and tables

Figures

Figure 1: The maximum extent of the Bourtanger Moor. **3**
Figure 2: Overview of the geological and geomorphological features **11**
Figure 3: Palaeogeographic reconstruction of the south-eastern part of the study area **15**
Figure 4: Reconstructed Barger-Oosterveld 'temple' and wooden trackway **18**
Figure 5: Photograph from 1981 of the second trench of the excavation of Late Neolithic trackway XXI **19**
Figure 6: Overview of all the archaeological data used in this thesis **32**
Figure 7: Palaeogeographic map (2750 BCE) with selective depositions and trackways from the Late Neolithic and (Early) Bronze Age plotted on top. **35**
Figure 8: Palaeogeographic map (1500 BCE) with selective depositions from the Middle Bronze Age (A & B), older depositions, bog trackways, and the Barger-Oosterveld 'temple' & Angelslo-Emmerhout settlement plotted on top. **38**
Figure 9: Palaeogeographic map (500 BCE) with selective depositions from the Late Bronze Age, older depositions, bog trackways, and the Barger-Oosterveld 'temple' & Angelslo-Emmerhout settlement plotted on top. **40**
Figure 10: Late Neolithic to Late Bronze Age selective depositions in the south-eastern part of the study area **41**
Figure 11: Deposition zone near the stream valley north of the Barger-Oosterveld 'temple' and the deposition zone near the Runde brook river and Middle Iron Age trackway XV plotted on the palaeogeographic reconstruction of the study area ca. 1500 BCE by Vos et al. (2020).**47**
Figure 12: Deposition zone near the stream valley north of the Barger-Oosterveld 'temple' and the deposition zone near the Runde brook river and Middle Iron Age trackway XV plotted on the palaeogeographic reconstruction of the study area ca. 1500 BCE by Casparie et al. (2008). **49**

Tables

Table 1: The archaeological periods in the Netherlands **4**
Table 2: Number of associated selective depositions per landscape unit per period **42**
Table 3: Associated selective depositions from a natural context per landscape unit **43**

1. Introduction

Selective deposition is a well-known and extensively studied phenomenon in European archaeology (*cf*. Fontijn, 2019; Bradley 1985; 2013; 2017; Becker, 2013; Needham, 1988; Torbrügge 1971). It concerns the phenomenon that deposition of objects by Bronze Age people followed particular conventions (*i.e*. specific item categories were deposited in specific contexts only, never in other contexts) (Fontijn, 2019, 6). Other terms that are often used to describe the same phenomenon include 'ritual deposition', 'votive deposition', and 'special deposition'. The interpretation of selective deposition practices has been one of the most studied questions in European archaeology since the nineteenth century (Fontijn, 2019, 4).

David Fontijn (2019) recently formulated a new theory regarding the interpretation of different aspects of Bronze Age selective deposition. Aspects such as the short- and long-term economic implications of selective deposition of valuable bronze objects and certain apparent conventions in depositional practices were discussed.

The seventh chapter of Fontijn's monograph focussed on the landscapes that 'received' the selective depositions. He discussed how selective deposition might relate to the perception of the cultural value of certain places by Bronze Age people. Furthermore, he identified particular deposition place categories where certain object types were deposited specifically through time. Hence, he concluded that it seems that Bronze Age depositional landscapes have been structured and are to a certain extent predictable (Fontijn, 2019, 149). Thus, models of the siting of selective depositions in specific landscapes can be formulated. Numerous north-western and northern European case studies about the siting of prehistoric selective depositions (§3.3 & 3.4) attest to this.

1.1 Problem definition

Consequently, this thesis concerns a study of the siting of selective depositions from the Bourtanger Moor and adjacent Hondsrug to devise such a model. This area is renowned for its selective depositions, as many such finds were found during peat exploitation activities in recent centuries (Van den Broeke 2005, 672-673; Fontijn 2012, 54-61; §3.2.2).

1.1.1 Knowledge gap

By analysing the landscape siting of selective depositions from the Bourtanger Moor, this thesis aims to resolve two main knowledge gaps.

Namely, although the siting of selective depositions in the study area has been assessed for the preceding Neolithic period (*i.e.* Wentink 2006) and succeeding Iron Age (*i.e.* De Vries 2015; 2016), a similar analysis for the Bronze Age is lacking. Moreover, seldomly more than a single palaeogeographic reconstruction was used in Dutch and other north-western and northern European case studies. Hence, a study into the variation in the siting of depositions in the Bourtanger Moor and Hondsrug area throughout the Late Neolithic and Bronze Age, whilst taking landscape change during that time frame into account, has not been undertaken yet. Therefore, the two knowledge gaps are:

- The patterning in physical and cultural landscape siting of selective depositions during the Late Neolithic and Bronze Age on the scale of the landscapes of the Bourtanger Moor and the Hondsrug.

  and

- The temporal variation in the siting of selective depositions in the Bourtanger Moor and at the Hondsrug throughout the Late Neolithic and Bronze Age.

1.1.2 Research question

To fill in these knowledge gaps, patterns in the siting of selective depositions from the Late Neolithic to the Late Bronze Age (*i.e.* 2850 – 800 BCE, table 1) are analysed on a landscape scale by assessing a series of palaeogeographic reconstructions of the study area (§4.2). Fortunately, the Netherlands has a long, renowned tradition of detailed palaeogeographic map-making on local, regional, supra-regional, and national scale (e.g. Pons et al. 1963; Berendsen 1982; Zagwijn 1986; Lenselink & Koopstra 1994; Cohen et al. 2012; Ten Anscher 2012; Van Dinter 2013; Pierik et al. 2016; Pierik & Cohen 2020; Vos et al. 2020) (§4.1.2), which enables a thorough assessment of the relation between selective depositions and the palaeolandscape. As a consequence, it is expected that this thesis offers a new perspective on the siting of selective depositions in the Bourtanger Moor and on the Hondsrug.

Thus, the research question of the thesis is:

What patterns can be identified in selective deposition practices in the Bourtanger Moor throughout the Late Neolithic and Bronze Age, and how do these relate to physical and cultural characteristics of the landscape?

Based on the research question, the aims of this master thesis are: i) to reconstruct the physical and cultural landscape setting of the Bronze Age depositions at the Bourtanger Moor, ii) to identify whether certain patterns in the siting of selective depositions can be discerned and iii) to find out if such patterns are related to specific features of the physical and/or cultural landscape.

The research area, (see figure 1), comprises the Bourtanger Moor, a former raised bog area in the North-East of the Netherlands (province of Drenthe) on the border with Germany, and the adjacent subglacially-formed Hondsrug, formed during the Saalian glacial. The Bourtanger Moor was formed between ca. 4500 BCE and 1700 CE, and subsequently use for peat mining in the centuries thereafter until ca. 1950 CE, as a result of which almost nothing of the original peatlands survived in the Netherlands (Casparie 1993). During and after peat extraction, archaeological finds were either found haphazardly during peat mining or were the result of targeted archaeological excavations. A selection of these finds is used in this study (§4.1.1). More on the archaeology and landscape development of the Bourtanger Moor and Hondsrug will be provided in §3.2.

1.2 Relevance

1.2.1 Academia

The scientific relevance of this thesis is two-fold. First, it will strengthen the predictability of selective deposition locations in a specific landscape setting by validating proposed theoretical models of patterns in depositional practices. Second, it will enhance our understanding of selective deposition by providing new insights into its relation with the physical and cultural landscape on different spatial and temporal scales. Hence, it is anticipated that both the methodological and the theoretical framework of Bronze Age selective deposition can be extended.

1.2.2 Archaeological practice and preservation

It is also relevant for the daily archaeological practice, specifically with regards to the protection of Late Neolithic and Bronze Age sites in peatlands. Many peatlands in Europe are threatened by anthropogenic activity (cf. Rydin & Jeglum 2013; Chapman et al., 2019). Examples of threats are deterioration or loss of peat due to extraction or oxidation. Furthermore, human-induced climate change might induce significant environmental change in different wetlands and increase worldwide peatland area loss. A better understanding of patterns in selective deposition in peatlands leads to a better expectation model for archaeological prospection. This leads to an enhancement of the protection of vulnerable deposition sites and consequently to an increase in the preservation potential of invaluable archaeological data.

1.3 Approach

The overall approach of the thesis follows the methods as described by Chapman et al. (2019), tailored to the specific landscape being studied (*Chapter 3 & 4*), whilst considering variable degrees of data availability (*Chapter 4*). Furthermore, the theoretical framework for the study of Bronze Age selective depositions from Fontijn (2019) will be used (*Chapter 2*) to try to establish relations between the physical and cultural landscape and depositional practices.

A dataset, compiled of data from different catalogues, will be combined with available palaeogeographic maps to conduct the research of this thesis (*Chapter 4*). Subsequently, the results of this study (*Chapter 5*) will be discussed (*Chapter* 6) in comparison to Dutch and other north-western and northern European case studies (*i.e.* from *Chapter 3*). Consequently, new insights into the siting pattern of Late Neolithic and Bronze Age selective depositions from the Bourtanger Moor will be gained. Finally, this thesis ends with the main conclusions (*Chapter 7*).

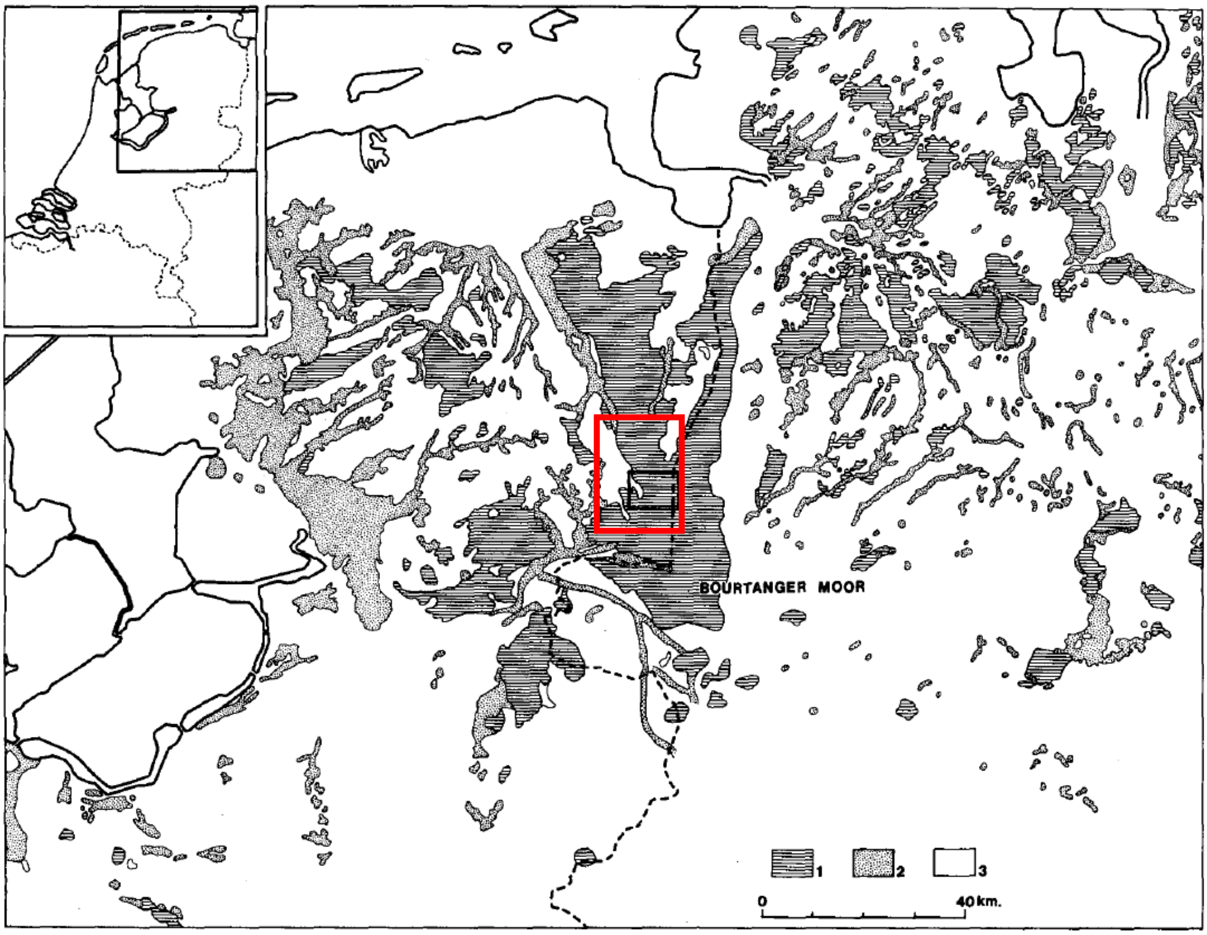

Figure 1: The maximum extent of the Bourtanger Moor. The dark grey areas (legend unit 1) concern raised bogs, the light grey areas (unit 2) concerns fens. The third unit of the legend concerns other type of soils. The red rectangle marks the study area of this thesis. Adapted from Casparie (1993, 204: figure 1).

Period	Subperiod	Start (BCE)	End (BCE)
Neolithic period (5300-2000 BCE)	Early	5300	4200
	Middle	4200	2850
	Late	2850	2000
Bronze Age (2000-800 BCE)	Early	2000	1800
	Middle A	1800	1500
	Middle B	1500	1100
	Late	1100	800
Iron Age (800-12 BCE)	Early	800	500
	Middle	500	250
	Late	250	12

Table 1: The archaeological periods in the Netherlands concerned in this study (after Louwe Kooijmans *et al*. 2005).

2. Theoretical framework: What entails selective deposition?

This chapter entails the theoretical framework of the study of the practice of selective deposition. First, it is established what is meant with 'selective deposition' and what the socio-cultural aspects thereof are (§2.1). Also, the current state of research with regard to our understanding of the 'right way' to deposit an object in prehistory is briefly discussed. Thereafter, an overview is given of the theory concerning the interpretation of the landscape context and spatial patterning of selective depositions (§2.2).

2.1 Socio-cultural aspects of selective depositions

2.1.1 What constitutes selective deposition?

To study the phenomenon of 'selective deposition', it must first be established what its definition is. Selective deposition, according to Fontijn (2002; 2019, 6), concerns depositional practices that followed particular conventions: certain valuable objects (see below) were deliberately placed at certain places in the landscape, apparently without the intention to later retrieve them. Conversely, said objects were excluded from intentional deposition in other settings or landscapes. In other words, there was a *selectivity* in the intentional deposition of objects. As we shall see, this *selectivity* concerns both the objects themselves (*this paragraph*), as well as the setting they are deposited in (§2.2).

It is important to note that when selective deposition is studied, what actually is being studied is a rather small percentage of the objects and materials that were in use during a given period in time. Only about 5 – 15 % of all metalwork in use ended up in the archaeological record (*cf.* Wiseman 2017; Fontijn 2002, 215). Hence, the exceptional character of selective deposition is further underlined: it is a special exception to the rule, because of its deliberate character.

Furthermore, Fontijn (2019, 24) states that selective depositions should not only be studied individually, or per category exclusively. Rather, he argues that depositions from all different contemporary depositional contexts (*e.g.* single finds, hoards, and even whole settlements) should be included in a systematic analysis of selective depositional practices. Selective depositions have to be studied 'as part of a bigger, relational whole' (Fontijn 2019, 24).

Consequently, selective deposition is seen as '*average behaviour*', 'an emergent social and historical phenomenon' (Fontijn 2019, 25). Behaviour is per definition relational, since it grounded in the local perception of one's world (*ibid*.). Hence, although each individual selective deposition did not have exactly the same meaning to the different people that deposited them, the individual actions resulting in each deposition are in one way or another related to each other (Fontijn 2019, 25). Selective deposition is the '*aggregate result*' (Ball 2004, 150) of all these individual actions which are to more or lesser degrees related to each other. Hence, it can be said that selective deposition practices through time were the result of an amalgamation of different forms of learnt behaviour on what is '*the right way of acting*' (Fontijn 2019, 25).

2.1.2 The 'right way of depositing'

This section provides a brief overview of the different components of the practice of selective deposition. Basically, it can be stated that the '*right way of depositing*' can be subdivided in the '*right ordering*', '*right treatment*', '*right appearance*', '*right selection*', and the '*right location*' (Fontijn 2019, 27-29).

'*Right ordering*' concerns specific ordering of things in a (selective) deposition. This implies placing an individual object in a specific position when it is placed in the landscape or buried, or placing several objects at a particular position with respect to each other during a deposition (Soroceanu 1995 in Fontijn 2019, 28).

Further, '*right treatment*' has to do with the *singularization* of a deposited object, and possibly also the *transformation* of said object from one state to another (Fontijn 2019, 28). Singularization is about the effort to make the deposited object or objects 'stand apart' from their (non-deposited) peers (Knight 2018). This was often achieved via the physical transformation of the object or objects in the form of wrapping them in cloths, bending, or breaking them prior to deposition (*cf.* Knight 2018; 2019; 2020). Subsequently, the deliberate *physical* transformation and consequent deposition might have achieved or significantly aided in the *metaphysical* transformation of the object or objects from one state to another (Van der Vaart-Verschoof 2017).

Lastly, linked to the '*right treatment*', the '*right appearance*' concerns the form of the object as well as its materiality. Especially the form and colour of metal (*i.e.* in this case predominantly bronze) objects is important, as it is the defining characteristic of such objects. Prehistoric metalworkers most likely had a basic understanding of the composition of metal objects ('pure' metal or alloys) based on slight variations in colour (Renfrew 2004 in Kuijpers 2013, 146). Furthermore, in prehistory, choices in metalworking practices were probably partly made on the basis of the colour of the metal or alloy as related to symbolic, aesthetic and/or technological motivations (Kuijpers 2013, 146 and references therein). Thus, the appearance of an object *informs* its beholders about its general function, role or roles in certain practices (*e.g.* selective deposition), and potentially also its provenance (Fontijn 2019, 27).

'*Right selection*' involves the ordering of the deposited objects or assemblages of objects into specific 'categories', which are consequently only allowed to be deposited at certain '*right locations*' in the landscape. It is important to note that the assignment of various objects to a specific category by prehistoric (*i.e.* in this case Bronze Age) people might have followed very different conventions and rules than we would follow in present day (Western) societies (Fontijn 2019, 28-29).

The '*right locations*' were apparently associated with specific social and cultural notions, as certain object categories are predominantly present in the selective deposition record at the exclusion of other categories. Different socio-cultural concepts relating to the logic behind the *right location* choice are concerned in the next paragraph.

2.2 The receiving landscape context

In addition to the socio-cultural aspects of selective deposition associated with the objects themselves, the spatial aspects are equally intriguing. There seem to be many indications that for large areas of the European continent and for long periods of time a certain logic behind the siting of deposited objects in the landscape can be discerned (Bradley 2017, 167-168). Large-scale spatio-temporal patterns in the siting of selective depositions as identified in both regional case studies (§3.2 & §3.3) and a supra-regional synthesis (§3.4) will be described in the next chapter.

First, to identify certain recurring patterns in selective deposition through space and time, it is pivotal to understand the different ways in which different forms of human memory, namely *episodic*, *semantic* and *collective* memory, work (§2.2.1). Second, an understanding of how humans experienced their surroundings via a so-called *dwelling perspective* is needed to link the collective memory to the siting of selective depositions in so-called *relational depositional landscapes* (§2.2.2). Finally, combining these three concepts allows for the formulation of a predictable logic behind the siting of selective depositions in an area (§2.2.3).

2.2.1 Episodic, semantic, and collective memory

As noted in the introduction above, a basic understanding of how different forms of memory affect people's perception of their surroundings, is needed to get a grasp of the logic behind the siting of selective depositions.

Generally, two types of memory are distinguished: '*episodic*' and '*semantic*' memory. Episodic memory is about remembering personal memories of specific (individual) events (Assmann 2006). On the other hand, semantic memory concerns the recognition of certain learned patterns after filtering sensed information, especially of the visual type (Fernyhough 2012).

A specific form of semantic memory is the so-called 'collective' memory, a term coined by the French sociologist Halbwachs (Halbwachs 1968 [1950]; 1971 [1941]). In recent decades the role of collective memory in present and past societies has received considerable attention in both archaeology and other social sciences. Collective memory is a variety of memory shared by members of a group of people, which is specific to that group of people (Halbwachs 1968 [1950], 74; Assmann 1992, 39). Importantly, a collective memory is wholly fictional; it creates a fictional topography with specific stories and legends connected to specific parts of a landscape (Halbwachs 1968 [1950], 74; 1971 [1941], 126; Assmann 1992, 40-41, 60).

Critical for the analysis of physical and cultural landscape siting of selective depositions is the fact that, with collective memory, fictitious tales are not only attached to landscape features that came into being during the lives of the members of a community (or that of their (grand)parents), but also to much older landscape features, which stem from 'time immemorial' (*e.g.* a millennia-old spring or a centuries-old barrow) (*cf.* Bourgeois 2013, 202). In that way, collective memory includes the (imagined) distant past into the present cultural topography of a group of people (Assmann 1992, 32; 2006; Bourgeois 2013, 202).

This implies that a specific location in the landscape was not deemed suitable as a location for a selective deposition because centuries or even millennia before another object had been intentionally placed there. Naturally, e.g. Bronze Age people didn't have a specific 'episodic' memory of a much older selective deposition from the Neolithic. Rather, such a place was considered *a right place* for *a selective deposition* in the collective (and cultural) memory of a people, and therefore chosen as the location for one or more selective depositions (Fontijn 2019, 147).

The collective memory thus strongly affected the location choices in selective deposition practices, and consequently produced distinct spatio-temporal patterns in the siting of selective depositions in a specific area (*cf.* Bourgeois 2013, 202 concerning secondary activities at ancestral barrows). Moreover, apparent consistencies in the collective memory over long periods of time can result in similar patterns in the landscape setting of selective deposition from different archaeological periods (*e.g.* the Neolithic and the Bronze Age) – even if the specific traits of the collective memory are not linked to the same, or similar belief system anymore. By this it is meant that repeated deposition at a certain location does not automatically imply that the motivation behind the choice for deposition at that location remained unchanged.

2.2.2 Dwelling perspective & relational depositional landscapes

In the previous section it has been shown that different aspects of the collective memory affect the location choice for a selective deposition. A 'depositional location' was, therefore, rooted in relational space, which the people that moved through the landscape or landscapes actively and passively experienced (Fontijn 2019, 143). Via interaction, travelling, performing various activities, and 'dwelling' in the world around them, people gathered different meanings from their world. This is what Ingold (2000, 192) terms the 'dwelling' perspective. According to him it is an 'engagement' with one's surroundings and its past and present characteristics (*ibid.*). Via this interaction an individual collects personal, yet also 'collective' and cultural meanings from her surroundings (Fontijn 2019, 144-146).

Landscapes in which recurrent selective deposition practices took place, in other words *depositional landscapes*, are thus situated in relational space. They are essentially *relational depositional landscapes* (Fontijn 2019,143-144). A relational depositional landscape is relational because of the repetition of the relational setting, which is mostly dependent on the imagined reality in the collective memory, and quite possibly less to the actual physical characteristics of a landscape. Hence, as noted in the previous section, even though its physical characteristics might change considerably, a relational depositional landscape could still remain appropriate for selective depositional practices, precisely because of the collective memory which is rooted in this landscape.

2.2.3 Depositional places: a predictable logic

Since depositional landscape are relational and significantly affected by the slowly changing and evolving collective memory of the people that inhabit them, it can be stated that the siting of selective depositions in a given area is not random but structured. Consequently, recurrent patterns in the siting of depositions might indicate a form of continuity in space and time in the motivation behind the location choice of selective depositions as linked to the collective memory of different (successive generations of) peoples. Contrastingly, marked differences in the siting patterns between successive archaeological periods and/or cultural groups might indicate strong differences and/or discontinuities in the motivation of location choices of selective depositions.

In conclusion: depositional landscapes are structured, and can be reconstructed to at least some degree (Fontijn 2019, 149). This implies that such landscapes are also predictable to some extent.

While this chapter concerned the theoretical framework of the study of the siting of selective depositions, the next one is about the methodological framework of such studies. Additionally, an overview of recent research into this topic from north-western and northern Europe is given.

3. Methodological framework: Study of the siting of depositions

This chapter concerns the methodological framework of the study of the landscape context of selective depositions. The previous chapter focussed on the theory of how to understand patterns in the practice of selective deposition, both from the perspective of the objects which were deposited as well as the places of the landscape wherein this occurred.

Conversely, the focus in this chapter is on how to recognize and subsequently analyse spatial patterns of selective deposition practices via different approaches. In recent years, several studies of the wider landscape context of bog bodies and selective depositions from north-western and northern Europe, from the Neolithic up to and including the Iron Age, have been published. As bog bodies can be argued to be to a specific category of selective depositions, the approach that is applied in the landscape context studies of them (§3.1) can be extended- and applied to all studies into the siting of selective deposition. Subsequently, an overview of the geology and archaeology of the Bourtanger Moor is given (§3.2). Hereafter, several case studies into the siting of selective depositions from north-western and northern Europe are described (§3.3), after which an overview of recurrent patterns in these studies is given (§3.4).

3.1 Spatial and chronological research scales

This paragraph discusses the proposed approach for the study of the landscape context of bog bodies as described by Chapman et al. (2019) and applied (*i.e.* tailored to specific case study at hand) by Van Beek et al. (2019). This approach can be applied to both new (*i.e.* as of yet undiscovered) bog bodies and already excavated, documented, and published bog bodies (*cf.* Chapman *et al*. 2019, 1). Chapman et al. (2019, 11-17) proposed to study the landscape context of bog bodies on three chronological and spatial scales: *micro*, *meso* and *macro*. The relationship between the scales is, however, not linear, and each scale should be adapted to the specific research area that is studied (Chapman *et al.* 2019, 12).

This study analyses the Bourtanger Moor relational depositional landscape on the macro-scale methodological level (see next chapter).

3.1.1 Micro-scale resolution

The micro-scale is confined to the direct find location and the few square metres surrounding. Timewise, it concerns this area's development for one or more decades – in the case of bog bodies for example the development of the bog surface in relation to the body and any present other archaeological remains (Chapman *et al.* 2019, 12-13). Landscape context analysis at this scale has almost always been conducted to more or lesser degrees in published bog body finds. With regards to current and future excavations of bog bodies – and ideally this should also apply to other kinds of selective depositions – Chapman et al. (2019, 12) state that excavation of the *in situ* remains should be performed under laboratory conditions to ensure preservation and consequently good recording and dating of the peat microstratigraphy. By doing so, the direct depositional environment can be reconstructed.

3.1.2 Meso-scale resolution

The meso-scale concerns the wider area surrounding the direct findspot, with a radius ranging from ca. 10 to 100 m (Chapman *et al.* 2019, 15). The timescale involves multiple generations at least (*i.e.* 100 or more years) to reconstruct century scale local landscape change (*ibid.*). Therefore, a thorough analysis of the local stratigraphy is required. Especially reconstructions of spatiotemporal changes in the local hydrology of the peatland benefit greatly from this analysis. Ideally then, when sufficient spatiotemporal data is available, reconstructions of the surface wetness and extent of the raised bog through time can be made. Thus, the accessibility of the raised bog can be established – also in relation to other adjacent areas. The latter is important, as studying bog bodies (*i.e.* selective depositions) on this scale also involves taking into account other archaeological remains in the area under study.

3.1.3 Macro-scale resolution

The macro-scale considers the broader context of a bog body find, generally beyond the borders of the (former) raised bog peatland (Chapman *et al*. 2019, 16). Hence, the spatial scale of the analysis is 1 kilometre or more (*i.e.* my interpretation), whilst the temporal scales range from multiple centuries to multiple millennia (*ibid.*). The study at this scale encompasses reconstruction of the broader geomorphology and vegetation, as well as the cultural landscape (*i.e.* other archaeological sites and single finds) over a longer timescale. Hence, societal changes or continuities can be inferred from these reconstructions (Chapman *et al.* 2019, 16). Subsequently, recurrent or changing patterns in-, and possibly also the logic behind these depositional practices might be reconstructed too (Chapman *et al.* 2019, 17).

Furthermore, the macro-scale reconstruction allows for comparison between different (relational) depositional landscapes, and thus for the potential recognition of broad-scale similar patterns in selective depositional practices through space and time.

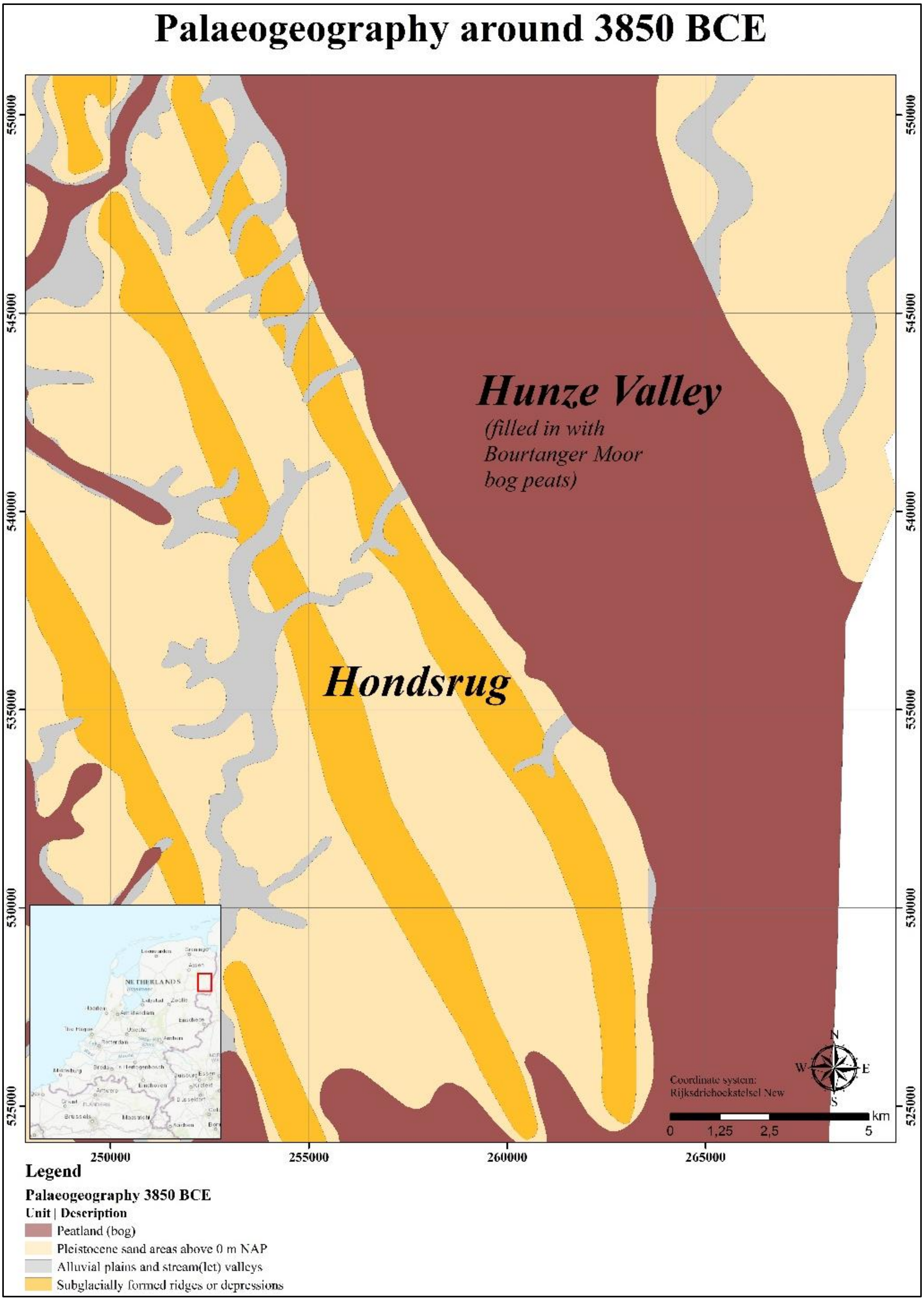

Figure 2: Overview of the geological and geomorphological features mentioned in §3.2.1 on the palaeogeographic map of the study area of 3850 BCE (adopted from Vos et al. 2020).

3.2 History of the study area

The Bourtanger Moor is a former, widespread peatland in the Northeast of the Netherlands extending into the Northwest of Germany, once one of the largest in Europe. The Dutch as well as most of the German parts of the peatland are now largely gone due to peat mining from the 17th well into the (first half of the) 20th century CE. Now only about 2 % of the original surface remains (Casparie 1993, 203).

It consisted of a heterogenous assemblage of patches with different surface humidity and relief ('hydro-geography'), and associated (bog) vegetation types. In this peatland landscape for a long period in time (*i.e.* from the Neolithic up to and including the Iron age and middle ages) objects were selectively deposited.

First the geological development of the Bourtanger Moor is described, thereafter its archaeology.

3.2.1 Geology & paleo-ecology

Geology

The majority of the Dutch part of the Bourtanger Moor was formed in the northwest-southeast oriented Hunze valley (in the provinces of Drenthe and Groningen) (figure 2). This ice marginal valley was incised during the Saalian glacial by a fluvio-glacio meltwater river that traversed a kettle hole[1] paraglacial landscape (Berendsen 2008, 77; Casparie 1993, 203). In the east, this valley is bordered by the slightly elevated yet flattened remains of the Winschoten, Schildwolde, and Onstwedde ice-pushed ridges, consisting of boulder-clays topped by (Late-Weichselian) cover sands (Berendsen 2008, 78). In the west, the Hunze valley is bordered by the Hondsrug, a (formerly) subglacial ridge formed during the Saalian glacial (ca. 238 – 126 ka) (Berendsen 2008, 77; Casparie 1993, 204). This ridge is the eastern edge of the Drenthe Plateau. At the end of the Saalian meltwater streams incised the edges of the Drenthe Plateau and thus the Hondsrug, forming stream valleys (Spek 2004, 203).

During the following Eemian interglacial (ca. 126 – 116 ka) the Hunze valley drowned due to eustatic sea level rise, resulting in the deposition of rather impermeable marine clays (Berendsen 2008, 77) (*Eem* formation, *cf.* TNO - GSN 2020a).

The depth and width of the stream valleys on the edges of the Drenthe Plateau increased during the succeeding Weichselian glacial due to continued erosion. Near the end of the Weichselian, the marine clays in the Hunze Valley got covered by substantial aeolian cover sands (*Boxtel* formation, *cf.* TNO - GSN 2020b). As such, the mouths of the stream valleys were blocked by these cover sands.

In the Holocene, the groundwater levels rose (due to rising sea levels), which eroded the obstructing cover sands, thus re-enabling ephemeral water flow during winter in the stream valleys (Wentink 2006, 67). Bourtanger Moor peats (*Nieuwkoop* formation, *cf.* TNO - GSN 2020c) could form in the Hunze valley and eventually in the stream valleys (*i.e.* from the Atlantic onwards), because of the increasing high ground water levels, reinforced by the impermeability of the Eemian marine clays (Kuijer 1991, 23; Spek 2004, 203).

Paleo-ecology & paleo-hydrology

The development of the Bourtanger Moor can be roughly divided in two phases: *minerotrophic* (*i.e.* groundwater-fed) and *ombrotrophic* (*i.e.* precipitation-fed) peat development (Casparie 1993, 205). Three different factors predominantly affect peatland development, namely: climate, autogenic & allogenic processes, and anthropogenic processes (Casparie 1993, 207). The overview below of the development during both phases is mainly based on the work of Casparie (1993), whose analysis and

[1] '*Doodijsgat*' in Dutch.

reconstruction of the Bourtanger Moor is based on an extrapolation of relatively scarce, often only local paleo-ecological data.

Around 11000 BCE (*i.e.* during the Late-Glacial at the end of the Weichselian) the Hunze valley became humid enough, so that Hypnaceae peat started to grow (Casparie 1993, 205). After this initial stage of peatland formation, *mesotrophic* fen peat started to grow, which was still groundwater-fed (*i.e. minerotrophic*). Eventually, this developed into an *oligotrophic* raised bog, which was precipitation-fed (*i.e. ombrotrophic*). First, from about 8300 BCE onwards, *Betula* (*i.e.* birch) was an important component, followed by *Alnus* (*i.e.* alder) from circa 5000 BCE and beyond (Casparie 1993, 205). Drying phases, around 7000 and 5300 BCE, were followed by the spread of *Pinus* (*i.e.* pine) across the peatland's surface.

Roughly 4500 BCE, the minerotrophic fen had grown so much – in height and most probably also in extent – that around this moment the highest groundwater levels were reached. Subsequently, precipitation became increasingly important for the peatland's growth, which consequently became gradually more ombrotrophic (Casparie 1993, 205). As during earlier drying phases (see above), *Pinus (silvestris)* could spread across the peatland around this time. Climate and local hydrological conditions remained favourable for constant peat growth. In this pine forest, abundant Ericaceae species grew, as a result of which in the following ca. 400 years very humid oligo- and ombrotrophic *Sphagnum (rubellum)* peat overgrew and thus replaced the former forest.

Before ca. 3000 BCE a dense forest was present the Hondsrug, whilst the stream valley incising its borders featured far less trees indicating a relatively open landscape (Spek 2004, 209; Bakker 1982, 114). However, based on palynological analyses of the forest development on the most south-eastern parts of the Hondsrug between ca. 3000 and 2000 BCE, combined with data from a Neolithic wooden trackway from the Bourtanger Moor (*i.e.* trackway XXI, see below), Casparie (1992, 126) concluded that around 2500 BCE large parts of the Hondsrug must have already been deforested. This deforestation was the result of tree-felling for the purpose of agricultural activities (*ibid*.).

Until ca. 2000 BCE (*i.e.* the onset of the Bronze Age in the Netherlands, see Table 1), the Ericaceae (with *Spagnum rubellum* being the dominant species) peat remained very humified, and therefore, continued to grow, laterally and vertically (Casparie 1993, 206). Furthermore, a so-called 'hummock-hollow' pattern arose, in which the hummocks were drier than the hollows.

After 2000 BCE, however, when the climate cooled and became more humid, especially the hollows became less humified, whilst the hummocks became more humified (Casparie 1993, 207) Namely, the hollows became inundated as the climate wettened, which caused the formation of other *Sphagnum* species that humify to lesser degrees. This induced the onset of the growth of lesser humified *Sphagnum* peat, which after around 500 BCE culminated in the formation of poorly humified Sphagnum peat (Casparie 1993, 206-207).

Brook rivers & bog lakes

Especially relief differences, such as hummocks and hollows, and linked to those drier and wetter parts (*e.g.* bog streams: so-called brook rivers or brooklets and ponds in the hollows) affected the Bourtanger Moor's accessibility.

The *Runde* was a one of those brook rivers present in the Bourtanger Moor (see figure 3). It ran in a South-North direction, draining the so-called *Zwarte Meer* (*i.e.* 'Black Lake' in English) near the present-day village Zwartemeer, southeast of Klazienaveen (see figure 3). This bog lake[2] originates after 2200 BCE (Casparie *et al*. 2008, 32), probably due to an increase in the amount of local surface water in the Moor as a result of a climate change. It was formed in a contact zone between raised bog domes

[2] *Meerstal* in Dutch.

that were present in this part of the Bourtanger Moor. The Runde developed shortly after the Zwarte Meer. It eventually discharged the water from multiple smaller scale brooklets that drained the raised bog domes (Casparie *et al*. 2008, 35).

Another large bog lake, *Emmen 19*, was formed around 1500 BCE northwest of Barger-Oosterveld in another contact zone between raised bog domes (Casparie *et al*. 2008, 34).

Because of the amount of precipitation was higher than amount of water that was drained via the brook rivers, the Zwarte Meer & Emmen 19 bog lakes continued to fill with water (Casparie *et al*. 2008, 34 - 36). As a result, a so-called 'bog burst' occurred around 530 BCE (dated based on eroded parts of Iron Age wooden trackway XV, *cf*. Casparie 1987). The weakest bank of the Zwarte Meer and Emmen 19 collapsed, as a resulted of which a massive amount of water drained from the bog lakes via erosion gulleys (Casparie *et al*. 2008, 34, 36). Consequently, the Runde got another course (Casparie *et al*. 2008, 36).

In conclusion, what might appear to have been a rather monotonous, not-so-dynamic peatland area in the northeast of the Netherlands from looking at large-scale palaeogeographic reconstructions, was actually a quite diverse landscape in terms of paleo-ecology, -hydrology, and -relief. The prehistoric archaeological remains that have been found in this area, are equally diverse and no less intriguing, as will appear from the next sections.

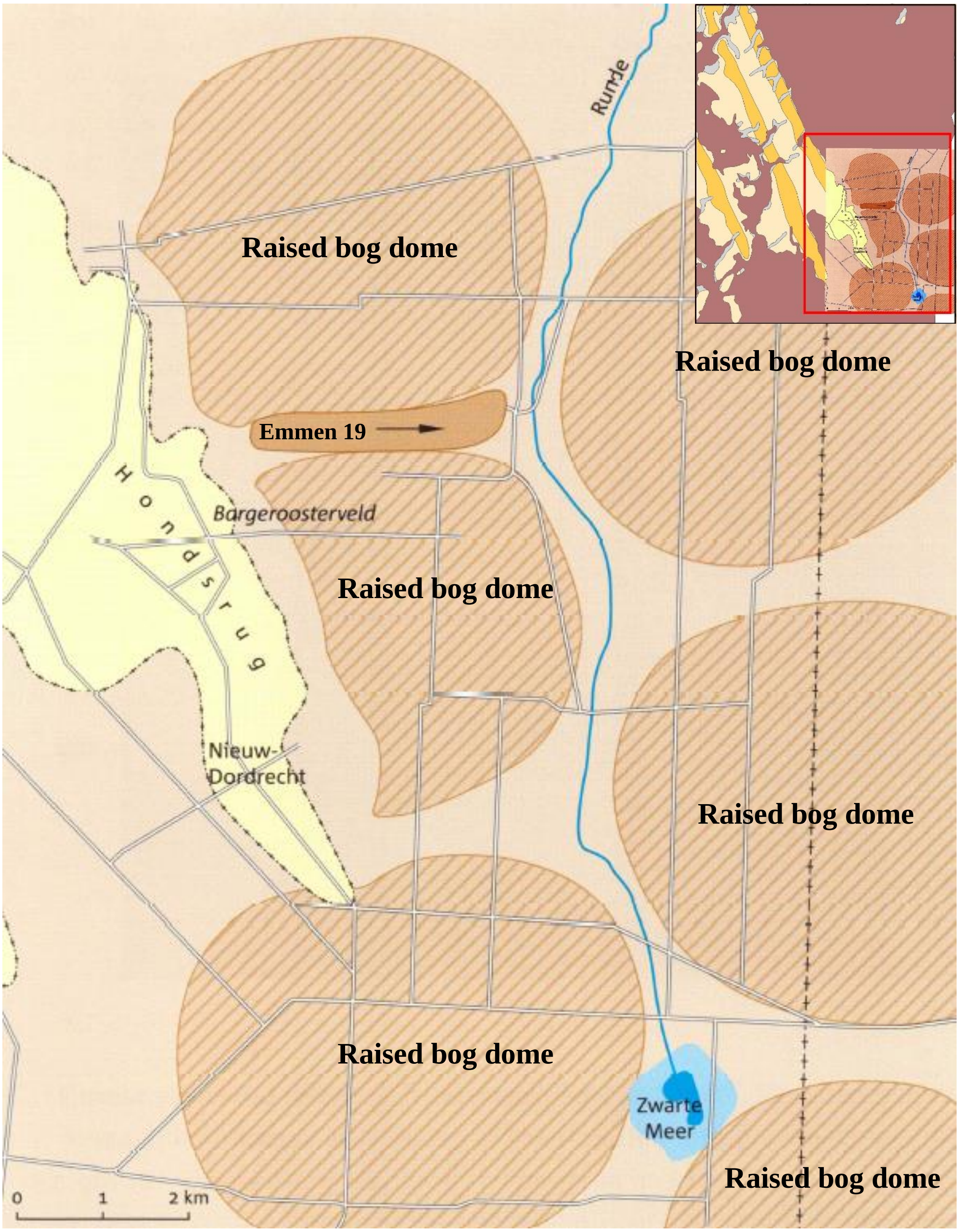

Figure 3: Palaeogeographic reconstruction of the south-eastern part of the study area (the Bargerveen) around 1500 BCE. Adapted from Casparie et al. (2008, 33, figure 12). Inset map shows the location of the Bargerveen (red outlined) in the study area.

3.2.2 Earlier studies into the siting of selective depositions in the Northern Netherlands

From a supra-regional perspective, the study area of this thesis is situated in the area of the Northern-Netherlands (generally considered to consist of the provinces of Drenthe, Groningen and Friesland). This section therefore provides an overview of the most important published studies into the siting of selective depositions from the Northern part of the Netherlands in general and the study area more specifically.

Wentink (2006)

In 2006 Karsten Wentink published an extensive monograph about the physical and cultural landscape context of (ceremonial) axe depositions from the Middle Neolithic Funnel Beaker Culture on the Drenthe Plateau (thus encompassing the research area of this thesis) (Wentink 2006). He found that axes were mostly deposited in or near stream valleys which often would have been filled-up with peat (Wentink 2006, 65). Additionally, stream valleys near the border of the Bourtanger Moor, intersecting the subglacial till ridges (*e.g.* the Hondsrug), were specifically preferred as locations for selective deposition (*ibid.*, 65). He further notes that slightly more than half (*i.e.* 53%) of all axes were found 'relatively near graves' (*i.e.* within 600 to 1900 m) (Wentink 2006, 67).

Wentink (2006, 67-69) argues that the selective depositions at the stream valleys bordering the Bourtanger Moor were transitional areas which at the same time had a dividing and binding social character. On one hand they acted as physical and social boundaries between different human groups on one hand, and between the human and supra-natural domain on the other (Fontijn 2002, 265 in Wentink 2006, 69). However, at the same time they connected different social groups and the human and supra-natural domain because of their important role with regard to water transport in the Drenthe Plateau (Wentink 2006, 69).

Wentink (2006, 111) reasons that by depositing the (ceremonial) axes at these places of transition between sand and peat, they were effectively placed at or beyond the boundaries of the sphere of everyday life and death of the Funnel Beaker communities inhabiting elevated parts of the Drenthe Plateau. His interpretation is that by doing so the objects together with their associated powers were returned to 'a larger social and cosmic universe' (Wentink 2006, 111). Lastly, he argues that the Funnel Beaker axe deposition tradition in the Drenthe Plateau was part of a 'much wider adopted practice' in Europe (Wentink 2006, 111 – *sensu* Essink & Hielkema 1998, 317 concerning the Bronze Age, see below).

Essink & Hielkema (1998)

Essink & Hielkema's (1998) article, which is based on the PhD theses of both authors, investigates the physical context of selectively deposited bronze objects from Drenthe, Groningen, and Friesland. They subdivided the 272 bronze objects (*i.e.* single- and multiple find depositions) from their catalogue in five categories: daggers, axes, knives, spearheads, and swords. Furthermore, they distinguished between three different reconstructed find context: wet, dry, and unknown (*i.e.* not reconstructed), for which no specific definitions are given.

It was found that throughout the Bronze Age, objects from all five categories were predominantly deposited in wet contexts (Essink & Hielkema 1998, 311-316). Overall, more than half of the objects had been deposited in wet contexts. The other finds were deposited in a dry context, or their context could not be reconstructed with certainty. Moreover, a marked increase in the percentage of single 'loose' bronze axes (*i.e.* not found in a funerary context) deposited in a wet context from the Early- to Late Bronze Age was observed (Essink & Hielkema 1998, 316). From less than 40% in the Early- to almost 50% and almost 60% in the in the Middle- and Late Bronze Age respectively (*ibid.*).

Fontijn (2012; 2019).

Fontijn (2012) assessed Butler's (1961) theory about the relation between the Barger-Oosterveld 'temple' (§3.2.3) and Bronze Age depositions. Butler (1961) stated that this 'temple' was explicitly linked to the siting of the Bronze Age depositions in its vicinity. Both were part of a Bronze Age sacred landscape, of which the 'temple' was the focal point, according to Butler. However, Fontijn (2012, 60-65) came to a slightly different interpretation of this presumed 'sacred landscape' after reassessment of old data combined with new data. He argued that, based on this combined evidence, it cannot be said whether the 'temple' was the focal point of the depositions or not (Fontijn 2012, 61). Instead, the area surrounding and including the Barger-Oosterveld 'temple' as a whole was a setting for selective depositions and other special events throughout the Bronze Age. The construction of the 'temple' was merely one of those events, but nothing more important than that (*ibid*.). In his conclusion (Fontijn 2012, 63) proposed that there is a link between the barrow landscape on the Hondsrug and the depositions in the Bourtanger Moor and along its boundaries. This theory states that the depositions were deliberately sited close to the burial mounds, but just before the locations where the Bourtanger Moor could be entered via a trackway or other passable part of its boundary. Fontijn (2019, 140-142) reiterated this theory.

De Vries (2015; 2016)

A decade after Wentink's (2006) research into the physical and social landscape context of Neolithic selective deposition on the Drenthe Plateau, Karen de Vries (2016) published a similar study about selective deposition practices from the Iron Age, based on her RMA thesis (De Vries 2015). She investigated the siting of 170 depositions dating from the Late Bronze Age up to and including the Early Roman period (De Vries 2016, 94).

Like Essink & Hielkema (1998) she made a distinction between depositions from wet and dry contexts, for which again no specific definitions are given. The main difference between depositions from these two categories is the way in which the objects were treated prior to deposition (De Vries 2016, 95). There was no significant difference between the types of objects that occurred in both contexts (*ibid*.), although she observed a sharp decrease in the deposition of metal objects from the Early Iron Age onwards too (*sensu* Van den Broeke 2005).

Dry context depositions are primarily sited in settlement areas and are generally more 'complex' than those from wet contexts (De Vries 2016, 95). Within these dry depositions from settlement areas the majority was interpreted as so-called 'abandonment depositions' in or near former houses (De Vries 2016, 96).

With regard to wet context depositions De Vries (2016, 101) remarks that these are largely structured based on old principles from preceding archaeological periods (referring to Wentink 2006 and Fontijn 2012).

Thus, the main conclusion of her study is that the primary differences between depositions from dry and wet contexts are the way that they were treated before deposition and how they are distributed across the Drenthe Plateau (De Vries 2016, 101-102). Wet context depositions were distributed based on structuring principles that related to the entire Drenthe Plateau, whereas dry context ones were distributed based on more local choices pertaining to individual settlements (De Vries 2016, 102).

3.2.3 Other archaeology from the study area

The other prehistoric archaeological remains from the study area that are relevant to this study are the Angelslo-Emmerhout settlement and the Barger-Oosterveld 'temple' building on the Hondsrug (both from the Bronze Age), and wooden trackways that led from the Hondsrug into the Bourtanger Moor (from the Neolithic, Bronze Age and Iron Age. These will be briefly described in this section. The specific archaeological dataset used in the analysis of this thesis is treated in the next chapter.

Angelslo-Emmerhout settlement & Barger-Oosterveld 'temple'

The Bourtanger Moor is well-known for the so-called Barger-Oosterveld 'temple', a wooden building from the Middle Bronze Age (ca. 1700 to 1400 BCE), presumably with a ceremonial function (Van der Sanden 2000; Waterbolk & Van Zeist 1961; Van Zeist & Waterbolk 1960) (figure 4). The specific function of said building is as of yet still unclear and. Besides, there are no signs that it acted as a focal point for Bronze Age metalwork selective depositions (Van der Sanden 2000; Fontijn 2012).

The Angelslo-Emmerhout settlement was in habited from the Middle Bronze- to Iron Age (Kooi 2008).

Figure 4: Reconstructed Barger-Oosterveld 'temple' and wooden trackway in the Hunebedcentrum in Drenthe (photo adopted from geheugenvandrenthe.nl).

Wooden trackways

Numerous prehistoric wooden trackways that traversed the Dutch part of the bog have been discovered in its subsurface (Casparie 1987; Casparie & Moloney 1994; Van der Sanden 2004; Casparie *et al*. 2004; Reus 2019). Casparie (1987) investigated the character and place in the bog of 22 certain and 5 possibly bog trackways, from the Neolithic to 1665 CE.

The trackways were used to reach the inner parts of the bog or to go across it to the other side. Their length, width and construction differed. Wider examples are thought to have been constructed for wheeled traffic (*cf.* Casparie & Moloney 1994). Some trackways even had subsurface structures that supported the trackways, thereby strengthening their surfaces (Casparie 1987).

Casparie & Moloney (1994) analysed the construction techniques used for north-western European Neolithic bog trackways – amongst which one specimen from the Bourtanger Moor. They found that the prime determinant for the chosen construction technique was the bearing strength of the hummock-hollow bog surface (see above). The latter, in turn, is mostly related to the water saturation of the *Sphagnum* peat's surface (*ibid.*) (Casparie & Moloney 1994, 56-57; Hayen 1989, 59-68), which was especially the case with the Bourtanger Moor (Casparie & Moloney 1994, 59). For that reason, damper and thus softer parts of a bog, like the hollows, were often filled with wood and/or other material before a trackway was constructed over them (Casparie & Moloney 1994, 56).

Interestingly, it was noted that the relatively limited length of the Nieuw Dordrecht XXI Bourtanger Moor trackway (*i.e.* around 1 kilometre, whilst the Moor at that time was ca. 10 kilometres wide) might indicate that this trackway was only constructed to reach the inner parts of the Moor, not to cross it (Casparie & Moloney 1994, 60) (figure 5). Moreover, Casparie & Moloney (1994, 60) stated that it might have been an unfinished trackway, probably never or only once used (later reiterated by Casparie *et al*. 2004).

However, more advanced techniques, such as fixing planks, trunks or branches by using pegs, were only applied from the Bronze Age onwards (Casparie & Moloney 1994, 56). This possibly enhanced the durability and bearing strength and consequently the accessibility of the later bog trackways.

Reus (2019) analysed four Bronze Age wooden trackways that lie in the research area of this thesis. She found that trackway XVII – a small footpath made of planks – was built from the Hondsrug subglacial ridge (see above), relatively close to some Bronze Age (*i.e.* dated between 1900 and 1300 BCE) barrows and ended in the Bourtanger Moor (Reus 2019, 21, 29). Moreover, trackway XVII probably started near a Bronze Age settlement, and it is anticipated that the same might be true for trackway XVIII – a footpath made of roundwood – given its parallel course to trackway XVII.

Conversely, the two other Bronze Age trackways in the research area, XVI (a small footpath made of planks) and XIX (a wide trackway made of tree trunks) lie solely in the bog, relatively distant from the Hondsrug and any archaeological features thereon (Reus 2019, 15, 29).

Three trackways from the Iron Age from Casparie's (1987) catalogue used in Reus' (2019) analysis are also present in the research area. These are trackways I, XIV, and XV. Trackway I is the longest one that has been discovered and recorded in the Bourtanger Moor (Reus 2019, 22) and was wider than the other here listed trackways (Reus 2019, 28). It probably supported wheeled traffic. Trackway XIV was probably constructed to facilitate access to a concentration of bog-iron ore in the Bourtanger Moor and featured an additional foundation of bundles of *Salix* rods at the place where a small brook stream was crossed (Casparie 1987, 47). Lastly, trackway XV stretches almost as far as the entire regional width of the Bourtanger Moor, and, therefore, was probably used to cross the it.

Figure 5: Photograph from 1981 of the second trench of the excavation of Late Neolithic trackway XXI, looking in eastern direction. Adopted from Casparie (1982, 136, figure 22).

3.3 Case studies of the siting of prehistoric selective depositions

This paragraph provides an overview of recent case studies into the landscape context of selective depositions during the Bronze Age (sometimes with some overlap with preceding and/or following periods) from several north-western & northern European countries.

3.3.1 Great Britain

With regard to selective deposition in England, Yates & Bradley (2010a; b) published two articles in which they analysed the relationship between the selective deposition of different types of objects and the physical and cultural landscapes of England. Namely, Yates & Bradley (2010a) assessed the presumed association between different kinds of Middle- to Late Bronze Age metalwork deposits with different types of so-called '*waterscapes*' in the East-Anglian fenlands, whilst Yates & Bradley (2010b) focussed on the positioning of metalwork hoards from the same periods in south-east England. A decade later, the latter study was followed-up and extended with single Bronze Age metalwork finds by Dunkin et al. (2020). In Wales, Mullin (2012) assessed the difference between deposition in peatlands and rivers.

Yates & Bradley (2010a)

Yates & Bradley (2010a) assess different types of '*waterscapes*' in relation to metalwork deposits. By '*waterscape*' any environment in which water plays or played a prominent, visibly identifiable role is meant.

They borrowed the term from Strang (2008), who also uses the term '*fluidscape*' to describe the same phenomenon (Strang 2008, 124). In her conclusion, Strang (2008, 127) postulates that '[…] *human engagements with water permeate every aspect of culture*.'. She continued that the major challenge for landscape archaeologists lies in interpreting the archaeological record related to water use through time, to subsequently link this with past relationships between humans and water, and the environment as a whole (see also *e.g.* Strang 2005; Fredengren 2018).

They ordered the find data, comprising both single finds and hoards, into particular categories and then analysed the reconstructed environmental context per each category to identify any possible patterning (Yates & Bradley 2010a, 406-411). The main findings of their analysis concern five clear patterns.

Firstly, single complete weapons are mostly found in or near the (former) routes of main river systems (Yates & Bradley 2010a, 412). Secondly, hoards, most prominently those comprised of weapons, have mainly been found in still waters and bogs at relatively distant locations from main river system channels (Yates & Bradley 2010a, 413). Thirdly, fragments of the same type or similar weapons were found in so-called dry land contexts (*ibid*.). Fourthly, other types of metalwork deposits were concentrated near two of the causeways that crossed the main river systems in the fenland – a pattern that is observed in other parts of Continental Europe and Britain too (Yates & Bradley 2010a, 412-413). Lastly, they note that there is a close association between the distribution of metalwork and of the remains of burnt mounds (which follow the fen edges) and fire-cracked flints (Yates & Bradley 2010a, 413).

Based on these five findings, Yates & Bradley (2010a, 413-414) conclude that it is more useful to address the significance of different sorts of watery environments than merely stating whether the contexts were 'wet' or 'dry' when selective depositions are studied. Nonetheless in the East-Anglian fenlands it appears that there was a strong association between metalwork selective depositions from the Late Bronze Age and watery places.

Yates & Bradley (2010b)

Yates & Bradley (2010b) concerns a rather similar study into the landscape context of selective depositions in terms of the applied, yet it differs with regard to the wider landscape setting. That is to say, the Weald river area in the south-east of England (*i.e.* the Low- and High Weald), comprised of river channel, natural levee, and flood basin deposits underneath or on the surface. Besides, the Weald is bordered by the outcropping elevated chalky strata of the North and South Downs respectively (Yates & Bradley 2010b, 45).

Field methods indicated that quite consistently Bronze Age metalwork hoards occur close to paleochannels (Yates & Bradley 2010b, 47-53). This association was subsequently confirmed by the topographical survey of the research area (Yates & Bradley 2010b, 53-66). In addition, it was found that hoards were also often located near (former) springs, burnt mounds or field systems, or on promontories overlooking a (paleo)channel.

Thus, Yates & Bradley (2010b, 66) concluded that the selective depositions in south-east England are patterned, probably not solely as a result of practical considerations. Furthermore, this pattern, although spatially dependent, is rather temporally consistent throughout the Middle- and Late Bronze Age. As in the East-Anglian fenlands (see above) there is predominantly an association with watery contexts: (ephemeral) streams, confluences, pools, and springs, and sometimes also burnt mounds or field systems (Yates & Bradley 2010b, 70).

Dunkin et al. (2020)

Dunkin et al. (2020) further investigated the siting of Bronze Age metalwork in south-east England. They extended both the total research area (with the East Anglian chalk area and the Upper Thames), as well as the dataset (now including single finds too) (Dunkin *et al*. 2020, 68). Furthermore, field visits now also encompassed the wider surrounding area (Dunkin *et al* 2020, 69). As a consequence, it was possible to assess whether different kinds of artefacts can be associated with different kinds of ‘dry land’ contexts (*sensu* Yates & Bradley 2010b for different kinds of ‘wet’ contexts).

Like Yates & Bradley (2010a; b), Dunkin et al. (2020, 79-80) found a distinct association between the findspots of metalwork depositions and fresh water, especially streams.

However, there were two intriguing new outcomes of their analysis. On one hand the proximity of findspots to the border areas of different geologies, whilst another significant amount of the findspots was sited in areas of local big relief differences. Namely, 25% of all the findspots in the dataset were located in these two area categories (Dunkin *et al.* 2020, 79). Hilltops and plateaux overlooking fresh water streams feature 29% of the larger hoards in the sample, whereas deep dry or ephemeral valleys (*e.g.* coombes) are associated with 21% percent of all findspots (Dunkin *et al.* 2020, 81).

Subsequently, Dunkin et al. (2020, 81-83) tested whether any of these observed patterns were the result of chance or were really related to different associations for different landscape settings. They found that for both the association with fresh water streams and meeting points of different geological regions, as well with areas with pronounced local relief differences, the comparisons indicated that these associations are distinct for the research area and not the result of pure chance (*ibid.*).

The clearest distinction between different landscape settings in their dataset is the one between relatively low lying and elevated parts of the landscape (Dunkin *et al*. 2020, 85). Based on evidence from European Bronze Age selective depositions (Čerče & Turk 1995; Wyss 1996; Zemmer-Plank 2002) and research into the possible cosmology of Neolithic people from the British Isles (Lewis-Williams & Pearce 2005), it is argued by Dunkin et al. (2020, 85-86) that it seems very possible that, during the (Late) Bronze Age, depositions at highly elevated locations were aimed at an ‘upper world’, whereas those at relatively low locations were aimed at a ‘subterranean domain’.

Mullin (2012)

In the east of England, and the West of Wales, Mullin (2012) investigated the differences between Bronze Age metalwork deposition in river systems and peatlands. Whilst both are considered to be 'wet' environments by Mullin too (*sensu* Strang 2005; 2008 and Yates & Bradley 2010a; b), he postulated that there are fundamental physical and cosmological differences between these two landscape features. Especially the River Severn is interesting in this regard.

Being Britain's longest river, it is remarkably underrepresented in terms of the number of Bronze Age metalwork depositions which have been recovered from it when compared to other less lengthy rivers (Mullin 2012, 47). Only 13 depositions can be said to have been found *in situ* in Severn channel deposits, of which seven were bronze axes, whilst only two were swords (Mullin 2012, 49). A potential physical (*i.e.* taphonomic) cause for the low number of depositions can be ruled out according to Mullin (2012, 49), since the Severn is and was (*i.e.* during the Bronze Age) a low- to medium energy level river system. Nor can differences in recovery intensities between river settings and more terrestrial environments account for the lack of depositions (Mullin 2012, 52).

Instead, potential causes must have been related to socio-cultural factors (Mullin 2012, 52). He notes that, in contrast to river settings, other wetland environments, especially bogs, did contain a high proportion of metalwork depositions (*i.e.* at least a factor 10 higher). Hence, Bronze Age people from this region might have preferred to deposit metalwork in such wetland-, rather than in river settings (Mullin 2012, 53).

Two notable – related – differences between rivers and bog concern how dynamic and consequently accessible both environments are. Whilst rivers are flowing (*i.e.* dynamic) and thus ideal for travelling and transport (*i.e.* accessible), bogs are instead static (*i.e.* non-dynamic) and also difficult to cross (*i.e.* less accessible). On the other hand, rivers have opposing banks (and sometimes even channels), whereas bog generally lack such clear, visible boundaries. Hence, the former might have been seen as marking social boundaries, whereas bogs might have been viewed differently (Fontijn 2002). Consequently, selective depositions in rivers might have been performed to strengthen their 'dividing' character, while those in bogs might have been aimed at enhancing group identity (Mullin 2012, 54).

Therefore, the lack of Bronze Age metalwork depositions in the Severn, according to Mullin (2012, 54), should be seen as an absence of the presence of social boundaries between different groups on both banks of the river. Instead, as the overrepresentation of metalwork depositions in bogs might indicate, the emphasis lay on reinforcing within-group social structures (*ibid*.).

3.3.2 Sweden

In Sweden, two notable studies into the landscape context of selective depositions concern the area of Lake Mälaren and Lake Hjälmaren and their surroundings (east-central Sweden), namely Fredengren (2011) and Rundkvist (2015). Fredengren (2011) analysed any type of selective deposition, including animal and human bones, and assessed the immediate surroundings of each findspot focussing primarily on wetland contexts. Rundkvist (2015), on the other hand, studied the context of selective depositions on the landscape scale, which he defines as '*[…] a scale of hundreds of metres, where you can see from one studied landscape feature to another and walk between in an hour or two.*' (Rundkvist 2015, 11). This scale is similar to the meso-scale of landscape context analysis as described by Chapman et al. (2019) (§3.1) and adopted in the methods of this thesis (§4.2).

Fredengren (2011)

Fredengren (2011) developed a 'grammar' for the associations between selective depositions and different types of water. She argues that different affordances as well as different potential types of action and properties of water might have invoked different kinds of selective depositions in different watery environments (Fredengren 2011, 110). This why, according to her, there is a distinct regional variation in the use of various types of water landscape in the Lake Mälaren area.

The most common watery environments for selective depositions were sea waterways & fluvial environments, whilst lacustrine environments were less common (Fredengren 2011, 113). Especially sources or confluences of waterways were chosen as suitable places for selective depositions during the Late Bronze- and Early Iron Age (Fredengren 2011, 116).

The different affordances that such 'meeting points' could provide include: communication between different areas, provision of fresh and 'young' water to the deposition, and establishment of various degrees of 'centrality' within an area (Fredengren 2011, 116). Furthermore, it is noted that different '*textures*' of water, namely '*flowing*' water in streams, '*firm*' in peatlands, and '*still*' in lakes, might have been important for assigning different types of selective depositions to different kinds of environments (Karsten 1994, 144 in Fredengren 2011, 116 and see also Fredengren 2018).

However, water would probably not only have been appreciated because of its favourable passive properties, but also because of its ability to actively change an object's appearance (*ibid*.). This could be both visually (*e.g.* via the creation of a patina) and/or physically (*e.g.* as a result of corrosion or erosion) (*cf.* Lowenthal 1985; Van de Wetering 1996). Moreover, via the different refraction of light in water as opposed to for example air, an object might appear to be doubled underwater looked at from above the water. Hence, water could have added a certain historical value to a selectively deposited object (Fredengren 2011, 118).

Thus, as found in the British case studies described above (§3.3.1), a strong association between watery environments and selective depositions was found in the Lake Mälaren area.

Rundkvist (2015)

Rundkvist (2015), on the other hand, focussed on the context of primarily metalwork depositions on a landscape scale, in the areas of Lake Mälaren and, additionally, Lake Hjälmaren. Archaeological data from web catalogues as well as analogue library sources were used in conjunction with palaeogeographic maps constructed by the Swedish geological survey (Rundkvist 2015, 27-29).

The article provides an investigation of the specific selective depositions per pre-determined landscape unit (Rundkvist 2015, 30-46). The main outcomes are that at least 87% of the findspots in the dataset are from Bronze Age wet contexts and that 59% of the total of the concerned findspots were sited on or in Bronze Age shores of sea inlets or lakes (Rundkvist 2015, 30). Moreover, whilst a small number of the findspots were sited in 'sublime and dramatic landscape locations' (Rundkvist 2015, 30), these peculiar findspots still followed the general placement pattern described above. Interestingly, (formerly) dynamic sections of streams, where a river 'changes state' (*e.g.* where rapids were present) were specifically targeted for selective deposition (Rundkvist 2015, 33-34).

Subsequently, these patterns were interpreted for the Early- and Late Bronze Age (Rundkvist 2015, 47-48). During the Early Bronze Age, sea inlet contexts often feature axe and spear depositions, but never swords and daggers. Conversely, the opposite can be observed for contemporaneous bogs. In such contexts, swords and daggers were far more common depositions than spears and axes (Rundkvist 2015, 48). During the Late Bronze Age, stone- and bronze axes were predominantly deposited in wet contexts, but almost never in dry contexts (*ibid*.). However, the stone axes are almost exclusively found in Late Bronze Age sea inlet contexts, and only very rarely on lakeshores. Jewellery, on the other hand, was mainly deposited in dry contexts, and exceptionally rarely in sea inlets.

Hereafter, the relationship between the locations of selective depositions and burnt mounds and rock art is investigated (Rundkvist 2015, 49-50). Burnt mounds are understood to indicate the presence of contemporaneous settlements. On average all types of deposition findspots (*i.e.* from the entire Bronze Age) are within 1.7 and 1.8 kilometres from rock art and burnt mounds respectively. This means that generally selective depositions were sited in the 'settled home territory' – not in more distant 'liminal' areas of the landscape (Rundkvist 2015, 49).

3.3.3 Estonia

In Estonia, Paavel (2017) undertook a similar approach as Yates & Bradley (2010a; b), Dunkin et al. (2020), and Rundkvist (2015) (see above) to study the siting of selective depositions in the entire country. Her dataset comprised 35 selective deposition findspots from the Early- to Late Bronze Age (Paavel 2017, 27). For most of these locations, detailed palaeogeographic reconstructions of the immediate landscape context of the sites lacks, except for the present-day shoreline findspots. Using regional Holocene sea level fluctuation studies, it was possible to reconstruct the position of the depositions in relation to the contemporaneous coastline (*ibid*.).

Paavel (2017, 33) found that watery environments (*i.e.* wetlands & bodies of water) were the most often featured locations for selective depositions in Estonia during the Bronze Age. As much as 70% of all the finds in her dataset were from such environments (Paavel 2017, 35). Specifically flowing water seems to have been important, as 40% of all the finds were associated therewith (*ibid*.).

Selective deposition in wetlands seems to have been especially a long-lived custom. It has been evidenced to have occurred during the preceding Neolithic period too (Kriiska & Roio 2011, 69; Johanson 2006 in Paavel 2017, 35) and continued well after the Bronze Age in Estonia had ended (Oras 2015 in Paavel 2017, 35).

The transition from the Early- to the Late Bronze Age in Estonia, characterized by the full adoption of a farmer subsistence strategy did not come with a marked change in the selective deposition patterns (Paavel 2017, 37). Hence, it was concluded, that the same object types, now made from a new material (*i.e.* bronze) received the same (selective) treatment as their lithic predecessors (*ibid*.).

3.3.4 Ireland

In Ireland, Becker (2006; 2008; 2013) published several important papers on the subject of Bronze Age selective deposition of metalwork on the island. Becker (2013) is briefly discussed here. Other notable publications on this phenomenon in Ireland include Bourke (1996; 2001) and Leonard (2014; 2015).

Becker found that Bronze Age selective deposition in Ireland was structured and, moreover, that there are type-specific landscape context patterns (Becker 2013, 228-242).

Namely, certain apparent associations between specific object types and particular places in the landscape could be discerned (Becker 2013, 233). That is to say, during the entire Bronze Age, especially specialised weapons are singly deposited mainly in other contexts than spear(head)s and axes (Becker 2013, 234). A larger proportion of for example daggers & dirks, rapiers & halberds, and battle axes were deposited in riverine contexts when compared to contemporaneous axes. Conversely, the latter were predominantly deposited in bog contexts, whilst their deposition in riverine contexts also decreased through time during the Bronze age (Becker 2013, 236).

Remarkably, gold objects (*i.e.* mainly ornaments) in the dataset were never retrieved from riverine settings, whilst they were found in bog and dry land contexts. Hence, Becker (2013, 236) argued that their treatment concerning selective deposition differed clearly from that of bronze objects, which might be related to diverse socio-cultural associations of both metals (Becker 2013, 245).

For hoards in the dataset category-specific context associations can be discerned. One-type hoards have a tendency to be associated with wet contexts (like bladed weapons, see above), as are single-category ornaments hoards from the Late Bronze Age. Alternatively, Late Bronze Age single-category tool hoards were principally deposited in 'rocky' contexts. Complex hoards (*i.e.* consisting of a mixture of different object types) were generally deposited in wet contexts as well, although those containing swords and other objects were deposited chiefly in dry contexts.

At the end, it is concluded that the transformative act of selective deposition assigned a specific meaning not only to these objects themselves, but also to the specific landscape context in which they were deposited (Becker 2013, 255).

3.4 Recurrent patterns in north-western & northern Europe

From reading the overview of the selected case studies described in the previous paragraph it becomes apparent that certain selective deposition patterns recur throughout prehistoric Northern Europe[3]. This was already identified by other scholars of prehistoric Europe, amongst which, Bradley (2017).

The settings that were chosen for selective deposition did not change markedly through time or space in the prehistory of north-western and northern Europe (Bradley 2017, 168). Namely, the vast majority of selective depositions discovered there were sited in similar locations that were somehow related to (a body of) water – even those that are usually classified as 'dry' depositions (Bradley 2017, 169; §3.3).

As Bradley (2017, 172) states, most of these find locations have in common that they are

- where water had unusual physical or visual characteristics, for example: in estuaries (*cf.* Fredengren 2011; Rundkvist 2015), at the boundary of different aquifers, bodies of water or watersheds (*cf.* Wentink 2006; Dunkin *et al.* 2020), in stagnant water such as lakes or peatlands (*cf.* Yates & Bradley 2010a; Fredengren 2011; Mullin 2012; Becker 2013; Rundkvist 2015; Paavel 2017; Fontijn & Roymans 2019), etc.

  and/or

- where water changed its character, for example: springs (*cf.* Torbrügge 1971; Stjernqvist 1997; Van der Sanden 2004; Yates & Bradley 2010b; Fontijn 2012; Frendengren 2011; Becker 2013), confluences (*cf.* Fontijn 2002; 2019; Yates & Bradley 2010a; b; Fredengren 2011; Becker 2013), tidal inlets (*cf.* Rundkvist 2015), fords & causeways (*cf.* Torbrügge 1971; Yates & Bradley 2010a; b; Becker 2013), ephemeral streams (*cf.* Wentink 2006; Yates & Bradley 2010a; Dunkin *et al*. 2020), etc.

The association between wet environments and selective depositions is specific for north-western and northern Europe, because – contrastingly – in southern Europe selective depositions are more strongly associated with 'openings leading into the earth' (*e.g.* cavities, gorges, fissures, and caves) rather than wet contexts (Bradley 2017, 178).

As mentioned afore, this pertains to most of the selective depositions from dry contexts too. Namely, these were often found near a body of water or on a hilltop overlooking a river, for example. Hence, although found in a dry context which comprised the immediate surroundings, a selective deposition can still be associated with a certain wet context if it was relatively close to it. This illustrates the problem with assigning finds to such ill-defined and dichotic categories as 'dry' *vs* 'wet', which is further hampered by the problem that finds are inconsistently assigned to a 'wet' or 'dry' context based on either the reconstructed environment around the time of deposition or the environment at the time of excavation. This problem is further considered in the discussion (§6.4.2)

In conclusion, when the landscape context of selective depositions in a certain part or region of north-western & northern Europe is studied, it can generally be anticipated that most of the depositions in that area can be – in one way or another – strongly associated with water.

[3] Bear in mind that there are many more studies into the landscape context of selective depositions that affirm this observation that are not mentioned or described in this thesis because it would otherwise get too lengthy.

4. Materials & Methods

This chapter first describes the materials that are used in the analysis of this thesis. Both the earth scientific and the archaeological data and their limitations are concerned. Thereafter, the methods with which to perform the analysis are explained.

4.1 Materials

The analysis in this thesis in performed using archaeological data (*i.e.* selective depositions, barrows, other graves, settlements, bog trackways, and the Barger-Oosterveld 'temple') and earth scientific data (*i.e.* palaeogeographic reconstructions).

An archaeological find is considered to be a selective deposition when it is either interpreted as such (and substantiated by contextual evidence) by the excavators or later by the editor(s) of a catalogue. Additionally, one or more object that seem to have been deliberately deposited at a specific location (*i.e.* which cannot be logically argued to have been lost haphazardly or to have been part of the refuse), but which was not directly interpreted as such by the excavators, can also be considered as a selective deposition. Crucially, an object that meets the above-described criteria needs to be contextualized if it is to be included as a selective deposition in this analysis. This means that the find location of an (assemblage of) object(s) (*i.e.* with at least 10 m accuracy) and age (*i.e.* at least assigned to an archaeological period, see table 1) both need to be known. If either or both of these criteria or not sufficiently met then the find is not included.

Appendix 1 provides an overview of all the selective depositions used in the analysis of this thesis, with corresponding description and literature reference(s).

4.1.1 Archaeological data

Selective depositions

The prime archaeological data in this study comprise selective depositions from the catalogues of Bronze Age bronze metalwork and amber finds from the Netherlands published by Butler (1990) and Butler & Steegstra (1996; 1998; 2002; 2008) (see figure 6 and Appendix 1). The database that contained the results of a meticulous query into the bronze metalwork depositions in these catalogues as well as other publications was composed by dr. Marieke Doorenbosch[4] and kindly provided to the author. Finds other than those from the Butler, Butler & Steegstra, and Van der Sanden publications in the database, were found by dr. Doorenbosch in databases of the Leiden University 'Ancestral Mounds' project. The accuracy of the coordinates of the data points differs, as very detailed (*i.e.* GPS) locational data was not always available to the excavators or, alternatively, to the researchers compiling particular datasets.

Butler (1990) concerns the first part of the catalogue and covers hoards and finds from rich graves from the Early Bronze Age. The second part of the catalogue involves stray finds and more specifically axes, also from the Early Bronze Age. To be precise: flanged-, flat- and stopridge axes in Butler & Steegstra (1996) and palstaves in Butler & Steegstra (1998). The third and fourth part of the catalogue contain Late Bronze Age finds of winged- & socketed axes and rich graves and hoards, respectively. Of those latter, the ones used here are Butler & Steegstra (2002) about socketed axes and Butler & Steegstra (2008) about hoards and rich graves.

In addition, selectively deposited Neolithic and Early Bronze Age objects in the south-eastern part of the study area (*i.e.* the Bargerveen) were gathered from Casparie (1982). In turn Casparie (1982, 126) selected these from a catalogue of bog and river valley finds from Germany and the northern parts of the Netherlands compiled by dr. W.H. Zimmermann between 1963 and 1970, partly obtained from

[4] Faculty of Archaeology, Leiden University.

museum depots inventories[5]. From a total of 24 selective depositions in Casparie (1982, 126-130) 14 were included in the dataset of this thesis. The remaining 10 finds were not sufficiently contextualized (*e.g.* their find location was too ambiguous) and/or properly dated (*cf.* Casparie 1982, 127) and thus left out.

As this thesis is primarily concerned with the siting of selective depositions related to the characteristics of the natural and cultural landscape, the focus of the analysis is on the selective depositions from a natural context in the dataset. By this, the selective depositions that were deposited in a 'unaltered' natural context are meant, not the depositions that were deposited in or at man-made landscape features or structures (*e.g.* barrows). The siting of the latter depositions is assumed to be mainly a determined by the presence of the man-made landscape features or structures, of which the siting is most probably affected by other characteristics of the surrounding natural and cultural landscape than those that affected the siting of deposition from a 'purely' natural context.

Bog trackways

The locations of the four Bronze Age trackways in the study area were obtained via Casparie (1987). Hence, the minimum and maximum ages of the four wooden trackways as well as their reconstructed extent are adopted from Casparie (1987), except for the Late Neolithic trackway XIX, whose age is adopted from Casparie et al. (2004).

Barger-Oosterveld 'temple' & Angelslo-Emmerhout settlement

The location of the Barger-Oosterveld 'temple' building (see 3.2.3) was gained through inspection of Van der Sanden (2000). Likewise, the location of the Angelslo-Emmerhout Middle Bronze Age settlement was gained from Kooi (2008).

4.1.2 Earth scientific data

Supra-regional- to national-scale palaeogeographic reconstruction

Palaeogeographic map series of the Netherlands by Vos et al. (2020) were acquired via the Cultural Heritage Agency of the Netherlands (RCE). The map series portrays palaeogeographic reconstructions of the landscape of the Netherlands at a certain moment in the past (*i.e.* visualised for specific (archaeological) time periods) on a supra-regional to national scale (Vos et al. 2020; Pierik & Cohen 2020). It is based on published geological and archaeological subsurface data as well as existing local- and regional-scale geological and palaeogeographic maps (*cf.* Vos *et al*. 2020; Pierik & Cohen 2020; Vos 2015; Vos *et al*. 2011). In addition, high resolution LiDAR imagery (*i.e.* different generations of the so-called *Actueel Hoogtebestand Nederland*; see ahn.nl) and historical maps were used to map specific pronounced geomorphological units.

As a result of availability and abundancy of data in the coastal and riverine regions of the Netherlands, the series mainly focusses on the evolution of the generally low-lying Dutch coastal plain and Rhine-Meuse-Scheldt delta. The higher areas of the Netherlands, which lie more inland and whose geomorphology as a rule has been mainly formed during the Pleistocene, were commonly reconstructed based on more scarce data. The expansion and retreat of inland peat cover in these areas as reconstructed by Leenders (1996), Spek (2004), and Van Beek (2009) is included in the map series. The study area of this thesis, the area surrounding the town of Emmen, is located in this one of these upland Pleistocene areas. Hence, for the study area, the national-scale palaeogeographic reconstructions depict general spatial and temporal trends general in peat development and other landscape change. Nevertheless, they

[5] Unfortunately, it was not possible to track the original catalogue down, which was in all probability either never officially published (i.e. Casparie (1982) does not refer to it in his bibliography) or never (not yet?) digitalised.

are deemed the most suitable landscape maps for this study as they still show peatland and landform change through time (as opposed to other national-scale earth scientific maps, *e.g.* the 1:50,000 geological and geomorphological map series of the Netherlands).

The palaeogeographic maps depicting the situation around 2750-, 1500-, and 500 BCE were used in this study. These correspond roughly to the Late Neolithic period, the (Middle) Bronze Age, and (Middle) Iron Age respectively.

Local-scale palaeogeographic reconstructions

In addition to the national-scale palaeogeographic reconstructions, a local-scale palaeogeographic reconstruction of the south-eastern part of the study area (*i.e.* the *Bargerveen*) by Casparie et al. (2008, figure 12) was used. It is based on numerous kilometres long well-documented geological borehole transects through the Bargerveen cored and logged by Wil Casparie and his colleagues during the decades before the publication.

Naturally, this local-scale reconstruction by Casparie et al. (2008) is more detailed than the national-scale palaeogeographic maps by Vos et al. (2020) when spatial resolution and distinction between different landscape units within the Bourtanger Moor are considered. Nonetheless, the two scales of palaeogeographic reconstructions are used in conjunction because local-scale reconstructions have only been published for the south-eastern part of the study area. Besides, the national-scale map series covers the entire time period under study, whereas the Casparie reconstruction does not.

Topographic reference map

As a background layer for location reference the latest 'Open Street Map' topographic map for the province of Drenthe[6] was used via the option to add a base layer in ArcMap (figure 6). The 'Open Street Map' is an open data and open access, community-made and -updated topographic map with global coverage and a scale that varies with the maps scale.

4.1.3 Data limitations

The combination of the archaeological dataset with the national- and local-scale palaeogeographic maps makes it possible to effectively reconstruct spatial and temporal patterns in the siting of selective depositions in the physical and cultural landscape of the Bourtanger Moor.

However, as with any (spatial) datasets, there are some limitations inherently connected to both types of datasets that need to be addressed. These concern both spatial- and temporal limitations.

Spatial limitations

The national-scale palaeogeographic maps show large-scale landscape change between relatively long timesteps (*i.e.* ≥ 1000 years). For example, local lateral peat growth is reconstructed based on earlier publications and often locally estimated, not necessarily reconstructed based on local subsurface data. On the other hand, the archaeological data is more diverse in terms of ages (*i.e.* dated to archaeological subperiods of several 100s of years), whilst the location of the finds is reasonably accurate (*i.e.* at least 10 m accuracy, see above). Therefore, the spatial and temporal resolution of the archaeological and palaeogeographic data differ. This has implications for the degree of spatial and temporal detail in the siting patterns that can be inferred from the analysis. It means that the distance between selective depositions and the locations of (the boundaries of) other spatial data (*e.g.* landscape units) assessed with ca. 10 – 100 m accuracy. This level of accuracy corresponds with the meso-scale of landscape context reconstruction as described by Chapman et al. (2019) (§3.1.2).

---

6 As per the 2nd of July 2020.

Temporal limitations

It is difficult – if not nigh impossible – to assess to which degree the selective deposition dataset at disposal is a fair representation of the total amount and composition of all selective depositions from the Late Neolithic to Late Bronze Age that have been deposited in the study area (Casparie 1982, 126, 131; Van der Sanden 2004, 155; Fontijn 2012, 62-63). This especially difficult considering most of the peat cover has disappeared (§3.2.1). Besides, not all finds that have been found during the period of peat exploitation might have been recorded and/or preserved. Rather, most finds that comprise the archaeological record of the study area result from discoveries of amateur archaeologists, local collectors, and/or accidental finds (Fontijn 2012, 62).

Nonetheless the dataset is believed to contain all (or at least almost all) selective depositions that have been discovered, recorded, and published in the study area. It is not expected that the dataset can be extended drastically/substantially by new discoveries in the future.

Consequently, considering the limited size age variability dataset and temporal scale of reconstructions, the temporal scale for which patterns in the siting can be recognized is ca. several centuries, which corresponds roughly to the duration of a single archaeological (sub)period.

4.2 Methods

To study the siting of selective depositions from a natural context in the Late Neolithic and Bronze Age in the study area, the relation between the palaeogeographic landscape and the locations of the depositions was analysed in a GIS environment. For this purpose, ArcGIS software (*i.e.* ArcMap & ArcCatalog, both version 10.6) developed by ESRI was used.

The study area measures 20 by 27 kilometres, which is largely determined by the spatial extent of the archaeological dataset. Herein, the selective depositions from the dataset (§4.1.1 and Appendix 1) are plotted as points in the ArcMap GIS environment, whilst the wooden trackways (§4.1.1 and Appendix 2) are plotted as polylines. They were implemented using the ArcMap editor tool. Conversely, the palaeogeographic maps by Vos et al. (2020) are continuous vector polygons, while the local-scale palaeogeographic maps by Casparie are georeferenced raster images (2nd order polynomial). The Open Street Map base layer was used for georeferencing both the bog trackways and the local-scale palaeogeographic maps by Casparie using the ArcMap georeferencing tools.

In ArcMap, the distance between the location of a selective deposition and:

- (an) other selective deposition(s)
- (an) other archaeological find locations(s) (*e.g.* the Barger-Oosterveld 'temple')
- the edge of a palaeogeographic landscape unit

was measured using the 'measure distance' tool in ArcMap 'as the crow flies'. It was measured at approximately perpendicular angles when the distance between a selective deposition and the edge of a palaeogeographic landscape unit was considered. Naturally, the palaeogeographic landscape unit (*i.e.* from palaeogeographic map of the corresponding period) in which each selective deposition was found, was also considered in the spatial pattern analysis.

It is important to note that in this analysis 'distance' is thus only measured in *absolute terms* (*i.e.* meters in a 2D plain), and therefore not in *relative terms*, (*e.g.* how much effort it took to get from one place to another). An analysis of the latter would require detailed information about local-scale vegetation-, wetness-, and bog relief differences, which are not available as of yet. Nonetheless, it can be stated that a selective deposition in the middle of a raised bog part of the study area near a contemporaneous bog trackway, was probably less isolated (*i.e.* relatively easier to reach) than a coeval selective deposition farther away from any bog trackway.

Thus, it was possible to assess three aspects of the siting of the selective depositions:

1. The direct physical landscape context (*i.e.* in which palaeogeographic landscape unit a selective deposition was discovered).
2. The relation between each selective deposition and its closest neighbouring archaeological find(s) (*i.e.* another selective deposition, bog trackway, settlement or the Barger-Oosterveld 'temple').
3. The relation between each selective deposition and its closest neighbouring palaeogeographic landscape unit.

Based on the 1st and 3rd aspect it was subsequently assessed what number of selective depositions (regardless of their respective ages) is associated with each landscape unit. If a selective deposition was in or close to a landscape unit (*i.e.* the latter in the case of the stream valleys), it was considered to be primarily associated with that landscape unit. Thus, associations between selective deposition and landscape units could be identified. Based on the 2nd aspect patterns in the cultural landscape siting could be recognized.

In order to determine what the closest association of an individual selective depositions could have been, it needs to be specified what is considered to be '*close*' or '*nearby*' in terms of measured distance between two locations. *Close*, of course, is a relative and subjective term, which consequently depends mostly on the dimensions of the research area. Here two locations are considered to be close to each other when the minimal measured distance between them ('as the crow flies') is 500 meters or less. This maximal distance roughly corresponds to the size of the *mesoscale* of spatial landscape context analysis as proposed by Chapman et al. (2019; §3.1.2) and is the same order of magnitude as the 'landscape scale', at most a few hundreds of meters[7], used by Rundkvist (2015) (§3.3.2). Additionally, when the minimal distance between two locations is between 500 and 1000 metres, these locations are deemed '*moderately close*' to each other.

In combination with the spatial scale of the research area (*i.e.* 20 x 27 kilometres) the above-defined maximal distance rules are therefore considered to be a good method to identify associations between the different types of spatial data in this thesis on a landscape scale. Moreover, it also leaves some room for error given/considering the ca. ± 10 m accuracy of the locations of the selective depositions (*e.g.* two locations that lie 450 m away from each other can then be fairly confidently said to have been located close to each other).

Subsequently, it could be determined what the relative importance of each landscape unit for the patterns in physical landscape siting of selective depositions in the study area was. To achieve this, the number of selective depositions per landscape unit was compared to the cumulative area of that landscape unit (*i.e.* raised bog, subglacially-formed ridge, Pleistocene coversand, or stream valley) on the 1500 BCE palaeogeographic map by Vos et al. (2020). Thus, when the number of associated selective depositions associated with landscape unit X is the same as the number of depositions associated with unit Y, while the total area of unit X is smaller than the total area of unit Y, then the relative importance of landscape unit X for the overall siting of selective depositions in the entire study area is higher than that of unit Y.

[7] "*I seek knowledge on the landscape scale: not on the artefact level, not on the level of the province-wide distribution map, but on a scale of hundreds of metres, where you can see from one studied landscape feature to another and walk between them in an hour or two.*" (Rundkvist 2015, 11).

This is based on the principle that when the selective depositions would be normally distributed across the entire study area, it would be expected that the number of selective depositions associated with a certain landscape unit should be proportional to the unit's size. An example to illustrate this: given that the total area of landscape unit Y is 10 times larger than the total area of unit X, one would expect that the number of selective depositions associated with unit Y would then also be ~10 times higher than the number of depositions associated with unit X when the depositions would be normally distributed across the research area.

Hence, this method – which essentially determines the weighed number of associated selective depositions per landscape unit – is ultimately aimed at identifying a form of intentionality or selectivity in the siting of selective depositions in a given area, which is exactly the opposite of a random distribution of depositions. Thus, patterns in the physical landscape siting of selective depositions can be identified, which is precisely the aim of this research.

Naturally, there are some weaknesses in this method. Namely, it has to be assumed that the dataset of selective depositions under study is representative – both in age, and spread across the study area – of the actual total number of selective depositions that was deposited in the research period.

As already noted in §4.1.3, it is virtually impossible to assess whether the dataset used in this study is an accurate representation of the actual number and spread of selective depositions in the study area. Ultimately this is, of course a problem that every study that looks into spatial patterns of an inherently incomplete archaeological record deals with. Therefore, in spite of differences in taphonomic conditions and degrees to which finds from certain areas were reported or excavated (§4.1.3), it is here assumed that the dataset used in this study is at least to some degree representative of the actual number and spread of selective depositions in the study area.

Furthermore, it has to be assumed that during the research period no major landscape change takes place, which would significantly alter the total area per landscape unit through time, which would be problematic given that the selective depositions in the research area date from different archaeological periods.

Fortunately, no major landscape change took place between the 2750 and 500 BCE palaeogeographic maps by Vos et al. (2020) (*i.e.* representative of the Late Neolithic & Early Bronze Age and the Late Bronze Age respectively). Hence, the 1500 BCE palaeogeographic map (*i.e.* representative of the Middle Bronze Age, in between the 2750 and 500 BCE maps), is most suitable for this type of analysis, since it can be relatively confidently assumed that, for example, a Late Neolithic (*Late Bronze Age*) selective deposition that is associated with landscape unit X on the 1500 BCE map is also associated with unit X on the 2750 BCE (*500 BCE*) map. In other words: the 1500 BCE map is the best representation of the palaeogeography of all three maps.

Hence, the cumulative area per landscape unit on the 1500 BCE palaeogeographic map by Vos et al. (2020) was calculated using the 'calculate geometry' option in ArcMap. It was applied to the part of the palaeogeographic shapefile that encompasses the study area, which was gained after cropping the original shapefile. The calculated geometries were then exported to Excel to calculate the percentages of each unit in the study area. Subsequently, the percentages (*cumulative area*) of each landscape unit were compared to the percentage (*number*) of associated selective depositions.
Thus, patterns in the physical landscape siting of selective depositions were identified. Since the patterns in the cultural landscape siting of selective depositions concern associations between different types of point data (and not between point data and vector data), these patterns are identified based on the closeness of different archaeological data only.

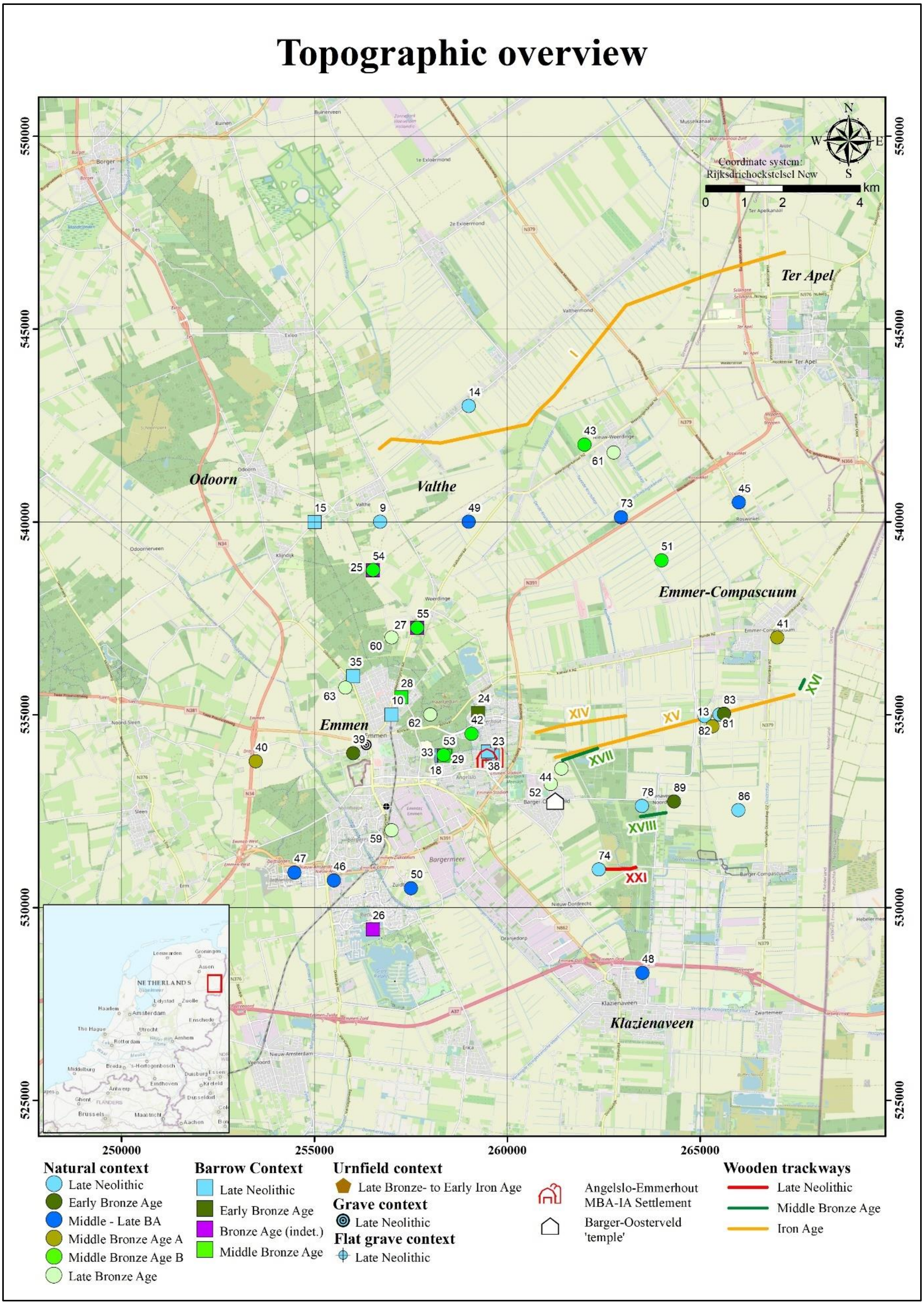

Figure 6: Overview of all the archaeological data used in this thesis (§4.1.1) plotted on the Open Street Map base layer (via Esri). Coordinate system is Rijksdriehoekstelsel New.

5. Results

In this chapter the results of the spatial analysis of the siting of the selective depositions are described. In chronological order, first the results of the Late Neolithic period and Early Bronze Age (§5.1), then the Middle Bronze Age (§5.2), and lastly the Late Bronze Age (§5.3) are given. Per period, first the results of the analysis of the siting of the selective depositions in relation to the palaeogeography are provided. Hereafter follow the results of the analysis of the siting of the selective deposition in relation to other archaeological finds and/or structures.

5.1 Late Neolithic & Early Bronze Age

Seven selective depositions from the Late Neolithic (LN) are present in the dataset (see Appendix 1). Three date from the Early Bronze Age (EBA).

Figure 7 depicts the palaeogeography of the study area around 2750 BCE, which is assumed to be representative for the LN period and EBA. The selective depositions from both periods, together with LN depositions from barrow, grave, and flat grave contexts are plotted on the palaeogeographic map. In addition, one EBA- & four indeterminate Bronze Age[8] barrow context depositions and one LN wooden trackway are charted.

5.1.1 Palaeogeography

In the Bourtanger Moor five LN- (*i.e.* two 'northern daggers': number 14 and 22) and two EBA depositions (*i.e.* two battle axes: number 83 and 89) are located. On the Hondsrug two LN depositions (*i.e.* a northern dagger near a NE-SW-oriented stream valley: number 9; a flint hoard near the western end of LN wooden trackway XXI near the boundary between the Hondsrug and the Bourtanger Moor: number 74) and one EBA deposition were found (*i.e.* a low flanged axe: number 39).

However, the palaeogeographic map series by Vos et al. (2020) do not distinguish between different (sub)types of landscape units that were inevitably present in the Bourtanger Moor bog landscape during the Neolithic and Bronze Age (§3.2.1). Therefore, to get more detail about the siting of the LN and EBA depositions in the Bourtanger Moor, all selective depositions in figure 10 plotted on a palaeogeographic reconstruction of the south-eastern part of the study area (*i.e.* the 'Bargerveen') around 1500 BCE by Casparie et al. (2008, 37: figure 12), which shows the course of the Runde and the location of raised bog domes present in the Bourtanger Moor.

It can be seen in figure 10 that LN deposition number 13 is located just east (*i.e.* ca. 320 metres) from the Bronze Age '*Runde*' (§3.2.1) brook stream at the edge of a raised bog dome. The *Runde*, albeit in a smaller form, already existed during the LN (Casparie 1982, 132). Thus, the LN selective depositions number 13, 82, and 86 as well as EBA deposition number 83 would have been deposited in a 'fluvio-bog' environment, perchance at the transition from a raised part of the Moor to an (ephemeral) peat drainage channel depression.

5.1.2 Archaeology

In terms of any relation between selective depositions and other contemporaneous archaeological finds or structures, only LN selective deposition number 74 is close (*i.e.* ca. 150 m) to another structure, namely LN wooden trackway XXI (figure 7 and figure 10). EBA selective deposition 39 lies approximately 420 m to the southwest of a LN grave context deposition. Furthermore, LN selective depositions 13 and 82 and EBA deposition 83 lie within ca. 500 m from each other. None of the other

[8] By which is meant that these depositions could not be dated more precisely to subperiods of the Bronze Age.

LN or EBA selective depositions are within 500 metres of any other another archaeological finds or features in the dataset (figure 7).

What is further interesting is that selective depositions 13 and 82 from the LN as well as deposition 82 from the EBA lie along the trajectory of Middle Iron Age (MIA) wooden trackway XV, and that LN deposition 78 and EBA deposition 89 lay close to MBA trackway XVIII (ca. 260 and 350 from the reconstructed trajectory respectively). This concentration of finds will be further discussed in §6.2.2.

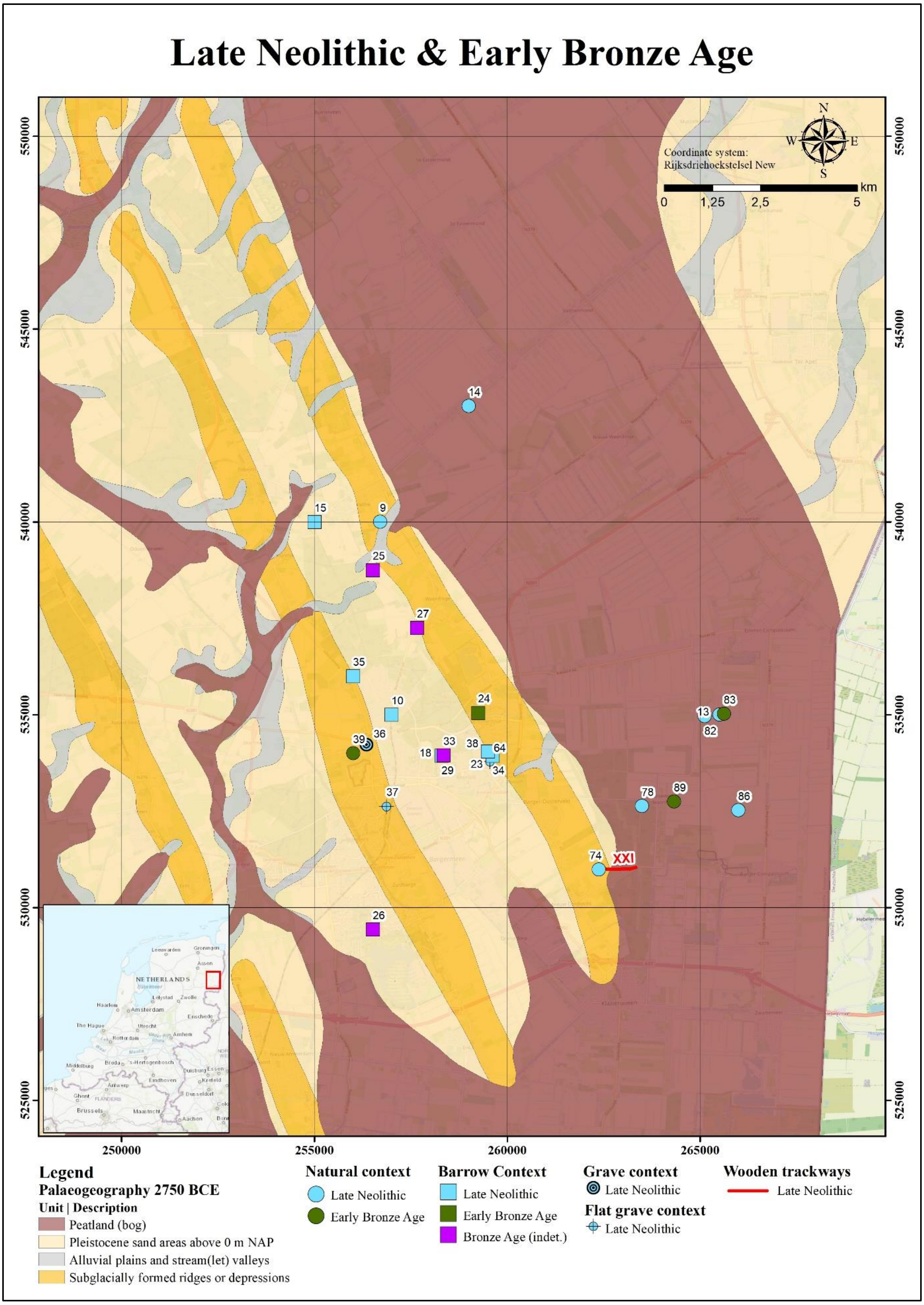

Figure 7: Palaeogeographic map (2750 BCE, adopted from Vos et al. 2020) with selective depositions and trackways from the Late Neolithic and (Early) Bronze Age plotted on top.

5.2 Middle Bronze Age

The dataset contains three Middle Bronze Age A (MBA A) selective depositions and six Middle Bronze Age B (MBA B) selective depositions. Seven depositions have been dated to stem from the MBA to the Late Bronze Age (LBA), since their age could not be more accurately determined.

Figure 8 shows the palaeogeographic map of ca. 1500 BCE with relevant archaeological information plotted for the MBA A and B respectively. The pattern in physical and cultural landscape siting of the selective depositions identified in the Early Bronze Age (EBA) does not change significantly from the EBA to the MBA.

5.2.1 Palaeogeography

Two of the three MBA A selective depositions, number 41 and 81, are located in the Bourtanger Moor (see figure 8). Selective deposition 41 concerns a complete bronze palstave of the Northern European type, which was probably imported from Schleswig-Holstein or adjacent parts of north-west Germany (Casparie & Steegstra 1998, 168-169). The other one, number 81 is a flint dagger or lance point (Casparie 1982, 129). When plotted on the 1500 BCE palaeogeographic reconstruction of the south-east part of the study area by Casparie et al. (2008) (figure 10), it becomes apparent that deposition 81 was sited close to the channel of the Runde (*i.e.* ca. 125 m to the east of the channel). The bronze palstave, deposition 41, was not deposited close to the Runde, but farther to the east.

The third MBA A selective deposition, number 40, concerns a complete bronze flanged axe, which on the 2750 BCE map is located in the channel of a stream valley west of the western rim of the Hondsrug (compare figure 8 to figure 7). Unfortunately, as it was gifted to the Drents Museum[9] by a local farmer, the stratigraphic context of the find was never recorded (Butler & Steegstra 1996, 224). Therefore, at the time of deposition of the axe, this channel depression was most probably either not yet (*cf.* figure 8 depicting the palaeogeography ca. 1500 BCE) or only just filled in by peat (*cf.* figure 9 depicting the palaeogeography ca. 500 BCE). Consequently, it may have been deposited in a stream valley during the Early- to Middle Bronze Age.

There are six selective depositions from the MBA B (figure 8). Two lay in the Bourtanger Moor in the Hunze valley, namely events 43 and 51. These are a complete bronze palstave (number 43) and a broken and damaged bronze palstave (number 51) (Butler & Steegstra 1998; see Appendix 1). As they both lie outside the area that is covered by the palaeogeographic reconstruction by Casparie et al. (2008) (see figure 10), it could unfortunately not be determined whether they were sited close to any contemporaneous peat drainage channel that might have been present in the Bourtanger Moor.

Three other MBA B selective depositions were found at or near the locations of Bronze Age and/or Neolithic barrows. These are selective depositions 53, 54, and 55, which are all hoards with various contents (Appendix 1). Concerning their paleogeographic context, these three depositions are all sited in the Pleistocene coversand area on the Hondsrug. Deposition 54, however, lay close to the upstream heads of a stream valley (*i.e.* ca. 200 to 300 m to the south).

The last of the six MBA B selective depositions, number 42, is not located near a barrow, nor does it lie in the Hunze Valley part of the Bourtanger Moor. Instead, it lies on the Hondsrug, near the edge of Pleistocene coversand area and the eastern rim of the Hondsrug. This selective deposition consists of two bronze palstaves.

[9] In Assen, the provincial archaeological museum.

Of the seven MBA-LBA selective depositions, four are located in the Bourtanger Moor: numbers 45, 48, 49 (*i.e.* all palstaves), and 73 (a ball of wool). One selective deposition, number 50 (also a palstave), is located on the western rim of the Hondsrug, whilst deposition number 46 (another palstave), is located west of deposition number 50 in the Pleistocene coversand area west of the Hondsrug.

The last of the seven MBA-LBA selective depositions, number 47 is located west of deposition number 46. It is the only selective deposition from MBA A, -B, and MBA-LBA that is located on the edge of a stream valley. In contrast to the stream valleys close to which selective depositions from older (section 5.1.1) and younger (section 5.3.1) periods were sited, this stream valley lies west of the Hondsrug and not on the eastern boundary of the Hondsrug with the Bourtanger Moor.

5.2.2 Archaeology

The three MBA B selective depositions that were found at or very near to the location of Neolithic and/or Bronze Age barrows context events (see 5.2.1) consist of multiple finds which were deposited together (*cf.* Appendix 1). Number 53 comprises a collection of finds placed in a coffin grave in the side of a sod-built mound (*i.e.* Bronze Age barrow, event number 33) (Butler 1990, 58, see Appendix 1). Number 54 is a group of finds from a secondary grave in a heath sods tumulus (*i.e.* Bronze Age barrow, event number 25). Lastly, number 55 concerns a group of finds from a secondary ('peripheral') grave in a sod-built tumulus (*i.e.* Bronze Age barrow, event number 27) (Butler 1990, 61-63).

One selective deposition, number 81 from the MBA A, is sited close to the older LN deposition 13 and 82 and EBA deposition 83 (*i.e.* minimum 300 to maximum 450 m away). Furthermore, like these older selective depositions it lay close to MIA wooden trackway XV too. Consequently, deposition 81 might have been deliberately deposited along an older precursor of MIA trackway XV (perhaps the undiscovered remains of MBA wooden trackway XVII in the Bourtanger Moor), like the older LN and EBA depositions (§5.1.2). In that case, this specific zone in the Bourtanger Moor where the Runde (or a precursor thereof) was crossed might indicate an important zone for selective deposition practices from (at least) the Late Neolithic until (at least) the Middle Bronze Age A. More on this later in the discussion (§6.2.2).

Concerning the other MBA A, MBA B and MBA-LBA selective depositions, it can be stated that none of them lie particularly close to any other archaeological find, the Angelso-Emmerhout MBA-IA settlement, or the Barger-Oosterveld 'temple' (figure 8). Naturally, this doesn't imply that it can be excluded that any of the selective depositions was close to a contemporaneous settlement, as such other settlements other than Angelslo-Emmerhout are not mapped and are thus not considered in the analysis.

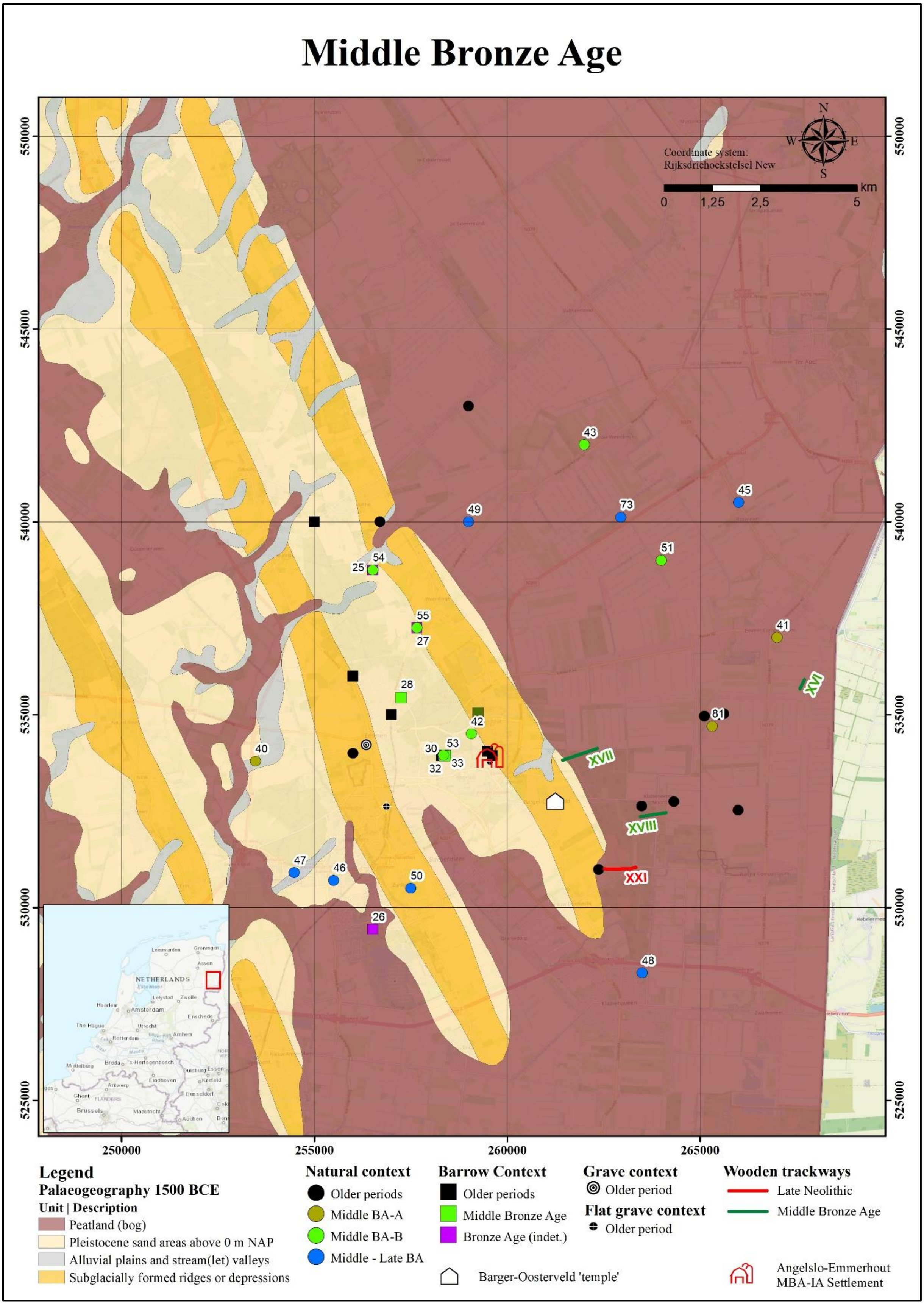

Figure 8: Palaeogeographic map (1500 BCE, adopted from Vos et al. 2020) with selective depositions from the Middle Bronze Age (A & B), older depositions, bog trackways, and the Barger-Oosterveld 'temple' & Angelslo-Emmerhout settlement plotted on top.

5.3 Late Bronze Age

In the dataset seven selective depositions date from the Late Bronze Age (LBA) are present, in addition to the seven MBA-LBA selective depositions concerned in the previous paragraph. Figure 9 show the LBA selective depositions and other archaeological finds plotted on the 500 BCE palaeogeographic map by Vos et al. (2020). An extra category of find events, LBA to Early Iron Age (henceforward EIA) urnfield context events, is portrayed on these four maps.

Lastly, to reiterate: figure 10 shows the palaeogeographic reconstruction of the south-eastern part of the study area around 1500 BCE by Casparie et al. (2008, 37: figure 12), with all selective depositions from that area plotted on top.

5.3.1 Palaeogeography

The siting of the seven LBA selective depositions – all bronze socketed axes – in relation to the contemporaneous palaeogeography differs notably from older periods. In the LBA, only one of the seven selective depositions is located in the Bourtanger Moor itself. The six other selective depositions are all located on the Hondsrug.

The selective deposition sited in the Bourtanger Moor, number 61, involves a bronze socketed axe. It cannot be reconstructed whether it lay close to any specific geomorphologic unit (*e.g.* a peat drainage channel) based on the existing palaeogeographic reconstruction of this part of the research area.

Conversely, four bronze socketed axes: selective depositions 59, 60, 62, and 63, were found on the Hondsrug. Depositions 59 & 63 are located on the western rim of the Hondsrug, while depositions 60 & 62 are sited in the Pleistocene coversand area in the middle part of the Hondsrug.

The siting of the last two LBA selective depositions, number 44 and 52 deviates markedly from that of the above-described ones. Number 52 comprises 2 bronze socketed axes (Butler 1961), whereas number 44 is actually an assemblage of two bronze palstave, two bronze '*nierenringen*', a bracelet, one bronze pin, and one bronze urnfield knife (Butler & Steegstra 1998). They are both located close to a stream valley that extends from the eastern rim of the Hondsrug into the Bourtanger Moor (figure 9). Moreover, selective deposition 44 is sited close to the edge of the Hondsrug with the Bourtanger Moor.

5.3.2 Archaeology

Selective deposition 63 is close to the LN barrow context depositions number 35, ca. 360 metres to the northeast. LBA selective deposition 61 is moderately close to MBA B selective deposition 43, around 800 m to the northwest. Likewise, LBA selective deposition 60 is also moderately close to MBA B selective deposition 55 (close to Bronze Age barrow context deposition 27), ca. 700 m to the east.

Interestingly, selective depositions 44 and 52 (which lay within ca. 500 m from each other) are moderately close and close to the Barger-Oosterveld 'temple'. Number 44 is ca. 800 metres north thereof, number 52 ca. 450 metres. It is currently not known whether the 'temple' was still standing or not when both depositions were deposited in this area during the LBA. Given the fact that the 'temple' is dated between 1700 and 1400 BCE (*i.e.* MBA A), this seems rather unlikely.

Furthermore, deposition 44 is especially close to the western end of the MBA trackway XVII and MIA trackway XV that extend into the Bourtanger Moor (figure 9 and 10). At the palaeogeographic map of 500 BCE they are located around 225 to 325 metres to the north of deposition 44 respectively.

Hence, because of the presence of three different types of archaeological events – selectively deposited LBA hoards, an MBA wooden trackway into the Bourtanger Moor, and a ceremonial building or 'temple' at Barger-Oosterveld – it can be stated that this part of the research area, the south-eastern end of the Hondsrug, might have played an important (ritual) role during the MBA to LBA (§6.2.1).

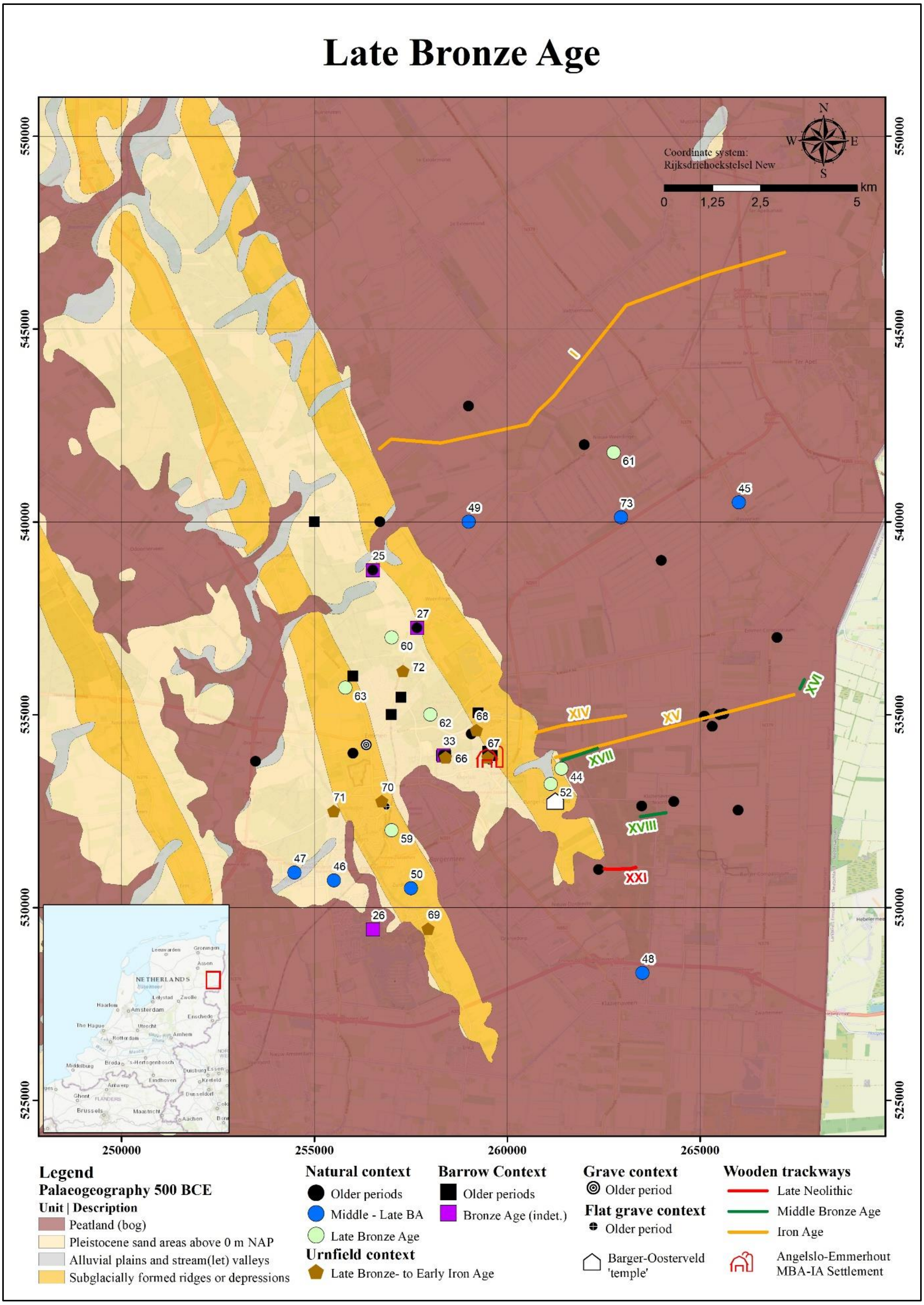

Figure 9: Palaeogeographic map (500 BCE, adopted from Vos et al. 2020) with selective depositions from the Late Bronze Age, older depositions, bog trackways, and the Barger-Oosterveld 'temple' & Angelslo-Emmerhout settlement plotted on top.

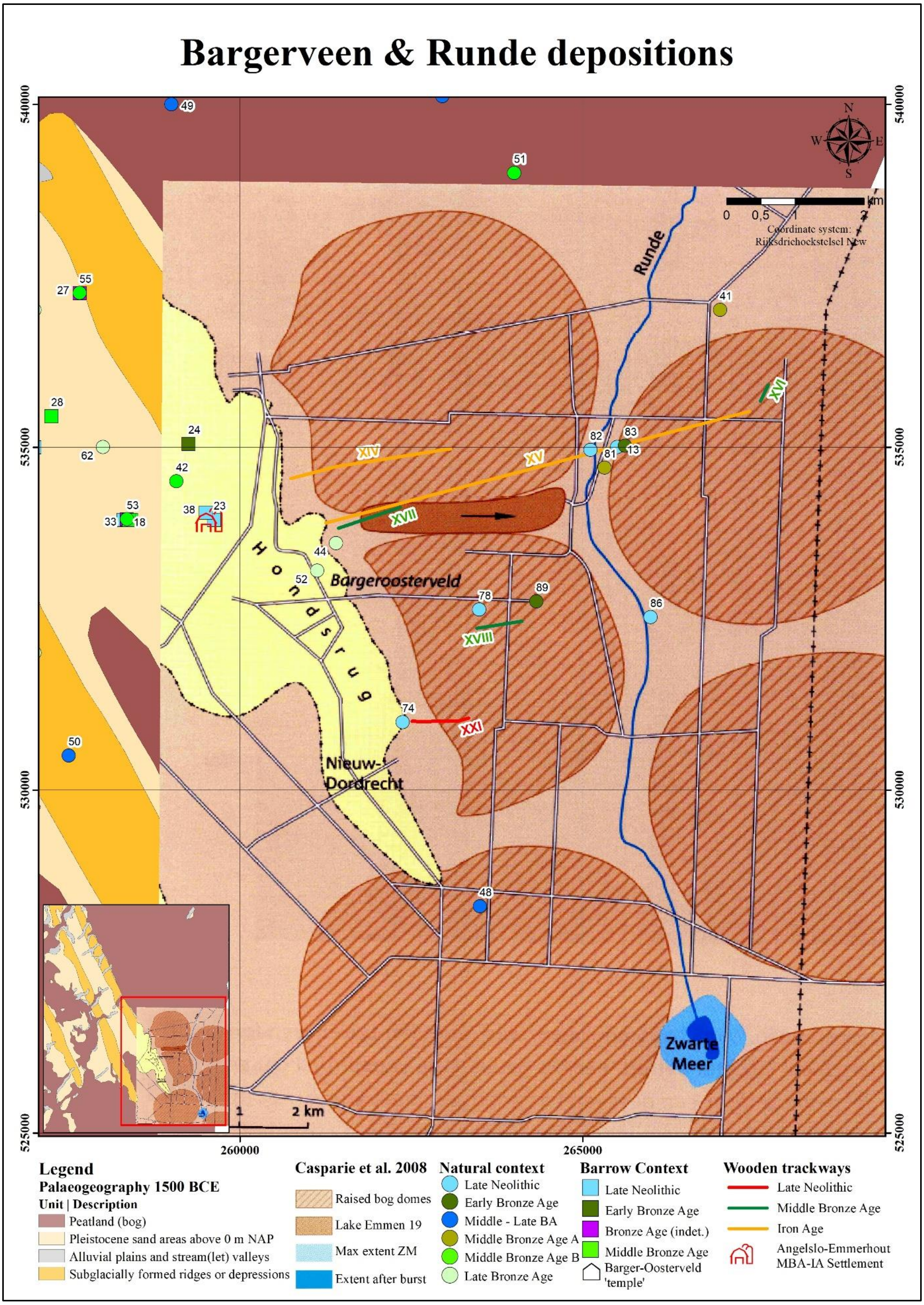

Figure 10: Late Neolithic to Late Bronze Age selective depositions (*i.e.* all periods) in the south-eastern part of the study area (the Bargerveen). Adapted from Casparie et al. (2008, 33, figure 12).

6. Discussion

In this chapter the outcomes of the investigation into the siting of the selective depositions from the Late Neolithic and Bronze Age described in the previous chapter, are discussed in relation to the theoretical background from chapter 2, and the insights from other north-western and northern European case studies from chapter 3.

First, patterns in the physical landscape siting of selective depositions are concerned. Second, in the same manner spatio-temporal patterns in cultural landscape siting of selective depositions are discussed.

Hereafter, the implications of the identified patterns for our understanding of the siting of selective deposition in the study area as well as in wider north-western and northern Europe are described.

Lastly, recommendations and suggestions for future research into the landscape siting of selective depositions are given.

6.1 Patterns in the physical landscape siting of selective depositions

The total number of selective depositions from natural contexts in the dataset is relatively small (*i.e.* 33). Nevertheless, sections 5.1.1, 5.2.1, and 5.3.1 show that certain patterns in the siting of selective depositions in the study area, can be discerned, and, moreover, that some of these patterns remained rather consistent from the Late Neolithic through the Bronze Age (table 2).

Therefore, this paragraph first discusses the number of Late Neolithic to Late Bronze Age selective depositions from natural contexts that can be associated with one of four palaeogeographic landscape units on the 1500 BCE map by Vos et al. (2020) (§6.1.1), following the method described in §4.2. Thereafter, the apparently especially strong association between waterways and selective depositions is assessed (§6.1.2). Consequently, this association is further discussed and compared to similar patterns as identified in other studies into the physical landscape siting of selective depositions in north-western and northern Europe (§6.1.3).

Period	Raised bog *(Runde)*	Subglacially formed ridge	Coversand area	Stream Valley
Late Neolithic	5 *(3)*	1	-	1
EBA	2 *(1)*	1	-	-
MBA	4 *(1)*	0	3	2
MBA-LBA	4 *(0)*	1	1	1
LBA	1 *(0)*	2	2	2

Table 2: Number of associated selective depositions per landscape unit per period inferred from the Vos et al. (2020) palaeogeographic reconstructions (figures 7, 8, and 9; §5.1.1, §5.2.1, and §5.3.1). The number of depositions than can be associated with the Runde brook river (in *italics* behind the total number of depositions associated with the raised bog category) was inferred from figure 10.

6.1.1 Associated selective depositions per landscape unit

The dominant landscape unit in the palaeogeographic maps (*i.e.* in terms of total area in the study area) is the 'raised bog' (~63% of the total area of the 1500 BCE map, see table 3), followed by Pleistocene 'coversand area' (~21%) and 'subglacially formed ridge' (~12%). The last of the four landscape units, the 'stream valleys', covers a mere ~4% of the total area. Hence, would it be the case that the selective depositions are normally distributed across the four landscape units, then it would be expected that the majority of the selective depositions are associated with the raised bogs in the study area (§4.2). Logically, the smallest number of selective depositions would then be associated with stream valleys.

Remarkably, however, this is not the case for the selective depositions in the study area when the number of associated selective depositions from a natural context per landscape unit in table […] are assessed. Namely, the number of selective depositions that is associated with stream valleys (*i.e.* 6, see table […]) is the same as the number of depositions that is associated with the coversands. This is striking, because the area of coversands in the study area is more than five times as large as the area that the stream valleys cover (21% *vs* 4%). In other words: although the total area of the coversands is an order of magnitude larger than that of the stream valleys, the number of selective depositions that are associated with them is the same (order of magnitude).

Moreover, when compared to the number of selective depositions in the raised bog landscape unit (*i.e.*16), the number of selective depositions in the (former) stream(let) valley unit (*i.e.* 6) becomes even more remarkable. The raised bogs former landscape unit has a total area which is more than 15 times as large as the area covered by the stream valleys (63% *vs* 4%, an order of magnitude larger), whilst the number of selective depositions found in or associated with the raised bogs is only 2.67 times as large as that of the stream valleys.

Thus, it can be concluded that the number of selective depositions that are found in or can be associated with the stream valleys is unusually high if an equal distribution of all selective depositions in the study area across the four landscape units would be assumed.

In conclusion: it seems that stream valleys were deliberately sought after when Late Neolithic and Bronze Age people determined the location for a selective deposition.

Unit (as per 1500 BCE)	Area per unit (m^2)	Percentage area per unit (%)	No. depositions per unit as of 1500 BCE (all periods)	Percentage depositions per unit as of 1500 BCE (all periods) (%)
Total area	$5.37 * 10^8$	-	33	-
Raised bog	$3.38 * 10^8$	63	16	48.49
Coversand:	$1.13 * 10^8$	21	6	18.18
Subglacial ridge	$6.49 * 10^7$	12	5	15.15
Stream valleys	$2.06 * 10^7$	4	6	18.18

Table 3: Associated selective depositions from a natural context per landscape unit on the 1500 BCE map.

6.1.2 Association with the Runde and the stream valleys

The 'raised bog' landscape unit from the palaeogeographic maps of Vos et al. (2020), does not distinguish between wetter and drier parts within the Bourtanger Moor. Consequently, the presence of brook rivers in the Bourtanger Moor, such as the '*Runde*' – is not taken into account in the analysis of the physical landscape siting of the selective depositions. When brook rives and stream valleys can both be considered to represent subcategories of the overarching category of 'fluvial' or 'riverine' contexts, then the association between selective depositions and places where water flowed (ephemerally) in the study area becomes even more distinct.

In the study area, 5 selective depositions can be associated with the Runde (or a precursor thereof): 3 from the Late Neolithic (13, 82, and 86; section 5.1.1), 1 from the Early Bronze Age (83; section 5.1.1), and 1 from the Middle Bronze Age A (81; section 5.2.1). All were found within 500 m from the reconstructed course of the Runde by Casparie et al. (2008) (figure 10). If the 5 depositions close to the Runde are taken together with the 6 depositions that are associated with the six stream valleys, then a total of 11 selective depositions have a strong association with (ephemerally) flowing water in the study area. These 11 depositions represent a third (*i.e.* 11 of 33) of all selective depositions from a natural context from the dataset.

Therefore, the dominant association of selective depositions in the study area would then be with (ephemerally) streaming water, or alternatively, with local depressions in the 'dry' (*i.e.* the subglacially-formed ridges of the Hondsrug) or in the 'wet' (*i.e.* the Bourtanger Moor itself) landscape.

Four of the six selective depositions that are associated with stream valleys are found in or close to valleys that slope eastwards to the Bourtanger Moor (see figures 7, 8, and 9: numbers 9, 44, 52, and 54). Probably they functioned as ephemeral channels, only draining into the Bourtanger Moor in times when excess water was present on the Hondsrug (§3.2.1). Hence, they probably acted as additional ephemeral sources of several brook rivers that must have been present in the Bourtanger Moor. A good example thereof is the stream valley (associated with LBA depositions 44 and 52, §6.2.1) that drained into lake 'Emmen 19', which in turn drained into the Runde (figure 10). The stream valleys thus connected the elevated 'drier' parts of the landscape (the subglacially-formed ridge(s) and Pleistocene coversand areas of the Hondsrug) with the 'wetter' parts (the raised bogs and hummocks & hollows) of the Bourtanger Moor.

6.1.3 Significance of waterways for selective deposition in the study area

As shown in paragraphs 3.3 & 3.4, in most north-western & northern European regions in which the landscape context of selective depositions has been studied, there is a strong link between depositions and water. Especially places where water had unusual physical or visual characteristics or where it changed character were favourable locations for selective deposition. Hence, the association between selective depositions and the Runde and the stream valleys that have been identified in the previous section can be further assessed via comparison with the findings of other case studies.

Stream valleys

The stream valleys in the study area, most prominently those on the eastern edge of the Hondsrug bordering Bourtanger Moor, share some characteristics with the landscape units that were favoured for selective deposition by Bronze Age people from south-east England.

Dunkin et al. (2020, 79-80) found that as much as 25% of the Bronze Age selective depositions in south-east England were sited on the boundaries of two markedly different geological regions or in the areas with steep hillslopes. Furthermore, elevated parts overlooking fresh waterways as well dry or ephemeral valleys were popular locations for selective depositions.

The stream valleys are mostly found on the border of two other landscape units, the Hondsrug subglacial ridge and the Bourtanger Moor. Therefore, they are comparable to the boundary zones of two geological regions that so often featured selective depositions in south-east England.

In addition, Wentink (2006, 67-69), who found that already during the Middle Neolithic period such stream valleys were popular location for the deposition of axes (§3.2.2), argued that because of this border position these locations should be seen as transitional areas, which had a liminal character.

Furthermore, the stream valleys were ephemeral waterways as they probably only discharged water when excess water was present on the Hondsrug or in its subsurface (during winter, §3.2.1). Hence, they can be seen as a kind of 'springs'.

As noted in paragraph 3.3, in many parts of north-western & northern Europe selective depositions can often be found in or near springs (*cf.* Yates & Bradley 2010b; Frendengren 2011; Becker 2013). Fredengren (2011, 116) (§3.3.2) stated that sources or confluences of waterways (in the Lake Mälaren area) can be seen as 'meeting points' that could provide fresh water to the deposited object(s) and facilitate communication between different areas, because of their centrality. Furthermore, springs could bestow water of different ‘textures’ (*e.g.* flowing water from the streams and ‘firm’ water from the bog) to the depositions at such meeting points. All these characteristics could make sources or springs preferable locations for selective depositions.

The stream valleys could be seen as ephemeral springs, and therefore, following Fredengren’s (2011) logic (see above), they could provide fresh flowing water to objects deposited close to them. In addition, they could also provide ‘firm’ water via the peat that grew in the downstream reaches of the valleys (§3.2.1). Hence, this is another reason why these stream valleys could have been seen as a transitional zone. The closeness of two different types of water or *waterscapes* that could have bestowed different meanings and/or associations to depositions (*cf.* Strang 2005; 2008; Fredengren 2011) could have provided an additional motivation for selective deposition in these transitional zones.

Lastly, it is interesting to note that no other selective deposition from the dataset has been found in other parts of the edge of the Hondsrug with the Bourtanger Moor (*i.e.* where stream valleys are absent). Apparently, the only suitable place to deposit an object near the edge of the bog, was close to a stream valley that connected both landscape units with each other.

Runde

As already mentioned in paragraph 3.3, selective deposition in or near rivers, estuaries and inlets was a widespread and long-lived tradition throughout prehistoric north-western and northern Europe. Therefore, it should come as no surprise that a relatively large part of the selective depositions from a natural context in this study were found close to the Runde brooklet. This pattern is line with observations by Van der Sanden (2004) and Wentink (2006). Van der Sanden (2004, 155) argued that the Runde and other brooklets, like waterways in the ‘sandy’ parts of the province of Drenthe were focal points for the practice of selective deposition and possibly also other (ritual) activities of prehistoric people for a very long period in time.

In this regard, the theory of Mullin (2012; §3.3.1) about the socio-cultural connotations of rivers and bogs for the Bronze Age people from Wales and West-England is interesting. He argues that river depositions (in his study area) might have been intended at reifying socio-cultural or political boundaries whilst bog depositions might have been aimed at strengthening intracommunity socio-cultural bonds.

In the study area of this thesis, however, the selective depositions from the Bourtanger Moor (a bog) were mostly found close to the Runde (a brook river). Thus, the findings of this thesis might add some nuance to the theory of Mullin. They show that within a bog landscape selective depositions can still be located close to or in a riverine environment present in that bog. Such selective depositions are then associated with both the bog and the (brook) river therein. Although the motivations for Neolithic and Bronze Age deposition in the Bourtanger Moor can never be reconstructed[10], this shows that the ‘bog deposition *vs* river deposition’ dichotomy isn’t as straightforward as it is presented by Mullin (2012). Perhaps the Runde represented the convergence of both the boundary aspect commonly associated with rivers and the unifying aspect associated with bogs when selective depositions are concerned.

Furthermore, earlier research has shown that fords and causeways were popular locations for selective depositions in north-western and northern Europe in prehistory (§3.3 & §3.4; Bradley 2017). Four of the selective depositions close to the Runde are concentrated close to each other in a relatively small zone, which could have been located at a ‘ford’ in the Runde. Consequently, this ford would have provided a passage from one part of the Bourtanger Moor (and the wider study area) to another.

Therefore, it is argued that they should thus be seen as another type of transition zone present in the Bourtanger Moor, providing access to different physical and socio-cultural domains. In the next

[10] Let alone that it could be assumed that these motivations would have been the same as those of the Bronze Age people of Wales and Western-England.

paragraph the concentration of selective depositions close to the Runde will be further discussed (§6.2.2).

Waterways as transition zones

In conclusions, it is argued that both the stream valleys and the brook rivers in the study area should be seen as transitions zones that marked the passage (both physically as well as mentally) between different physical and socio-cultural environments (*cf.* Wentink 2006, 69), and that this aspect made them interesting locations for selective depositions for Late Neolithic and Bronze Age people.

After having discussed the physical landscape siting of selective depositions here, the effect of the cultural landscape on the siting of the depositions is concerned in the next paragraph.

6.2 Patterns in the cultural landscape siting of selective depositions

As identified in sections 5.1.2, 5.2.2, and 5.3.2, several of the selective depositions from a natural context in the dataset were sited close to other archaeological finds and structures. Hence, this paragraph is aimed at analysing potential patterns in the cultural landscape siting of the selective depositions. Naturally, a possible association between two or more close archaeological finds becomes more plausible when the difference in age between de different finds is smaller.

There are two parts of the study area that feature 'concentrations' where selective depositions were deposited close to each other: near the stream valley just north of the Barger-Oosterveld 'temple' and near the Runde brook river in the Bourtanger Moor (see previous section and figures 11 and 12). Moreover, both concentrations of depositions can be associated with Middle Bronze Age wooden trackway XVII and Middle Iron Age trackway XV. The concentration near the stream valley involves two younger LBA depositions 44 and 52, whereas the concentration close to the reconstructed course of the Runde concerns LN depositions 13 & 82, EBA deposition 83, and MBA A deposition 81.

First, the deposition zone near the stream valley north of the Barger-Oosterveld 'temple' is discussed (§6.2.1), followed by the deposition zone near the Runde brooklet (§6.2.2). In between these two deposition zones lay the trajectories of a Middle Bronze Age trackway (XVII) and a Middle Iron Age one (XV). As these trackways might have connected the two deposition zones, the last section (§6.2.3) of this paragraph concerns the significance of wooden trackways for selective deposition practices in the study area.

6.2.1 Deposition zone near the stream valley north of the Barger-Oosterveld 'temple'

Just north of the Barger-Oosterveld 'temple', where MBA wooden trackway XVII and Middle Iron Age trackway XV entered the Bourtanger Moor from the Hondsrug, two Late Bronze Age depositions (44 and 52) were found close to a stream valley (§5.3). Considering that several physical- and cultural landscape features came here together, this area is termed a 'deposition zone'.

Both depositions, but deposition number 44 in particular (see figure 11), were located close to the edge of the Hondsrug. In combination with the presence of a stream valley incising the Hondsrug at this location, one could say that they both lay in the transition zone from the Hondsrug to the Bourtanger Moor. In addition, deposition 44 lay especially close to the western end of both aforementioned trackways, while deposition 52 lay closer to the older Middle Bronze Age Barger-Oosterveld 'temple'. Whether the 'temple' at Barger-Oosterveld was still standing at the time when both Late Bronze age depositions were deposited cannot be known, but seen its presumed ritual importance during the Middle Bronze Age, the 'temple' itself or its surroundings could very possibly still have had a meaningful influence on ritual practices performed in the area in the Late Bronze Age (*cf.* Fontijn 2012, 60-61; Butler 1961). The presence of both selective depositions near the Hondsrug end of the Middle Bronze

Age and Middle Iron Age wooden trackways is similar to the Late Neolithic deposition (number 74) close to the Hondsrug end of Late Neolithic trackway XXI.

The coming together of different elements of the physical and cultural landscape

Consequently, this part of the study area was probably a suitable deposition zone because of its association with trackways and a stream valley that both extended into the Bourtanger Moor, thus marking the transition from the relatively high and dry Hondsrug to the low and wet Bourtanger Moor. The closeness of an older (and possibly already collapsed) Middle Bronze Age 'temple' structure can have added to the ritual significance of this zone during the Late Bronze Age.

Lastly, it is noteworthy that Butler (1990, 50-51) suggested that there might have been a route from the Angelslo-Emmerhout settlement through a zone with barrows to the location(s) were the Bourtanger Moor was entered in this deposition zone. If this can be evidenced by future excavations or non-destructive research, then this deposition zone would have even been connected to a barrow context and a domestic context via the Angelslo-Emmerhout settlement (*sensu* Fontijn 2012, 63-65; 2019, 142).

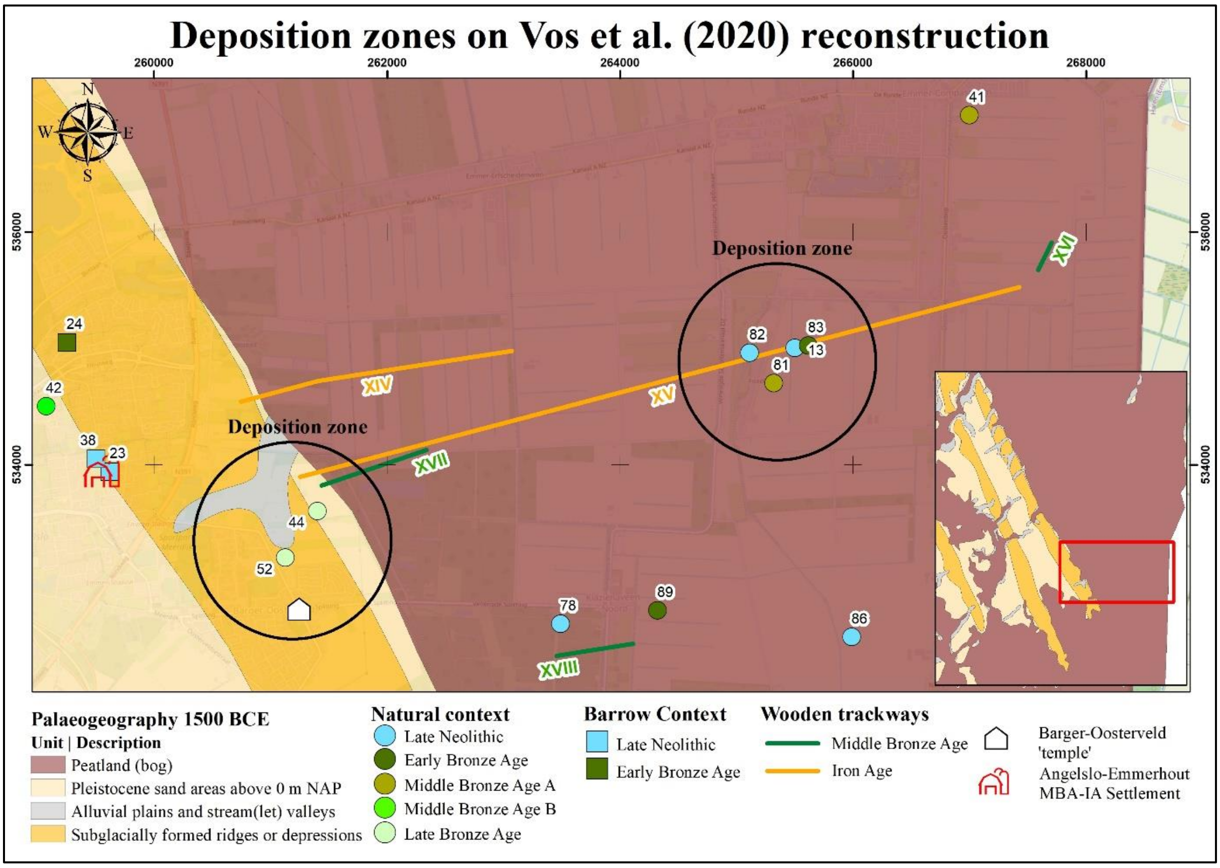

Figure 11: Deposition zone near the stream valley north of the Barger-Oosterveld 'temple' (left circle) and the deposition zone near the Runde brook river and Middle Iron Age trackway XV (right circle) plotted on the palaeogeographic reconstruction of the study area ca. 1500 BCE by Vos et al. (2020).

6.2.2 Deposition zone near the Runde & Middle Iron Age trackway XV

The concentration of four selective depositions from the Late Neolithic, Early- and Middle Bronze Age A is not only located close to the Runde, but also close to the Middle Iron Age wooden trackway XV through the Bourtanger Moor (§5.1 & §5.2 and figures 10 and 12). Furthermore, when the trajectory of Middle Bronze Age wooden trackway XVII is continued in eastern direction (parallel to trackway XV, see figure 12) – assuming that this trackway crossed the Bourtanger Moor or at least reached farther into its inner parts – then this concentration would also lie close to the hypothetically extended trajectory of this trackway. It is not unthinkable that one or more undiscovered or unpreserved older trackways following a similar course were present during the Late Neolithic and/or Early Bronze Age.

The fact that deposition in this zone where the Runde (or its precursor) was crossed – by traversing the bare bog surface or via a bridge from possibly at least the Middle Bronze Age onwards – continued from at least the Late Neolithic to the Middle Bronze Age A, indicates that this must have been an important deposition zone in the study area for a relatively long period. The fact that also later during the Middle Iron Age the Runde was crossed at this point via a trackway adds further strength to the (ritual) significance as a transition zone (§6.1.3) of this part of the Bourtanger Moor in prehistoric times[11].

Other cases of selective deposition along trackways and the Runde

This deposition zone was, however, not the only part of the study area in which one or more selective depositions lay close to a trackway or the Runde.

North of Middle Bronze Age wooden trackway XVIII lay Late Neolithic deposition 78 and Early Bronze Age deposition 89. Furthermore, if the trajectory of this trackway is continued in eastern direction (like trackway XVII, see above), then it would cross the Runde close to Late Neolithic deposition 86. It is noteworthy that Casparie (1982, 131) identified two concentrations of selective depositions along the Runde: a northern (*i.e.* the deposition zone near trackway XV) and southern one (at approximately the location of Late Neolithic selective deposition 86, see figures 10 and 12). The southern zone has not been explicitly identified as such, because the other finds surrounding deposition 86 lacked sufficient information about their location and age, and were thus not included in the dataset of this thesis (§4.1.1). Nonetheless, this other potential deposition zone where the Runde was crossed, possibly by a wooden trackway, can be further considered in follow-up studies into the landscape context of selective depositions in the Bourtanger Moor when more contextual information is found.

Furthermore, Casparie (1982, 126-130; 1987, 53) mentions that close to Late Neolithic trackway XXI a broken *Quercus* wagon wheel (disc wheel type) was found, and underneath it and a *Taxus* axe haft & *Sorbus* axe haft. Since these selective depositions too are not sufficiently enough contextualized (*i.e.* in terms of find location and age), they are not part of the dataset (§4.1.1).

'Special' or 'ritual' character of trackway XXI

Noteworthy, however, is that although Late Neolithic trackway XXI did feature an even surface consisting of planks to facilitate wheeled transport, a sufficient subsurface structure to support the weight thereof lacked (Casparie 1987, 53; Casparie & Moloney 1994, 60; Wentink 2020, 111). In combination with the fact that the surface of the trackway was hardly worn, Casparie (2004, 154) and Wentink (2020, 231), after Van der Waals (1964, 47-50), came to the conclusion that this trackway would never have been able to properly function and thus, given the selective depositions in its vicinity, could be seen as a 'ritual' trackway.

[11] The reconstructed trajectory of Middle Iron Age trackway XIV also points in the direction of this particular zone where the Runde was crossed (see figures 11 and 12). Perhaps this trackway also continued in this direction to cross the Runde.

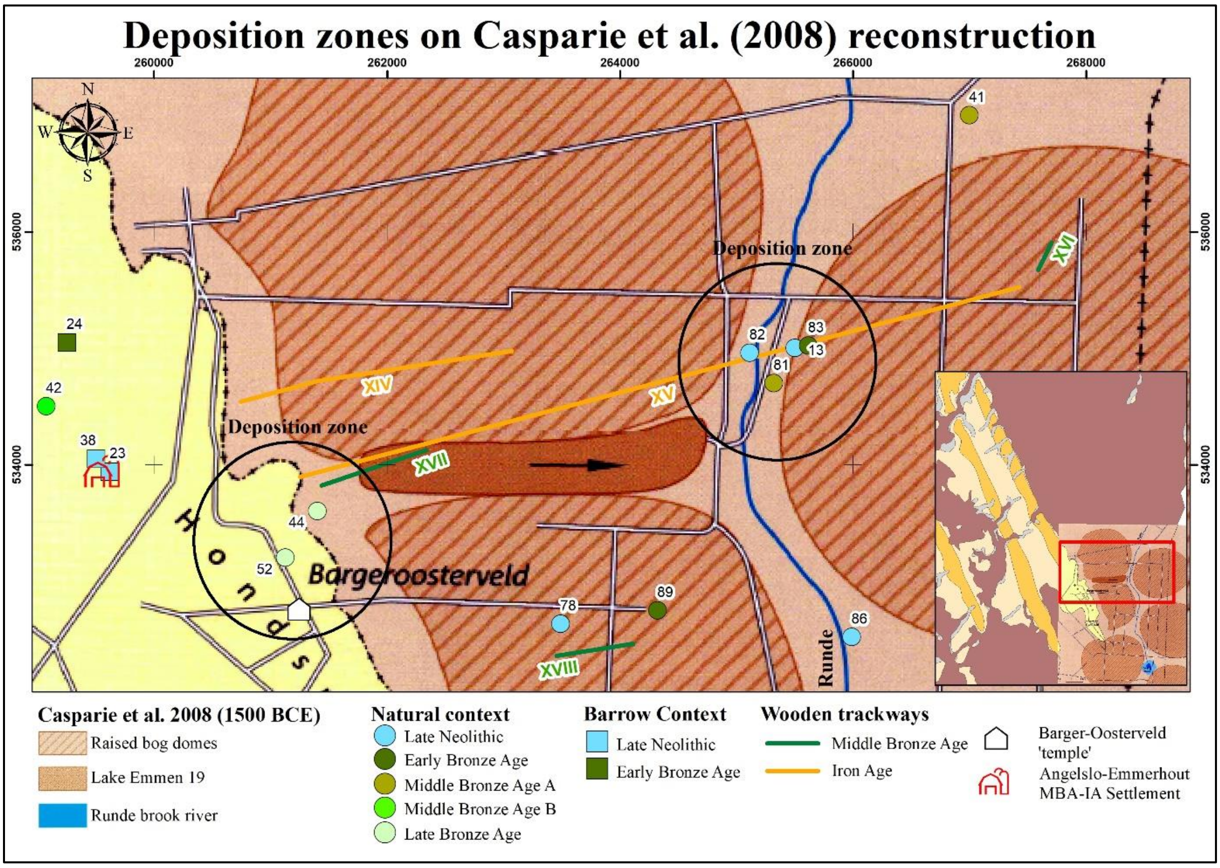

Figure 12: Deposition zone near the stream valley north of the Barger-Oosterveld 'temple' (left circle) and the deposition zone near the Runde brook river and Middle Iron Age trackway XV (right circle) plotted on the palaeogeographic reconstruction of the study area ca. 1500 BCE by Casparie et al. (2008).

6.2.3 Significance of trackways for selective deposition in the study area

In recent decades the trackways in the Bourtanger Moor have often been the topic of a debate about the existence of a supra-regional route network in the Neolithic and Bronze Age (*cf.* Casparie *et al.* 2004; Van der Sanden 2004; Burmeister 2001; Lanting & Van der Plicht 2000; Fansa & Schneider 1992). In the last two decades, the general opinion in the Dutch literature with regards to this matter, is that in the Dutch part of the Bourtanger Moor such a supra-regional route network was probably non-existent (Casparie *et al*. 2004, 137; Van der Sanden 2004, 154). However, the trackways most probably still played an important role in accessing different parts of the Bourtanger Moor, perhaps primarily for selective deposition practices, and to reach other landscapes beyond the raised bogs.

Trackway construction related to increasingly wetter climate

Especially after ca. 2000 BCE (*i.e.* the onset of the Bronze Age in the Netherlands, table 1) the climate wettened, as a result of which the bog surface gradually became wetter too and hollows started to form (Casparie 1982, 130; 1993, 207; Bauerochse 2003) (§3.2.1). Hence, it could be that because of this wetting the Middle Bronze- to Late Iron Age wooden trackways in the study area were constructed. This would also explain why only one Late Neolithic and no Early Bronze Age trackway have been discovered in the study area[12], as Casparie (1984, 89) deems it very possible that people during the Late Neolithic and Early Bronze Age could still access the inner parts of the Bourtanger Moor by walking

[12] Note that wooden trackways dating to the Late Neolithic have been recorded in the adjacent region of north-west Germany, however (Hecht 2007, 171).

carefully on the drier parts of the bog surface (possibly only during the generally drier summer). Hence, during these periods wooden trackways were not needed to access most parts the Bourtanger Moor.

Additionally, Casparie (1982, 131, 152-154; 1987, 47, 49-50), argued that so-called bog iron-ore locations in the Bourtanger Moor – environments where ferruginous water seepage produced siderite, which originated between 5200 and 3100 BC (Casparie 1982, 132) – might have been possible destinations of the trackways (*e.g.* Middle Iron Age trackway XIV in §3.2.3). Such locations must have had a distinct type of vegetation and were dome-shaped (Casparie 1982, 132) and it is assumed that they were already exploited come the Middle Bronze Age (Casparie & Smith 1978). This theory, however, deserves more attention in future research.

Interconnected selective depositions and trackways in the study area

To return to the relation between the trackways and the selective depositions, it is possible that the selective depositions in the bog themselves were important reasons for the construction of at least the Middle Bronze Age, and perhaps also the Late Neolithic and Iron Age trackways. This hypothesis was already mentioned by Van der Sanden (2004, 154-155).

As large parts of the bog surface wettened during the Bronze Age, it became increasingly difficult to reach the inner parts of Bourtanger Moor that were probably suitable for the selective deposition of objects, especially the Runde or other brooklets that were present there (Van der Sanden 2004, 155). Most of the wooden trackways, therefore, must have been built during the Middle- to Late Bronze Age and later to ensure access to such parts and to cross the Bourtanger Moor.

The deposition zone near the Runde (see 6.2.2), consisting of *older* selective depositions which lay along the course of a *younger* Middle Iron Age trackway (XV) substantiates the hypothesis about the reason for the construction of trackways in specific parts of the Bourtanger Moor when the bog surface wettened. The possibility that the older Middle Bronze Age trackway XVII could have also crossed the Runde at this location because its uncovered trajectory is parallel to the trajectory of trackway XV (§6.2.2) further signifies that this area of the Bourtanger Moor mattered to prehistoric people for a long period of time.

North-western & northern European examples of deposition along trackways

In other areas of north-western and northern Europe too selective depositions have been found along peatland trackways. For example, in England along the Sweet Track in Somerset (*cf.* Coles & Brunning 2009), in Ireland at Edercloon (*cf.* Moore 2008; McDermott *et al*. 2009), and North-Western Germany (*cf.* Burmeister 2003; 2004).

Especially broken vehicle parts seem to have been favoured as objects for selective deposition along trackways – either as part of a hoard or as single deposition (Brunning & McDermott 2013, 369; Maran 2017). Already in 1964, it was suggested by Van der Waals (1964, 41, 47) that broken vehicle parts discovered along bog trackways in the Netherlands may have been selective depositions, which was later reiterated by, amongst others Van der Sanden (1997a; b; 2004), Burmeister (2004) and Wentink (2020, 35, 109-111).

Recently Maran (2017) published an article specifically concerned with broken vehicle parts deposition along trackways during the Neolithic (*i.e.* from ca. 3000 BCE onwards) and Bronze Age in the bogs of the Netherlands, Northern-Germany, and Denmark. He postulates that vehicle parts were objects that were restricted to selective deposition because they are never found in grave contexts from those periods (Maran 2017, 117). Moreover, he argues that such vehicle parts should be seen as *pars pro toto* depositions involved in ritual practices affected by various ideas and purposes (Maran 2017, 118).

Trackways connecting different deposition zones
Thus, the multiple selective depositions along trackways in the study area, fit within a broader north-western and northern European Late Neolithic and Bronze Age tradition of selective deposition of objects, often related to vehicles, along bog trackways (Brunning & McDermott 2013; Maran 2017; Bradley 2017; Wentink 2020). Based on the specific location of the deposition zone close to the Runde and along the trajectory of Middle Iron Age trackway XV, it is argued that at least the trajectory of this trackway and possibly also of Middle Bronze Age trackway XVII and other – undiscovered – trackways crossed the brooklets of the Bourtanger Moor intentionally at or close to the location of such deposition zones.

Moreover, since a deposition zone was also present at de Hondsrug end of trackways XV and XVII (§6.2.1), is argued that these and other trackways in the study area could have had an important role in connecting deposition zones with each other. As both the deposition zone in the area of the stream valley (§6.2.1) and the deposition zone were the Runde was crossed (§6.2.2) can be interpreted as transition zones, the trackways then effectively connected different transition zones with each other (see figure 12).

Combined with the (very) short periods of time that several of the discovered ones were in use, and the fact that objects were also deposited along them, this trait attests to the special or ritual character assigned to the trackways by other researchers (see above).

6.3 Implications

The findings of these thesis have a number of implications for both our knowledge about the practice of selective deposition in the study area, as well as for our understanding of the siting of selective depositions (in raised bogs) from north-western and northern Europe on a more general level.

First, the physical and cultural landscape siting of selective depositions in the research area during the Late Neolithic and Bronze Age is compared to the findings of Essink & Hielkema (1998) and Fontijn (2012; 2019) with respect to the Bronze Age (§3.2.1 & §3.2.2). Likewise, it is compared to the siting of depositions during the preceding Middle Neolithic (Wentink 2006) and succeeding Iron Age (De Vries 2015; 2016) (§3.2.1 & §3.2.2). Consequently, based on these comparisons it is determined whether there was any continuation in the patterns of the siting of selective depositions from the Neolithic to the Iron Age (§6.3.1).

Hereafter, the place of the resultant overview of the siting of selective depositions in the study area within the wider north-western and northern European tradition of selective depositions (§3.3) is assessed (§6.3.2).

6.3.1 (Dis)continuity in the siting of depositions in N-Netherlands?

Similarities
The pattern in the siting of Bronze Age selective deposition in the Bourtanger Moor as identified in this study corresponds largely with the patterns as described by Fontijn (2012, 63-65; 2019, 140-142; §3.2.2). The findings do indeed show the importance of the area just north of the Barger-Oosterveld for selective depositions 'temple' (§6.2.1; *cf.* Fontijn 2012 and §3.2.2).

Nonetheless, our understanding of this pattern can be refined slightly with regard to the siting of the selective depositions along boundary of the Bourtanger Moor with the Hondsrug. Namely, it turned out that selective depositions were sited in or close to stream valleys that protruded from the Hondsrug into the Bourtanger Moor (§6.1.3, §6.2.1, and §6.2.3), but not along other parts of the boundary between the Hondsrug and the Bourtanger Moor which lacked such stream valleys.

Fontijn (2012, 60) states that there is apparently no connection between MBA trackways XVII and the Barger-Oosterveld 'temple'. Based on the findings in this study, on the other hand, it is argued that the trackway and the 'temple' might have been 'connected' via the two Late Bronze Age depositions (44 & 52) that lay in between them. Both are considered to have been part of the deposition zone in this area and were thus connected (§6.2.1 & §6.2.3).

As has been noted earlier (§3.2.2 & 6.1.3), Wentink (2006) observed that Middle Neolithic Funnel Beaker axes were preferably deposited close to stream valleys on the border of the Hondsrug with the Bourtanger Moor. They simultaneously had a dividing and binding effect, since they acted as boundaries (because they were literally on the border between two landscape units) but also as connections (since they intersected this border) between different natural landscapes and socio-cultural domains (§3.2.2 & §6.1.3).

De Vries (2015; 2016), although her research focussed more on the temporal differences in the types of objects that were deposited in 'wet' *vs* 'dry' contexts[13], concluded that the siting of selective depositions during the Iron Age was determined based on the same principles that affected the siting of selective depositions during the Neolithic and Bronze Age (§3.2.2). She found that most Iron Age selective depositions were preferably deposited in or close to the stream valleys.

Differences

In addition to the above-mentioned similarities in the findings of this and earlier studies, the importance of the Runde (and other brook streams) for the siting of selective depositions in the Bourtanger Moor is brought under the attention again. Although this role was already suggested by Van der Sanden (2004, 155), it seems that importance of the Runde was overlooked or not observed in more recent studies about selective depositions in the northern Netherlands (*e.g.* Wentink 2006; 2020; Fontijn 2012; 2019; De Vries 2015; 2016). For example, Iron Age deposition in or close to brook rivers such as the Runde is not mentioned by De Vries (2015; 2016) and is not displayed on her maps either. However, in figure 4 of De Vries (2016, 100) several selective depositions are located roughly in the middle of the Bourtanger Moor east of the south-eastern part of the Hondsrug (*i.e.* in the study area of this thesis), which could suggest that they might have lain close to the contemporaneous course of the Runde. Consequently, further analysis of her Iron Age dataset in combination with the palaeogeographic maps of the Bronze- and Iron age course of the Runde by Casparie (1984; 1986) and Casparie et al. (2008) is needed to provide a better insight into this remaining question.

Another new insight into the siting of selective depositions in the study area, concerns the role of bog trackways (§6.2.3). It is argued here that at least part of the trajectories of Middle Bronze Age trackway XVII and Middle Iron Age trackway XV were planned with the aim of connecting the deposition zone near the stream valley north of the Barger-Oosterveld 'temple' (§6.2.1) with the deposition zone near the Runde (§6.2.2). This adds a new element to the 'special' and/or 'ritual' character ascribed to them by Van der Sanden (2004, 154) and Wentink (2020, 231).

Continuity rather than discontinuity in the siting of selective depositions

Thus, it can be concluded that for much of the period from the (Middle) Neolithic until the Late Iron Age the physical siting pattern of selective depositions in the study did not change significantly.

Waterways, either in (*i.e.* the brook(let)s) or on the border of (*i.e.* the stream valleys) the Bourtanger Moor were preferable locations for selective depositions[14]. Deposition in or close to the Runde occurred from at least the Late Neolithic up to (and possibly including) the Iron Age. On the other hand, deposition in or close to the stream valleys took place for an even longer period, namely from at least the Middle Neolithic till the Late Iron Age. Trackways (and the Barger-Oosterveld 'temple') can be

[13] Remarkably, neither in her thesis (De Vries 2015), nor in her article (De Vries 2016) were the characteristics of these categories clearly-defined.

[14] *Sensu* Essink & Hielkema (1998) who noted that wet context depositions were preferred during the Bronze Age (§3.2.2).

argued to have had an effect on the siting of selective depositions (and/or *vice versa*) for at least the Bronze Age, and possibly also the Iron Age.

Hence, it is reasonable to assume that the notion of what constituted suitable locations for selective deposition in the study area in the collective memory of its inhabitants did not change significantly (*cf.* §2.2.1). It seems that particularly parts of the landscape with a transitional notion attached to them were favoured locations. This implies that, apparently, the relational depositional landscape of Iron Age people remained largely the same as their Bronze Age and Iron Age predecessors (*cf.* §2.2.2), and that a certain logic behind the siting of selective depositions can be considered when the archaeological expectancy of an area is assessed (§2.2.3).

As it has been established what the spatio-temporal developments in the siting pattern of selective depositions in the study area are, it is now interesting to consider how does this pattern compares to the general siting of selective deposition in wider north-western and northern Europe.

6.3.2 Depositions from the study area in a north-western & northern European context

The physical and cultural landscape siting in the study area fits within the wider north-western and northern European tradition of the association between selective depositions and water (*cf.* Bradley 2017; §3.2 & §3.3). As in many other case studies from these parts of Europe (§3.3 and references in Bradley 2017) selective depositions from a natural context in the study area were primarily associated with 'springs' and/or boundaries between two different geomorphological or geological landscape units (*i.e.* the ephemeral stream valleys) and flowing water (*i.e.* the Runde and possibly other brook(let)s).

Likewise, selective depositions were frequently found along trackways, which is also the case in other bogs in north-western and northern Europe (§6.2.3). In combination with the fact that some trackways in the Bourtanger Moor lack a sufficient construction to have been used for prolonged periods of time, it is argued that at least some of the trackways might have been made with 'special' or 'ritual' intentions (*sensu* Casparie 2004, 154 and Wentink 2020, 231). The same might be true for the bog trackways from other parts of north-western and northern Europe.

Conversely, at least one Middle Iron Age trackway (XV) and possibly also older undiscovered or unrecorded precursors connected two deposition zones to each other (§6.2). A similar situation has not been encountered in recent literature on prehistoric trackways and selective deposition.

Likewise, deposition in or close to water streams *within* a bog landscape has not been found or described in detail in any other of the north-western and northern European studies discussed (§3.3 & §3.4). Nevertheless, given the fact such brook rivers must have been present in raised bog in other countries as well, and seen the recurrent association between selective depositions and water(ways) throughout north-western and northern Europe, it can be expected that most selective depositions from those bogs will have been located in or close to brook streams.

To further investigate this hypothesis, the still preserved raised bogs of Ireland might be interesting analogues to compare with the present study area. By investigating the siting of selective depositions found in these bogs, it can be assessed if selective deposition near bog waterways and trackways in the Bourtanger Moor might have been part of a wider north-western and northern European tradition. These and other recommendations for further research are given in the next chapter.

6.4 Outlook

This paragraph provides recommendations and suggestions for directions of future research into the spatio-temporal siting patterns of selective depositions. Firstly, some recommendations to refine our understanding of the siting of selective depositions in the study area itself will be provided (§6.4.1).

Secondly, suggestions regarding potential research methods and approaches on a more general level are given (§6.4.2). Lastly, several other areas in north-western and northern Europe with a high potential for fruitful case studies into the siting of prehistoric selective depositions are given (§6.4.3).

6.4.1 Recommendations for future research in the Bourtanger Moor

Increasing the spatio-temporal resolution

The analysis of the siting of selective depositions in the Bourtanger Moor would benefit from an increase of the spatial as well as temporal detail of the palaeogeographic reconstructions of the Bourtanger Moor.

Increasing the spatial detail, for example by further differentiation between wetter and drier parts of the raised bogs, will increase the detail with which the physical siting patterning of selective depositions in the Bourtanger Moor can be assessed.

Regarding the temporal detail, especially a conclusive establishment of the age of the Runde as a mature brook river would greatly benefit the analysis in this thesis. The identified association between selective depositions and brook(let) rivers in the Bourtanger Moor could then be further examined for a more confined period in time.

Potentially, the PhD research of Cindy Quik[15] into the (lateral) development of raised bogs in the Netherlands (amongst which the Bourtanger Moor) will add the above-mentioned higher spatio-temporal details to be able to further analyse the relation between selective depositions and palaeogeographic landscape unity in the Bourtanger Moor.

Adding selective depositions to the dataset

Additionally, adding more (potential) selective depositions to the dataset would also enhance the detail with which the siting of selective depositions can be assessed. Furthermore, this would enable a statistically significant analysis of the type of object per landscape unit. Hence, this would lead to a more quantified comprehension of the spatial patterning of the selective depositions in the study area. Unfortunately, however, it is rather unlikely that many more selective depositions from the Bourtanger Moor can be added to the dataset, since most of the peats have been dug away already (§3.2.1) and most of the finds have not been recorded or reported (§4.1.3; Fontijn 2012, 62).

Paleo-vegetation reconstructions & paleoDEMs

The inclusion of vegetation reconstructions in the analysis might reveal siting patterns that are in some cases largely the same as those inferred from the palaeogeographic maps. Contrastingly, it may also be that different patterns can be discerned. This will lead to new insights about the location choice of selective depositions by prehistoric people, which could subsequently lead the formulation of new or improved theories (*cf.* Spek 2004, 206: Wentink 2006, 67; Rundkvist 2015, 11; Fontijn 2019, 141).

Inclusion of a paleoDEM model might also provide new insights (*cf.* Bauerochse & Niemuth 2012), although the production of such a model might be difficult due to limited peat growth data that is available. Acquiring new data might be difficult given the fact that most of the Dutch parts of the Bourtanger Moor have disappeared as a result of peat mining in recent centuries. Perhaps the forthcoming research of Quik (see above) might be useful in this regard too.

On a more general level, studies into the siting of selective depositions could benefit from the suggestions in the next section.

---

[15] At the time of writing this thesis a PhD researcher at Wageningen University within the *Home Turf* VIDI project of dr. Roy van Beek (*cf.* Van Beek *et al.* 2015).

6.4.2 A new hypothesis & suggestions for future research approaches

Based on the findings of this research, it is argued that it could be that the location choice for selective depositions of prehistoric people from the research area might have been primarily influenced by differences in the temporal scales of landscape change. By this it is meant that some landscape units might change considerably, yearly, seasonally, or in the course of a few decades (*i.e.* one or two human generations, whereas others might not change noticeably in several centuries, or in extreme cases, even millennia.

Landscape units that experience(d) relatively much morphodynamic activity, and thus experience(d) relatively much landscape change in short periods of time, can be seen as transitional places in a landscape. Precisely the stream valleys and the Runde were such transitional places, which (in the past) had relatively much morphodynamic activity. This difference in morphodynamic activity between landscape units that underwent relatively fast landscape change as opposed to units which changed over much longer time-scales, might have been the primary factor that determined which places in the landscape were perceived most suitable for the selective deposition of objects[16].

Fontijn (2012) put forward a comparable hypothesis with regard to the motivation behind the location choice for selective depositions in the Bourtanger Moor. He stated that:

> "*[…] it should not be forgotten that the landscape where these items were left also has profound transgressive qualities. A river looks very different in summer and winter. Items that were deposited in its dried up backswamps in summer may have been under water during most of autumn and winter. Raised bogs may be impassable, dangerous areas in the wet season, but can often be safely visited during dry summers. A preference for placing items that are relevant to the constitution and change of identities in areas that are themselves always in a process of change may thus have been deliberate.*" (Fontijn 2012, 64)

Thus, Fontijn (2012, 64) suggested that seasonal differences in the wetness of landscape units might have significantly affected the siting of selective depositions.

As of yet, this hypothesis has not been further explored in any other landscape context analysis of selective depositions. Therefore, it would be interesting to investigate this hypothesis in several case studies – both in areas which have been well-studied and those still (largely) un-studied – using a 'best practice' approach.

The currently common approach

However, most landscape studies currently investigate either the present-day the landscape context of selective deposition or, preferably, the reconstructed context at the moment of deposition (§3.3 & §3.4). Categories such as 'river', 'hilltop', 'bog', 'lake', etc. are used to categorize selective depositions in a study area. Furthermore, in many cases there is still some sort of broadly-defined distinction between 'dry' and 'wet' contexts[17] (*e.g.* Essink & Hielkema 1998; De Vries 2015). Often, however, it is not explicitly stated what constitutes a specific category, which is problematic when the siting pattern of selective depositions from one area is compared that of another area. Furthermore, such categorizations neglect differences in morphodynamic activity between different geomorphologic units that constitute them (*cf.* Fontijn 2019, 140).

---

[16] See also Karsten (1994, 94), who suggested that perhaps movements of the water surface might have determined a location's appropriateness for selective deposition.

[17] This is unfortunately, and in my opinion erroneously, often seen as a dichotomy.

Formulating a best practice approach for the analysis of the siting of selective depositions
Therefore, based on the above-mentioned points, it is argued that broadly-defined categories such as the above-mentioned should be avoided when describing the siting of a selective deposition. Instead, an alternative approach could be to define categories based on differences in morphodynamic activity.

Namely, the findings of this thesis have shown that it was not necessarily the overarching landscape unit 'bog' that mainly affected the siting of selective depositions in the study area. Rather, the types of geomorphologic units which were present *within the bog* affected the siting of selective depositions. Late Neolithic and Bronze Age people from the study area *specifically* sought-after stream valleys and brook streams to deposit specific objects. It was not necessarily the bog in general that mattered to them, but specific parts of it, which had different morphodynamic characteristics than other parts.

Thus, rather than speaking of 'bog' as the environmental context of a selective deposition, one should use 'brooklet' or 'fenland' to describe this context. As already mentioned, a brooklet could be expected to be – depending on the wider environmental setting – a more dynamic landscape unit than a fenland.

In a similar vein 'dry', contexts should be more specifically classified. As an example: a flood basin context might be considered a 'dry' context, whilst a rocky promontory might be too. Nonetheless, there are major differences between these two contexts, both in terms of how 'dry' they really are and what kind of morphodynamic processes are at play.

What should further be part of a 'best practice' approach in any analysis of the siting of selective depositions, is to always describe the *reconstructed* environment and not the present-day environment when assessing the siting of a selective deposition. By doing so, any ambiguity about temporality of the described siting of a deposition (*i.e.* reconstructed *vs* present-day environment) is prevented. In essence, a reliably reconstructed environment is always more informative about the motivation or logic behind the siting pattern of selective depositions in a given area than its present-day counterpart (*cf.* Wentink 2006, 67).

Lastly, only contextualized finds with sufficient spatial information (*viz.* of which the find location is known with at least 10 m accuracy, see §4.1) should be included in any dataset that is used for studies into the landscape siting of selective depositions.

6.4.3 Extension to other bog landscapes & network analysis

As mentioned at the end of §6.3.2, doing research in similar regions with preserved or well-documented lost bog landscapes while applying the above-described 'best practice' approach (§6.4.2), will aid in understanding whether the siting pattern found in the Bourtanger Moor was part of a wider north-western and northern European tradition or whether it was confined to the Bourtanger Moor.

Unfortunately, most of the peatlands in Europe have been extensively exploited and have consequently disappeared in recent centuries (Rydin & Jeglum 2013, 233). Yet in north-western and northern Europe Ireland, Estonia and Finland, still have fairly high percentages of peatland cover of their total surface area, although these percentages have been steadily decreasing in recent decades (Rydin & Jeglum 2013, 232)[18]. Thus, these countries feature promising areas for case studies to compare with this thesis research. Moreover, most of these surviving areas may still be largely unaffected by (modern) anthropogenic actions.

Consequently, the palaeogeography, paleo-relief, paleo-ecology and cultural landscape of these peatlands can be reconstructed in a more accurate and thus complete manner, as extensive data gathering using modern techniques is possible. This enables high resolution mapping of specific geomorphological

[18] Rydin & Jeglum got their data in 2013 via the Global Peatland database of the *International Mire Conservation Group* (imcg.net), which refers to areas with a minimal peat depth of 0.3 m.

features present within the overarching bog landscape with different morphodynamic, ecological, and/or hydrological characteristics.

Hence, the hypothesis regarding the preference for areas within peatlands of which the landscapes change considerably over short time-scale as locations for selective depositions (§6.4.2), can be tested in greater detail.

Waalsprong

In addition, an interesting second study area in the Netherlands to compare this Bourtanger Moor case study with might be the '*Waalsprong*' west of the present-day city of Nijmegen in the east of the country. This mainly fluvial landscape also features many selective depositions from the Bronze Age and other periods. It would, therefore, be a good area to compare the siting pattern of the selective depositions from the present study area with. Thus, for the same archaeological period(s) potential differences between the siting of selective depositions in mainly peaty landscapes (*i.e.* the Bourtanger Moor and Hondsrug) and primarily riverine landscapes (*i.e.* the Waalsprong) can be analysed.

Network analysis

Finally, it would be interesting to perform network analyses on the dataset used in this study (or an expanded version thereof) as well as on the datasets used in other case studies in addition to the above-proposed 'best practice' approach. In a network analysis (*e.g.* Bourgeois & Kroon 2017) a pre-determined set of variables of all the selective depositions in a dataset can then be analysed, and subsequently patterns identified. Consequently, these can be further examined and explained. Thereby, new hypotheses, such as the one concerning different scales of temporal landscape change proposed above (§6.4.2), can be tested using such a holistic, 'big data' approach.

7. Conclusions

The research question of the thesis was:

What patterns can be identified in selective deposition practices in the Bourtanger Moor throughout the Late Neolithic and Bronze Age, and how do these relate to physical and cultural characteristics of the landscape?

The analysis of the patterns in the associations between depositions and landscape units indicates that more selective depositions from the study area are associated with stream valleys and the Runde brook river than would be expected when a normal distribution of all selective depositions across all landscape units is assumed. Thus, these depositions were intentionally sited in or near (ephemeral) waterways within or close to the borders of the Bourtanger Moor. These findings imply that there was a strong association between ephemeral and more permanent waterways and selective deposition in the landscape of the Bourtanger Moor and the adjacent Hondsrug from the Late Neolithic until the Late Bronze Age.

Moreover, two concentrations of selective depositions were identified in the study area: one in the area where the trajectory of a Middle Iron trackway crossed the Runde, the other at the location of a stream valley on the edge of the Hondsrug, in the area where the same trackway entered the Bourtanger Moor and where the Barger-Oosterveld 'temple' was found. Both deposition zones are argued to have been located in transition zones, as the stream valley and the Runde at the same time both divided and connected different physical and socio-cultural domains. Moreover, the association with the same trackway (and potential older precursors), indicates that there was probably also a strong association between bog trackways and selective depositions. Not only were selective depositions frequently found along these trackways, but the trackways also connected different deposition zones to each other. Hence, they most probably had a special or ritual character for the prehistoric inhabitants of the study area.

The custom of selectively depositing objects near stream valleys was rooted in the preceding Middle Neolithic (Wentink 2006), and is likely to have continued well into the Iron Age (De Vries 2015; 2016). Deposition in or close to the Runde and other brook streams in the Bourtanger Moor had already been identified by Van der Sanden (2004), but had not been observed in other recent research (*e.g.* Wentink 2006; Fontijn 2012; De Vries 2015; 2016). However, maps of Iron Age selective deposition by De Vries (2016) seem to indicate that also during the Iron Age depositions were sited close to the Runde.

Moreover, the identified associations between waterways and trackways and selective depositions in the study area are in line wider north-western and northern European traditions of selectively depositing objects in or near bodies of (flowing) water. However, the association between waterways *within* and on the borders of bogs has not been identified in other bogs of north-western and northern Europe yet.

Based on the outcomes of this research, a new hypothesis is proposed for the preference behind the selective deposition in or near to stream valleys and brook streams in the Bourtanger Moor. It is argued that the relatively fast landscape change that the stream valleys and brook streams experienced, due to relatively high morphodynamic activity caused the preference for these area as locations for deposition.

To test this hypothesis, more study into the landscape siting of selective depositions in other north-western and northern European bog landscapes is needed. Such studies should ideally be carried out by applying a 'best practice' approach, in which a distinction is made between specific landscape units within bogs, rather than that selective depositions are merely associated with overarching categories such as 'bog' or 'river'. By doing so, potential motivations behind the siting of selective depositions based on differences in temporal landscape change between landscape units can be assessed.

Bibliography

Assmann, J., 1992. *Das kulturelle Gedächtnis. Schrift, Erinnerung und politische Identität in frühen Hochkulturen*. München: C.H. Beck.

Assmann, J., 2006. *Religion and cultural memory*. Stanford (CA): Stanford University Press.

Bakker, J.A., 1979. *The TRB West Group. Studies in the Chronology and Geography of the Makers of Hunebeds and Tiefstich Pottery*. Amsterdam: Amsterdam University (Cingula 5).

Ball, P., 2004. *Critical mass. How one thing leads to another*. London: Arrow Books.

Bauerochse, A. 2003. Environmental change and its influence on trackway construction and settlement in the south-western Dümmer area, in: Bauerochse, A. & H. Haßmann (eds), *Peatlands. Moorlandschaften. Archaeological Sites - Archives of Nature - Nature Conservation - Wise Use*. Rhaden: Leidorf, 68–78.

Bauerochse, A. & A. Niemuth, 2012. 3D-Landschaftsmodellierung und Umweltrekonstruktion. *Telma* 42, 19–26. https://doi.org/10.23689/fidgeo-2958

Becker, K., 2006. *Hoards and Deposition in Bronze Age Ireland*. Unpublished PhD thesis, University College Dublin.

Becker, K., 2008. Left but not lost. *Archaeology Ireland* 22, 12-15.

Becker, K., 2013. Transforming Identities – New Approaches to Bronze Age Deposition in Ireland. *Proceedings of the Prehistoric Society* 79, 225-263. DOI: 10.1017/ppr.2013.8

Berendsen, H.J.A., 1982. *De genese van het landschap in het zuiden van de provincie Utrecht*. Utrecht: Utrecht University.

Berendsen, H.J.A., 2008. Landschappelijk Nederland (4th edition). Assen: Koninklijke Van Gorcum.

Bloemers, J.H.F., 1968. Flintdolche von Skandinavischen Typus in den Niederlanden. *Berichten van de Rijksdienst voor het Oudheidkundig Bodemonderzoek* 18, 47-110.

Bourgeois, Q.P.J. & E. Kroon, 2017. The impact of male burials on the construction of Corded Ware identity: Reconstructing networks of information in the 3rd millennium BC. *PLoS ONE* 12(10), e0185971. https://doi.org/10.1371/journal.pone.0185971

Bourke, L., 1996. A Watery End: Prehistoric Metalwork in the Shannon. *Archaeology Ireland* 10(4), 9-11.

Bourke, L., 2001. *Crossing the Rubicon. Bronze Age metalwork from Irish rivers*. Galway: National University of Ireland: Department of Archaeology (Bronze Age Studies 5).

Bradley, R., 1985. *Consumption, change and the archaeological record: the archaeology of deliberate deposits*. Edinburgh: University of Edinburgh, Department of Archaeology, Occasional Paper 13.

Bradley, R., 2013. Hoards and the Deposition of Metalwork, in Fokkens, H, & A. Harding (eds), *The Oxford Handbook of the European Bronze Age*. Oxford: Oxford University Press, 121-139.

Bradley, R., 2017. *A Geography of Offerings – Deposits of Valuables in the Landscapes of Ancient Europe*. Oxford: Oxbow Books.

Brunning, R. & C. McDermott, 2013. Trackways and roads across the wetlands, in Menotti, F. and A. O'Sullivan (eds), *The Oxford Handbook of Wetland Archaeology*. Oxford: Oxford University Press, 359-384.

Burmeister, S., 2001. Strassen im Moor. Die befahrbaren stein- und bronzezeitlichen Moorwege in Nordwestdeutschland. *Hemmenhofener Skripte* 3, 123-132.

Burmeister, S., 2003. 'Don't Litter' – Müll am steinzeitlichen Wegesrand, in: Fansa, M. & S. Wolfram (eds), *Begleitschrift zur Sonderaustellung 'Müll – Facetten von der Steinzeit bis zum Gelben Sack'. (Schriftenreihe des Landesmuseums für Natur und Mensch 27)*. Mainz: Philipp von Zabern, 47–54.

Burmeister, S., 2004. Neolithische und bronzezeitliche Moorfunde aus den Niederlanden, Nordwestdeutschland und Dänemark, in: Fansa, M. & S. Burmeister (eds), *Rad und Wagen – Der Ursprung einer Innovation: Wagen im Vorderen Orient und Europa*. Mainz: Philipp von Zabernm 321–340.

Bursch, F.C., 1936. Grafvormen van het Noorden. *Oudheidkundige Mededelingen uit het Rijksmuseum van Oudheden te Leiden* 17, 53-72

Butler, J.J., 1961. A Bronze Age concentration at Bargeroosterveld. *Palaeohistoria* 8, 101-126.

Butler, J.J., 1990. Bronze Age metal and amber in the Netherlands (I). *Palaeohistoria* 32, 47-110.

Butler, J.J. & H. Steegstra, 1996. Bronze Age metal and amber in the Netherlands (part II:1). Catalogue of flat axes, flanged axes and stopridge axes. *Palaeohistoria* 37/38, 159-243.

Butler, J.J. & H. Steegstra, 1998. Bronze age metal and amber in the Netherlands (II:2): Catalogue of the palstaves. *Palaeohistoria* 39/40, 163-275.

Butler, J.J. & H. Steegstra, 2002. Bronze age metal and amber in the Netherlands (III:2): Catalogue of the socketed axes, part A. *Palaeohistoria* 49/50, 375-414.

Butler, J.J. & H. Steegstra, 2004 - Bronze Age metal and amber in the Netherlands (III:2): Catalogue of the socketed axes, part B - Palaeohistoria 45-46.

Butler, J.J. & H. Steegstra, 2008. Bronze age metal and amber in the Netherlands (IV): Hoards and rich grave in the Late Bronze Age, part A. *Palaeohistoria* 49/50, 375-414.

Casparie, W.A., 1982. The Neolithic wooden trackway XXI(Bou) in the raised bog at Nieuw-Dordrecht (the Netherlands). *Palaeohistoria* 24, 115-164.

Casparie, W.A., 1987. Bog trackways in the Netherlands. *Paleahistoria* 29, 35-65.

Casparie, W.A., 1992. Neolithic deforestation in the region of Emmen (The Netherlands). *Palaoklimaforschung*, 115-127.

Casparie, W.A., 1993. The Bourtanger Moor: endurance and vulnerability of a raised bog system. *Hydrobiologia* 265, 203-215.

Casparie, W.A, 2005. Het hoogveen ontsloten. Houten wegen en paden in de Drentse venen, in: Louwe Kooijmans, L., Van den Broeke, P., Fokkens, H. and A. Van Gijn (eds), *Nederland in de prehistorie*. Amsterdam: Bert Bakker, 401–406.

Casparie, W.A. & A.F. Smith, 1978. Het stuk hout van dominee de Graaf: een oude veenvondst uit het Emmererfscheidenveen. *Nieuwe Drentse Volksalmanak* 95, 243-257.

Casparie, W.A. & A. Moloney, 1994. Neolithic wooden trackways and bog hydrology. *Journal of Paleolimnology* 12, 49-64.

Casparie, W.A., Van Geel, B., Hanraets, A.E.M., Jansma, E. and I.L.M. Stuijts, 2004. De veenweg van Nieuw-Dordrecht – onvoltooid en niet gebruikt, in: Bos., J., Van der Meer, J.K.H., Van der Sanden, W.A.B., Van Vilsteren, V.T. and M.A.W. Gerding (eds), *Nieuwe Drentse Volksalmanak 2004 (121e jaar)*. Assen: Koninklijke Van Gorcum, 114-141.

Casparie, W.A., Tonnis, W. and J. de Vries, 2008. *Bargerveen: de veengroei in het natuurreservaat Bargerveen*. Groningen: Staatsbosbeheer Regio Noord.

Čerče, P. & P. Turk, 1995. Hoards of the Late Bronze Age – the circumstances of their discovery and the structure of the finds, in B. Teržan (ed), *Hoards and Industrial Metal Finds from the Eneolithic and Bronze Age in Slovenia*. Ljubljana: Narodni Muzej, 7–30.

Chapman, H., van Beek, R., Gearey, B., Jennings, B., Smith, D., Helt Nielsen, N. and Z. Zein Elabdin, 2019 (online first). Bog Bodies in Context: Developing a Best Practice Approach. *European Journal of Archaeology*, DOI: 10.1017/eaa.2019.54

Cohen, K.M., Stouthamer, E., Pierik, H.J., and A.H. Geurts, 2012. *Digitaal Basisbestand Paleogeografie van de Rijn-Maas Delta/Rhine-Meuse Delta Studies' Digital Basemap for Delta Evolution and Palaeogeography*. Available at https://easy.dans.knaw.nl/ui/datasets/id/easy-dataset:52125.

Coles, B.J. & R. Brunning, 2009. Following the Sweet Track, in Cooney, G., Becker, K., Coles, J., Ryan, M. and S. Sievers (eds), *Relics of Old Decency: Archaeological Studies in Later Prehistory*. Dublin: Wordwell, 25-37.

De Vries, K.M., 2015. *Together apart. Iron Age deposition patterns in the northern Netherlands*. Unpublished RMA thesis Groningen University.

De Vries, K.M., 2016. Together apart. Iron Age deposition practices on the Fries-Drents plateau, in: Müller, A. & R. Jansen (eds), *Metaaltijden 3. Bijdragen in de studie van de metaaltijden*. Leiden: Sidestone Press, 93-104.

Dunkin, D., Yates, D. & R. Bradley, 2020. The findspots of Bronze Age metalwork in lowland England: a new field study. *Oxford Journal of Archaeology* 39(1), 67-88.

Essink, M. & J.B. Hielkema, 1997/1998. Rituele depositie van bronzen voorwerpen in Noord-Nederland. *Palaeohistoria* 39/40, 277-321.

Fansa, M. & R. Schneider, 1992. Der Bohlenweg XVIII(Le) bei Ockenhausen/Oltmannsfehn (Uplengen, Ostfriesland, Ldkr. Leer). *Archäologische Mitteilungen aus Nordwestdeutschland* 15, 89-99.

Field, N. & M. Parker Pearson, 2003. *Fiskerton: An Iron Age timber causeway with Iron Age and Roman votive offerings*. Oxford: Oxbow Books.

Fontijn, D.R., 2002. Sacrificial landscapes. Cultural biographies of persons, objects and 'natural' places in the Bronze Age of the southern Netherlands, c. 2300–2600 BC. *Analecta Praehistorica Leidensia* 33/34, 1–392.

Fontijn, D.R., 2012. Landscapes without boundaries? Some thoughts on Bronze Age deposition areas in North-West Europe, in: Hansen, S., Neumann, D. and T. Vachta (eds), *Hort und Raum – aktuelle Forschungen zu bronzezeitlichen Deponierungen in Mitteleuropa (Berlin Studies of the Ancient World 10)*. Berlin: De Gruyter, 49–68.

Fontijn, D.R., 2019. *Economies of destruction – How the systematic destruction of valuables created value in Bronze Age Europe, c. 2300-500 BC*. New York (NY): Routledge Taylor & Francis Group.

Fredengren, C., 2011. Where Wandering Water Gushes – the Depositional Landscape of the Mälaren Valley in the Late Bronze Age and Earliest Iron Age of Scandinavia. *Journal of Wetland Archaeology* 10, 10-135.

Fredengren, C., 2015. Water Politics: Wetland Deposition of Human and Animal Remains in Uppland, Sweden. *Fornvännen* 111, 161-183.

Fredengren, C., 2018. Personhoods of Water: Depositions of Bodies and Things in Water Contexts as a Way of Observing Agential Relationships. *Current Swedish Archaeology* 26, 219-245.

Halbwachs, M., 1968 [1950]. *La mémoire collective* [2nd edition]. Paris: Presses Universitaires de France.

Halbwachs, M., 1971 [1941]. *La Topographie Légendaire des Évangiles en Terre Sainte* [2nd edition]. Paris: Presses Universitaires de France.

Hayen, H., 1989. Bau und Funktion der hölzernen Moorwege: Einige Fakten and Folgerungen. *Untersuchungen zu Handel und Verkehr der vor- and frühgeschichtlichen Zeit in Mittel- und Nordeuropa* 5, 11-82.

Hecht, D., 2007. *Das schnurkeramische Siedlungswesen im südlichen Mitteleuropa. Eine Studie zu einer vernachlässigten Fundgattung im Übergang vom Neolithikum zur Bronzezeit*. Unpublished PhD thesis Heidelberg University.

Ingold, T., 2000. *The perception of the environment. Essays in livelihood, dwelling and skill*. London and New York (NY): Routledge.

Karsten, P., 1994. *Att kasta yxan I sjön. En studie över rituell tradtion och förändring utifrån skånska neolitiska offerfynd*. Stockholm: Almqvist & Wiksell (Acta Archaeologica Ludensia. Series in 8. No. 23).

Knight, M., 2018. *The intentional destruction and deposition of Bronze Age metalwork in South West England*. Unpublished Ph.D. thesis, Exeter University.

Knight, M., 2019. Going to Pieces: Investigating the Deliberate Destruction of Late Bronze Age Swords and Spearheads. *Proceedings of the Prehistoric Society* 85, 251-272. doi:10.1017/ppr.2019.3

Knight, M., 2020 (online first). There's Method in the Fragments: A Damage Ranking System for Bronze Age Metalwork. *European Journal of Archaeology*, 1-20. doi:10.1017/eaa.2020.21

Kooi, P.B., 2008. Nederzettingen uit de bronstijd en ijzertijd in Angelslo-Emmerhout (Gem. Emmen). *Palaeohistoria* 49/50, 327-373.

Kriiska, A. & M. Roio, 2011. Prehistoric archaeology of wetlands in Estonia, in: Pranckėnaitė, E. (ed), *Wetland settlements of the Baltic. A prehistoric perspective*. Vilnius: Center of Underwater Archaeology, 55-74.

Kuijer, P.C., 1991. *Toelichting bij kaartblad 12 West Assen, Bodemkaart van Nederland 1:50000*. Wageningen: Stiboka.

Kuijpers, M., 2013. The sound of fire, taste of copper, feel of bronze and colours of the cast - Sensory aspects of metalworking technology, in: Sørensen, M.L.S. & K. Rebay-Salisbury (eds), *Embodied Knowledge. Perspectives on Belief and Technology*. Oxford: Oxbow Books.

Lanting, J.N., 1968. Een grafheuvel uit de vroege Bronstijd in Emmerhout, gemeente Emmen. *Nieuwe Drentse Volksalmanak* 1968, 159-168.

Lanting, J.N. & J. Van der Plicht, 2000. De ^{14}C-chronologie van de Nederlandse pre- en protohistorie. III: Neolithicum. *Palaeohistoria* 41/42, 1-110.

Lanting, J.N., 2008. De NO-Nederlandse/NW-Duitse klokbekergroep: culturele achtergrond, typologie van het aardewerk, datering, verspreiding en grafritueel. *Palaeohistoria* 49/50, 11-116.

Leenders, K.A.H.W., 1996. *Van Turnhoutervoorde tot Strienmonde. Ontginnings- en nederzettingsgeschiedenis van het noordwesten van het Maas-Schelde-Demergebied (400–1350): een poging tot een synthese*. Amsterdam: University of Amsterdam.

Lenselink, G. & R. Koopstra, 1994. Ontwikkelingen in het Zuiderzeegebied; van Meer Flevo, via de Almere-lagune, tot Zuiderzee, in: Rappol, M. & C.M. Soonius (eds), *In de Bodem van Noord-Holland*. Amsterdam: Lingua Terra, 129–138.

Leonard, K., 2015. Arranged artefacts and materials in Irish Bronze Age ritual deposits: A consideration of prehistoric practice and intention, in: Houlbrook, C. and N. Armitage (eds), *The Materiality of Magic: An artifactual investigation into ritual practices and popular beliefs*. Oxford: Oxbow Books.

Lewis-Williams, D. & D. Pearce, 2005. *Inside the Neolithic Mind: Consciousness, Cosmos and the Realm of the Gods*. London: Thames & Hudson.

Lohof, E., 1991. *Grafritueel en sociale verandering in de bronstijd van Noordoost-Nederland*. Unpublished PhD thesis, University of Amsterdam.

Louwe Kooijmans, L.P., Van den Broeke, P., Fokkens, H. and A. van Gijn, 2005. *The Prehistory of the Netherlands*. Amsterdam: Amsterdam University Press.

Lowenthal, D., 1985. *The Past is a Foreign Country*. Cambridge: Cambridge University Press.

Maran, J., 2017. Wheels of Change: The Polysemous Nature of Early Wheeled Vehicles in 3rd Millenium BCE Central and Northwest European Societies, in: Stockhammer, P.W. & J. Maran (eds), *Appropriating Innovations – Entangled Knowledge in Eurasia, 5000-1500 BCE*. Oxford: Oxbow books, 109-121.

McDermott, C., Moore, C., Murray, C., Plunkett, G. and M. Stanley, 2009. A colossus of roads: The Iron Age archaeology of Ireland's peatlands, in Cooney, G., Becker, K., Coles, J., Ryan, M. and S. Sievers (eds), *Relics of Old Decency: Archaeological Studies in Later Prehistory*. Dublin: Wordwell, 49-66.

Moore, C., 2008. Old routes to new research: the Edercloon wetland excavations in County Longford, in: O'Sullivan J. & M. Stanley (eds), *Roads Rediscovery and Research: Proceedings of a Public Seminar on Archaeological Discoveries on National Road Schemes, August 2007*. Dublin: National Roads Authority, 1–12.

Mullin, M., 2012. The river has never divided us: Bronze Age metalwork deposition in western Britain. *Oxford Journal of Archaeology* 31(1), 47-57.

Needham, S.P., 1988. Selective Deposition in the British Early Bronze Age. *World Archaeology* 20 (2), 229-248. Stable URL: jstor.org/stable/124472.

Oras, E., 2015. *Practices of wealth depositing in the 1st–9th century AD Eastern Baltic*. Leiden: Sidestone Press.

Paavel, K., 2017. Pattern or random? Contextualization of Estonian Bronze Age bronze stray finds on the landscape. *Archaeologia Baltica* 24, 26-42.

Pierik, H.J., Cohen, K.M. and E. Stouthamer, 2016. A new GIS approach for reconstructing and mapping dynamic late Holocene coastal plain palaeogeography. *Geomorphology* 270, 55–70. doi: 10.1016/j.geomorph.2016.05.037.

Pierik, H.J. & K.M. Cohen, 2020 (online first). The use of geological, geomorphological and soil mapping products in palaeolandscape reconstructions for the Netherlands. *Netherlands Journal of Geoscience*, 1-20.

Pons, L.J., Jelgersma, S., Wiggers, A.J. and J. De Jong, 1963. Evolution of the Netherlands coastal area during the Holocene, in: De Jong, J. (ed): *Verhandelingen van het KNGMG "Transactions of the jubilee convention – part two"*. The Hague: Koninklijk Nederlands Geologisch Mijnbouwkundig Genootschap, 197–207.

Reus, M., 2019. Prehistoric bog trackways in context: Wooden trackways in the Bourtanger Moor and their relation with the natural and cultural landscape. Unpublished BSc thesis, Wageningen University.

Rundkvist, M., 2015. *In the Landscape and Between Worlds. Bronze Age Deposition Sites Around Lakes Mälaren and Hjälmaren in Sweden*. Umeå: Department of Historical, Philosophical and Religious Studies, Umeå University (Umeå University Archaeology and Environment 29).

Rydin, H. and J.K. Jeglum (eds), 2013. The Biology of Peatlands. Oxford (UK): Oxford University Press.

Spek, T., 2004. *The open field village landscape in Drenthe: a historical-geographical study*. Utrecht: Stichting Matrijs.

Stjernqvist, B., 1997. *The Röekillorna Spring: Spring-cults in Scandinavian prehistory*. Stockholm: Almqvist & Wiksell.

Strang, V., 2005. Common Senses – Water, Sensory Experience and the Generation of Meaning. *Journal of Material Culture* 10(1), 92-120.

Strang, V., 2008. The Social Construction of Water, in: David, B. & J. Thomas (eds), *Handbook of Landscape Archaeology*. Walnut Creek (CA): Left Coast Press, 123-130.

Ten Anscher, T.J., 2012. *Leven met de Vecht: Schokland-P14 en de Noordoostpolder in het Neolithicum en de Bronstijd*. Amsterdam: Universiteit van Amsterdam.

TNO-GSN, 2020a. Eem Formation, in TNO – Geological Survey of the Netherlands, *Stratigraphic Nomenclature of the Netherlands*.
Accessed on 06-11-2020 from http://www.dinoloket.nl/en/stratigraphic-nomenclature/eem-formation.

TNO-GSN, 2020b. Boxtel Formation, in TNO – Geological Survey of the Netherlands, *Stratigraphic Nomenclature of the Netherlands*.
Accessed on 06-11-2020 from http://www.dinoloket.nl/en/stratigraphic-nomenclature/boxtel-formation.

TNO-GSN, 2020c. Nieuwkoop Formation, in TNO – Geological Survey of the Netherlands, *Stratigraphic Nomenclature of the Netherlands*.
Accessed on 06-11-2020 from http://www.dinoloket.nl/en/stratigraphic-nomenclature/nieuwkoop-formation.

Torbrügge, W., 1971. Vor- und frühgeschichtliche Flussfunde: zur Ordnung und Bestimmung einer Denkmälergruppe. *Bericht der Römisch-Germanischen Kommission* 51–52, 1-146.

Van Beek, R., 2009. *Reliëf in tijd en ruimte. Interdisciplinair onderzoek naar bewoning en landschap van Oost-Nederland tussen vroege prehistorie en middeleeuwen*. Wageningen: Wageningen University.

Van Beek, R., Maas, G.J. and E. van den Berg, 2015. Home Turf: An Interdisciplinary Exploration of the Long-term Development, Use, and Reclamation of Raised Bogs in the Netherlands. *Landscape History* 36: 5–34.

Van Beek, R., Candel, J.H.J., Quik, C., Bos, J.A.A., Gouw-Bouman, M.T.I.J., Makaske, B. and G.J. Maas, 2019 (online first). The Landscape Setting of Bog Bodies: Interdisciplinary Research into the Site Location of Yde Girl, the Netherlands. *The Holocene*, https://doi.org/10.1177/0959683619838048

Van den Broeke, P., 2005. Gifts to the gods. Rites and cult sites in the Bronze Age and the Iron Age, in: Louwe Kooijmans, L.P., Van den Broeke, P., Fokkens, H. and A. van Gijn (eds.), *The Prehistory of the Netherlands*. Amsterdam: Amsterdam University Press, 659–677.

Van der Sanden, W.A.B., 2000. Het tempeltje van Barger-Oosterveld. *Nieuwe Drentse Volksalmanak* 117, 135–143.

Van der Sanden, W.A.B., 1997a. Veenvondsten in Drenthe (2): over potten, herten en wielen. *Nieuwe Drentsche Volksalmanak* 114, 117–121.

Van der Sanden, W.A.B., 1997b. Wielen en wieldelen uit de Drentse venen: de late ijzertijd en romeinse tijd. *Nieuwe Drentsche Volksalmanak* 114, 180–201.

Van der Sanden, W.A.B., 2004. Veenwegen in Drenthe: stof voor discussie. *Nieuwe Drentse Volksalmanak* 121, 142-160.

Van der Sanden, W.A.B., 2008. Wolkluwens uit de Drentse venen. *Nieuwe Drentse Volksalmanak* 125, 131-141.

Van der Vaart-Verschoof, S., 2017. Fragmenting the chieftain. A practice-based study of Early Iron Age Hallstatt C elite burials in the Low Countries (PALMA 15). Leiden (NL): Sidestone Press.

Van der Waals, J.D., 1964. *Prehistoric Disc Wheels in the Netherlands*. Groningen: J.B. Wolters.

Van de Wetering, E., 1996. The Surface of Objects and Museum Style, in: Price, N.S., Kirby Talley Jr., M. and A. Melucco Vaccaro (eds), *Historical and Philosophical Issues in the Conservation of Cultural Heritage*. Los Angeles (CA): The Getty Institute, 415-421.

Van Dinter, M., 2013. The Roman Limes in the Netherlands: how a delta landscape determined the location of the military structures. *Netherlands Journal of Geosciences* 92, 11–32. doi: 10.1017/S0016774600000251.

Van Giffen, A.E., 1936. De steenkransheuvel en de Paaschberg te Weerdinge, gem. Emmen. *Nieuw Drentse Volksalmanak* 54, 38-43.

Van Giffen, A.E., 1938. Een kistgrafheuvel uit den Bronstijd te Emmen, gem. Emmen. *Nieuw Drentse Volksalmanak* 56, 17-19,

Van Giffen, A.E., 1943. Tumulus II, de zgn. Paaschberg, te Weerdinge, gem. Emmen, *Nieuw Drentse Volksalmanak* 61, 2-5.

Van Zeist, W. & H.T. Waterbolk, 1960. Een houten gebouwtje uit de Bronstijd in het veen bij Bargeroosterveld. *Nieuwe Drentse Volksalmanak* 78, 199-204.

Vos, P., 2015. *Origin of the Dutch coastal landscape: long-term landscape evolution of the Netherlands during the Holocene, described and visualized in national, regional and local palaeogeographical map series*. Groningen: Barkhuis.

Vos, P.C., Bazelmans, J., Weerts, H.J.T. and M.J. Van der Meulen 2011. *Atlas van Nederland in het Holoceen: Landschap en bewoning vanaf de laatste ijstijd tot nu*. Amsterdam: Bakker.

Vos, P.C., Van der Meulen, M.J., Weerts, H.J.T. and J. Bazelmans, 2020. *Atlas of the Holocene Netherlands, landscape and habitation since the last ice age*. Amsterdam: Amsterdam University Press.

Waterbolk, H.T. & W. van Zeist, 1961. A Bronze Age sanctuary in the raised bog at Bargeroosterveld (Dr.). *Helinium* 1, 5–19.

Wentink, K., 2006. *Ceci n'est pas une hache: Neolithic Depositions in the Northern Netherlands*. Leiden: Sidestone Press.

Wentink, K., 2020. *Stereotype. The role of grave sets in Corded Ware and Bell Beaker funerary practices*. Leiden: Sidestone Press.

Wiseman, R., 2017. Random accumulation and breaking: the formation of Bronze Age scrap hoards in England and Wales. *Journal of Archaeological Science* 90, 39–49.

Wyss, R. 1996. Funde von Pässen, Höhlen aus Quellen und Gewässenn der Zentral- undWestalpen. In C. Huth (ed), *Archäologische Forschungen zum Kultgeschehen in der jüngeren Bronzezeit und frühen Eisenzeit Alteuropas*, Bonn: Habelt, 417–428.

Yates, D. & R. Bradley, 2010a. Still water, hidden depths: the deposition of Bronze Age metalwork in the English Fenland. *Antiquity* 84, 405-415.

Yates, D. & R. Bradley, 2010b. The siting of metalwork hoards in the Bronze Age of south-east England. *The Antiquities Journal* 90, 41-72.

Zagwijn, W.H., 1986. *Nederland in het Holoceen*. The Hague: Sdu.

Zemmer-Plank, L. (ed) 2002: *Kult der Vorzeit in den Alpen: Opfergaben, Opferplätze, Opferbrauchtum*. Bolzano: Athesia.

Appendices

Appendix 1: Selective depositions

Map no	Index_code	X_coor	Y_coor	Context	Find	Period	Literature reference
4	AVG0029	259000	539500	Surface find	Sickle	EIA	DMA 1959-XI-6
9	AVG0042	256700	540000	Deposition	Northern dagger	NEO	Bloemers (1968)
10	AVG0051	257000	535000	Barrow	Northern dagger	NEO	Bloemers (1968)
11	AVG0058	257000	534000	Unknown	Northern dagger	NEO	Bloemers (1968)
12	AVG0065	257000	535000	Unknown	Northern dagger	NEO	Bloemers (1968)
13	AVG0066	265500	535000	Deposition	Northern dagger	NEO	Bloemers (1968)
14	AVG0071	259000	543000	Deposition	Northern dagger	NEO	Bloemers (1968)
15	AVG0121	255000	540000	Barrow	Southern dagger	NEO	Bloemers (1968)
16	AVG0195	259800	538325	Surface find	Sickle	IA	Archis: 36102
17	AVG0272	263000	537000	Unknown	Sickle	IA	Info from: geheugenvannederland.nl, check museum register; RMO c 1939-VI-2
18	AVG0300	258300	533940	Barrow	GP dagger	NEOL	Ancestral Mounds project database and references therein
19	AVG0306	257000	534000	Unknown	Northern dagger	NEO	Ref not findable in Wentink database
20	AVG0319	263000	542000	Unknown	Sickle	IA	DMA 1925-VI-20
21	AVG0320	260250	529300	Unknown	Sickle	EIA	DMA 1962-II-32
22	AVG0327	266950	537500	Surface find	Northern dagger	NEO	DMA 1959-XI-2
23	AVG0342	259620	533940	Barrow	Arrowheads	NEOL	Ancestral Mounds project database and references therein
24	AMP0003	259250	535050	Barrow	-	BA	Lanting (1968)
25	AMP0350	256520	538750	Barrow	Wheel-headed bronze pin	BA	Butler (1990, 61)
26	AMP0351	256520	529430	Barrow	-	BA	Lohof (1991)
27	AMP0366	257660	537250	Barrow	-	BA	Van Giffen (1936; 1943)

28	AMP0373	257250	535450	Barrow	-	MBA	Van Giffen (1938)
29	AMP0379	258300	533940	Barrow	Flint dagger	NEOL	Bursch (1936)
30	AMP0380	258400	533940	Barrow	*c 1932-I-9 groove scherven op klokurn gelijkend uit heuvel 4. c 1932-I-9 urnscherven uit heuvel 4. RMO check*	MBA	Bursch (1936)
31	AMP0381	258410	533940	Barrow	Ceramic pottery vessel	MBA	Bursch (1936)
32	AMP0383	258380	533940	Barrow	Rond bronzen staafje	MBA	Bursch (1936)
33	AMP0385	258350	533950	Barrow	Fragments of Bronze little ring(s)	BA	Bursch (1936)
34	AMP0454	259620	533940	Grave	Flint arrowhead, and other	NEOL	Lanting (2008)
35	AMP0455	256000	536000	Barrow	Northern flint dagger	NEOL	Bloemers (1968)
36	AMP0456	256350	534220	Grave	Stone wristguard	NEOL	Lanting (2008)
37	AMP0457	256870	532620	Flat grave	Ceramic pottery vessel	NEOL	Lanting (2008)
38	AMP0478	259500	534050	Barrow	Metal(??) ring ("kopergroene materie")	NEOL	Lanting (2008)
39	1	256000	534000	Deposition	Low Flanged axe with patina	EBA	Butler & Steegstra (1996)
40	4	253475	533790	Deposition	Flanged Axe	BA	Butler & Steegstra (1996)
41	5	267000	537000	Deposition	Palstave	MBA A	Butler & Steegstra (1998)
42	6	259070	534500	Deposition	2 Palstaves	MBA B	Butler & Steegstra (1998)
43	7	262000	542000	Deposition	Palstave	MBA B	Butler & Steegstra (1998)
44	8	261400	533600	Deposition	Hoard: 2 Palstaves, 2 nierenrings, 1 Bracelet (intentionally destroyed),	LBA	Butler & Steegstra (1998)

					1 urnfield knive (intentionally destroyed), and 1 pin.		
45	10	266000	540500	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
46	12	255500	530700	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
47	13	254480	530900	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
48	14	263500	528300	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
49	16	259000	540000	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
50	18	257500	530500	Deposition	Palstave	MBA-LBA	Butler & Steegstra (1998)
51	19	264000	539000	Deposition	Palstave, damaged and broken	MBA B	Butler & Steegstra (1998)
52	22	261125	533200	Deposition	2 Socketed Axes	LBA	Butler 1961; Fontijn (2012)
53	26	258350	533950	Deposition	Hoard: 31 amber beads (26 preserved), 1 rock crystal bead, 2 vessels (pear-shaped with concave shoulder), bronze fragments, and 1 annular bronze ring, and 'flint splinters'.	MBA B	Butler (1990, 58)
54	27	256520	538750	Deposition	Hoard: 4 pins (1 nagelkopf, 1 rollennadel, and 2 wheel-headed), 1 ring, 1 bracelet, and 1 bead.	MBA B	Butler (1990, 59-61)
55	28	257660	537250	Deposition	Hoard: 2 bracelets and 1 necklace of 29 amber beads.	MBA B	Butler (1990)

59	34	257000	532000	Deposition	Socketed Axe	LBA	Butler & Steegstra (2004)
60	36	257000	537000	Deposition	Socketed Axe lower part of blade sawed-off; object re-used	LBA	Butler & Steegstra (2004)
61	38	262755	541800	Deposition	Socketed axe, casting defect on rim	LBA	Butler & Steegstra (2004)
62	39	258000	535000	Deposition	Socketed Axe, sharp cutting edge	LBA	Butler & Steegstra (2004)
63	42	255800	535700	Deposition	Socketed Axe, casting seams on upper part	LBA	Butler & Steegstra (2004)
64	72	259550	533780	Flat grave cemetery	3 Axes, ceramics, cremation remains, and a hammer stone	NEOL	Bakker (1979, 146)
74	91	262369	530986	Deposition	Flint hoard	NEOL	Casparie 1982, 128 & references therein
78	95	263489	532630	Deposition	Oak disc-wheel	NEOL	Casparie 1982, 128 & references therein
81	98	265317	534699	Deposition	Flint dagger or lance-point	MBA	Casparie 1982, 129 & references therein
82	99	265112	534959	Deposition	Stone axe	NEOL	Casparie 1982, 129 & references therein
83	100	265615	535020	Deposition	Battle Axe (flint??)	EBA	Casparie 1982, 129 & references therein
86	103	265989	532519	Deposition	Battle Axe (flint??)	NEOL	Casparie 1982, 130 & references therein
89	106	264321	532748	Deposition	Battle Axe of gabbro-like stone	EBA	Casparie 1982, 130 & references therein

Appendix 2: Wooden trackways

Track number	Period	Age (BCE)	Remarks
XVIII	Middle Bronze Age B	1120	0.5 m width, pinus trunks from bog 75-85 years old, possibly 3 km from Hondsrug built to reach bog Fe ore. Date ± 50 a.
XVII	Middle Bronze Age B	1350	Age is Dendro date. 14C: 1170±50 and 1195±55 BCE. 0.25-0.30 width → footpath. Quercus trees more than 100 years old. Connected to the Hondsrug via the Barger-Oosterveld, ca. 3 km long. Indication of Fe working from MBA, adjusted to wet/dry parts.
XVI	Middle Bronze Age B	1160	0.3 m width. Emmercompascuum. Direction probabaly NE-SW. Probably ca. 2 km long. Intended to reach some place in the bog, not to traverse it. Construction insufficiently solid and too unstable to provide efficient access. Age accuracy = ±35
XV	Middle Iron Age	530	0.4-0.5 m width. Pegs in construc. Construc elem of > 100 y old Quercus. Certainly connected to Hondsrug, ca 4.5 km long. Might have provided access across bog, would be 12 km. Intention destroyed afterwards, prob relate to increase in erosion after bog-burst. accuracy= ±40.
XIV	Late Iron Age	170	2.7 m width. Four years old salix wood was used for surface, framework of Alnus, Fraxinus, Betula, and Pinus. Crossed a small bog stream, where an extra foundation of salix rods was present. ca. 3km long to extract bog iron ore. Accuracy ±40.
I	Middle Iron Age	345	2.5 - 3 m width. Probably extending all across Moor, ca. 12 km. Maybe a lot of wood (i.e. a few hundreds of hectares) would have been needed.

XXI	Late Neolithic	2549	2.5-3.0 m width. Prob unfinish and possibly never used track into (not across!) the bog (see Casparie 1987 and Casparie et al. 2004). Den age from latter. Near track broken disc wheel, axe shaft and haft were found (see Casparie 1987).
XIX	Late Neolithic/Bronze Age	Not determined	3.5 m width. Roughly N-S direction. Relative dating (based on thickness of peat) indicates Late Neolithic or Bronze Age. Definitely not a track connected to the Hondsrug. Possibly connection with XXI