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Persistent traditions: a long-term perspective on communities in the process of Neolithisation in the Lower Rhine Area (5500-2500 cal BC)
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Unsettled issues: settlement systems, integrative strategies and Neolithisation

8.1 Introduction: integrative strategies and settlement systems

The previous chapter demonstrated the importance of an approach that contextualizes regional practices and livelihood of communities from a long-term landscape perspective. In general it may be stated that the communities in the wetlands and their margins distinctly employed a broad spectrum economy which, over time, was extended with crop cultivation and animal husbandry (Louwe Kooijmans 1993^a; 2007^a). The actual application of this extended broad spectrum economy in daily practice was hypothesized subsequently by the definition of integrative strategies, *i.e.* the multitude of practices that enabled communities to successfully combine and exploit both natural and domesticated resources. While this touches upon the general perception of resources by hunter-gatherers (see epilogue), its particularities in this study should be understood from the perspective of the inhabitation by these communities of the wetland landscape. This specific behaviour is understood as an innate part of the *mentalité*, the socio-cultural identity of these communities, resulting from their specific interaction with the wetland environment. The flexible, pragmatic attitude towards the array of options available may offer a number of models that are in need of substantiation in the actual data, with respect to economy, permanency and function of sites. Since sites never exist in isolation (Casey 1996), this requires an integration into potentially viable settlement systems over time.

Towards an application

There is a multitude of options for integrative strategies. Several were mentioned earlier, including mobility, symbiosis, interdependence, switching strategies, exchange, and flux (*e.g.* Gregg 1988; Kelly 1995). These assumed practices probably remained important in the study area throughout the Neolithic, but the suggestion of their existence is not informative on the way strategies may have actually been integrated, or on their development over time. In order to provide an informative perspective on this, a coupling with the actual site evidence is necessary. In view of the quantitative and qualitative aspects of the dataset available (see Appendix I and Chapter 4) several sites may be classified for a number of variables in relation to settlement systems. Additional sites may provide locational or other evidence that could accentuate the system and interrelationships involved. The selection of sites is presented in table 8.1. Evidently the number of sites

geographical region	coastal	salt marsh	fresh/tidal	peat marsh	river clay	wetland margin	local wetland in upland	upland
Informative sites								
Vlaardingen	Voorschoten Leidschendam Rijswijk-Schaapweg Haamstede	Zandwerven Hellevoetsluis	Vlaardingen Hekelingen-III Hazerswoude	Hazendonk	Ewijk	(Homberg) (Berghem)	(Toterfout) (Tilburg) Veldhoven	
TRB		Slootdorp				P14	+++	
Haz. group	Rijswijk-A4 Ypenburg Schipluiden Wateringen 4		(Barendrecht)	Hazendonk Brandwijk	Nijmegen-Klumke	Het Vormer Gassel Pater-Berthier	Haz. sites Limburg	
Late SWB				Schokkerhaven	(Zoelen)	(P14)	MK Limburg	
Middle SWB			Bergschenhoek S2/3/4	Hazendonk Brandwijk S11 (S21-24/561)	P14	Hude I (Gietsenveentje) (Oudenaarde)		
Early SWB		deposits absent or out of reach		Hardinxveld		Hoge Vaart-A27 (Bronneget)		
Late Mesol.				Hardinxveld (Rotterdam CS) (Rotterdam-Beverwaard 13-17) (Gouda-Goverwelle)		(Maaspoort) (Hoge Vaart-A27) (S11-13/21-24/61/81-84)	Jardinga +++	

Table 8.1 Spatio-temporal overview of informative and less informative (brackets) sites per ecological region. See Appendix 1 for further information.

available per ecological and geographical region is limited. This means that a simplified conceptual interpretation is required that retains sufficient complexity to incorporate variability adequately.

8.1.1 Site qualities and mobility: criteria

Before accommodating sites into settlement systems, a number of criteria have to be decided upon. These concern (aspects of) site location, site function, seasonality and mobility. Together they form a set of premises upon which the allocation of sites to a settlement system is based.

8.1.1.1 Regional attribution

Sites are located in different geographical and ecological zones. These shift somewhat over time and as such form an important substrate with differential dynamics, both in space and time (*e.g.* Van Gijssel/Van der Valk 2005, 67; Louwe Kooijmans 1993^a, 73; *cf. supra*). Although the actual dynamic environmental situation may have been an important factor in the rationale behind settlement location, function and mobility (*e.g.* Leary 2009; Sturt 2006), the static nature of a settlement system model can account for these dynamics only to a limited extent. Furthermore, with notable exceptions (*e.g.* Hardinxveld, Schipluiden, Ypenburg), there is not always information regarding the micro-regional (ecological) setting of sites. Site locations and the larger geographical and ecological zones that roughly comprise the different landscapes inhabited (*e.g.* Louwe Kooijmans 1993^a) form the main sources of information. Recapitulating, these include the coastal area with coastal barriers and low dunes. East of this there is a marine to brackish tidal zone with estuaries, salt marshes and creeks, which borders on a freshwater zone with tidal influence. Sites are generally situated on low dunes and levees. East of this area there is a freshwater peat marsh characterized by *donken* as dominant site locations. Further east the riverine area is characterized by fluvial activity, resulting in levees and crevasses, and by (larger) fossil inland dunes. Wetland landscapes also existed in the Scheldt valley and in the IJsselmeer basin. A few additional remarks have to be made. The coastal area only became inhabitable during the 4th millennium cal BC. It can be assumed that before this period the unstable beach barrier environment was unsuitable for residential settlement (see Van Gijssel/Van der Valk 2005, 68; *contra* Raemaekers 2003). Finally, as can be seen in table 8.1, two separate categories have been created. First ‘wetland margin’ has already been used in this study in a generic way in order to comprise locations in the direct vicinity of wetlands (see Louwe Kooijmans 1993^a). Distance to the wetland has not been quantified, but may best be characterized as ‘close-by’ in the sense of roughly 1 kilometer. Second, an additional category (local wetland in upland) was created for sites in local wetland conditions in the uplands such as a stream valley or lake.

8.1.1.2 Dealing with seasonality

As argued earlier (*cf. infra*) the interpretation regarding evidence for seasonal and year-round occupation is beset with difficulties (Dark 2004, 39-40; Milner 2005, 33-35). Only a handful of sites provided clear-cut seasonal information (Hardinxveld-Polderweg phase 1, Swifterbant-S3, Bergschenhoek, Schipluiden, Hekelingen, Vlaardingen and Hellevoetsluis). The overview presented in fig. 7.6

can therefore only be read as indicative of the presence of seasonal information per site over time, not as a qualitative assessment of it. This can be achieved only when taphonomic and methodological issues are taken into account (Chapter 4). It also indicates that the available seasonal information should be coupled with other evidence that is crucial for interpreting site function and mobility (*e.g.* Rafferty 1985).

8.1.1.3 Other criteria

A number of additional criteria should be mentioned that may be employed in defining site function and position in a settlement system.

Micro-regional setting and site location characteristics

This involves both the ecological and landscape dynamics in the direct vicinity of a site and the direct location choice. Secondary arguments, for instance, include the availability of potential arable land (*e.g.* in the coastal area during the Hazendonk or Vlaarding occupation or at the boulderclay outcrop of P14), repeatedly wet conditions and flooding events (for instance at Swifterbant-S3 and S4, Bergschenhoek and Hude I), or the specific location choice (Bergschenhoek and Hekelingen). These aspects illustrate the rationality in the choice of a certain settlement location within the given ecological margins, especially from an economic perspective.

Character of waste disposal (see also Chapter 4)

Waste disposal may reflect on permanency of stay, based on the principle that a more consistent long-term site use would lead to a greater distinction between living areas and waste disposal (Schiffer 1995, 31). Of course, post-depositional processes affect waste patterning and result in temporal and cumulative palimpsests (Bailey 2007, 204–207), and ethnography (*e.g.* Kent 1991; 1992; Kent/Vierich 1989) demonstrates that different waste disposal practices exist that relate to factors such as group and site dimensions, duration of stay, presence of water, range of activities conducted, anticipated stay and socio-symbolic or cosmological rules. Still, the extent, composition and thickness of refuse layers may form a coarse-grained factor regarding site use intensity (see for instance the thickness and extent of the Hazendonk layers, Appendix I).

Presence of fields and contribution of domesticated animals and crop plants (table 7.1, fig. 7.4)

A large contribution of domestic animals may indicate more permanent agrarian sites, since a correlation between the degree of residential mobility and the importance of more game has been demonstrated in various ethnographic case-studies (Kent 1989^a; see Chapter 5). On the other hand, other types of (logistical) mobility may be employed to accommodate the contribution of hunting. For the sites studied here the relatively stable aquatic resources (including fish, fowl, otters and beavers) provide an incentive for lower residential mobility, compared to the (large) game-based argument mentioned above (*e.g.* Binford 1990; Nicholas 1998^a; 2007^{a,b}; Zvelebil 2003^b; Chapter 5). An assessment depends on the overall sample size and the way in which the attributions of problematic categories (pig-wild boar; cattle-aurochs) have been dealt with. Furthermore, the presence of

domesticated animals is not directly informative on permanency because of the possibility of nomadism or transhumance (Bentley/Knipper 2005; Cribb 1991). The presence of all four domesticates may indicate greater permanency, while a more specialist wild spectrum may point to the extractive nature of a site. Taphonomic and behavioural factors also affect our perspective on the importance of crop plants and how these arrived at the site (*cf. supra*). Evidence mainly points to consumption and import of crop products is assumed for a number of sites in the delta (Out 2009, 423). The presence of agricultural fields, indicated by ard or hoe marks, pollen evidence for large-scale clearings and, to a lesser extent, sickles, form good arguments for local production and increased permanency.

Durable building traditions

Another factor of importance is the presence of durable (and regular) buildings used for multi-seasonal or sedentary purposes. While investment and proper construction may point to a higher degree of permanency, it should be noted that building traditions also relate to local traditions, anticipated mobility and available materials (*e.g.* Kent 1991; Kent/Vierich 1989; Marshall 2000; Rapoport 1969). A good example is formed by the Schipluiden site (Hamburg/Louwe Kooijmans 2006) where firm evidence for a sedentary occupation somewhat contrasts with a building tradition of limited structure and durability. Examples of durable buildings include Haamstede, Wateringen-4, Ypenburg (and later Zeewijk). The structures at Swifterbant-S3, Hekelingen, Vlaardingen and Slootdorp cannot be classified as durable. It should be noted that durable housing is not always indicative of permanency. Ethnography reveals non-sedentary interpretations too. Rafferty (1985, 129) mentions the Missouri Hidatsa, who occupied sturdy housing only during the winter months. Marshall (2000, 76-77) mentions the Nuu-chah-nulth who own several large seasonally occupied houses and move sets of planks between the sturdy house frames. In the absence of additional indicators, caution is required in using sturdiness as an indicator for permanency.

'Exotic' artefacts

Artefacts or objects made from materials that could not be procured or obtained locally may also determine the permanency and function of a site in a settlement system. The presence of non-local weed in the botanical assemblage of the Hazendonk (Out 2009), the presence of a fragment of a *Breitkeil* at S3 or non-local flint at Polderweg (Louwe Kooijmans 2003) and various Vlaardingen sites (Amkreutz 2010^b) are indicative of contacts.

The arguments presented above form a set of variables that, especially in combination and in relation to information on seasonality and site location, present an argument for site attribution. Below the structure of the settlement system and the associated criteria will be outlined.

8.1.2 Defining the system

The classification of sites according to site function and their implementation in settlement systems is necessarily an abstraction of reality based on the quantity and quality of the data available. It is important to establish the degree of permanency involved and in relation to this the type of mobility strategy. This basically comes down to the distinction between sedentary, year-round locations and sites that

are used in a seasonal or temporary manner. With respect to mobility a much used and appropriate classification is the one based on Binford's forager-collector model (1980) or Woodburn's immediate-delayed return model (1982; see also Crombé *et al.* 2011^b; Louwe Kooijmans 1993^a; Raemaekers 1999, 120-121). A number of drawbacks and repercussions of the use of this model has been discussed extensively earlier (Chapter 5). The existence of various complementary and alternative strategies caution our use of these categories (Lovis *et al.* 2006^{a,b}). Moreover, Binford (1980, 12) intended the forager-collector mobility concepts not as polar types of settlement systems, but rather as a range of options. Despite this the definition of hypothetical settlement systems can be based only on classifications of sites. A workable outline will now be given.

Combining strategies and sites

Site classification depends on a number of distinctions and the degree to which archaeological data can be fitted into these categories. A first distinction is between sedentary year-round locations and sites used in a temporary manner. The latter may be subdivided between residential locations used in a seasonal or short-term manner and special activity camps. A mobility system incorporating these site typifications may range from residential to logistical mobility. An important argument related to this is the distribution of (critical) resources. According to Binford (1980, 5-10), residentially mobile systems are more common in areas where the resource distribution is undifferentiated or regular, while logistical systems are more common in situations of spatio-temporally incongruous resources. The dynamic but regionally continuous distribution of relatively rich botanical and faunal resources in the wetlands (*e.g.* Nicholas 1998^a; 2007^{a,b}; Van de Noort/O' Sullivan 2006) argues for spatial congruence, yet many of these resources are available seasonally. This may favour logistical strategies. Based on this, four combinations of strategies and sites are proposed (see table 8.2).

The characteristics of the four site types defined and their archaeological parameters will now be described and these are depicted in table 8.3:

- *Permanently inhabited sites.* These are residential locations that may operate independently, in combination with extractive sites or exchange. They may also operate in conjunction with other permanent or seasonal sites (and thus become designated as 'dependent'). Exchange and expeditions form additional strategies. *Criteria:* complete households; sturdy houses; spatial structuring; large contribution domesticates; presence of all four domesticates; limited contribution of game, fowl, fish; fields; ard marks/palynological signal/macroremains; seasonal evidence for year-round permanency.

site / system →	dependency		mobility		interaction
	independent	dependent	residentially mobile	logistically mobile	interaction
permanent	+	(+)		+	+
seasonal		+	+	+	+
short-term		+	+		+
extractive		+	(+)	+	

Table 8.2 Overview of the different combinations of sites, dependency and mobility strategies. Brackets point to optional character. 'Interaction' indicates interaction and exchange with sites outside the direct system.

- *Seasonally inhabited sites.* These are residential locations that are dependent on a counterpart elsewhere, in another season. Seasonal sites function in a logistical mobility strategy with approximately one to three moves per year (*e.g.* summer and winter sites; see Binford 1980; 1982). Occupation may involve one season or cover, though not necessarily include, two to three seasons (*e.g.* late spring-early autumn). *Criteria:* complete households; housing of limited durability; limited spatial structuring; distinct combination of domesticates and wild faunal resources; important role for hunting, fishing, gathering, fowling; evidence for limited local crop production; seasonal evidence for non-annual use.
- *Short-term sites.* In (gradual) relation to the previous category these fit a system of more frequent residential mobility, with stays of up to several weeks. Exchange and expeditions also form additional strategies. *Criteria:* complete households or task forces; shelters or tents; limited site extent; no spatial structuring; limited role for domesticates; importance of hunting, gathering,

Table 8.3 Overview of available criteria for site function, mobility and inter-site relations.

criteria	evidence			
	permanent	seasonal	short-term	extractive
group composition	complete HH	complete HH	complete HH or task force	task force
anthropological / artefactual	deciduous teeth, task range, etc.	deciduous teeth, task range, etc.	limited task range	specific task
housing	durable (sturdy?)	limited durability	shelter, tents	none, or shelter/tents
dimensions/structure	+++	++	+	+/-
spatial structuring	spat. structured	limited spat. structuring	<i>ad hoc</i>	<i>ad hoc</i> /concentrated
extent	+++	++	+	+/-
domestic animals	large contribution; all four present	combination of dom. & wild fauna	limited role, unless nomadic	none
wild animals	limited contribution of game, fowl, fish	hunting, fishing, gathering fowling important	hunting, fishing, gathering fowling important	specific importance of hunting, fishing, gathering, fowling or combi
crop cultivation	fields; ard marks / macro / palynology	limited evidence local crop production	no crop cultivation, limited importance crop products	limited to no importance
seasonality	evidence for several seasons	evidence for restricted part of the year	evidence for restricted part of the year	evidence for restricted part of the year
expected character	<i>combi evidence year-round</i>	<i>indications may point to major season(s) of use</i>	<i>(homogeneous) indications (various) seasons</i>	<i>task related seasonality</i>
artefacts	complete range of artefacts, potential expedient technology	complete range of artefacts, potential expedient technology	limited range lithics, limited mobilia (including pottery), curated technology	specific toolkit, limited mobilia (often no pottery), curated technology, limited/no production
	permanent	seasonal	short-term	extractive
dependency	independent (+ extraction) dependent ('conjunction' to permanent or seasonal)	dependent on 'counterpart' elsewhere, different season	dependent sequence' of sites exploiting range	dependent satellite sites, local base for small or shorter exped.
relation	<i>primary site</i>	<i>one of primary sites/ bi-modal</i>		<i>subordinate to permanent, seasonal, (short-term)</i>
investment	+++	++	+	+/-
mobility	logistical	logistical, 1-3 residential moves	'more frequent residential mobility', stays up to sev. weeks	logistical/targeted
exchange & expedition	yes	yes	yes/limited	(unlikely/limited)

fishing, fowling; no crop cultivation; limited importance crop products; limited range of lithic artefacts; limited mobilia (including pottery); seasonal evidence for short-term use.

- *Extractive or special activity sites.* These are satellite sites that function in a subordinate relation to both permanent and seasonally occupied sites. Their character in a system of logistical mobility may be more fixed and diverse, requiring increased technological investment, while the 'locations' in a residential system of mobility may be of a more temporary nature. These sites are used by task forces as a local base for smaller or shorter expeditions. *Criteria:* task force; no structures or shelters/tents (often implying absence of evidence for structures); no domesticates; specific importance of either hunting, fishing, gathering, fowling, or combination; limited to no importance crop products; specific lithic toolkit; limited mobilia (especially pottery); seasonal evidence for short-term seasonal use.

Criteria

The criteria per site definition are context-dependent and suffer from the discrepancy between an assumed ethnographic characterization and problematic (often poor) archaeological evidence. Their importance increases when combinations may be made of several criteria. For instance, macroremains of cereals point to consumption, rather than production and become more convincing as an indicator of permanency when combined with sturdy houses and a significant contribution of all four domesticates. Furthermore, because of this qualitative aspect and because of the methodological and taphonomic factors affecting organic remains, no fixed quantitative limits have been set for the contribution of domesticates, or the importance of wild faunal resources, fowling and fishing.

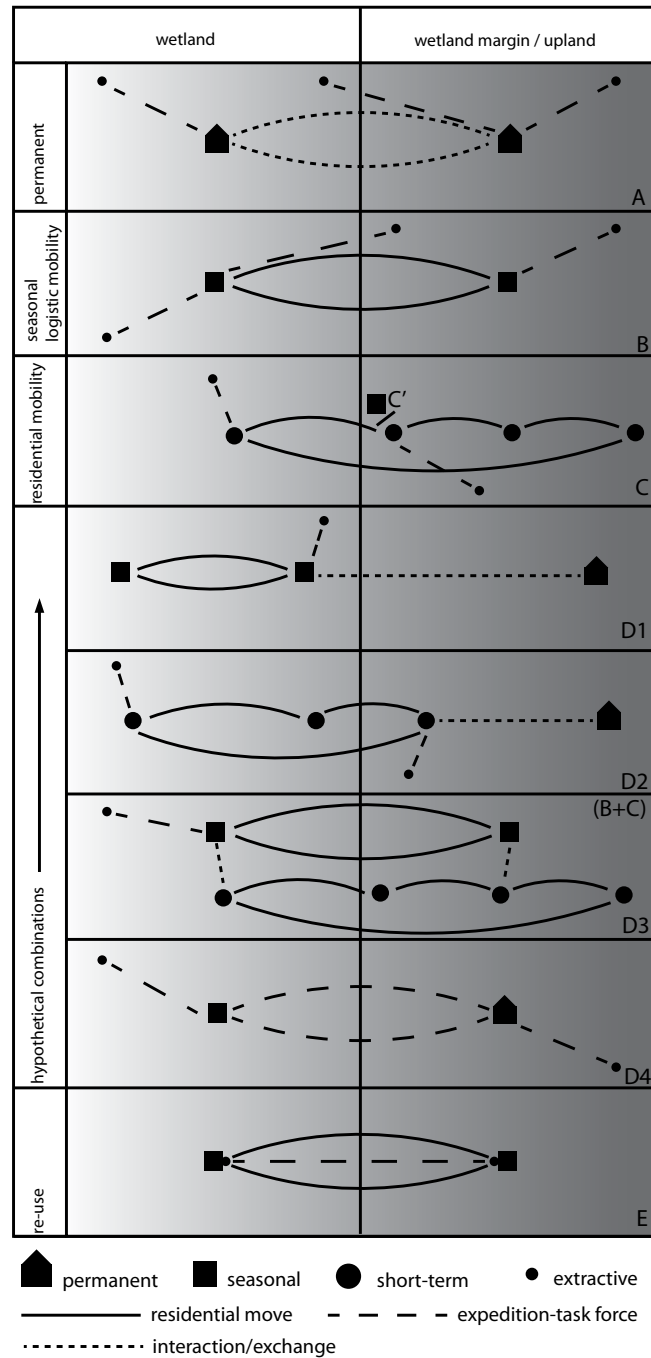
Range of strategies

Having defined the different types of sites and the mobility strategies involved, it is now possible to model a number of strategies in relation to each other (see fig. 8.1). This serves to demonstrate the options available. This overview is necessarily a simplification of reality, both in space and time. In the model a simple distinction is made between 'wetland', and 'wetland margin' or 'upland'. The combination of both categories is based on the notion that the mobility within the territories of the communities studied here, or their interaction with other communities will often be directed at the area bordering on the wetlands (including the coastal barriers etc.). At the same time mobility and interaction further afield cannot be refuted. No further distinction is made with regard to different ecological zones. With respect to the latter we lack the necessary regional resolution to pinpoint the duration and development of distinct system dynamics over time.

The overview is non-exhaustive and exemplary of the hypothetically available range. Below the various options are explained.

- A. Permanent sites, logistical mobility system, no residential mobility
This option represents sites that are in use year-round. Additional resources may be procured by means of extraction sites in similar or diverging ecozones as well as through interaction between sites. With respect to food and non-food resources, the complementary site will most likely be situated in a different ecozone.

Fig. 8.1 Schematic representation of potential mobility strategies (A-C) and a number of possible combinations of strategies through interaction and exchange (D). The placement of extraction camps is arbitrary.



- B. Seasonal sites, logistical mobility system, limited residential mobility
 Sites are in complementary seasonal exploitation of resources (e.g. spring-summer/autumn-winter or summer-autumn/winter-spring). Extractive sites are in use for additional resource procurement.
- C. Short-term sites, residential mobility system

A number of sites in the settlement system indicates a short-term seasonal use, requiring an increase in residential moves. These moves may cover different ecozones, most likely in relation to (seasonal) shifts in resources, but moves may

also take place within one ecozone due to depletion of resources (*cf.* Binford 1980). Sites are characterized by shorter stays. Extractive sites may be in use for additional resource procurement, although their diversity, size and duration will be more limited compared to logistical systems. C' represents a seasonal site within a residentially mobile system.

D1 Combination. Permanent and seasonal sites, logistical mobility system
Permanent site operates in relation to a wetland seasonal system. Extractive sites may be in use for additional resource procurement.

D2 Combination. Permanent and short-term sites, logistical and residential mobility
Permanent site operates in relation to wetland-wetland margin residentially mobile system. Extractive sites may be in use for additional resource procurement.

D3 Combination. Seasonal and short-term sites, logistical and residential mobility
This is in fact a visualization of the combination between B and C. Seasonal logistical system operates in relation to residentially mobile system, both in upland/wetland margin and wetland zones. Extractive sites may be in use for additional resource procurement.

D4 Combination. Permanent and seasonal site, logistical mobility
Permanent upland location operates in complementary system with seasonal site. This involves temporary division of the group. Extractive sites may be in use for additional resource procurement.

E Seasonal sites, logistical mobility system, limited residential mobility
See B. Abandoned seasonal site is used as extractive location during off-season.

The options above provide an indication of the range of settlement systems in potential operation. It is, however, in their regional and temporal application that we may find which settlement system may have been in use and may be able to come to a characterization over time. In the following the available informative sites will be discussed per period and interpreted in terms of settlement systems. The reader is referred to Appendix I for further site information.

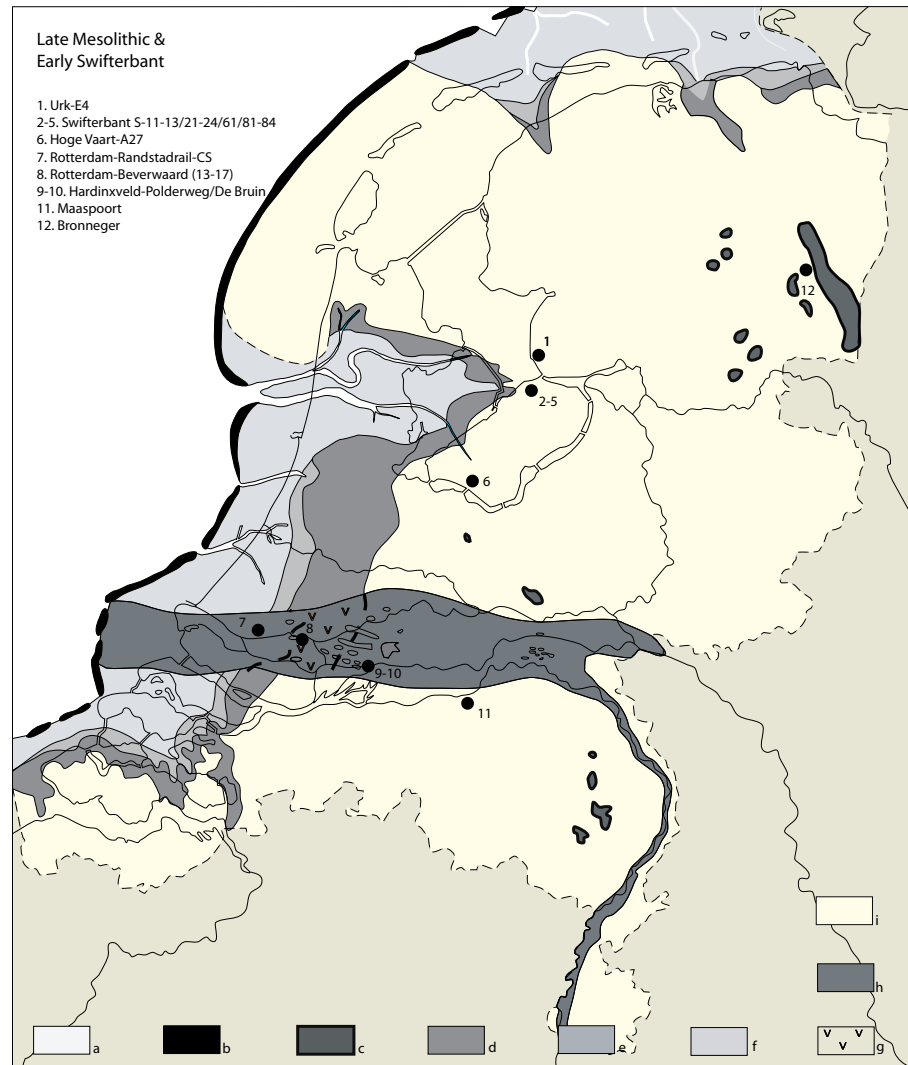
8.1.3 Late Mesolithic and Early Swifterbant (*c.* 6500-4500 cal BC)

Information for the earliest period is sparse due to the limited number of sites excavated. Both Late Mesolithic sites as well as early Swifterbant sites with pottery (ceramic foragers) are included. Sites with evidence for domesticated fauna are excluded. The incorporated sites provide information regarding the nature of the hunter-gatherer settlement systems before the introduction of domesticates or cultigens. The sites are mapped in fig. 8.2.

8.1.3.1 Attribution of function

A site-function is attributed to the selected sites, based on a combination of informative variables (*cf. supra*; see table 8.4). For the period under discussion the evidence available is distributed unevenly; Hardinxveld-Polderweg phase 1 forms the main anchor point (Louwe Kooijmans 2001^b; 2003). The level of structural investment at this location, in combination with the rich dataset on artefacts and

Fig. 8.2 Late Mesolithic and Early Swifterbant sites plotted on the palaeogeographical map for the Early Atlantic period, c. 5700 cal BC (adapted from plate 2 in: Van Gijssel/Van der Valk 2005). Legend: a: open water; b: coastal dunes and beaches; c: raised bog; d: fen peat; e: salt marsh and clay deposits; f: tidal flats; g: local peat formation; h: fluvial deposits and peat marsh; i: Pleistocene uplands



food economy, points to a broad spectrum of activities, aimed at hunting, fishing and gathering, local production of artefacts and accumulation of raw material and products. Sunken dwellings point to a degree of structural investment and permanency, while the presence of burials may underline an attachment to place. The human remains indicate the presence of complete families. The organic and stone artefacts reflect an array of activities congruent with the range of tasks conducted at a base camp. Various artefacts point to the flow and accumulation of products to and at this site, substantiating its residential character (see 7.3.5). Convincing evidence regarding the nature of occupation was provided by the faunal remains. These point to an elaborate exploitation of the aquatic environment with a distinct seasonal character indicative of a winter base camp.

A similar function may be proposed for Hardinxveld-De Bruin phase 2, although the site also yielded distinct summer indicators. This may be explained by a continuation of a winter base camp function (perhaps as a follow-up of Polderweg) and occasional short-term extractive visits in summer (Louwe Kooijmans 2001^b, 518), perhaps from the wetland margin. For the other periods of occupation at Hardinxveld (Polderweg phase 1/2 and 2, De Bruin phase 1) no singular season

site	date cal BC	region	location	seasonality	structures	economy+p	type
Hardinxveld-Polderweg 1	5500-5300	peat marsh	riverdune	winter	huts	h/g/f	seasonal
Hardinxveld-Polderweg 1/2-2	5100-4900	peat marsh	riverdune	winter/summer	hearth/concentration	h/g/f+p	extractive
Hardinxveld-De Bruin 1	5475-5100	peat marsh	riverdune	winter?	posts/pits	h/g/f	extractive
Hardinxveld-de Bruin 2	c. 5100-4800	peat marsh	riverdune	winter/summer	huts?	h/g/f+p	seasonal+extractive
Hardinxveld-de Bruin 3	c. 4700-(4450)	peat marsh	riverdune	winter/summer	huts?	h/g/f+p	seasonal+extractive
Rotterdam-Randstadrail-CS	c. 6250-4850	peat marsh	riverdune	indet.	hearths?	(h/g/f)	seasonal/extractive?
Rotterdam-Beverwaard (13-17)	c. 5800-5600	peat marsh	riverdune	indet.	hearth	(h/g/f)	seasonal/extractive?
Gouda-Goverwelle	c. 5500-4500	peat marsh	crevasse splay	indet.	posts	(h/g/f)	seasonal/short-term?
Maaspoort	6500-5500	wetl. margin	riverdune/ridge	summer?	hearths?	(h/g/f)	seasonal
Swifterbant S11-13/21-24/61/81-84	c. 6100-5000	wetl. margin	riverdune	indet.	hearthpits	(h/g/f)	short-term
Urk-E4	c. 6000-5000	wetl. margin	riverdune	indet.	hearthpits	h/g/f	short-term
Hoge Vaart-A27-2	5500-4850	wetl. margin	coversand ridge	indet.	hearthpits	h/g/f	short-term
Hoge Vaart-A27-3	4850-4500	wetl. margin	coversand ridge	indet.	hearths, posts, pits	h/g/f+p	seasonal/short-term
Bronneger	c. 4850-4550	upland	river side	-	-	-	special

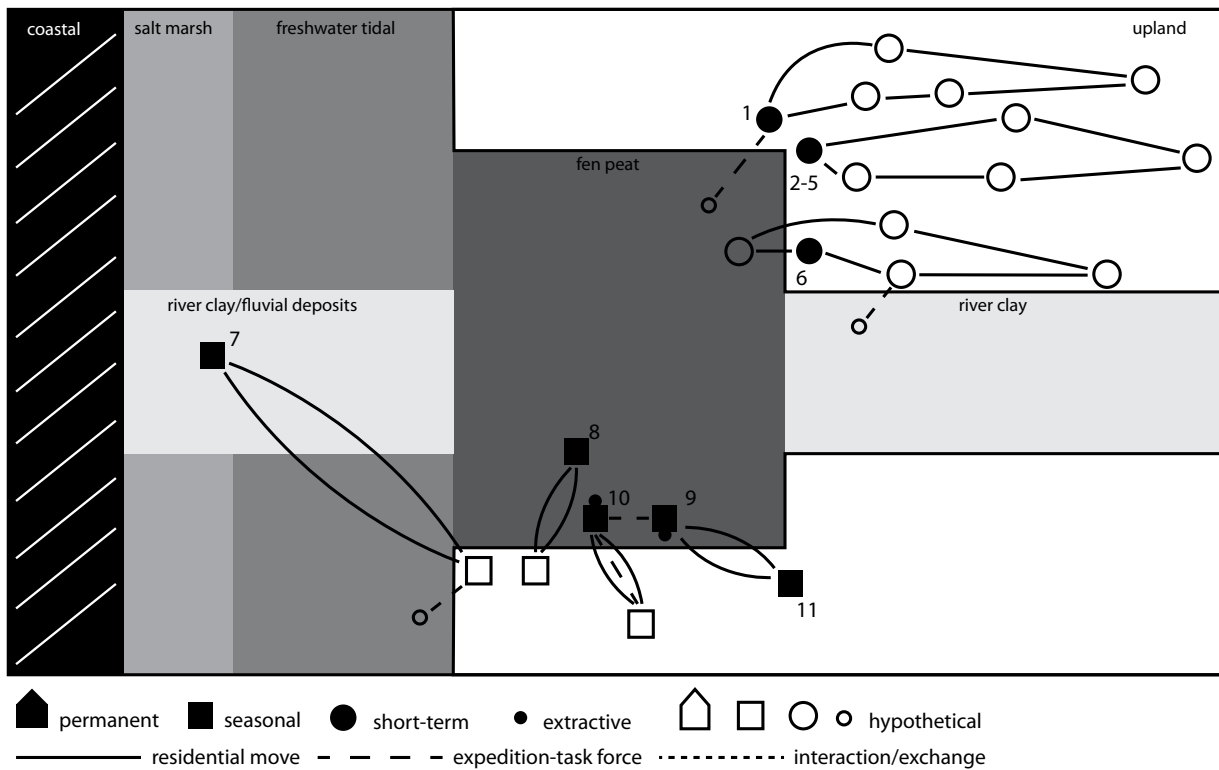
Table 8.4 Basic variables of Late Mesolithic and early SWB sites in combination with inferred site-function; ('?') indicates little or no information; '/' indicates either/or. Hunter-fisher-gatherer economy is established or assumed; brackets indicate limited quantitative of qualitative evidence. Pottery (p) is indicated.

of occupation could be determined. Occupation at De Bruin phase 3 may be interpreted as similar to phase 2. The introduction of domesticates most likely took place at the end of this range and will be discussed for the next phase. The shift in occupation emphasis from Polderweg phase 1 to De Bruin phase 2 suggests the abandoned non-residential location may have been used simultaneously as a 'twin-site', possibly for extractive purposes (Louwe Kooijmans 2001^a, 456-457; 2003, 612). A complementary summer location for the winter occupation of Polderweg phase 1 may have been the wetland margin site of Maaspoort, *c.* 40 km southeast (Louwe Kooijmans 2001, 459). Other river dune sites in the peat marsh area also show evidence of Late Mesolithic or early Swifterbant occupation (see fig. 8.2). The evidence is non-conclusive with regard to site function or season of occupation. Occupation at Rotterdam-Randstadrail-CS may be comparable to the Hardinxveld sites. The recently discovered site at Gouda-Goverwelle may also be interpreted as a seasonal base camp, although current evidence does not argue against a temporary short-term location. This site is situated on a crevasse splay, widening our scope as to the landscape elements inhabited and perhaps the site functions associated with these.

Other sites are less informative, but provide a different emphasis for the period. The river dune and ridge locations of Swifterbant (S11-13/21-23/61/81-84), Urk and Hoge Vaart phase 2 are characterized by clusters of hearthpits. As argued earlier (Chapters 7 and 8), these may be associated with shorter residential stays. An exception is formed by Hoge Vaart phase 3. According to Peeters (2007) the site may be interpreted as an accumulation of short-term hunting camps as identified for the isolated northern cluster, yet pottery (production), pits, posts and evidence for the presence of children point to an, at least at times, more consistent residential function. A site such as Bronneger, situated in a stream valley on the upland, forms an example of other potential site functions, most likely of a ritual character.

8.1.3.2 Different rates of residential mobility

The association of sites with certain types of mobility strategies (*cf.* Binford 1980; 1982; Kelly 1995) and their 'translation' into settlement systems is hampered by the limited number of informative sites. Hypothetical locations have been added to complement the picture. The settlement systems presented in fig. 8.1 are coupled with the modelled mobility strategies presented in fig. 8.3. Starting with the best information available, the winter base camp at Hardinxveld points to a logistical system of mobility with two to three seasonal residential bases (see Louwe Kooijmans 2001^a, 455). The auxiliary function of De Bruin and later Polderweg (when the main occupation shifted from one to the other), as well as the potentially subsidiary function of De Bruin (as an extractive summer location; model E) during phase 2, confirm the existence of logistical system with extractive sites. This may also be assumed for other river dune sites in the donken area. Considering the limited number of moves and long seasonal stays, it is likely that other locations were situated in complementary environments, making Maaspoort and the wetland margin in general a likely candidate (model B). From there the (seasonal) terrestrial resources of the upland may have been exploited, without abandoning the benefits of the nearby wetlands. These locations may also have served as a starting point for more wide-ranging resource expeditions (*e.g.* flint).



The inferred logistical mobility of the river dune sites contrasts with the view of mobility further north. The hearthpit sites of Swifterbant, Urk and Hoge Vaart appear to be similar, albeit smaller, versions of locations further inland (e.g. Marienberg, Verlinde/Newell 2006), characterised by shorter stays and increased residential mobility. The wetland margin location of these sites indicates that the wetlands may have been exploited from these locations, or as a next move (model C). Interestingly, occupation of Hoge Vaart phase 3 demonstrates a different use of the site, perhaps related to the increasingly wet conditions surrounding the site. While short-term hunting camps may explain part of the archaeological patterning, certain features (*cf. supra*) point to a more intensive use. The site may have functioned in a residentially mobile system, probably extending into the uplands during other parts of the year, in line with the already mentioned hearthpit sites (model C), or formed a seasonal base in a logistical system (model B).

In conclusion, both logistically mobile systems as well as residentially mobile systems characterize this phase. A crucial factor is the position and importance of aquatic resources as these generally are recognised to provide a reliable and rewarding environment for lowering residential mobility (see Chapter 8; Ames 2002; Binford 1990; Nicholas 1998^{a,b}; 2007^{a,b}; Zvelebil 2003^b). Whether distinct combinations exist is unclear. Hoge Vaart phase 3 may represent an intermediate position. The likelihood of a combination of strategies depends on the extent to which the place-bound investment in certain sites may be combined with the different characteristics of mobility and food procurement in residentially mobile systems with a predominantly terrestrial upland focus (model C'). Seasonal group fissioning resulting in smaller family units may form an explanation.

Fig. 8.3 Cartogram of the potential settlement systems and mobility for Late Mesolithic and Early Swifterbant sites. Note that the coastal area at this time was uninhabitable due to the insufficient closure of the coastal barriers and dynamic marine incursions. All site relations are hypothetical.

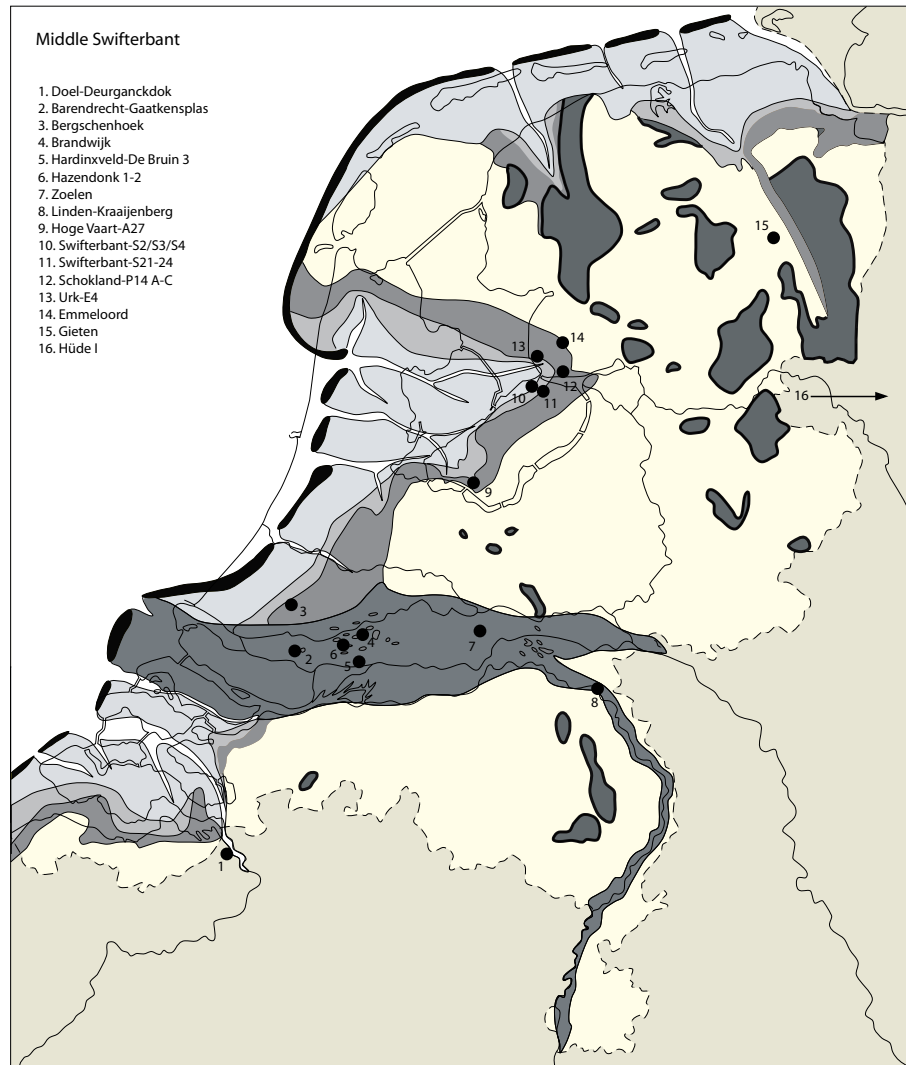


Fig. 8.4 Middle Swifterbant sites plotted on the palaeogeographical map of the Late Atlantic period, c. 4200 cal BC (adapted from plate 3 in: Van Gijssel/Van der Valk 2005). See fig. 8.2 for legend.

8.1.4 Middle Swifterbant (c. 4500-3800 cal BC)

The number of informative sites that was selected for this phase is substantial, although the quality varies. Exemplary is the high-resolution image of the special activity site of Bergschenhoek as opposed to the temporal palimpsest (*cf.* Bailey 2007) of Schokland-P14. Furthermore, the difficulties noted regarding the preservation and interpretation of botanical and faunal remains (*e.g.* local production as opposed to import of crop products) influence attributed site functions. The sites are mapped in fig. 8.4.

8.1.4.1 Attribution of function

The sites selected for this phase, with some exceptions, mainly cluster in the middle phase of the Swifterbant period, c. 4600-3800 cal BC (see table 8.5). Domesticates and cultigens now complement the economic picture at some locations. This indicates that changes to the settlement system may have taken

place, especially as agriculture is expected to be a pull-factor for sedentism (Kent 1989, 6-7; Raemaekers 1999, 120). However, for these semi-agrarian communities other options appear equally realistic (*cf.* Louwe Kooijmans 1993^a, 90).

With respect to permanency, none of the selected Swifterbant sites meet the criteria discussed for year-round occupation. There are no sites with durable houses. The evidence available (S3; Hùde I; P14) points to frequently repaired or rebuilt, relatively lightweight shelters or huts that appear to be of a short-term, seasonal nature. The contribution of domesticates never exceeds 20% (see fig. 7.4), except at Swifterbant-S3 (34%) and S2 (38%). At these sites pigs dominate the domestic spectrum and these may also be reared sustainably in a nomadic or mobile system (*e.g.* Albarella *et al.* 2007). Sheep and goat are absent at S3. Furthermore, there is no clear-cut evidence for crop cultivation in the form of indisputable fields with ard marks. Crop processing evidence does not imply local production and for some of the sites in the delta import of cereals remains a likely option (Out 2009, 423). The recently discovered potential field at Swifterbant-S4, may, in combination with palynological and other evidence point to local cultivation (Huisman/Raemaekers 2008; Huisman *et al.* 2009), yet this will have been small-scale and of limited economic importance (Cappers/Raemaekers 2008). It could have been embedded in seasonal visits, especially when spring sowing is assumed, as at Swifterbant-S3 (Out 2009, 422).

The presence of indicators for non-permanent use at certain sites, such as houses of limited durability, limited site structuration etc. and the absence of indicators for year-round permanency at these places, implies that residential sites are likely of a seasonal nature. Some sites provide a handle on the season of use. The character of the Swifterbant occupation of the river dunes and for instance the Hazendonk may be seen as a follow-up to Hardinxveld-Polderweg and De Bruin (phase 1 and 2 respectively; see Louwe Kooijmans 2001^b, 518). Limited evidence on seasonality (mainly based on fauna) points to a presence in various seasons (*e.g.* Zeiler 1997, 86, 99). No particular season of use could be determined.¹ The find of chess (*Bromus secalinus*) in the Hazendonk 1 layer (Bakels 1981, 143) may be interpreted as a winter indicator but points to import of cereals at the Hazendonk (Out 2009, 423) and seems confirmed by the associated weed assemblages. Faunal evidence at Brandwijk remains inconclusive with respect to seasonality. The location and characteristics of the site favour a comparison with the Hazendonk.

The Swifterbant levee site S3 yielded seasonal evidence for an occupation from spring to autumn with occasional winter visits (Zeiler 1997, 87). This scenario seems to be confirmed by the argument that winter floodings may have hampered occupation in that season (Raemaekers 1999, 117). The presence of one or two dwelling structures, in combination with consistent reuse of the location and a broad spectrum of resources used, including domesticates and cultigens, affirms its residential role. Seasonal evidence at Swifterbant S2 and S4 was inconclusive. The similarities in setting and archaeology between these three locations, however, point to similarities in function. From this it follows that the potential field discovered at S4 (Huisman/Raemaekers 2008; Huisman *et al.* 2009) may be interpreted as functioning within a non-permanent settlement system.

A seasonal domestic function also applies to Hùde. Hut features, finds and a broad spectrum economy convincingly point to a residential function, yet the light hut structures in combination with evidence of seasonal flooding suggest a non-permanent use. Most evidence on seasonality points to a presence in summer

site	date cal BC	region	location	seasonality	structures	economy w/d/wd+c	type
Brandwijk-L50 (base/top/40-50)	c. 4200-3900	peat marsh	riverdune	indet.	posts?	133 / 36 / 164 + c	seasonal
Hardinxveld-De Bruin 3 (end)	(4700)-4450	peat marsh	riverdune	winter/summer	pits	475 / 0 / 61	extractive
Hazendonk 1+2	c. 4000-3800	peat marsh	riverdune	summer/winter	pits?	118 / 26 / 17 + c	seasonal+extractive?
Bergschenhoek	c. 4300-4000	freshwater tidal	lake margin	winter	platform	9 / 0 / 2	extractive
Swifterbant-S2	c. 4500-4000	freshwater tidal	levee	indet.	stakes, graves	369 / 231 / 0 + c	seasonal
Swifterbant-S3	c. 4300-4000	freshwater tidal	levee	summer	hut	2528 / 1297 / 0 + c	seasonal
Swifterbant-S4	c. 4300-4000?	freshwater tidal	levee	indet.	field?, grave	indet. + c	seasonal
Swifterbant-S21-24	c. 4450-3800	peat marsh	riverdune	indet.	graves	indet.	seasonal
Schokland-P14 A-C	c. 4400-3600	wetland margin	outcrop	summer/yearround?	graves, posts?	464 / 67 / 357 + c	seasonal
Urk-E4	c. 4300-3900	wetland margin	riverdune	indet.	graves, hearths	68 / 39 / 107 + c	seasonal
Hude I	c. 4450-3500	upland	lake margin	summer/winter	huts, hearths, posts	1708 / 49 / 0	seasonal + extractive?
additional sites							
Hoge Vaart-A27-4	4350-4100	peat marsh	ridge	indet.	fish weirs	indet.	extractive
Emmeloord-J97	c. 3650-3350	wetland margin	levee	indet.	fish weirs	w / d	extractive
Doel-Deurganckdok-B	4550-3960	wetland margin	ridge	indet.	hearth(pits)	25 / 0 / 0 + c	short-term?
Barendrecht-Gaatkensplas	c. 4200-3800	freshwater tidal?	levee	indet.	hearths?	w / d? + c	seasonal?
Zoelen	c. 4200-3900	river clay	-	-	grave	-	special
Linden-Kraaienbergh	c. 4000	river clay	dune	-	pits/posts	-	seasonal?
Gieten	c. 4050-3450	upland	pingo	indet.	-	-	-

Table 8.5. Basic variables of selected Middle Swifterbant sites in combination with inferred site-function; ('?') indicates little or no information; '/' indicates either/or.

(see Appendix I; Boessneck 1978; Hübner *et al.* 1988). The botanical and faunal information on seasonality at P14 points to a seasonal presence between spring and autumn (Gehasse 1995, 67) although visits in other seasons cannot be ruled out. With respect to cultivation practices there is no evidence for cultivation at the outcrop of P14 (Gehasse 1995, 61), and insufficient evidence at Urk-E4 (Out 2009, 417, 424). Nor is there convincing evidence for sturdy housing. In view of the other locations it therefore seems that a permanent occupation of P14 is unlikely (*contra* Raemaekers 1999, 117).²

Apart from these seasonal sites, a number of other locations may be mentioned that have an extractive or specialist function. Emblematic is the fishing and fowling camp of Bergschenhoek (*e.g.* Louwe Kooijmans 1987). The faunal spectrum in combination with the structural characteristics of the site underline its extractive function in a yearly routine (see Appendix I). The spectrum of bird and fish remains points to a seasonal presence in winter. Other sites such as Hoge Vaart phase 4 and Emmeloord represent extractive locations specifically aimed at fishing. The continuity of these extractive practices at Emmeloord into the Late Neolithic points to the consistency in use of these locations. Another site that may have been of an extractive nature is Hardinxveld-De Bruin phase 3. While seasonal information, in combination with some of its features enable an interpretation of this location as a successor to the base camp function of phase 2 (*cf. supra*), in combination with incidental summer visits (Oversteegen *et al.* 2001, 266) of a potential extractive nature, the overall diminished size of the site (25 x 25 m) rather points to a main function as extractive location (Louwe Kooijmans 2001^b, 514-515). This may have been a gradual development. However, it should be noted that all four domesticates are present at the site at the end of phase 3, although this may have involved quarters instead of live animals, with the exception of pig (*e.g.* Louwe Kooijmans 2007^a). Sites such as Zoelen and (earlier) Bronneger form an example of other potential site functions aimed at ritual practices such as burial and deposition.

8.1.4.2 Absence of permanency

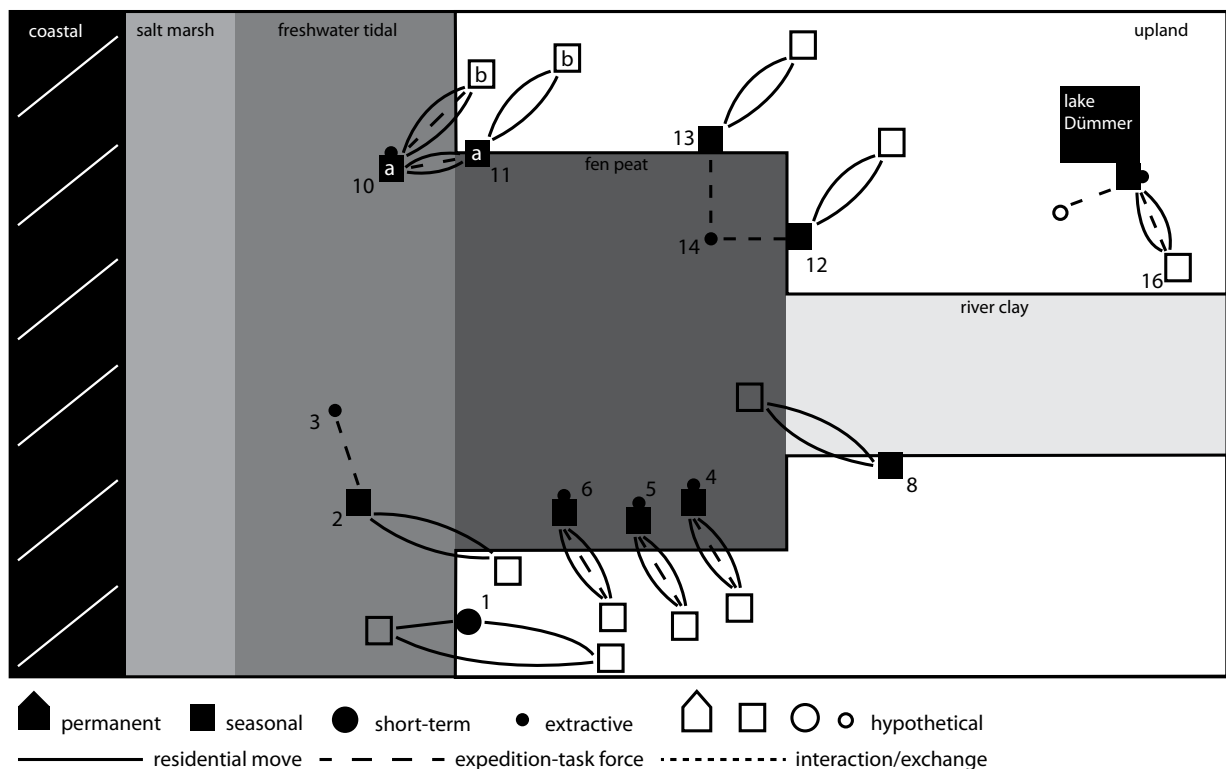
The settlement system belonging to this phase points to a classical system of logistical mobility (model B; *cf.* Binford 1980). Fig. 8.5 presents a model incorporating some of the sites mentioned. It is important to underline here that the ingredients of the extended broad spectrum economy (Louwe Kooijmans 1993^a; 1998^a) are combined distinctly with mobility. This involves both animal husbandry and crop cultivation. Since some evidence points to import of crop products, especially for sites in the delta region (*cf.* Out 2009, 423), the limited indications existing for local cultivation at other sites, most notably Swifterbant S3 and S4 (see Out 2009, 424) initially should be interpreted as small-scale, seasonal practices that were rather of an additive nature (*cf. supra*; see also Cappers/Raemaekers 2008).

The seasonal nature of the system raises the question where the (potential) counterparts of the identified sites may be found. Although hard to determine these may point to other (complementary) ecological zones. It, for instance, is plausible that Hardinxveld-De Bruin phase 3, if of a residential nature, functioned in the same system as the previous phases, whereby a location such as Maaspoort remains a plausible counterpart. Linden-Kraaienberg, Brandwijk and the Hazendonk may have operated in comparable systems. Similar suggestions have been made for the

Swifterbant levee sites. Raemaekers (1999, 117) argues that the nearby river dune sites probably formed a dry alternative for the wet winter season (fig. 8.5 option 'a'). If the exploitation of a different ecozone and other (seasonal) resources is required or opted, related sites would have been situated further afield (fig. 8.5 option 'b'). The limited indications for a winter visit may point to incidental returns (model E). Similar wet-dry scenarios, for instance, may also apply to other locations such as Urk-E4 and the Húde I lake site, where upland settlement may be found within several kilometers. It, however, should not be ruled out that counterparts may be found in other regions. If P14 may be interpreted as a seasonal summer site, than its winter counterpart could be positioned elsewhere, more to the west. Both the winter base camp function of Polderweg as well as the ability to deal with and counter wet living circumstances as demonstrated at Bergschenhoek, Swifterbant-S3 and Húde I should prevent us from perceiving the wetlands as uninhabitable in the winter half of the year. On the other hand, and in contrast to the previous period, it is evident that both animal husbandry and crop cultivation now form part of the economy. Where their role increases in importance, this of course benefits from dryer, more stable locations at some point during the year. Finally, a site such as Barendrecht-Gaatskensplass demonstrates that not only river dunes were targeted for occupation. The location may have formed a counterpart for the extractive use of a site like Bergschenhoek.

In relation to the seasonal system mentioned above, sites such as Bergschenhoek, Emmeloord and Hoge Vaart phase 4 functioned as relatively fixed extractive locations for these sites. The attachment to place at these locations may have been no less than at residential sites. There are also seasonal indications for short-term,

Fig. 8.5 Cartogram of the potential settlement systems and mobility for Middle and Late Swifterbant sites. Note that the coastal area at this time was stabilizing, although there is no evidence regarding the nature of its use. All site relations are hypothetical.



potentially extractive visits at otherwise seasonally inhabited residential sites, for instance at Swifterbant-S3 (winter) and Húde I (winter). At the Hazendonk (phase 1 and 2) there are winter indicators as well, but it is not clear what the main season of use was. In any case, evidence at these sites points to an alternating use of the same locations, potentially within the span of a year (see Binford 1982).

Concluding, as illustrated in fig. 8.5, a logistical, seasonally mobile settlement system, using two or more ecozones and incorporating relatively fixed extractive sites characterizes this period. Some sites provide a nuance. The Swifterbant river dune sites of S21-24, for instance, did not provide enough (organic) evidence to be able to place them on a functional par with the levee sites. In line with the previous period, their nature may have been more short-term, although this is hypothetical. Similarly Doel-Deurganckdok is characterized by an absence of domesticates and activities aimed at hunting, fishing and gathering. Some of the material clusters in small patches and the main features detected are probably hearths (Crombé *et al.* 2004, 106; clayey patches). This brings to mind similarities with the hearthpit sites of Swifterbant and Urk and therewith of potentially short-term locations (model C). This would point to more extensive mobility, perhaps in combination with exchange (see for instance model C and C' or D3). In view of the other sites it is also plausible to suggest Doel was a short-term site in an overall system of logistical mobility with seasonal sites (model B). Diverse evidence of sites situated further afield, such as Gieten, Winterswijk, Meppel and Heemse (see Appendix I) as well as the distribution of perforated wedges and stone axes (see Raemaekers 1999, fig. 3.35 and 3.36) also point to the widespread use of the upland, although this need not be residential in nature.

8.1.5 Hazendonk group and Late Swifterbant (c. 3800-3400 cal BC)

The following period involves the occupation of the Hazendonk group as well as contemporary Late Swifterbant sites (Schokland-P14-D-E). Although the phenomenon of Hazendonk ware is geographically more elaborate (for instance incorporating the Meuse valley; Amkreutz/Verhart 2006), the emphasis here lies with excavated sites in, or verging on the Rhine-Meuse delta, in the coastal area, the peat marsh area and the eastern river clay area (see also Louwe Kooijmans 2006^b, 168). Virtually all of the southern coversand area is void of any diagnostic Neolithic pottery (as well as other indicative artefacts). The sites are mapped in fig. 8.6.

8.1.5.1 Attribution of function

In contrast to the previous periods, this phase is characterized by convincing evidence of year-round permanency, based on a combination of arguments regarding location, economy, housing, investment, group composition site structure and seasonality. Apart from these sedentary locations, other sites were used in a non-permanent manner. Unfortunately differential preservation and diverging excavation methodology hamper a singular attribution in those cases. The sites are presented in table 8.7.

The most convincing evidence for year-round permanency has come to light for the coastal Delfland region, with the recently published sites of Schipluiden-Harnaschpolder (Louwe Kooijmans 2006^a; Louwe Kooijmans/Jongste 2006),

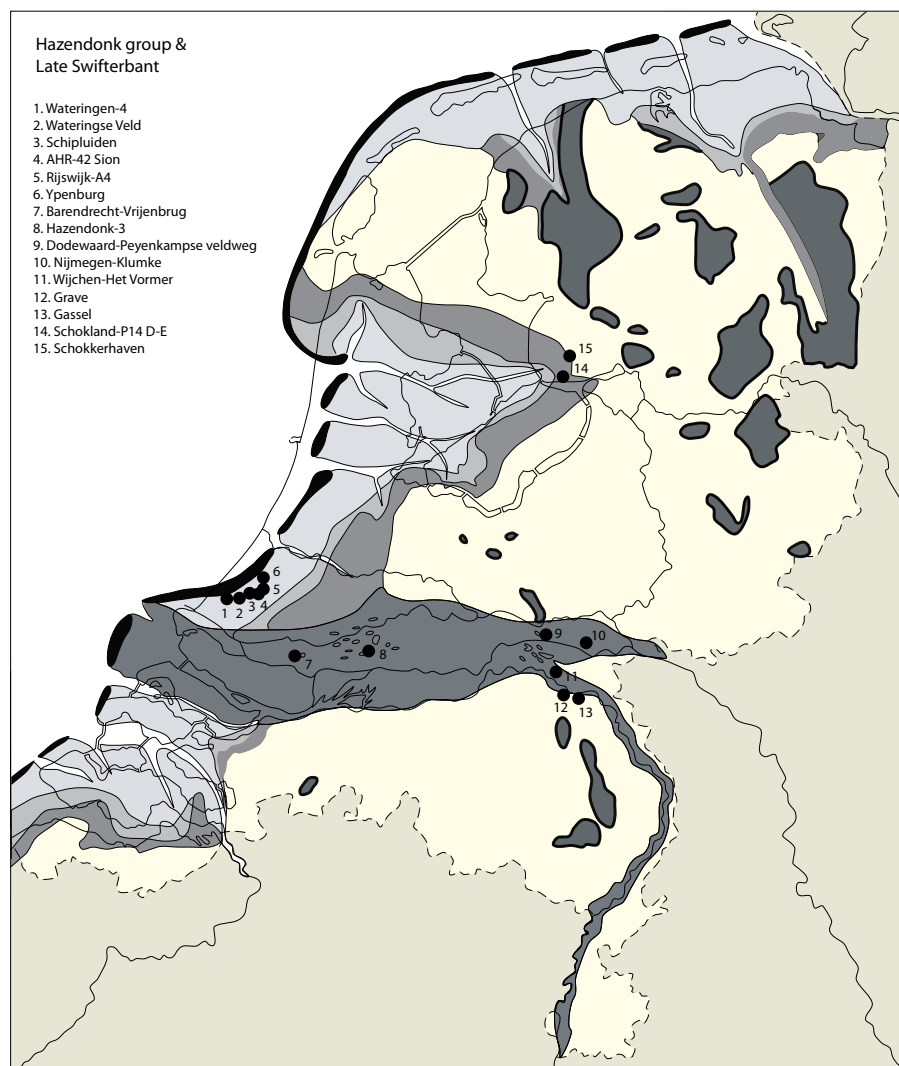


Fig. 8.6 Hazendonk group sites plotted on the palaeogeographical map of the Late Atlantic period, c. 4200 cal BC (adapted from plate 3 in: Van Gijssel/Vander Valk 2005). Schokland-P14 D-E (Late Swifterbant) is included as well. See fig. 8.2 for legend.

Ypenburg (Koot *et al.* 2008) and an analysis of several locations in the Delfland region (Louwe Kooijmans 2009). The various arguments brought to light, some of which have been mentioned above (see Koot *et al.* 2008, 480-481; Louwe Kooijmans 2006^a, 486; 2007^a, 299-305; 2009, 39; see also Appendix I) will not be discussed further here, but provide a firm footing for the permanent (albeit at times interspersed) character of occupation at Schipluiden and Ypenburg. Other locations such as Rijswijk-A4 (nearby and possibly related AHR-42) and Wateringen-4, by extension, may or have been interpreted along similar lines, based on their geographical vicinity and, in the case of Rijswijk, the domestic faunal spectrum (see also Raemaekers *et al.* 1997, 187). Internal differences in composition, layout etc. of Ypenburg, Schipluiden and Wateringen have been interpreted as local expressions of a similar settlement form (Louwe Kooijmans 2009, 39). Wateringen-4, however, also forms a cautionary tale; although a year-round occupation cannot be excluded, there are no clear seasonal indicators for a presence in winter (Louwe Kooijmans 2006^b, 170-171).³ Furthermore, it can be argued that the number of extractive sites related to the coastal occupation may be limited as a number of complementary ecological regions may be reached

sites Delfland	excavation	size	structure	Nfeatures	Npottery	Nflint
Schipluiden	5500 m ²	70 x 120	clustered	4609	29957	15405
Ypenburg	40.000 m ²	150 x 750	dispersed	2300	>1361	15515
Wateringen-4	2400 m ²	45 x 60	clustered	134	c. 4000	1065
sites eastern riverine area						
Nijmegen-Klumke	2900 m ²	100 x 50	-	7	186	321
Wijchen-Het Vormer H	-	12 x ?	-	1	614	41
Wijchen-Het Vormer N	-	50 x 60	-	2	328	52
Gassel	445 m ²	20 x 20	concentrated	-	2225	214
Grave-Pater Berthierstraat	80 m ²	-	dispersed	3	192	107

within the daily radius of 5-10 km (pers. comm. Louwe Kooijmans 2011; Louwe Kooijmans 2006^a).

Another cluster of Hazendonk sites is located *c.* 150 km further east on several dunes in the wetland margin and river clay area. Unfortunately the limited preservation at these locations prevents a proper functional attribution. Apart from pottery and flint, the sites yielded some posts and pits, but no houses could be determined. Most information was derived from the excavation at Nijmegen-Klumke (Ball/Van den Broeke 2007). The faunal spectrum is dominated by cattle (N=24) in contrast to red deer (N=5) and indeterminate identifications of pig/wild boar (N=24). Cereal remains point to the presence of emmer (Out 2009, 250). Regarding site location and taking into account the economy of Klumke, a site function similar to the sedentary locations of Delfland may be assumed. There are, however, slight differences with respect to site size, number of features and finds. Although these all relate to factors of preservation and excavation, a difference in scale and intensity of occupation may be noted, possibly indicating a difference in function (see table 8.6). This is apparent especially if the category flint is compared since this should preserve more or less equally and be in equal need. If it is accepted that the reflection of the 'Delfland-sites' would not be different when 'transported' to the eastern riverine area, then it should be concluded that either occupation duration and intensity, or, perhaps less likely, site function were different.

A further site, the Hazendonk, is situated in the peat marsh area. The site location largely explains the different character of habitation. Emphasis was placed on hunting and gathering with an important role for otter, beaver and wild boar, in line with previous use of the site (*cf. supra*; Louwe Kooijmans 2006^b, 170). This seems to correlate to the general absence of features (although some of these may have been situated on top of the dune). The scarce seasonal information may be interpreted as pointing to a use during multiple seasons (*ibid.*; *cf. infra*), which, in combination with the other site characteristics, will have been non-permanent. In relation to the consistency in use of this location and the (extended) broad spectrum of resources exploited or used (see also Zeiler 1997, 85), a function as a seasonal base camp may be expected or a role as a multi-seasonal subordinate site. Whether a site such as Barendrecht-Vrijenburg may be interpreted along similar lines remains unclear due to the limited information available for this location. However, it does point to an exploitation of the freshwater tidal environment and a site location choice involving a levee.

Table 8.6. Several characteristics of Hazendonk sites in the Delfland coastal area and the eastern river clay area.

site	date cal BC	region	location	seasonality	structures	economy w/d/wd+c	type
Schipluiden	3630-3380	coastal plain/salt marsh	low dune	year-round	posts, pits, wells, fence, graves	2872 / 4609 / 0 + c	permanent
Ypenburg	3860-3435	coastal plain/salt marsh	low dune	year-round	houses, pits, wells, graves	182 / 177 / 0 + c	permanent
Wateringen-4	c.3625-3400	coastal plain/salt marsh	low dune	year-round?	houses, pits, wells	284 / 173 / 153 + c	permanent?
Rijswijk-A4	c. 3800-3400	coastal plain/salt marsh	low dune	year-round	wells, ditch	24 / 1 / 0 + c	permanent
Hazendonk-3	3670-3610	peat marsh	river dune	indet.	-	408 / 37 / 0 + c	seasonal
Nijmegen-Klunke	3770-3530	river clay	dune	indet.	posthole, pits	7 / 25 / 24 + c	seasonal?
Wijchen-Het Vormer	c. 3800-3400	wetland margin	low dune	indet.	depression?, pit	-	seasonal?
additional sites							
AHR-42-Sion	3640-3380	coastal plain/salt marsh	low dune	indet.	posts, postholes	0 / 2 / 5 + c	permanent?
Wateringse Veld	c. 3800-3400	coastal plain/salt marsh	low dune	indet.	+	-	seasonal?
Barendrecht-Vrijenburg	3650-3380	freshwater tidal	levee	indet.	-	w / wd + c	seasonal?
Gassel	c. 3800-3400	wetland margin	dune	-	depression	-	seasonal/short-term?
Grave-Pater Berthierstraat	c. 3800-3400	wetland margin	dune	-	posts, pit	-	seasonal?
Dodewaard	c. 3800-3400	river clay	crevasse	indet.	ditch	w / d / wd + c	seasonal?
Schokland-P14 D-E	c. 3600-3300	wetland margin	outcrop	indet.	graves, posts?	16 / 29 / 24	seasonal
Schokkerhaven	c. 3950-3720	wetland margin	river dune	indet.	-	w / + c	seasonal?

Table 8.7. Basic variables of selected Hazendonk sites in combination with inferred site-function; ('?') indicates little or no information; '/' indicates either/or. Also presented are the Late Swifterbant sites of Schokland-P14 and Schokkerhaven.

Another location is the Late Swifterbant site of Schokland-P14 D-E. The use of this location during the later Swifterbant culture mainly seems to point to continuity from the previous period onward. The somewhat higher domestic ratios in layers D-E compared to the previous period (*cf.* Gehasse 1995, 53) should be seen in view of the limited number of bones from these layers. Most post features have been dated relatively to the late Swifterbant culture (Ten Anscher 2000/2001, 84). Based on these considerations the site is interpreted in line with its previous use as a seasonal base camp. The nearby location of Schokkerhaven is characterized by wild faunal remains as well as cereals, but does not allow any further nuance with regard to site function.

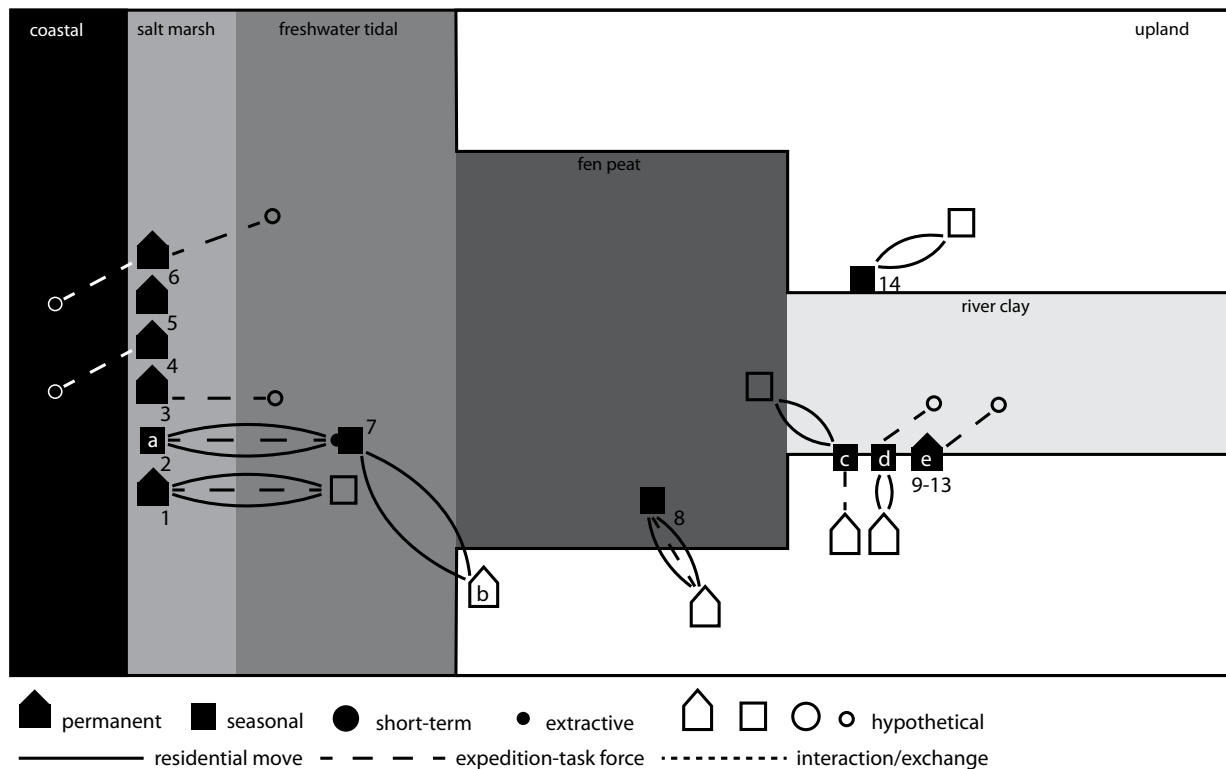
8.1.5.2 Not all is permanent

A model of the settlement system of the Hazendonk group is depicted in fig. 8.7. Evidently the sites situated in the Delfland area functioned as the first permanent settlements (see Louwe Kooijmans 2009). These year-round inhabited locations form the residential and functional bases from which the environment was exploited. This may happen in conjunction with extractive locations, most likely situated in complementary ecozones such as the peat marsh or freshwater tidal area (model A). Two additional remarks, touched upon earlier, should be made. The first of these concerns the notion that while the Delfland region may have provided the most suitable area for permanent settlement, this was predominantly a conscious cultural choice. Evidence of this may be found, for instance, at Schipluiden where during occupation the direct environmental conditions of the site changed from brackish to fresh and the inhabitable area slowly decreased. The economic range and ratio aspects, however, remained constant (Louwe Kooijmans 2006^a, 64). Secondly and building upon this, against an ecologically largely similar background different habitational and economic choices were made between nearby settlements, which underline this element of choice and group agency involved (see Chapter 6; Louwe Kooijmans 2009, 51). Against this background the role of Wateringen-4 in the settlement system may be understood as one of the composite parts of Ypenburg (Koot *et al.* 2008) and therewith as a permanent location. One could also stress the increased importance of hunting red deer at this site (see table 7.4a), the absence of seasonal signal and the less intensive rebuilding and repairing of the dwelling structure as an indication of a non-permanent use, but that may over-stretch the argument. A non-permanent use has been suggested distinctly for the dunes in use at the Wateringse Veld (Bakker/Burnier 1997; Louwe Kooijmans 2009), although a more precise functional attribution is still lacking there.⁴ If Wateringse veld (and perhaps Wateringen) functioned as seasonal settlements, then it is likely its counterpart was situated in a different ecozone (model B, or E). So far evidence for this is lacking. At a distance of *c.* 40 km, the levee site of Barendrecht-Vrijenburg situated in the freshwater tidal area would provide such a counterpart, especially in view of the later Vlaardingen evidence. This option has been visualized (option 'a'). Barendrecht, however, may also have functioned in relation to a permanent settlement in the wetland margin (option 'b'), while Wateringse veld could have been a special purpose location in relation to one of the other coastal sites.

Further east in the river clay area and wetland margin area the characteristics and different reflection of Hazendonk sites, prevent a functional attribution as permanent location analogous to the Delfland settlements. Either we are dealing with permanent locations with a shorter or different use-life (model A), or with temporary seasonal sites perhaps related to cattle herding and potentially in function of permanent upland coversand sites (model D4), or even through a network of exchange (model D1). These upland counterparts may be situated at a short distance to the south, yet none have been discovered so far. Among the river-clay sites the small size of the concentration at Gassel and the presence of a possible hut (Verhart/Louwe Kooijmans 1989, 105-107), may underline the temporary nature of some locations. If taphonomic factors are not completely responsible for the different character of these sites in the eastern riverine area, then a seasonally mobile component in the settlement system should be assumed. The three options mentioned above have been marked in fig. 8.7, with 'c', 'd' and 'e'. Based on the combination of evidence available, option 'e' may be most likely for Nijmegen-Klumke.

The continued (logistical) mobility in this period is perhaps best attested by the Hazendonk. Although there is no single season of occupation, use of the site should be interpreted as temporary. Based on the character of the finds and the focus in the faunal spectrum on otters, beavers and increased large game hunting, two options spring to mind. The first is that of a specialist extractive location in relation to an agricultural settlement on the wetland margin (model A, with an extractive location in a different ecozone), perhaps situated in the vicinity of Maaspoort (see Louwe Kooijmans 2006^b, 169-170). The thickness and extent of the occupation layer, the spectrum of finds including pottery and the broad spectrum nature of the economy including fish, birds, domesticates as well as

Fig. 8.7 Cartogram of the potential settlement systems and mobility for Hazendonk sites. Note that the coastal area at this time was available. All site relations are hypothetical.



(imported) emmer and barley, however, somewhat contradicts visits of a short-term extractive nature aimed at trapping otter and beaver. In this light the location may be seen as a successor to earlier Swifterbant use of the site, in which case it was used as a seasonal base camp. This might have functioned within a logistical, seasonally mobile system (model B), or within such a system, in connection to permanent settlements on the wetland margin or upland (model D1). Based on the current evidence a distinct choice cannot be made. In view of the Delfland sites and potential function of the Hazendonk sites in the riverine area, a subordinate role would be likely. This would position the Hazendonk in an auxiliary, but not strictly seasonal, relation towards permanent settlements on the wetland margin (model D4). This option has been depicted in fig. 10.15. In contrast the site P14 seems to represent a more general domestic function. This argues against a subordinate role in relation to more permanent sites elsewhere and in favour of a counterpart, located in a complementary ecozone (model B).

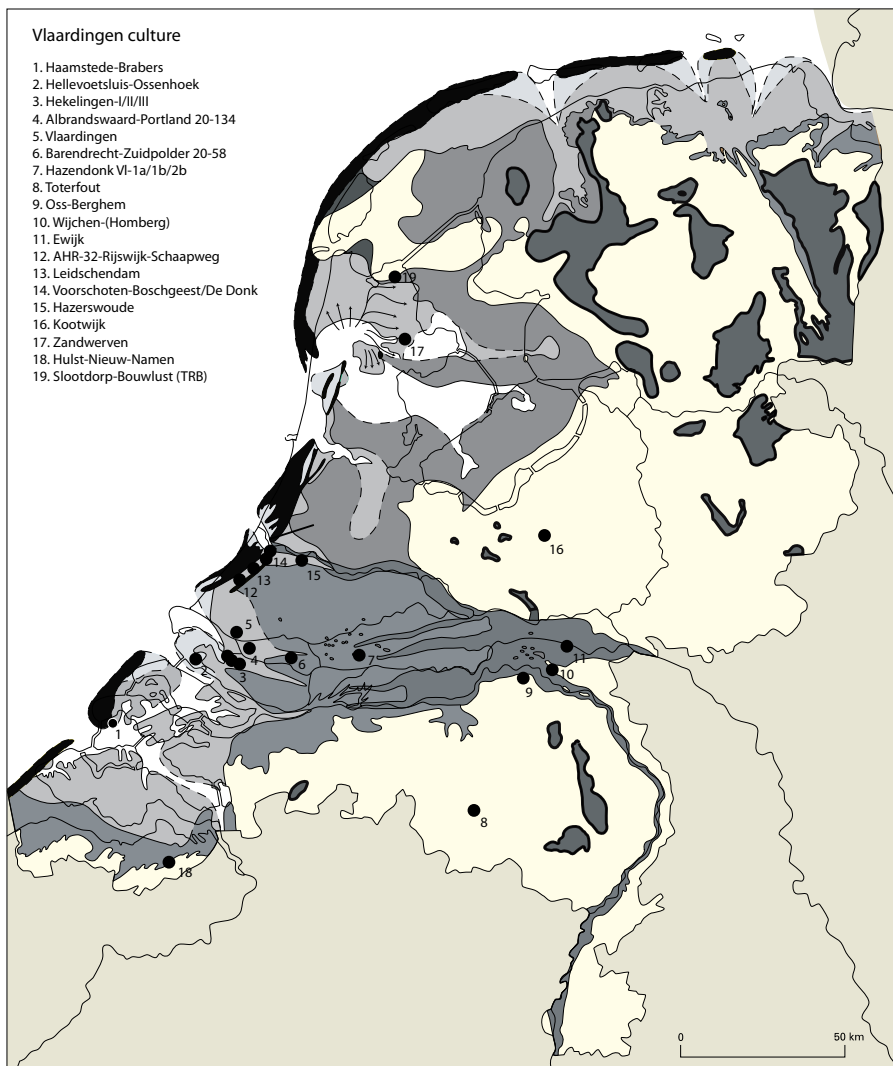


Fig. 8.8 Vlaardingen culture sites and the TRB site Sloodorp, plotted on the palaeogeographical map of the Early Subboreal period, c. 3000 cal BC (adapted from plate 4 in: Van Gijssel/Van der Valk 2005). See fig. 8.2 for legend.

8.1.6 Vlaardingen culture (c. 3400-2500 cal BC)

Finally the settlement system of the Vlaardingen culture will be discussed. Both well-excavated sites and several less informative locations have been included. Sites attributed to the Stein group, such as the recently discovered site of Veldhoven-Habraken (Van Kampen/Van den Brink in prep./2013), are not included, because they are situated further afield and because it is still far from evident how, or to what extent Stein and Vlaardingen interrelate (see Van Gijn/Bakker 2005; Verhart 2010^b). The TRB wetland site of Slootdorp-Bouwlust has been included. The sites are mapped in fig. 8.8.

8.1.6.1 Attribution of function

Vlaardingen sites in the coastal region form a continuation of the increased evidence for sedentism that characterized the previous period. Several sites convincingly may be characterized as inhabited year-round. A number of other locations continue to provide a nuanced perspective regarding the overall degree of permanency in the settlement system and point to diverse choices being made. The sites are presented in table 8.8.

In line with the previous period the most convincing evidence for agricultural sites with year-round permanency is to be found in the coastal and salt marsh region. The evidence (*cf. supra*; durable houses, site location, dominance of domesticated species in the faunal spectrum, and marks etc.), is not distributed evenly, probably due to differences in preservation and excavation methodology. Haamstede-Brabers, situated on the broad coastal barrier, yielded good evidence for a number of rather sturdy houses (Verhart 1992). Both Voorschoten (Boschgeest and de Donk) and Leidschendam yielded faunal spectra dominated by domesticated fauna, comprising all four species. The site of Rijswijk-Schaapweg confirmed this picture with butchering and consumption evidence of cattle, ovicaprids and pigs as well as chaff remains of emmer (Rieffe *et al.* 2006). In line with Schipluiden and Ypenburg, settlements located immediately east of this zone, in the salt marsh area, are also largely characterized by a domestic agricultural signal. The sites of Zandwerven and recently Hellevoetsluis-Ossenhoek (Goossens 2009; 2010) also yielded ard marks (in combination with palynological information) and therewith distinct evidence for crop cultivation. Hellevoetsluis also provided evidence of durable structures, most likely houses and part of a palisade with deep posts. Based on these indications it is appropriate to designate the sites situated in the coastal and salt marsh area as agricultural settlements with year-round permanency. Hellevoetsluis, however, does point out the importance of wild resources. These contribute 40 % of the faunal spectrum. The many fish remains also point to the importance of this particular resource. The site therefore was not fully agricultural. Seasonal evidence indicates that fur animals and water fowl probably were hunted in winter (Goossens 2009, 138), but there is no evidence for absence in other seasons.

The freshwater tidal area, bordering on this region, is characterized by a different type of site. The area was probably less suitable for agriculture and year-round occupation (Raemaekers 2003, 744) and the faunal assemblages of Vlaardingen and to a lesser extent Hekelingen III are dominated by wild species. At Vlaardingen seasonal indicators (mammals, fish and birds) both point to a presence in summer as well as winter (birds; *cf. infra*; Clason *et al.* 1979; Louwe Kooijmans 1987, 250).

At Hekelingen III no distinct season of use could be determined (see Appendix I; Prummel 1987). The fish remains form a strong indicator for a presence between spring and autumn, the many bones of sturgeon pointing to a presence between May and July. The mammal info does not contradict this, although fur bearing species may have been hunted in winter. Some species of bird particularly point to winter presence. Perhaps Hekelingen and Vlaardingen were reused at that time for fowling activities.

The spatial layout and structures at both sites seem to confirm a limited degree of permanency. Both at Vlaardingen and Hekelingen the distribution of waste largely coincides with features and activity areas. The absence of a developed spatial segregation of habitation and disposal areas indicates a shorter-term stay (*sensu* Schiffer 1995). The evidence for dwelling structures confirms this idea. At Hekelingen there is evidence for small lightweight shelters or huts that were repaired and rebuilt, while Vlaardingen shows evidence of postclusters representing frequently rebuilt houses that are of a different nature than, for instance, the ones from Haamstede. Other Vlaardingen sites at Hazerswoude and Barendrecht currently do not seem to contradict such a conclusion (however, see Diependaele/Drenth 2010, 145). The small-scale nature of the site of Albrandswaard (several hearths, hazelnut shells and burnt and unburnt fishremains) indicates the presence of extractive sites in this area.

For the peat marsh area the functional attribution of the Vlaardingen occupation of the Hazendonk is problematic. In line with the previous occupation (Hazendonk-3), the rather specialist faunal assemblage (otters and beavers), in combination with the wetland location of the site would argue in favour of a subsidiary function, perhaps as an extractive site in relation to wetland margin locations. On the other hand, domestic animals remain part of the faunal assemblage, albeit small. Vlaardingen-1b and 2b also yielded macroremains of crops, although these could of course have been imported. The seasonal evidence remains inconclusive, incorporating both summer as well as winter indicators (*cf. infra*; Zeiler 1997, 86), but there is evidence for some structural and artefactual investment. During VI-1a a track of branches was made. A human skull also dates to this phase. VI-1b yielded a canoe, a paddle blade, a bow, and a wooden bowl. Most striking was a wooden palisade surrounding an area of some 35 m in diameter (Louwe Kooijmans 1985; see Appendix I). In combination with the amount of pottery documented and the distribution of the waste layers and the amount of material it is plausible that the site was used intensively. Recently Louwe Kooijmans and Verbruggen (2011) argued that a part of the Hazendonk during VI-1b probably was used in a residential manner. The increased importance of terrestrial hunting (red deer and wild boar) contrasting with the more aquatic focus of the previous period (see Zeiler 1997) may also be brought in relation with this. Furthermore for VI-2b a very slight increase in cattle should be noted (Zeiler 1997, 34), but may not be of significance. Based on these characteristics the Hazendonk sits uneasy, both with an extractive as well as a permanent site function. Although the specialist nature of the faunal assemblage at times argues against the more all-round (extended) broad spectrum of most seasonal sites, domestic species and resources were brought to the Hazendonk and investment and use-intensity seem to surpass the small-scale nature of extraction camps. Furthermore terrestrial hunting increased during phase 2b. Based on these considerations a seasonal domestic function, perhaps with an extractive function during another part of the

site	date cal BC	region	location	seasonality	structures	economy w/d/wd+c	type
Haamstede-Brabers	3340-2900	coastal	coastal barrier	-	houses (3), structures, posts	0 / 1 / 0	permanent
Voorschoten 2-5	c. 2900-2500	coastal	coastal barrier	-	-	42 / 263 / 0	permanent
Voorschoten 6-13	c. 2900-2500	coastal	coastal barrier	-	-	36 / 84 / 0	permanent
Leidschendam	c. 2850-2500	coastal	sand ridge	-	houses (2), granary?, posts	51 / 404 / 10	permanent
Zandwerven	c. 2700-2300	salt marsh	sand ridge	-	pits, posts, ard marks	1 / 47 / 0 + c	permanent
Hellevoetsluis	3000-2800	salt marsh	sand ridge	-	postholes, fence/palisade, ard marks	966 / 1364 / 0 + c	permanent
Vlaardingen	c. 3200-2600	freshwater tidal	levee	summer/winter	houses (2), posts, concentrations	1549 / 668 / 0	seasonal
Hekelingen-III	c. 3200-2800	freshwater tidal	levee	spring-summer/winter	concentrations, post clusters, burial (structure)	618 / 609 / 0 + c	seasonal
Hazerswoude	c. 2800-2500	freshwater tidal	levee	-	hearths, postholes	w / d / wd + c	seasonal
Hazendonk-VI-1a	3270-3090	peat marsh	river dune	-	track of branches	-	seasonal+ extractive?
Hazendonk-VI-1b	3260-2960	peat marsh	river dune	spring-autumn/winter	palisade	411 / 52 / 0 + c	seasonal+ extractive?
Hazendonk-VI-2b	2580-2480	peat marsh	river dune	spring-autumn/winter	-	302 / 24 / 72 + c	seasonal+ extractive?
Ewijk	c. 3100	river clay	levee	-	posts	20 / 528 / 1	permanent?
additional sites							
Voorschoten-De Donk	c. 2900-2500	coastal	sand ridge	-	hearths, pits, postholes	1 / 72 / 0	permanent
AHR-32-Rijswijk-Schaapweg	c. 2900-2500	coastal	coastal barrier	-	-	0 / 30 / 0 + c	permanent
Hekelingen-I	c. 3200-2800	freshwater tidal	levee	-	posts, pit	284 / 107 / 0	seasonal
Hekelingen-II	c. 3200-2500	freshwater tidal	levee	-	-	1 / 11 / 0	seasonal
Barendrecht-Zuidpolder 20-58	3343-2466	freshwater tidal	levee	-	post	w / d / + c	seasonal?
Albrandswaard-Portland 20-134	2877-2581	freshwater tidal	levee	-	hearths	w	extractive
Wijchen-Homberg	c. 3300-2900	wetland margin	dune	-	-	-	permanent?
Oss-Berghem	3300-2900	wetland margin	coversand	-	-	-	special?
Hulst-Nieuw-Namen	3400-2900	wetland margin	slope	-	-	-	permanent?
Kootwijk	3300-2900	upland	coversand	-	-	-	special?
Toterfout	3400-2900	upland	coversand	-	-	-	permanent?
TRB site							
Slootdorp-Bouwlust	3500-3100	salt marsh	artificial	autumn-winter/summer	house/hut, posts/stakes	462 / 256	seasonal

Table 8.8 Basic variables of selected Vlaardingen sites in combination with inferred site-function; ('?') indicates little or no information; 'I' indicates either/or. Also presented is the TRB site Slootdorp-Bouwlust.

year would be most likely. For phase VL-1b such a seasonal residential function even seems a minimal option. This will be discussed further below.

Finally, sites in the wetland margin and upland areas complete the spectrum. Ewijk, located in the river clay area is characterised by a high contribution of all four domesticates in the faunal spectrum. Postholes that were discovered on top of the levee may have formed part of the settlement, arguing in favour of a sedentary site. The levees and the river environment may also have been seasonal locations used in relation to a cluster of sites situated on the wetland margin near Wijchen and Bergharen, where several Vlaardingen sites have been found (see Teubner/Tuyn 2010). Berghem and even Hulst have also yielded evidence for Vlaardingen occupation. Unfortunately preservation at these locations prevents a functional attribution. Only the site locations argue in favour of year-round permanency. A few sites are situated further afield. At Kootwijk on the Veluwe a Vlaardingen pot was discovered. The isolated nature of the find, argues in favour of a pot deposition (Louwe Kooijmans 2010^b). At Toterfout, finally, a small-scale excavation yielded pottery, flint and stone material that may be attributed to the Vlaardingen culture (Van Beek 1977). Based on its geographical location, the site may have been a permanent agricultural settlement. However, its southern location and the quartz temper of the pottery may also be in favour of an attribution to the Stein group, despite rim perforations (see Verhart 2010, 220-221). Because of their specialist nature or questions regarding cultural attribution, these sites will be left out of consideration.

A final location that is included is the TRB site Slootdorp-Bouwlust, characterized by a faunal spectrum with an emphasis on red deer. The seasonal indicators favour a presence during autumn and winter and the cluster of posts indicates a frequently repaired or rebuilt structure. The location of the site in a salt marsh and the repetitive reinforcement of the living area (Hogestijn/Drenth 2000/2001, 44) substantiate the idea of a non-permanent seasonal use of this site. Deciduous teeth indicate the likely presence of complete families.

8.1.6.2 Continued mobility

The settlement system of the Vlaardingen culture generally is interpreted in relation to four geographical regions, each with characteristic site types (*e.g.* Van Gijn/Bakker 2005; Raemaekers 2003; 2005). The first group, located on the coastal dunes and intracoastal ridges, is characterized by houseplans, bone assemblages dominated by domestic animals and some evidence for crop cultivation. The second group involves levee sites such as Hekelingen and Vlaardingen with less evidence for permanent occupation and a lower contribution of domesticated animals. River dune sites such as the Hazendonk with a wild faunal spectrum form the third group. A fourth group consists of sites on the river clay such as Ewijk, the wetland margin, such as Wijchen, and, further afield on the uplands, Hulst and Toterfout, for which an agricultural function may be assumed. This subdivision of Vlaardingen sites has been interpreted as representing elements of a settlement system. Raemaekers (2003, 744-745) suggests that the first group of settlements was probably inhabited year-round by family groups focusing on cereal cultivation and animal husbandry. Sites in the fourth group by extension may be interpreted along similar lines. It is argued (*ibid.*) that sites in the second group were probably inhabited on a seasonal basis by task forces involved in fishing, fowling, hunting

and perhaps crop cultivation. Produce might then be transported back to base sites as known from the coastal area and may have served to survive the lean winter period (Raemaekers 2005^a, 273). River dune sites such as the Hazendonk were interpreted as special activity sites, linked to permanent settlements elsewhere (*e.g.* Louwe Kooijmans 2007, 299; Raemaekers 2003, 745; 2005^a, 273). This suggests that the location of the main sites was determined by the possibilities for nearby cereal cultivation and animal husbandry. These, according to Raemaekers (2003, 745) shifted from being an extension to the broad spectrum subsistence base, to being the major subsistence strategy.

This subordinate interpretation of the Vlaardingen settlement system forms a straightforward explanation, yet the option of an alternative, more heterogeneous system is possible as well. The first interpretation is based importantly on the idea that agricultural sites with (an assumed) sedentary occupation form the main element in the settlement system, while locations with an important contribution of wild resources and a location that seems less ideally situated for animal husbandry or crop cultivation function in a subordinate role. This interpretation foregrounds the role of agriculture in relation to Neolithisation. An alternative perspective may provide a different emphasis, focusing on aspects of continuity and on the characteristics of the involvement of the indigenous communities in the process of Neolithisation in this area.

Alternative options

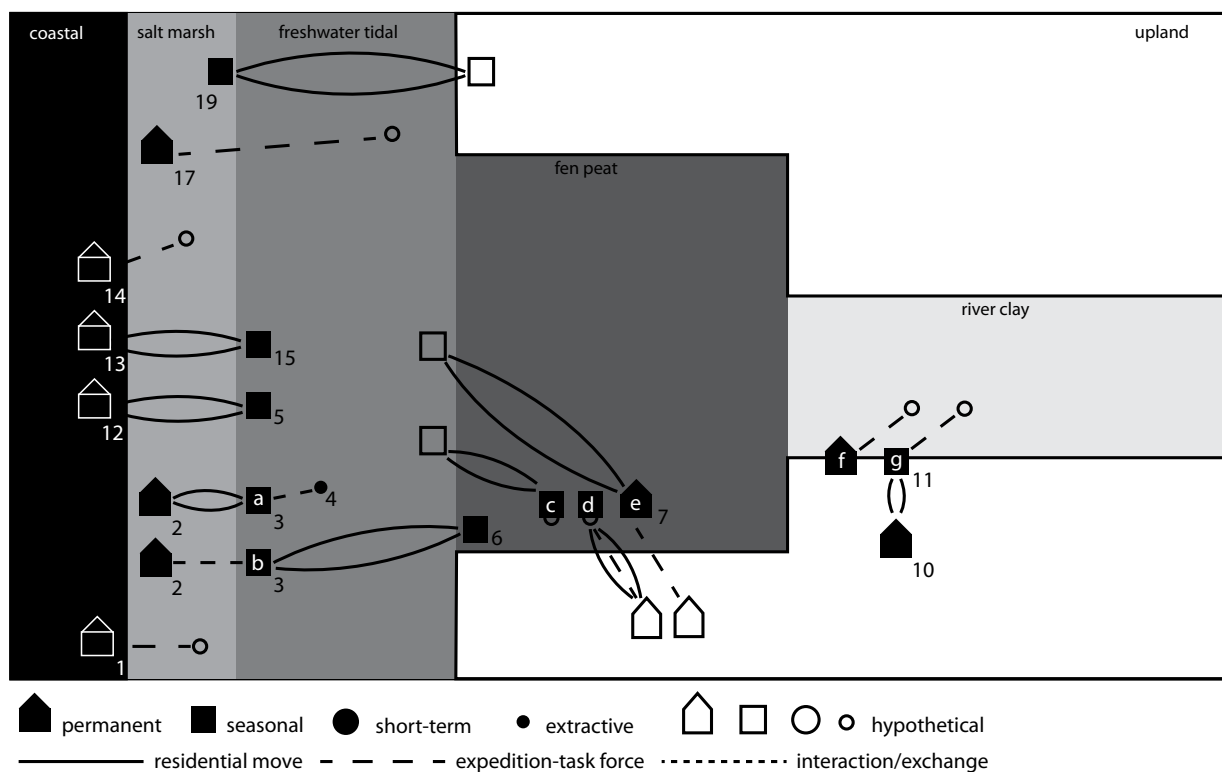
An alternative interpretation of the settlement system may stress the role of the continued flexible use of integrative strategies, although their exact composition remains difficult to establish. Argumentation may be based (partially) on the intra-regional diversity that was mapped for the Hazendonk group as well as on the indications of distinct differences between sites in habitation and economy as mapped for the Vlaardingen locations (*e.g.* Louwe Kooijmans 1993^a, 103; 2009).

The settlement system of the Vlaardingen culture is modeled in fig. 8.9. It is probable that the coastal sites represent permanent agricultural settlements (model A), potentially with extractive locations in adjacent ecozones.⁵ Such a system may also be extrapolated to the wetland margin setting around Wijchen, based on the potential for agriculture there. The salt marsh sites of Zandwerken and Hellevoetsluis would also benefit a year-round agricultural attribution, when emphasizing the arid marks at both locations and sturdy structures at Hellevoetsluis. The significant contribution of hunting (40%) to the subsistence at the latter site, however, does warn against overestimating the role of agriculture in the food economy and, at least hypothetically, opens up a possibility for an alternating use during the year within a mobile system (model E).

In the freshwater tidal zone a different picture emerges that cannot be wedded to an exclusive permanent occupation, nor to an existence mainly based on agriculture. The dominance of wild fauna, especially the cattle-red deer ratio, points to the importance of hunting within a broad spectrum economy (Hazerswoude, Hekelingen and Vlaardingen). This is combined with lightweight, repeatedly curated structures or shelters and indications for a seasonal presence, both for Hekelingen-III and Vlaardingen. The nature of settlement, however, is distinctly residential, including some evidence for mortuary practice (cremations and an excarnation platform, see Louwe Kooijmans 2007^b), and probably involving complete households. For these sites a seasonal occupation seems most appropriate

A similar choice affects the function of the Hazendonk during part of its Vlaardingen occupation (marked 'c', 'd', 'e'). It surpasses the nature of a small-scale extractive site, especially during VL-1b, where the palisade, the distribution and amount of waste and the importance of terrestrial hunting point to a more substantial use that may have been permanent (option 'e'; see also Louwe Kooijmans/Verbruggen 2011). This indicates it functioned in a seasonal system with presence in more than one season (model E), it was used by part of the group, during part of the year (model D4), or it functioned in an intensive relation with a wetland margin location (model D1). In the latter case the specialist activity of trapping otter and beaver, which remained important during the entire use of the site, may be perceived in relation to exchange with a margin site (perhaps in return for domesticates and crops). Similar suggestions have been made for the Baltic area (Zvelebil 1998a; 2006). Relational analogies characterized by such interaction, for instance, are formed by the ethnographically documented Hudson's Bay company fur trade with native Americans (*e.g.* White 1991), or the labour and product relationship between the Mbuti pygmies and the Bantu (Turnbull 1983). Further east in the river clay area Ewijk is characterized by a distinct domestic faunal

Fig. 8.9 Cartogram of the potential settlement systems and mobility for Vlaardingen sites. Note that the coastal area at this time was available. All site relations are hypothetical.



spectrum. The site either represents the marginal zone of a year-round sedentary site (model A; marked 'f') or is a seasonal location for cattle grazing, most likely in relation to permanent settlements in the Wijchen area (model D4; marked 'g').

Finally, the site of Slootdorp probably functioned as a seasonal base in relation to a permanent site situated elsewhere, most likely on the northern Pleistocene soils. It indicates that even within a characteristically Neolithic culture such as the TRB-culture, certain elements and groups in the settlement system adapted considerably to make use of the wetland environment. To what extent this also provides insight into the cultural coherence of these communities remains to be seen.

8.1.6.3 Cautionary tales and alternatives

Based on the available evidence it is currently not possible to define one singular settlement system for the Vlaardingen culture. A subordinate system in which agricultural settlements form the key sites seems to be a too straightforward interpretation. The requirements for successful crop cultivation and animal husbandry and the time and investment involved would make the coastal region, including the salt marsh and the wetland margin the most appropriate area for this. There are, however, a number of sites and arguments that indicate that reality at times was more complex and that a perspective focusing on this diversity and thereby allowing for a more heterogeneous settlement system may form a complementary interpretation.

Economy

Regarding subsistence, crop products found outside of the appropriate regions for cultivation may have been exchanged with communities in, for instance, the coastal or salt marsh area (see Out 2009, 423). These may have been the same communities using both regions. This way Hellevoetsluis produce may have ended up at Hekelingen-III (Goossens 2010). On the other hand, although arid marks are lacking in the freshwater tidal area and further east, crops may have been grown locally as well. This would distinctly involve small-scale practices of cultivation (*cf.* Bakels 1988, 161) aimed at producing a (limited) harvest as an addition to the wild resources (in an extended broad spectrum economy). Similar indications for local cultivation have been suggested and discussed for earlier periods (Cappers/Raemaekers 2008; Out 2009, 412) and documented ethnographically (*e.g.* Griffin 1989). The difference between minimal surplus producing systems and ancillary cultivation systems, or their combination (see Freeman 2012 and Chapter 7) adds a further aspect of choice and diversity to this. The idea of a settlement system with agricultural and largely non-agricultural sites here thus depends on the (quantitative) importance attributed to crop products (see also Bakels/Zeiler 2005, 327) and their role in subsistence. These considerations may also reflect upon the contribution of domesticates and become even more complex if nomadic specialization (*cf.* Cribb 1991) and exchange are involved.

System

Related to these economic issues and operating side by side to cultural preferences are fundamental behavioural rules, underlying the subsistence and mobility system, including aspects of optimization and risk minimization (Winterhalder/Kennett

2006, 11). If the incorporation and contribution of domesticates and cultigens is optional rather than traditional, then investment in agriculture likely will have been lower in areas of high hunting and gathering returns (Barlow 2002, 70-75). This then raises the question whether scheduling and management of time and resources allows certain combinations of sites. Does the high proportion of hunting and, likely, fishing at Hekelingen and Vlaardingen combine well with agriculture at the same sites, or investment in agriculture at sites that may have been occupied by the same group during other parts of the year (*e.g.* Hellevoetsluis or Leidschendam)? Why would a seasonal move of (part of) the group be preferable compared to task forces from fixed coastal settlements, or perhaps relations of exchange? What does annual group fissioning say about the 'fully Neolithic' character of the agricultural sites in view of the increased time and energy inputs traditionally associated with an agricultural existence (Harris 1989, 20; Winterhalder 2006, 298-303; Zvelebil 1986^a)? These questions not only reflect upon an annual modeling of mobility, for which we often lack the necessary resolution, but also relate to other issues such as investment in structures and facilities, local knowledge, group tradition, environmental dynamics, territorial claims etc.

Houses

While these issues cannot be resolved easily, other factors also colour a choice between a subordinate or a more heterogeneous system, with respect to the Vlaardingen settlement system. Regarding material culture, houses of a durable (sturdy) nature have been argued to be indicative of increased permanency (*cf. supra*; Louwe Kooijmans 1993^a, 92). The Haamstede structures and potentially those of Hellevoetsluis argue in favour of this type of occupation in the coastal region, especially in view of the Wateringen and Ypenburg houses from the preceding Hazendonk occupation. Other regions lack these structures and show evidence of more frequently curated lightweight structures or shelters (Vlaardingen and Hekelingen). For the Haamstede site Verhart (1992, 93-95) argues that, based on its location, the assumed importance of hunting, and the nature of other Vlaardingen structures, permanent habitation may not have taken place. While this is hypothetical based on the evidence available some caution is required when other indicators are absent (*cf. supra*).

Material culture

Another perspective is offered by the lithic component in the material culture spectrum. As argued earlier, one of the significant characteristics of the Vlaardingen sites as a whole is the heterogeneous nature of their lithic raw material supply (see table 7.2). Several coastal settlements are characterized by artefacts produced on rolled flint (nodules). A use of northern flint has been suggested for Zandwerven as well as Leidschendam. At the Hazendonk there is a combination of (mainly) terrace flint and import products from the Rijkholt and Hesbaye area, while both Hekelingen and Vlaardingen are characterized by an important contribution of 'exotic' flint deriving mainly from Spiennes or northern France (probably the Boulogne coastal area). This is less so at Hellevoetsluis. Although new research regarding the identification of the various source materials is in place (Amkreutz 2010^b, 22), there are characteristic differences representing site-specific resource networks. If, for instance, the coastal and freshwater tidal sites are assumed to

operate dependently within one settlement system (*e.g.* Van Gijn/Bakker 2005; Raemaekers 2003), then one would expect more similarities in the (transported) raw material component.

History, choice and flexibility

A final nuance is offered by a historical perspective. In addition to perceiving the Vlaardingen culture settlement system as a subordinate system with key agricultural sites (*cf.* Raemaekers 2003), one may adopt a point of view that stresses the historically flexible and adaptive relationship with the wetland environment. In this respect the agricultural components are perceived as options within a spectrum, implying that different combinations and emphases in procurement and mobility may have operated simultaneously. The existence of such group agency has been demonstrated earlier for the Hazendonk group in the Delfland coastal area. Although this concerned sedentary settlements in an ecologically homogenous setting (see Louwe Kooijmans 2009), and although ecological arguments, at this time, form the primary, and only archaeological, explanation for the differences between (Vlaardingen) sites located in different ecozones, a more culture-wide extrapolation of this behaviour and the group agency associated with it may be in place regarding the long-term continuity in communities, practices and landscape dynamics involved. The long-term existence of this behaviour is substantiated by the historically flexible use of the wetland landscape in previous periods (*cf. supra*). Some of the sites arguing in favour of such a tradition will be discussed later on.

By means of conclusion

It is difficult to decide on a singular settlement system for the Vlaardingen culture. Based on factors of permanency and previous occupation, the coastal and salt marsh sites may be perceived as permanent year-round settlements, with an important agricultural character. In this respect it is plausible to suggest a subordinate relationship with sites located in other ecological zones. It may even seem illogical to assume different types of settlement systems operating simultaneously, especially when sites are situated in each others direct vicinity, such as Hellevoetsluis and Hekelingen, or when sites with a specialist character are involved, such as the Hazendonk with its game dominance. On the other hand, when the emphases are placed elsewhere, different options emerge that may reflect on, at least part, of the settlement system. Agriculture (cultigens and domesticates) may have formed a varying and relative contribution at a number of sites. Houses were of different structure, design and durability and different raw material networks operated at the same time. When incorporating mechanisms and strategies, such as (partial) group mobility, inter and intra-group exchange and complementary resource specialization, a more heterogeneous image of a settlement system emerges. The complex internal logistics defining these settlement systems remain difficult to determine or grasp archaeologically, but they do form an aspect of past existence that is real and should be taken into consideration. Moreover, in view of the consistent characteristics of the long-term interaction between communities and the wetland landscape and the issues of flexibility and pragmatism discussed earlier, this is a worthwhile perspective to incorporate. Concluding, it may be stated that although largely of a hypothetical nature the heterogeneous characteristics that potentially underlie the Vlaardingen settlement

system and that build upon an extensive use of the integrative strategies available form a complementary perspective on determining and interpreting (subordinate) site relationships.

8.1.7 Conclusion

The overall aim here has not been to define the settlement system of the Vlaardingen culture or previous periods, nor to determine the composition of integrative strategies over time. Based on the current evidence, it is argued here that such a definition cannot yet be made and that only rough periodical trends may be sketched. The most important of these seem the following. For the Late Mesolithic, including the ceramic Mesolithic of the Early Swifterbant period, site characteristics and their landscape locations suggest that, apart from potentially residentially mobile systems on the northern coversand, logistically mobile systems were in operation. In the case of the delta sites of Polderweg, De Bruin and potentially Maaspoort a settlement system seems to have developed with an important focus on wetland exploitation from wetland or wetland margin settings that is characterized by an increased degree of permanency and investment (*cf.* Chapter 5; see also Nicholas 1998^{a,b}; 2007^{a,b}; Van de Noort/O' Sullivan 2006). In the following period this system of logistical mobility characterized by seasonal sites in combination with extraction camps becomes the 'standard' for the Middle Swifterbant occupation in the research area. This logistical mobility seems to have been combined with animal husbandry, exchange of crop products, or small-scale local cultivation. There is no conclusive evidence for year-round permanency, while some sites (most notably Doel) indicate the continued possibility of short-term occupations. In view of Binford's argument (1980; 1982) of a continuum of opportunities ranging from residential to logistical mobility, it seems appropriate to expect intermediate types of mobility in relation to site location and exploitation of the environment. During the Hazendonk and Late Swifterbant occupation two types of settlement systems emerge. On the one hand several sites in the Delfland coastal area provide convincing evidence for year-round permanency, in combination with an important contribution of agricultural resources. This, however, is combined with distinct differences in type of occupation, subsistence spectrum and other aspects such as burial (*cf.* Louwe Kooijmans 2009), arguing in favour of an important degree of group agency. Other sites continue to provide evidence, albeit of limited quality, for the continuation of seasonally occupied locations in a system of logistical mobility. During the Vlaardingen occupation we see a continuation of this system with year-round permanency and an agricultural subsistence base. Most evidence concentrates in the coastal area, including the salt marsh. The main question is whether these sites in this period should be perceived as the main elements in the settlement system, as such making sites in other regions (most notably the freshwater tidal and peat marsh area) subordinate locations with an auxiliary function. Based on the current evidence available, this study argues that such a conclusion is premature.

Different options, contrasting sites

When emphasis is placed on agricultural contribution from a perspective dealing with (economic) Neolithisation, then a subordinate system would be the most plausible option. When emphasis is placed on the long-term characteristics of

the communities involved in relation to landscape and environment interaction, then a more heterogeneous system may be supposed. In general it can be argued that a certain development in site function and settlement system, as sketched above, existed and that there was a general development in settlement types and interaction (see fig. 8.10). Yet, certain sites continue to form a cautionary tale with respect to the general nature of such a development. A few examples may be highlighted (see above and Appendix I for further details). For the Middle Swifterbant period the site of Schokland-P14 provides the best location for an emphasis on the contribution of agriculture to the extended broad spectrum economy. The evidence from multiple phases of occupation, however, more convincingly points to seasonal use of this location and an emphasis on the exploitation of wild resources. Swifterbant-S3 and S4 furthermore point to the way in which these agricultural components may have been incorporated in logistical mobility. For the Hazendonk period, the agricultural signal of the Delfland sites is contrasted by other locations that indicate different site functions. In the coastal area Wateringse Veld and to a lesser extent Wateringen-4 represent locations that may have been occupied in a non-permanent manner. Barendrecht-Vrijenburg and Gassel also point out the existence of non-permanent, seasonal or short-term sites and extractive locations in other areas. These form a contrast to the permanent agricultural settlements. For the subsequent Vlaardingen period these contrasts exist as well. Sites such as Hekelingen and Vlaardingen demonstrate the continued presence of seasonally occupied residential sites operating next to or in relation with permanent coastal settlements. The Hazendonk, in this case, sets even more of an example. Situated in the encroaching peat marsh, the specialist economy of this site during its previous occupation phases, focusing on

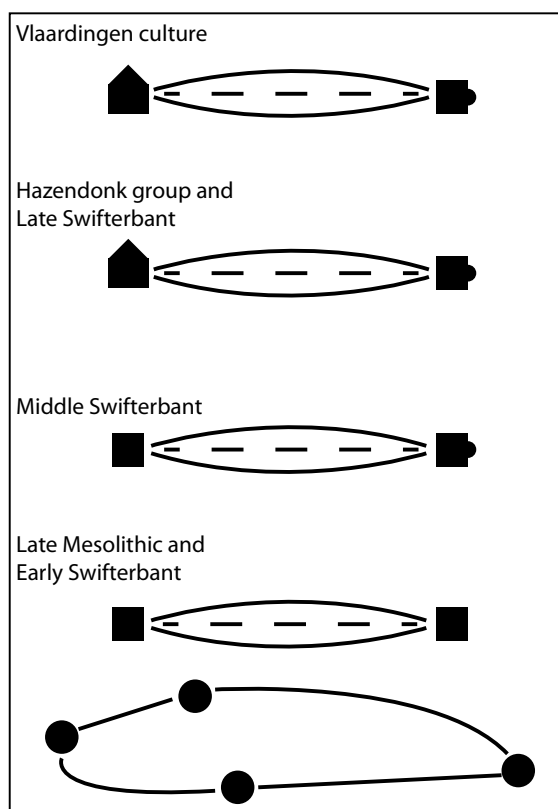


Fig. 8.10 General development of the site relationships and mobility type in the settlement systems from the Late Mesolithic to the Vlaardingen culture.

otter and beaver, became more terrestrial in nature during the VI-1b phase. In combination with the palisade and the amount and distribution of refuse, an at times residential function of this site may be assumed as well as a certain degree of permanency. Similarly, the TRB site of Slootdorp-Bouwlust forms a seasonally occupied residential site. It may indicate the existence of an element that adapted to the exploitation of the wetland environment in the otherwise generally fully Neolithic TRB culture. It also points out the question whether this site is a local adaptation of the TRB culture, or whether the latter is the 'cultural veneer' of a regional wetland adaptation.

The main contribution of this chapter with regard to the interpretation and development of settlement systems then is to emphasize that certain sites contrast with what would be expected when modeling settlement systems and community interaction from a parsimonious perspective. Partially the origin of these contrasts hypothetically may be placed with the long-term characteristics of these communities in their dealing with the wetland environment and the related aspects of flexibility and pragmatism that have been discussed here. They indicate the continued existence of diversity in settlement systems and strategies of these wetland communities. In any case these sites with their divergent characteristics signal the existence of a past reality that is far more complex and that deserves attention in our interpretations.

A note on integrative strategies and settlement systems

The considerations mentioned above, may seem abstract at the level of settlement systems. Due to the qualitative and quantitative nature of the evidence available we have to hypothesize on the character and combination of the integrative strategies involved. Nevertheless, some long-term particularities may be noted, some of which may be documented, others (partially) inferred (*e.g.* 5 and 6).

1. The diversity in wetland landscapes that were occupied, used and combined, comprising the five major ecological zones mentioned earlier.
2. The different orientation of raw material networks and their implications regarding hinterland, territory and cooperation.
3. The different characteristics and emphases in the subsistence spectrum, accounting for the contribution of hunting, fishing and fowling versus animal husbandry and the difficult question regarding local production versus exchange and/or transport of crops.
4. The differences in housing, structures, settlement layout and other practices.
5. The importance of a degree of residential mobility whether independent or in relation to a permanent settlement.
6. The potential options involved with respect to mechanisms such as group fissioning, task division and exchange.

Most of these aspects are characteristic for most of the occupation of the wetlands and their margins during the time period between 5500/4500-2500 cal BC (depending on the first introduction of domesticates and cultigens). From that perspective it is assumed that they reflect part of the behavioural as well as socio-ideological identity of the communities involved. As such they form more or less measurable aspects of the *mentalité* of the groups inhabiting this wetland landscape. Based on this it may be argued that with the long-term and large-scale trend of an increasing reliance on agriculture and an increasing importance of

permanency the overall composition of the integrative strategies involved changed or developed. On the other hand their underlying importance may have remained constant as they continued to offer flexible and pragmatic ways of dealing with the wetland landscape. This innate coupling of communities, strategies and environment may provide a good framework to study these communities from a long-term perspective. It also offers a perspective on the particular developments of Neolithisation in this area. This will be discussed in the following paragraphs.

8.2 Discussion: making a short story long again?

The interpretation of the duration and development of Neolithisation in the ‘Dutch delta’ has been characterized mainly as a long-term and gradual process spanning some two millennia (Louwe Kooijmans 1993^a; 2007^a, 305-307; Raemaekers 1999). The transition as a whole has generally been viewed against the background of the ‘availability-model’ (*cf.* Zvelebil/Rowley-Conwy 1984) in which the LRA situation has been characterized by long availability and substitution phases. In the past decade the ‘long transition model’ has been challenged by a ‘short transition model’. Raemaekers (2003) argued that the available evidence also can be interpreted to suggest a short transition in which the consolidation phase is reached in or perhaps before the Hazendonk group. Based on the ideas expressed above, I want to demonstrate that this interpretation and the choice between a short and long transition model is strongly dependent upon the premises and definitions chosen (*cf.* Louwe Kooijmans 2007^a, 307). A perspective focusing on indigenous behavioural aspects in relation to landscape accentuates different sides of the transition to agriculture. In view of these a long transition model seems most plausible.

8.2.1 *Cutting a long story short: premises*

The argumentation for the short transition model is based on a number of premises. The first of these is the custom, in archaeological discourse, to describe the process of Neolithisation in terms of food production (Raemaekers 2003, 740). The ratio between wild and domesticated animals (preferably ungulates) forms the best index to measure this since it reflects dietary contribution, is reasonably well represented archaeologically and quantifiable. This ratio may be used to define the three stages of the availability model (*cf.* Zvelebil 1986^a; Zvelebil/Rowley-Conwy 1984; 1986). Raemaekers (2003) avoids the difficult distinction between domestic and wild pig by creating a separate pig category.

The faunal representation at Swifterbant, Hazendonk and Vlaardingen sites may be mapped for these three categories which, generally, results in an apparent substitution phase during the Swifterbant culture and a consolidation phase in the Vlaardingen culture. Raemaekers (2003, 744-746) argues that the domestic faunal contribution in combination with evidence for sedentism and cultivation in the coastal area during the Hazendonk period indicates that the actual consolidation phase may be placed in or even before the Hazendonk period. This interpretation is supported by the argument that the faunal assemblages differ more with respect to different environments, than they do over time in a similar environment (Raemaekers 2003, 745). Furthermore, it is argued that the coastal erosion that took place before 4000 cal BC prevents the discovery of potentially earlier Swifterbant sites with an agricultural ‘signature’. Based on this

coastal agricultural argument, the absence of earlier evidence and similarities in the use of landscapes over time, it is proposed that the process of Neolithisation in the Dutch delta was likely short (*ibid.*, 746).

A circular argument?

I want to comment upon the underlying ideas of this approach here. In particular I want to touch on some of the model's premises, such as the interpretation of subsistence, and the function of sites and their position in the settlement system. With respect to subsistence, the lumping of domesticated animals, wild fauna and pigs in three groups blurs the internal differentiation between sites (*cf. supra*). Moreover, the category of pigs remains multi-interpretable. However, while a comparative study of terrestrial meat consumption may be the most informative, the importance of other resources, such as fish and fowl should not be underestimated (*e.g.* the isotope study at Schipluiden; Smits/Van der Plicht 2009; Smits *et al.* 2010). For instance, while the 50% domesticates boundary is passed at Wateringen-4 (Raemaekers 2003, 133), sites where natural resources dominate continue to exist until the Vlaardingen culture. Next to this, the prime position that is given to faunal remains in the context of the 'availability model' and the way in which other data are interpreted forms another determining factor in mapping the development of Neolithisation. The (beginning of) the end of the Neolithisation process in a certain region is formally set at the moment when domesticates (and cultigens, *cf.* Zvelebil 1998^a) account for 50% or more in the assemblage of a single site. This 'formal' arrival at the Neolithic then also colours the manner in which the subsistence spectra of nearby sites as well as site function and settlement systems are interpreted in a dualistic manner.

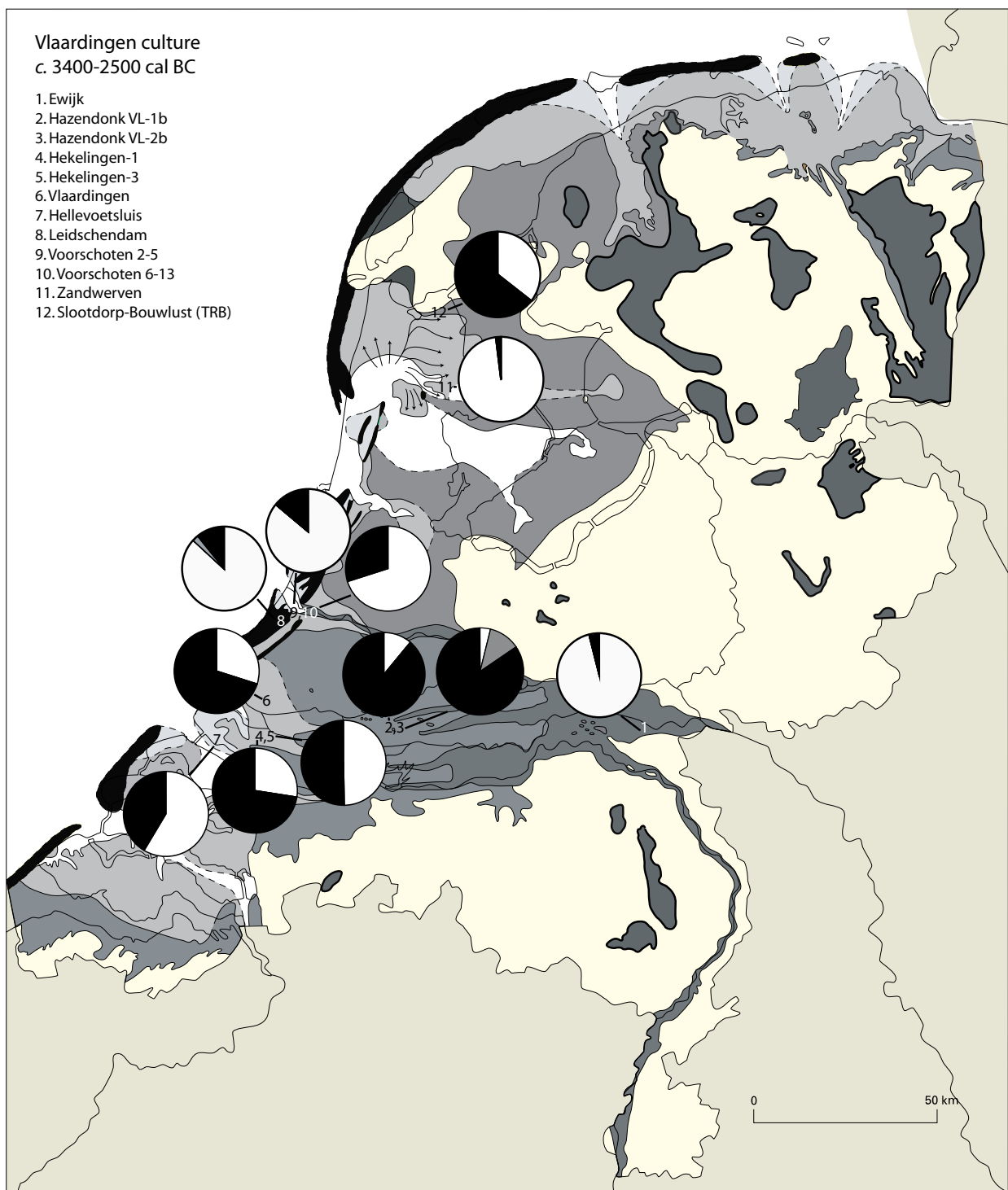
An additional factor is whether the sites with the strongest Neolithic signature are used as the central elements in the settlement system, or whether a more heterogeneous approach is adopted. In the case of the former, it is attractive to suggest a linear development. It has been argued that the Swifterbant culture was probably characterized by a residential mobility system, because of the presence of seasonal sites and absence of evidence for year-round occupation or long-term residential settlements in dryland areas (Raemaekers 1999, 121). Based on similarities between the faunal spectra of the Hazendonk group and the Vlaardingen culture (Raemaekers 1999, 160), this residential mobility is then contrasted with a system of (more) logistical mobility for these periods, characterized by the appearance of year-round agricultural settlements (*ibid.*, 1999, 192; 2005, 276).⁶ These, from the Hazendonk period onward, have often been interpreted as the central elements in logistical systems (*cf. supra*; Raemaekers 2003; 2005^a; see also Louwe Kooijmans 2007^a, 299). As argued by Raemaekers (2003, 745) the location of base camps became determined by the possibilities for nearby cereal cultivation and animal husbandry. These shifted from being an extension to the broad spectrum base to being the major subsistence strategies.

These considerations demonstrate that the choice for a shorter or longer transition to agriculture in the study area depends upon the emphasis that is placed upon certain elements of subsistence and the settlement system. It also depends on the interpretation of residential and logistical mobility, and whether a prominent role is attributed to sites characterized by Neolithic characteristics and year-round permanency.

8.2.2 *An approach of alternatives*

In chapters 7 and 8, emphasis in the interpretation of the developments in the study area during the transition to agriculture has been placed differently. Regarding subsistence, the interpretation of faunal remains is not aimed primarily at the contribution of domesticates. For the Swifterbant culture the restricted data available only allow for a limited comparison, yet point to choices being made that importantly yet not exclusively relate to the environmental situation (see 8.1). At P14, for instance, the available space and conditions on the outcrop did not lead to a convincing emphasis on domestic resources and agricultural practices. Similarly, the site location choice at Swifterbant and the Hazendonk did not favour an important agricultural function, while at the latter site cattle forms an important contribution to the economy in the first phase, contrasting with the importance of, for instance wild boar and pig at S3. In this respect Raemaekers (1999, 113, 117) argues that the wide variation in the natural surroundings of the Swifterbant sites is not reflected in the mammal bone spectra, suggesting a cultural preference rather than exploitation of the specific possibilities of the natural environment. Although this forms a factor, this argument seems overstated. It is argued here that ecological margins form a primary factor in explaining the economic diversity witnessed, yet communities made choices from a set of options (within the ecological margins). This provides a number of variations combining domestic and wild resources with a distinct degree of residential mobility. Later, within the Hazendonk group year-round permanency is documented for (coastal) sites with an important agricultural contribution, yet the Delfland case-study indicates that different subsistence choices still were being made by contemporaneous communities, even in comparable ecological settings (Louwe Kooijmans 2009). This underlines that while natural differences account for most of the variation between sites situated in separate ecozones, and archaeologically often will form our only means of investigation, the element of choice and group agency should be taken into consideration. In relation to this, the isotope data collected at Schipluiden (Smits/Van der Plicht 2009; Smits *et al.* 2010) demonstrate that marine resources made up an important part of the diet at that site which, based on faunal and botanical evidence would be characterized as terrestrial and agricultural. Based on the argument of cultural continuity this continuation of choices made on the community level may also be suggested for the subsequent Vlaardingen culture where we see both a distinct agricultural element emerging that is rooted in the previous Hazendonk group as well as an ongoing emphasis on the exploitation of a variety of wild resources and an occupation and use of various wetland zones. This diversity with respect to the contribution of wild and domestic resources is demonstrated in figure 8.11.

It may be argued that the diversity we see in subsistence with respect to wild and domestic resources is already present during the Swifterbant period and continues into the Vlaardingen culture. Coastal and (hypothetically) wetland margin sites offered the best conditions for livestock herding and crop cultivation, yet domesticates and cultigens were not confined to that area, nor was their importance within that area always consistent.⁷ The presence of earlier agricultural coastal sites in the Swifterbant culture (*cf.* Raemaekers 2003) seems unlikely since the area would have been too dynamic to farm (*pers. comm.* Louwe Kooijmans 2011). This argues for a late start of truly agricultural settlements (not



before the Hazendonk group), but moreover points to these being part of a more elaborate range of settlements with a seasonal character and an important focus on wild resources. Overall, rather than the dietary contribution of domesticates and cultigens, it is the intra and interregional differentiation with which these resources were exploited that seems most defining for the developments taking place. This continuity in using and combining the integrative strategies available

indicates that the contribution of domesticates and cultigens should be analysed primarily against the environmental background but should not be predominantly interpreted from a 'farming perspective' (Amkreutz 2010^b, 19).

This is substantiated by the evidence available on settlement systems and the way in which integrative strategies, including mobility and exchange, may have functioned within these (see 7.4 and 8.1). Next to the earlier mentioned appearance of year-round permanency, it is the variability in strategies and mobility, as evidenced by faunal spectra, housing, seasonality, site location choice and site structure that forms a constant factor over time. Combined with the fact that we are dealing with indigenous communities and regional cultural developments, it is plausible to see the later evidence of diversity as rooted in the Mesolithic (e.g. Louwe Kooijmans 1993^a, 103). There is thus a certain continuity in the ways of employing flexibility and combining integrative strategies.

8.2.3 What about 'the uplands'?

The focus in this chapter has been on elucidating the characteristics of the subsistence and settlement system of the LRA wetland and wetland margin communities. It is the question whether these wetland settlements formed the 'wet part' of a settlement system that also included upland or dryland sites, for instance on the Pleistocene coversands of Brabant, the Veluwe or the Drenthe-Frisian coversand area.

The chapters dealing with the Late Mesolithic occupation have indicated that a wetland orientation of certain communities is likely (see Chapter 5). For the Swifterbant culture, there is evidence of chance finds away from the delta, but these (Winterswijk, Bronneger) are situated locally in wetland settings (stream valleys etc.). Other evidence, such as the distribution of perforated wedges (Van der Waals 1972), or more recently arrowheads (Crombé/Sergant 2008; Niekus 2009) and the presence of palynological signals (Bakker 2003^{a,b}), points out that the Pleistocene landscape definitely was used during the Swifterbant culture. The evidence is difficult to interpret due to differences in taphonomy (see Chapter 4). In general (and for now) a logistical (task-related) exploitation of the uplands instead of the existence of a distinct domestic and occupational SWB upland counterpart appears likely. While evidence of absence does not imply absence of evidence the argument here may be based on the nature of the evidence in the wetland and wetland margin area. The distinctly residential wetland orientation attested there indicates that these areas formed an important aspect of the settlement system and mobility rounds of these communities. As argued earlier it should be questioned whether this investment allows the existence of an equally important upland counterpart or presence. Crombé *et al.* (2011, 11-12; Crombé/Sergant 2008) also comment upon the absence of Swifterbant sites in dryland areas, since all of the Belgian sites are situated in the Scheldt floodplain. In correspondence with this study they see the wetland orientation of the Swifterbant communities in relation to a Final Mesolithic displacement towards lower and wetter grounds (which expanded rapidly in relation to the sea-level rise). The hinterland would be used predominantly in a non-residential manner. For the subsequent Hazendonk group and Vlaardingen communities an additional argument may be given by the fact that most evidence also concentrates on the wetlands.⁸ Apart from these arguments there is increasing evidence from the Middle Neolithic onwards that some areas

Fig. 8.11 Vlaardingen faunal complexes, including the TRB site Sloodorp-Bouwlust, divided by wild (black), domesticated (white) and indeterminate (grey), plotted on the palaeogeographical map of the Early Subboreal period, c. 3000 cal BC (adapted from plate 4 in: Van Gijssel/Van der Valk 2005). See fig. 8.2 for legend.

verging on the wetlands and their margins were inhabited by the Michelsberg communities, and later by those of the TRB culture and Stein group.⁹ It seems therefore that the wetlands and their margins formed an important (cultural) basis for the communities studied here.

8.2.4 Neolithisation: a long transition again?

The answers to questions regarding the development of Neolithisation remain a matter of choice, based on the premises chosen (see Chapter 2). It should also be realized that a discussion on the process of Neolithisation differs from defining (an artificial) boundary for the Neolithic. Concerning the latter issue, this study argues against such a distinction being made for the study area and the communities involved. The appearance of settlements with a faunal composition incorporating 50% domesticates or more, as well as increased evidence of crop cultivation and sedentism can be positioned in the mid of the 4th millennium. In view of the approach taken by Raemaekers (2003), this argues in favour of a shorter transition to the Neolithic; being completed at the time of the Hazendonk group or even before (if absence of evidence is taken into account (*ibid.*, 746)). While the period of transition is less extended (*c.* 1800 instead of 2500 years), it remains gradual in nature, since evidence abounds for the continued importance of wild resources. The emphasis, both with tracking Neolithisation as well as in determining the nature of the settlement system, often lies with the 'Neolithic' side of the spectrum. The contribution of domesticates and cultigens to the subsistence base is interpreted as having shifted from an extension to being the major subsistence strategy (*cf. supra*). While evidence for this scenario initially appeared most convincing for the Vlaardingen culture, excavations at Wateringen and more recently at Ypenburg and Schipluiden have pushed back this threshold, enabling a shorter transition.

Re-addressing the balance

This perspective, although it informs us on the duration of the transition to agriculture, limits insight into the dynamics of the period and the communities involved. If emphasis is placed on the strategies and behaviour of these groups, a different picture emerges, one that stresses continuity and an incorporation of novel practices and products that did not lead to abrupt changes, instead of a 'relentlessly' advancing Neolithisation. Focusing on behaviour highlights the way communities dealt with the potential changes in this period. It stresses the flexible, pragmatic manner in which they operated in the wetland landscape and made use of the resources available. Mobility, wild resources and heterogeneity of subsistence between sites remain typical as late as the Vlaardingen culture. In this respect, the idea that cereal cultivation and animal husbandry shift from being an extension of the broad spectrum subsistence base, to being its major component is a matter of perspective. Firstly, not all of the sites of the Hazendonk group and Vlaardingen culture demonstrate convincing evidence regarding the primacy of animal husbandry, crop cultivation and sedentism: a number of residential sites was inhabited seasonally (see 8.1) and shows an important contribution of wild resources. As argued above, their placement in a subsidiary role with respect to sites of a more agricultural nature is a matter of debate and currently of alternative interpretations. Secondly, in those places that are most suitable for agriculture, *i.e.*

the sites in the coastal area, evidence for its contribution in the Hazendonk period (*cf.* Louwe Kooijmans 2009; Smits *et al.* 2010) and to a lesser extent during the Vlaardingen culture (*e.g.* Hellevoetsluis; see Appendix I; Goossens 2009) point to differences in importance between sites. Choices were not always aimed at expanding the agricultural component of the spectrum. Thirdly, the adoption of domesticates and cultigens does not inform us directly on their impact on the lifeways of these communities. In other words, an increased or increasing contribution of domesticates and cultigens as well as sedentism may have become part of the repertoire of options, characterized here as integrative strategies.

It may be argued that while from our perspective the appearance of Neolithic elements (objects, practices, agriculture and sedentism) may form crucial developmental stages characterizing the process of Neolithisation, they may have been incorporated and assimilated into already existing practices of living in the area. Viewed from the position of the communities involved, continuity in *habitus* is a characteristic aspect of these groups. From that perspective it is more appropriate to conclude that the process of Neolithisation had not yet ended in or during the Vlaardingen culture and to opt for a gradual and long transition to agriculture.

8.3 Unsettled issues, continued practices

Chapters 7 and 8 have dealt with behavioural flexibility, pragmatism and community agency in the succession of communities from the Late Mesolithic to the Vlaardingen culture. This was done from a long-term perspective focusing on habitation, the diversity of strategies employed and the integrated relationship between communities, landscape and environment.

8.3.1 *Land owns people*

As argued in 7.2, landscape and environment are not neutral (Pollard 2000) and form an important constituent of the identity of a region's inhabitants. They also form a factor for understanding the actions and decisions of local communities (Brück 2005; Louwe Kooijmans 2000; Schama 1995). The wetlands and wet margins of the LRA can be defined as an area characterised by diversity. The environment was relatively rich. At the same time there is evidence for landscape dynamics. The coastal area only stabilized during the 4th millennium and sites in the intracoastal plain, the riverine marshes and northern lagoons slowly submerged due to rising groundwater levels. The landscape thus changed continuously. Much of this change will have been gradual and slow, while other changes may at times have been quick, unexpected and dramatic (Leary 2009; Sturt 2006). Living in such a dynamic environment meant that inhabitants had to deal with changing patterns of expectation and anticipation. They had to adapt or cope with altered circumstances, to maintain their way-of-life, at least by temporarily reducing the effects. The sites yield evidence of the ways in which people dealt with these changes, for example by reinforcement, mobility, abandonment or shifts in site function. The fact that sites were only temporarily abandoned, or changed function rather than being given up shows flexibility on the part of the communities, but also constancy in the importance of specific places.

It is suggested here that living in a wetland landscape transcends purely ecological and temporal boundaries and on a more metaphysical level influenced the characteristics and behaviour of these communities. The wetlands and the way they were occupied over time forged a regional identity (*e.g.* Harrison 2004; Van de Noort/O'Sullivan). Understanding the characteristics of this type of inhabitation may also shed new light on the process of Neolithisation in this area.

8.3.2 *Subsistence and settlement systems*

Chapters 7 and 8 stressed the continuity in the varied use of resources and strategies. While over time the contribution of domesticates and cultigens increases and sedentary settlements appear, indicating progress from a Neolithic perspective, there is evidence for the continued importance of wild resources, of flexible and pragmatic combinations of strategies and of mobility.¹⁰ This means that the extended broad spectrum economy should be studied not only for the contributions of wild and domestic fauna, but also for the way in which the available resources were used and to what extent this follows logically from the local ecological situation. It appears that within the margins of the environment there was a certain degree of liberty in 'composing' the menu. With regard to settlement systems the role of the 'upland' and the relationship between sites in different regions is unclear. However, next to a model that combines upland and wetland elements in one settlement system, as has been suggested before (*e.g.* Van Gijn 1989; Van Gijn/Bakker 2005; Raemaekers 1999, 123; Louwe Kooijmans 1986; 1993^a), the (earlier) idea of specifically, though not exclusively, wetland oriented communities has been raised. The mapping of Neolithisation, through material and economic contributions favours an early start of the Neolithic, or the consolidation phase (*cf. supra*; Raemaekers 2003), implying a major role for residential (semi-) agrarian sites in the coastal area during the Hazendonk and Vlaardingen periods and more subsidiary functions of locations elsewhere in the Delta. However, the absence of convincing residential upland indicators for the period studied (in combination with ethnographic case studies offering different options), and the dynamic conditions in the coastal area previous to *c.* 4000 cal BC, argue against this scenario. While the settlement system develops through the addition of year-round permanent sites from the Hazendonk group onwards and the increasing role of agriculture, these essentially form an addition to the options that were available. This emphasizes the continuity existing for many of the underlying characteristics of the wetland and wetland margin settlement system, rooted in the Late Mesolithic. From this long-term perspective, economic and habitational diversity become meaningful features of the way communities deal and interact with their surroundings.

8.3.3 *Neolithisation: no need for novelties?*

Defining the environment of the indigenous communities as rich in resources and dynamic in character implies the absence of an economic need for change. Having adapted in a sustainable manner to (wetland) life, does not easily give rise to any incentives that might disrupt this type of living, while the changing, wet and at times unpredictable circumstances prevent evident economic benefits to be gained from a switch to agriculture in contrast to the situation on the uplands (*e.g.* Dusseldorp/Amkreutz in prep.).

The faunal, botanical and seasonality evidence of wetland sites during the process of Neolithisation partially substantiates this. Although there is an increasing reliance on domesticates and cultigens, this is never culture-wide or absolute. It concerns local to regional switches to a greater reliance on agriculture, especially in the drier coastal or, hypothetically wetland margin or upland areas. These are contrasted by other contemporary sites where wild resources, often in combination with mobility, characterize occupation. The analysis of the evidence presented above yielded a picture of subsistence and habitation in these wetland environments, based on a flexible, pragmatic use of options. The increasing availability of 'Neolithic novelties', especially domesticates, cultigens and the knowledge required were used in a similar manner, not as superior options, but as an addition to the existing spectrum.

In the mosaic

This somewhat deconstructed idea of Neolithisation does not mean that there is no larger story to tell, or that the transition from forager to farmer was not about important economic and social changes that eventually restructured society. It is, however, about the appreciation of the diversity in lifeways of, at least for the LRA, more than two millennia of hunter-gatherer-farmer communities.

The use of ethnographic, archaeological and historical parallels offers a rich background for understanding the many ways in which these systems could be sustainable for so long. It pointed out the importance of an increase in behavioural options with the availability of new knowledge and technology. Apart from that, it stressed how communities may benefit from mutualistic behaviour, both in relations of exchange and interaction, as well as in interdependency or symbiosis (Gregg 1988; Jochim 2006; Verhart 2000). This substantiates the idea that instead of dealing with a variety of sites used for different functions by the same community, we might be dealing with a variety of lifeways of different communities with the same cultural background. This perspective was supported by the supposed ability of groups to switch between strategies, (Freeman 2012; Layton *et al.* 1991; Madsen/Simms 1998; Rowley-Conwy 2001).

With these broadened horizons it is interesting to review the LRA groups against the perspective of their natural environment. Many of the strategies adopted during the 5th and 4th millennium cal BC may be classified as 'extended broad spectrum economies' (*sensu* Louwe Kooijmans 1993^a). This characterization should not be seen as static. The evidence points to diversity, and, in view of the wetland setting described above and its relation to the communities living therein, a flexible exploitation of the extended broad spectrum options that existed. This led to the idea of 'integrative strategies', a term which seeks to underline the ability to draw on a repertoire of behavioural options and various modes of food procurement. This was a crucial feature of sustainable habitation in the wetlands and wet margins of the LRA. The emphasis therewith shifts from the addition of domesticated resources to the diet and their relative importance, to the dynamics of their use.

Implications with respect to rhythms

The approach taken here is in fact an archaeology of inhabitation, centred on the notion of dwelling (Brück 2005; Pollard 2000; Ingold 1993; 2000; see Chapter 6) and on the active and recursive relationship between humans and their natural

environment (e.g. Barrett 1994; Gosden 1994; Pollard 2000; Whittle 2003). Meaning and significance come into existence through their incorporation into a regular pattern of activity (Ingold 2000, 153). The repetition of these routines provided the 'ontological security' for life to go on (Whittle 2003, 22). Their rhythm (cf. Lefebvre 2004) is at the heart of existence and throws light on issues of change and repetition, identity and difference, contrast and continuity. Extrapolating this idea to the process of Neolithisation identifies it as a potent source of 'new rhythms' some of which will have been disruptive, requiring considerable attunement (see Chapter 6; Lefebvre 2004).

If we focus upon the inhabitation of the wetlands, however, it can be argued that there were no sudden or definitive transitions, nor any culture-wide adoptions. When domesticates and cultigens played a more dominant, important role, this was mostly the case in coastal or upland locations from the second half of the 4th millennium onward. These sites existed alongside other locations with different strategies, while there was also considerable variation within one region. It could be argued that many of the tasks familiar to the small group of hunter-gatherers camping at Polderweg were still in practice two millennia later. If we then accept that daily practices, tasks and routines create a collective sense of identity and belonging (e.g. Edmonds 1997; 1999; Ingold 2000; Wells 2001, cited in Van de Noort/O'Sullivan 2006, 79), it is evident that a strong sense of continuity in collective tradition may be documented for the LRA. Change was present, but overall these groups were rather conservative.

The fact that there is such clear evidence for 'Mesolithic' continuity (in technology, habitation and economy) argues in favour of the consistency of certain types of *habitus* and the existence of a valuation or respect for the traditions and rhythms handed down from the ancestors. This may be explained by the character of the environment, often inhibiting or constraining the possibilities for change. While this will have been an important factor, it cannot be denied that during the entire period the choices made by local communities, even those living in suitable areas, often were characterized by flexibility and pragmatism, never completely abandoning the values and benefits of a hunter-gatherer existence. This suggests the existence of a *mentalité*, characteristic to communities of hunter-gatherers and hunter-gatherer-farmers (see Louwe Kooijmans 1993^b, 136-137; 2000, 324; Raemaekers 1999, 189) that was persistent and influenced their position in the adoption of agriculture. In this study this aspect of *mentalité* has been coupled particularly with the inhabitation of the wetlands and their margins and the creation of a regionally specific attitude and identity (see also Van de Noort/O'Sullivan 2006, 67-68). To understand this wetland attitude, it may be more profitable to adopt a behavioural perspective instead of one that tracks the introduction of domesticates and cultigens. Although there are many difficulties involved in identifying and delimiting a common socio-cultural theme, it may be possible to define a sense of what was shared, and create the idea of a moral community (Whittle 2003, 17, 67-69). From such a perspective, the absence of drastic change and the slow and never complete avulsions of new rhythm tie in with the way in which these communities were connected with and embedded in their environment.

Notes

- 1 Zeiler (1997, 86, 99) indicates that the site was used at least between spring and later autumn or early winter. He argues that the presence in other season may relate to occasional visits. These may have been of an extractive nature. (A roe deer (VL-2b) may have been killed in midwinter, while swan bones (VL-1v and 2b) point to a presence between late autumn and early spring. Sturgeon again points to a presence between spring and (early) autumn). Overall, the evidence available is too limited to decide with certainty on a particular or main season of use.
- 2 It should be noted that the balance between wild and domestic fauna at P14 is strongly dependent on the choices made. If antler is left out of the counts (as has been done in this study) than the importance of red deer is limited, especially when compared to cattle. Lauwerier *et al.* (2005) also leave out beaver which is not done in this study since it provides both an important source of fur as well as meat. The contribution of pig versus wild boar is difficult to establish since the limited positive identifications of either species prevent an attribution of the mixed category pig/wild boar. However, although the faunal spectrum of P14 may be more agricultural depending on this balance, the overall characteristics of the site regarding occupation and seasonality argue against its function as a permanent site with a main agricultural function (see also Appendix I; Raemaekers 1999).
- 3 While the absence of ample winter indicators may also be part of local choice in subsistence (Louwe Kooijmans 2009, 39-45), it is not impossible to argue that Wateringen-4 may have been inhabited seasonally (for instance a main occupation in summer and an extractive task in winter). Furthermore the botanical and artefact evidence point to local consumption of crops, but not necessarily to local cultivation (Out 2009, 99). This brings to mind the seasonal occupation of Swifterbant-S3 several centuries earlier, although there are obvious differences regarding site location, domestic-wild faunal ratio and the house structure.
- 4 Ypenburg phase 11/K yielded an even higher percentage of red deer (see Louwe Kooijmans 2009, fig. 10), yet the assemblage of this phase is rather small for comparison.
- 5 It should be noted though that many locations in complementary ecozones, to a certain extent, could be reached well within the daily range of action of *c.* 5-10 km.
- 6 According to the concepts as proposed by Binford (1980; 1982), the use of residential and logistical mobility here (*cf.* Raemaekers 1999; 2005^a, 267-277) is incorrect. According to Binford (1980) residential mobility is geared towards frequent residential moves in order to exploit resources, while logistical mobility implies a lower number of residential moves and exploitation of resources from logistical sites using special taskforces that go on expeditions to procure far-removed resources. In this respect the Late Mesolithic site of Hardinxveld-Polderweg could be interpreted as a winter base camp in a logistical system, while the site of Bergschenhoek could be explained as an extraction site in a logistical system. A system of logistical mobility is not characterized necessarily by the absence of residential mobility. It rather involves a difference in degree. The application of residential and logistical mobility according to Raemaekers (1999; 2005^a, 267-277) therefore is based on the false assumption that logistical mobility, according to Binford (1980) necessarily involves fixed sedentary sites. This is not the case.
- 7 The Delfland case-study (*cf. supra*; Louwe Kooijmans 2009) in this sense may be hypothetically relevant for the element of choice existing within the later Vlaarding culture and the preceding Swifterbant period (Amkreutz 2010^b), although its archaeological significance is lost to the explanatory value of natural differences when comparing sites situated in different ecozones.
- 8 For the Hazendonk group some peculiar exceptions of isolated sherds may be noted further south Amkreutz/Verhart 2006).
- 9 This should be nuanced. Apart from the distribution of axes, MK presence in the coversand area is limited (there is more convincing evidence of presence in the Meuse valley for instance; *cf.* Verhart 2000). For the Stein group the recently excavated houses at Veldhoven form a case in point (Kampen/Van den Brink, in prep.) as well as evidence of settlements in the river clay area, such as at Linden-Kraaienberg (Louwe Kooijmans/Verhart 1990). For the TRB culture evidence is more 'visible' due to megalithic burial monuments and the characteristic decoration on pottery (pers. comm. Louwe Kooijmans 2011).
- 10 For instance, isotopic evidence from Schipluiden demonstrates that wild resources were still dominant in at least some populations in a period for which it has also been argued that the process of Neolithisation had ended (*cf.* Raemaekers 2003).

