3.5. EARLY MESOLITHIC SITES – ARE THEY ALL THE SAME?

Seventeen find concentrations from Southeast Norway in a forager-collector perspective

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INTRODUCTION

The Early Mesolithic sites investigated within the *E18 Tvedestrand–Arendal project* in Aust-Agder county in Southeast Norway date to the period *c*. 9000–8300 cal. BC. This time span covers the Early Mesolithic phase *EM2* and the first half of *EM3*, according to Bjerck (2008d). Several researchers have argued that an increased use of local raw materials and a greater diversity in both settlement types and tool types can be observed from the start of EM2, *c*. 9000 BC. This is considered an indication of a slightly more stationary, yet still mobile, population that is more familiar with the landscapes in question along the Norwegian coast than in the preceding pioneer phase, *EM1* (*e.g.* Jaksland 2014; Damlien 2016: 400–402, with references). At the same time, Early Mesolithic sites are often portrayed as a homogeneous group in current Norwegian research (*e.g.* Bang-Andersen 2003; Bjerck 2008b, 2017; Breivik & Callanan 2016). Bjerck (2008b: 561–570, 2017: 283–286) and Breivik & Callanan (2016) argue that Early Mesolithic sites display several similarities; the sites are the results of short-term occupations and have not been parts of a network of functionally differentiated sites.

During the excavations of the Early Mesolithic sites included in the E18 Tvedestrand–Arendal project, we found that some sites did not necessarily fit the pattern described by Bjerck (2008b, 2017) and Breivik & Callanan (2016). Interpretations of lithic find distributions are central in the E18 Tvedestrand–Arendal project's predefined research questions (Mjærum & Lønaas 2014; *cf*. Mjærum *et al.*, chapter 1.4, this volume). In addition, the project aims at preparing the ground for future large-scale studies of the settlement history of the coastal area of Southeast Norway. Through an analysis which compares the size and inventory of seventeen find concentrations from seven different Early Mesolithic sites investigated within the project, this article looks into how the sites were organized, and thereby whether or not it is possible to recognise different site functions and settlement types in Southeast Norway during the Early Mesolithic, *c*. 9000–8300 BC. The sites and find concentrations will be analysed in a forager-collector perspective, where variation or homogeneity within or between sites will have implications for understanding Early Mesolithic settlement patterns in Southeast Norway.

FORAGERS, COLLECTORS AND MOBILITY

In his studies of hunter-gatherer settlement systems, Binford (1983c) differentiates between foragers and collectors as well as between *residential mobility* and *logistical mobility*. Foragers primarily practise residential mobility, which involves moving the entire group to where the resources are. This strategy will result in two types of sites, which he refers to as *residential bases* and *locations*. Sites of the latter category are extraction sites used for a very short time, and few or no tools will be left. Therefore, a residential mobility pattern is likely to primarily be recognised archaeologically in the shape of residential sites. On the other hand, collectors are more likely to practise a logistical mobility, where individuals or designated *task groups* move the resources to the residential base. Collectors can therefore be expected to create several types of sites; in addition to residential bases and locations, one could expect *field camps*, *stations* and *caches*. Field camps are temporary bases where task groups eat, sleep and maintain their gear while away from the residential base. Examples of stations are hunting stands and observation points. In contrast to the forager locations, collector locations are likely to be visible archaeologically. The task groups have to procure products for a group far larger than themselves, and therefore procure and/or process raw materials at locations (Binford 1983c: 346). Binford notes that the mobility pattern which is practised by a group might vary with the season and setting, and that groups are likely to practise a combination of residential and logistical mobility. Nonetheless, a trend towards one or the other may be observed (Binford 1983c: 355).

It should be kept in mind that Binford's forager-collector model is based on data from inland hunter-gatherer groups, while the sites studied in

this article were used by marine-oriented hunter-gatherers. Even so, Binford's model is a helpful tool for understanding what type of mobility pattern the excavated E18 Tvedestrand–Arendal sites reflect. As mentioned above, other researchers have argued that Early Mesolithic sites in Central Norway (i.e. the counties of Nord-Trøndelag, Sør-Trøndelag, and Møre and Romsdal) are traces of forager groups practising residential mobility (Bjerck 2008b, 2017; Breivik & Callanan 2016). In a recent work, Bjerck (2017: 281) argues that the most prominent variation between Early Mesolithic sites seems to be the number of occupations at each site, and that there is little evidence of large base camps or specialized sites such as stations. However, in an older paper Bjerck (1990) argued that the Mesolithic settlements on the islands of *Vega* in Nordland county, Northern Norway, reflected a coastal collector site structure. Also, in an ethnographic perspective, a foraging strategy among hunter-gatherers living in colder environments is unusual; a collector strategy is far more common (Binford 1983c: 351–352; 2001a: 276).

If this analysis shows that the E18 Tvedestrand–Arendal sites are homogeneous, i.e. residential sites, the sites are likely to be the traces of foragers who have primarily practised residential mobility. Conversely, functionally different sites would suggest that Early Mesolithic people in coastal Southeast Norway were primarily collectors practising logistical mobility.

METHODOLOGY

Several factors can be used to detect similarities and differences between find concentrations and sites (*cf.* Nærøy 2000; Bjerck 2008a: 231–235; Stene *et al.* 2010). Find concentrations can also be identified in various ways. Nærøy (2000: 98–99), in his dissertation "Stone Age Living Spaces in Western Norway", carried out a visual inspection of significant changes in the distribution pattern at each site, i.e. significant increase/reduction in artefact numbers per 50 x 50 cm square. In the investigations carried out by the *Gråfjell project* along the River Rena in Hedmark county (interior Southeast Norway), a find concentration was defined as "*an area with a higher density of finds than the average of all find-yielding 50 x 50 cm squares"* (Stene *et al.* 2010: 463, translation by the author). At the *Ormen Lange project* at Aukra in Møre and Romsdal county (coastal Central Norway), Early Mesolithic find concentrations (*units)* were defined by a numeric criterion: *"the term unit denotes a contiguous area with a clear density of artefacts, where the limit is drawn against areas with a find density lower than approx. 10/m²"* (Bjerck 2008a: 232). Within every unit at Ormen Lange, additional concentrations of finds could be observed: *"Artifact concentration refers to a significant concentration of finds within the unit, with no specified density criteria"* (Bjerck 2008a: 232).

In order to make the data empirically comparable within and between the E18 Tvedestrand–Arendal sites, the find concentrations will be identified by use of a numeric definition. To exclude the possibility of ending up with several very small concentrations, as the result of, for example, a piece of flint being frost damaged within a 50 x 50 cm square, the concentrations discussed in this article must be larger than 1 m². Subsequently, a find concentration is *a contiguous area of more than 1 m² with a clear density of artefacts, where the limit is drawn against areas with a find density lower than 10 per 0.25m²*. One could argue that this definition would effectively exclude the detection of small and rather unusual find concentrations, e.g. caches, but I think it is safe to assume that these types of find concentrations would have been observed during excavation, or during find registration, by the individual excavation leader. Experiments have shown that debris around one knapper producing a large number of flakes in one event creates a find concentration (by the definition used in this article) covering an area of at least 1.5 m², depending on knapping technique and raw material (see *e.g.* Fischer *et al.* 1979; Nærøy 2000: 92–94, with references). Small knapping areas are therefore likely to be recognized, unless the area has been cleared of a large amount of the material.

The sites included in the analysis are the *Sagene* sites *B1, B2, B4* and *B6*, and the *Kvastad* sites *A1, A5-6* and *A8* (see chapters 2.2.1–2.2.3, 2.2.5 and 2.2.7, this volume). The sites date to the time span *c.* 9000–8300 BC, and the lithic material from all the identified find concentrations display distinct Early Mesolithic traits, with no discernable traces of knapping activities from later periods of the Stone Age. As none of the Early Mesolithic sites from the project yielded Preboreal radiocarbon datings, the sites are dated based on the local shore line displacement curve (Romundset, chapter 3.2, this volume), combined with the typological dating conducted by the individual excavation leader (on the basis of Bjerck 2008d; Jaksland 2014; Damlien 2016).

Early Mesolithic sites including find material typologically dated to later periods that were excluded from this study are *Kvastad A2*, *Kvastad A4* and *Kvastad A7* (Stokke & Reitan, chapter 2.5.5, Darmark *et al.*, chapter 2.2.6, this volume; Darmark 2017a). The Early Mesolithic site *Kvastad A9* (Darmark, chapter 2.2.4, this volume) did not fulfill the requirements, as

none of the 50 x 50 cm squares contained more than 10 finds in layer 1.

The included sites were excavated to different extents. On certain sites, the find concentrations were excavated in their entirety in more than one layer. On other sites, the excavated layers covered varying extents of the find concentrations. As a consequence, by using all finds from all layers when identifying find concentrations, one could end up with "false" find concentrations, created by more intensive find collection, in smaller areas on some of the sites. To avoid this, the find concentrations are identified by the find distribution in layer 1, which is the layer containing most finds on all the analyzed sites (see table 3.5.1).

By applying this method, finds from deeper layers are excluded. As a consequence, there is a potential for some diagnostic tool types to be under-represented. Ideally, all lithic finds from all layers should have been included in the analysis. However, this was not within the scope of the present article. Natural formation processes and disturbances that are likely to have influenced the sites and find concentrations (*cf.* Darmark, chapter 3.3, this volume) have not been evaluated in this article, but this is a prospect for future research.

In the analysis, the seventeen find concentrations will first be compared using the following variables: the find concentration's age, size, number of finds, raw material composition, presence/absence of structures or clusters of heated flints, tool percentage, tool types and tool production waste. Each individual variable is suited to shed light on selected aspects connected to the find concentrations. In combination, these variables can determine whether the find concentrations and sites are functionally homogeneous or differentiated.

- *Find concentration size* and *number of finds* are variables used to estimate occupation duration and to establish whether the concentration is the result of one or several occupations (*e.g.* Bjerck 2008a, 2008b, 2017; Buck Pedersen 2009). Furthermore, the size and distribution pattern of find concentrations is used to discuss the presence of possible hut/tent structures and to estimate the group size of the Early Mesolithic occupation (*e.g.* Nærøy 2000; Bjerck 2017).
- The presence or absence of *structures* can be a helpful variable when it comes to determining the find concentration's function. Traces of dwellings in the shape of tent rings, cobble floors or post-holes are rarely identified on coastal Early Mesolithic sites (but see e.g. Bjerck 2008c; Ramstad 2014; Breivik & Bjerck 2017; Fretheim *et al.* 2017; Viken, chapter 2.2.3, this volume). Early Mesolithic hearths in southeastern Norway are seldom recognized on the basis of charcoal, but are visible as small stone clusters in otherwise stone free areas, where some of the stones may be fire-cracked (Jaksland 2014: 28). As these features are difficult to discern, clusters of heated flints are often used to identify possible locations of hearths; clusters of heated flints indicate structures that are not evident, but can be interpreted from find distribution (*cf.* Buck Pedersen 2009: 45, 48–49). Hearths or traces of such are often found centrally in find concentrations, and may in some instances be indicative of otherwise unidentifiable dwelling structures (*cf.* Bjerck 2008b: 560).

Site	Step 1	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8-9	Sum
Kvastad A1	11 %	71 %	18 %	-	-	-	-	-	-	100 %
Kvastad A5-6	25 %	60 %	15 %	-	-	-	-	-	-	100 %
Kvastad A8	4 %	88 %	8 %							100 %
Sagene B1	6 %	92 %	2 %	0 %	-	-	-	-	-	100 %
Sagene B2	8 %	45 %	26 %	12 %	3 %	1 %	2 %	2 %	0 %	100 %
Sagene B4	1 %	69 %	28 %	2 %	-	-	-	-	-	100 %
Sagene B6	5 %	55 %	36 %	4 %	0 %	-	-	-	-	100 %

Table 3.5.1: The vertical find distribution on all analyzed Early Mesolithic sites from the E18 Tvedestrand–Arendal project. Each layer is a 10 or 15 cm thick (varies between sites) manually excavated stratum. Step 1 refers to all initial 50 x 50 cm squares dug every 4 metres (see Sundström *et al.*, chapter 1.5, this volume).

- Early Mesolithic assemblages in southern and central Norway tend to be clearly flint-dominated, but the *raw material composition* seems to become more diversified towards the end of the Early Mesolithic (*cf.* Bang-Andersen 2003; Jaksland & Fossum 2014; Åstveit 2014a:92, with references; Breivik & Callanan 2016). In combination with the find concentration's age, this variable will be used to determine whether variation in raw material use on the E18 Tvedestrand–Arendal sites is solely chronologically dependent, or if this variable may also reflect functional differences between the find concentrations.
- Variation in *tool percentage* and *tool types* between sites or find concentrations indicates different functions (*cf.* Nærøy 2000: 64–69). In this article, the tool percentage includes all secondarily modified artefacts of flint, except microburins, while the tool types represent all formal tools in each find concentration. Projectiles are separated into three classes: tanged points, Høgnipen points and microliths. Tanged points include all projectile types with a retouched tang, while microliths include lanceolate and rhombic microliths (see table 3.5.2; see also Darmark & Viken, chapter 3.8, this volume on Early Mesolithic projectile technology).
- As projectiles often occur in abundance on Early Mesolithic sites and they are mostly produced by microburin-technique (Kindgren 1999, with references; Jaksland 2014), the presence of the easily recognisable *production waste* in the form of microburins, is used to identify tool production in the find concentrations.

Based on the results of the initial analysis, a more detailed analysis will be conducted. Variables compared in order to look into the find concentrations' function are (*cf.* table 3.5.4):

- Based on the find concentration size and number of finds, the *find density* in each find concentration is calculated.
- As projectiles are the most common tool type present in all three find concentration types, *microburins* combined with the *arrowhead percentage* (arrowhead/flint) is used to identify tool production/retooling in this study.
- Most tools in Early Mesolithic assemblages are made from blades, but microblades are rarely modified by retouching and are regarded as waste from blade production (*cf.* Damlien 2016: 248). The *microblade percentage* in the find concentrations from the E18 Tvedestrand-Arendal sites is used to identify blade production.

ANALYSIS

Seventeen find concentrations were identified on seven different E18 Tvedestrand–Arendal sites (table 3.5.2). If the analysis shows that the seventeen find concentrations are similar, based on the analysed variables, this would suggest little variation in terms of function; the find concentrations and sites are the result of a foraging strategy where entire groups moved from place to place. On the other hand, if there are significant differences between the find concentrations, with regard to the analyzed aspects, this would indicate functional differences between find concentrations and sites investigated within the E18 Tvedestrand–Arendal project. Such differences should only be expected in a collector strategy based on logistical mobility (*cf.* Binford 1983c).

When the size and number of finds of the seventeen find concentrations are compared (fig. 3.5.3), three groups form:

- *Small find concentrations*: eight find concentrations are included in this category. These cover areas from 1.25 to 4.25 m^2, and contain between 76 and 341 finds.
- *Medium find concentrations*: four find concentrations are included in this category. These cover areas from 7 to 8.75 m^2, and contain between 523 and 858 finds.
- *Large find concentrations*:five find concentrations are included in this category. These cover areas from 11 to 18.25 m^2, and contain between 1145 and 2897 finds.

As find concentration size and number of finds may be interrelated, and not necessarily connected to functional differences, the three find concentration groups presented above will be analyzed with regard to the other variables.

The small and medium find concentrations seldom contain hearths or other *structures*. In the large find concentrations, however, hearths are often present and other structures may occur.

Site, find concentration (C-number)	M²	Finds	Raw materials	Structures/Cluster of heated flints	Tools (flint)	Formal tools	Tool production waste	Reference
Sagene B2, south (C59675) 9200-8800 BC	12,75	1145	96 % F 3 % Q 1 % R C		2,7 %	3 microliths 1 burin 1 flake axe 11 tanged points	6 m.burins	Darmark, this vol. 2.2.1
Sagene B2, north 9200-8800 BC	8,25	858	91 % F 0,5 % R C 8 % Q		2,6 %	2 scrapers 1 burin 9 tanged points 1 microlith	5 m.burins	Darmark, this vol. 2.2.1
Sagene B4 (C59677) 9000-8800 BC	2,25	239	100 % F	Cluster of heated flints	2,9 %	1 scraper 1 microlith	2 m.burins	Darmark, this vol. 2.2.2
Sagene B6 (C59679) 8900-8700 BC	7	524	74 % F 25 % R C 1 % Q	-	2,3 %	1 høgnipen point 1 tanged point	-	Darmark, this vol. 2.2.2
Sagene B1, B I (C59674) 8800-8700 BC	11	1408	16 % F 83 % Q 1 % O	Cobble floor, postholes Cluster of heated flints	3,2 %	1 Knife/micro-lith 1 microlith	2 m.burins	Viken, this vol. 2.2.3
Sagene B1, B II 8800-8700 BC	1,25	196	18 % F 82 % Q	-	2,8 %	-	-	Viken, this vol. 2.2.3
Sagene B1, B III 8800-8700 BC	1,25	82	73 % F 26 % Q 1 % O	-	1,7 %	-	-	Viken, this vol. 2.2.3
Sagene B1, C I 8800-8700 BC	13,75	2897	20 % F 80 % Q 0 % O	Hearth with cluster of heated flints	1,4 %	2 microliths 3 tanged points	5 m.burins	Viken, this vol. 2.2.3
Sagene B1, C II 8800-8700 BC	3,75	341	87 % F 13 % Q	Cluster of heated flints	4,4 %	1 knife 1 scraper 1 tanged point	1 m.burin	Viken, this vol. 2.2.3
Sagene B1, D 8800-8700 BC	8,5	523	62 % F 3 % R C 35 % Q	Cluster of heated flints	3,4 %	1 microlith 3 tanged points	9 m.burins	Viken, this vol. 2.2.3
Sagene B1, E 8800-8700 BC	12,5	1679	86 % F 13 % Q 1 % O	Hearth with cluster of heated flints	1,9 %	1 flake axe 2 burins 5 høgnipen point 7 microliths 1 scraper 1 axe	33 m.burins	Viken, this vol. 2.2.3
Sagene B1, F 8800-8700 BC	18,25	2452	40 % F 60 % Q	Cluster of heated flints	3,0 %	4 flake axes 2 scrapers 1 borer 2 microliths 8 høgnipen point	34 m.burins	Viken, this vol. 2.2.3
Sagene B1, G 8800-8700 BC	2,5	235	11 % F 89 % Q	-	3,7 %	-	2 m.burins	Viken, this vol. 2.2.3
Kvastad A8 (C59672) 8600-8400	2,25	133	100% F	-	2,3 %	1 tang/høgnipen point	1 m. burin	Darmark 2017b
Kvastad A1, north (C59665) 8500-8300 BC	8,75	575	94 % F 4 % Q 2 % R C 0% O		2,0 %	2 scrapers 1 høgnipen point 1 tanged point 3 microliths	-	Stokke, this vol. 2.2.5
Kvastad A1, south 8500-8300 BC	4,25	222	98 % F 1 % Q 1 % R C	Hearth	1,4 %	1 knife 1 høgnipen point 1 microlith	-	Stokke, this vol. 2.2.5
Kvastad A5-6, south (C59669) 8400-8300 BC	1,25	76	67 % F 33 % O	-	0 %	1 core axe	-	Viken, this vol. 2.2.7
Average value	7	798	55% F 44 % Q 1 % R C <1 % O		2,5 %			

Table 3.5.2: The 17 Early Mesolithic find concentrations from E18 Tvedestrand–Arendal chronologically organized from oldest to youngest.

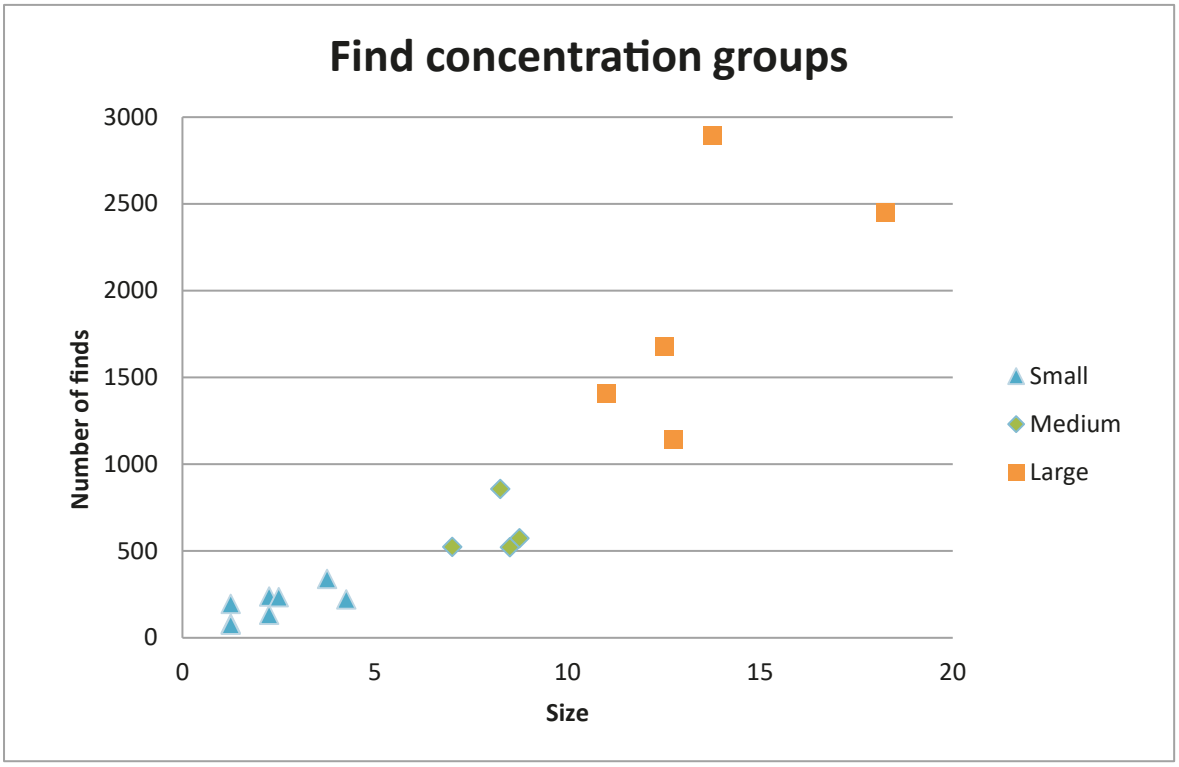

Figure 3.5.3: Scatter-plot showing the size and number of finds in the 17 find concentrations identified at the Early Mesolithic E18 Tvedestrand–Arendal sites. Blue: Small find concentrations. Green: Medium find concentrations. Orange: Large find concentrations.

The *raw material composition* shows a chronological tendency towards a greater use of local raw materials on the younger sites. On a more detailed level, flint is the dominant raw material in all medium-sized find concentrations, while the raw material composition varies greatly in the small and large find concentrations.

The *tool percentage* is highest in the medium find concentrations (2.6 %). The large find concentrations have a slightly lower tool percentage (2.4 %). In the small find concentrations, the tool percentage varies between zero and 4.4 %: respectively the overall lowest and highest tool percentage of all find concentrations. Projectiles are the only *tool type* present in all find concentration types, and flake axes are only present in the large find concentrations (this could be a result of the method applied; see discussion in the *Methodology* passage above).

The *find concentration's age* is of importance in order to reveal whether the three find concentration types are chronologically distinct. The median age of each find concentration shows that the three find concentration types are present in the earliest part of the analyzed time span. The oldest sites, Sagene B2 and Sagene B4, dated to around 9000 BC (Darmark, chapters 2.2.1, 2.2.2, this volume), include one large, one medium and one small find concentration. The slightly younger sites Sagene B6 and Sagene B1, dated to around 8900–8700 BC (Darmark, chapter 2.2.2; Viken, chapter 2.2.3, this volume), include four large, two medium and four small find concentrations. On the slightly younger sites, Kvastad A8, Kvastad A1 and Kvastad A5-6 from around 8500–8400 BC (see Darmark 2017b; Stokke *et al.*, chapter 2.2.5; Viken, chapter 2.2.7, this volume), no large find concentrations were identified. These sites include three small and one medium find concentrations.

After this first part of the analysis, it seems the three size-segregated find concentration types present on the E18 Tvedestrand–Arendal sites could be functionally different. Still, the variation within each find concentration type is difficult to understand at this level of the analysis; the small find concentrations are particularly diverse. Some additional variables are investigated in order to define if the three find concentration types are functionally different (table 3.5.4).

In terms of *find density* (finds/m^2), the large find concentrations all have 90 or more finds/m^2. The medium find concentrations on average contain 77/m^2, and all medium find concentrations contain less than 1000 finds in total. The small find concentrations vary most in find density, with minimum 52/m^2 and maximum 157/m^2. The average small find concentration contains 86/m^2.

Find conc. type	Site, find conc.	Finds pr. m²	Tool %	Microblades %	Microburins %	Arrowheads %
Large	Sagene B1, BI	128	3,2 %	4 %	2 %	1,2 %
Large	Sagene B1, E	134	1,9 %	2 %	2 %	0,8 %
Large	Sagene B2 south	90	2,7 %	7 %	1 %	1,3 %
Large	Sagene B1, CI	211	1,4 %	3 %	1 %	0,9 %
Large	Sagene B1, F	134	3,0 %	4 %	3 %	1,0 %
Medium	Sagene B6	75	2,3 %	26 %	0 %	0,5 %
Medium	Sagene B2 north	104	2,6 %	2 %	1 %	1,3 %
Medium	Sagene B1, D	62	3,4 %	3 %	3 %	1,2 %
Medium	Kvastad A1, north	66	2,0 %	7 %	0 %	0,9 %
Small, subgroup A	Sagene B1, BIII	66	1,7 %	7 %	0 %	0,0 %
Small, subgroup A	Kvastad A5-6	61	0,0 %	6 %	0 %	0,0 %
Small, subgroup A	Kvastad A8	59	2,3 %	6 %	1 %	0,7 %
Small, subgroup A	Kvastad A1, south	52	2,0 %	8 %	0 %	0,9 %
Small, subgroup B	Sagene B1, BII	157	2,8 %	0 %	0 %	0,0 %
Small, subgroup B	Sagene B4	106	2,9 %	13 %	1 %	0,4 %
Small, subgroup B	Sagene B1, G	94	3,7 %	0 %	8 %	0,0 %
Small, subgroup B	Sagene B1, CII	91	4,4 %	4 %	0 %	0,3 %

Table 3.5.4: Table showing additional variables investigated in the 17 find concentrations at the Early Mesolithic E18 Tvedestrand–Arendal sites.

Arrowheads are common in the large and medium find concentrations, constituting between 0.8 and 1.3 % of the flint artifacts. *Microburins* are present in all the large find concentrations, and are always present in the medium find concentrations when arrowheads, too, are present. Some of the small find concentrations contain an arrowhead and a microburin, some contain none, or one but not the other.

All large find concentrations have a low *microblade percentage*. The medium find concentrations also have a low microblade percentage, with the exception of Sagene B6. The microblade percentage varies the most in the small find concentrations.

After investigating the additional variables, it seems the three find concentration types are quite consistently different from each other in many aspects. This strengthens the impression from the initial analysis: the three find concentration types are functionally differentiated. In the following, a characterization of the find concentration types will be given.

Large find concentrations

The large find concentrations vary most in size, but in terms of find density, they all contain ≥ 90 finds/m². The tool percentage (2.4 %) is lower than in the medium sized find concentrations. Microburins and arrowheads are always present, and hearths are often present in these find concentrations, while other structures may be present. The microblade percentage is generally low. The large find concentration at the oldest site, Sagene B2, exhibits a clear flint dominance. At the younger site Sagene B1, the raw material composition is more varied in the inventory from the large find concentrations.

The large find concentrations at the E18 Tvedestrand–Arendal sites are likely to represent areas for differentiated tool use, and retooling is a common activity. Blade production occurs, but not to the same extent as in some of the small find concentrations. Hearths and the possibility for other structures to be present, indicate that the large find concentrations might be locations for dwellings.

Medium find concentrations

The medium find concentrations are quite homogeneous in terms of size, find density and tool percentage. On average, they have a find density of 77/m², a low microblade percentage and a relatively high tool percentage (2.6 %). Arrowheads are constantly present in these, and microburins can occur. All medium find

concentrations are flint-dominated. The medium-sized find concentrations seldom include structures.

A higher degree of tool use and a lower degree of knapping can be observed in the medium find concentrations compared to the large find concentrations on the E18 Tvedestrand–Arendal sites. Retooling occasionally occurs. As the medium find concentrations seldom include structures, they are less obvious candidates for dwelling locations than the large find concentrations.

Small find concentrations

The small find concentrations on the E18 sites seldom include structures, and they are the most diverse in terms of find density, tool percentage and microblade percentage. This variation suggests that this group should be divided into two subgroups:

A) The find concentrations Sagene B1 BIII, Kvastad A1 South, Kvastad A5-6 and Kvastad A8 are included in this subgroup. They are characterized by a low tool percentage (1.5 %), low find density (57/m^2), clear flint dominance and a high microblade percentage (≥ 6 %). The only formal tool type present is arrowheads.

   The small find concentrations belonging to subgroup A are likely to represent short-term activity areas where blade production has been the main activity. Ready-made tools and replacement parts (arrowheads) may have been brought to the area.

B) The find concentrations Sagene B1 BII, CII and G, as well as Sagene B4 are included in this subgroup. They are, in contrast to subgroup A, characterized by a high tool percentage (3.7 %), high find density (104/m^2), a larger portion of local raw materials, and, with the exception of Sagene B4, a lower microblade percentage (< 5 %). These find concentrations may contain microburins and/or arrowheads. In addition, they are likely to include the occasional scraper.

   The small find concentrations belonging to subgroup B are likely to represent find concentrations/sites where knapping and hide-working have taken place. The knapping activity seems less focused on blade production than in subgroup A. Retooling occurs.

In order to illustrate the differences between the find concentration types identified on the E18 sites, the average large, medium, small subgroup A and small subgroup B find concentrations have been calculated (table 3.5.5).

The differences between the four find concentration types indicate that the E18 sites represent functionally differentiated sites connected to collectors practising logistical mobility. Archaeologically, logistical mobility should be recognized through the presence of residential bases, locations, field camps, stations and caches (Binford 1983c:346). The possibility for identifying such sites among the analyzed E18 Tvedestrand–Arendal sites will be discussed below.

Find concentration type	M^2	Finds	Raw materials	Structures/Cluster of heated flints	Tools (flint)	Formal tools	Tool production waste
Large (n=5)	13,65	1916	45% F 55% Q	Cluster of heated flints (n=5)	2,4%	3 microliths 1 burin 1 flake axe 3 tanged points 3 høgnipen points 1 scraper	16 m. burins
Medium (n=4)	8,13	620	82% F 11% Q 7% RC		2,5 %	1 scraper 4 tanged points 1 microlith 1 høgnipen point	4 m. burins
Small, subgroup A (n=4)	2,25	127	90% F 5% Q <1 % RC 5% O		1,5 %	1 projectile	
Small, subgroup B (n=4)	2,44	253	59% F 41% Q	May contain cluster of heated flints (n=2)	3,7 %	1 scraper 1 projectile	1 m. burin

Table 3.5.5: The average large, medium and small find concentrations based on the analysed E18 Tvedestrand–Arendal sites. If the majority of the find concentrations included in each type contained structures or clusters of heated flints, these are included. Formal tools and tool production waste are rounded up/down to the nearest whole number.

DISCUSSION

This analysis shows that in EM2 and the first half of EM3, four categories of find concentrations can be identified among the E18 Tvedestrand–Arendal sites. As demonstrated above, Bjerck (2008b, 2017) and Breivik & Callanan (2016) argue that Early Mesolithic sites in Central Norway are the result of forager groups practising residential mobility. The sites in Central Norway include one or more distinct units of 10–20 m^2, each comprising *c.* 1000–3000 finds. Larger areas with significantly more finds are seen as the result of several occupations at approximately the same place (*cf.* Bjerck 2008a). Furthermore, the Early Mesolithic units in Central Norway often include a smaller artefact concentration, traces of a central hearth and a broad spectrum of tools. This is interpreted as traces of a highly mobile society, where small family groups have executed a set range of activities at each site (Bjerck 2008b: 565–570). The large find concentrations on the E18 Tvedestrand–Arendal sites fit well into Bjerck's (2008b: 561–564) description of Early Mesolithic units. None of the large find concentrations on the E18 sites contain more than 3000 finds. This, and the fact that the oldest and third largest of the analysed find concentrations (Sagene B2 South, see table 3.5.2) has an average find density, suggest that the large find concentrations identified at the E18 Tvedestrand–Arendal sites are not accumulations, but rather that they are functionally different to the medium and small find concentrations. The small and medium find concentrations challenge Bjerck's (2008b, 2017) and Breivik & Callanan's (2016) conclusions. In the following, I will illustrate how the four find concentration types identified at the E18 Tvedestrand–Arendal sites may represent residential sites, field camps, locations and stations belonging to a logistical mobility system.

Residential sites and field camps should be recognized by the presence of possible remains of dwellings. At excavated Early- and Middle Mesolithic sites in Norway, dwelling floors and tent rings cover areas of 6–12 m^2 and usually include traces of a central hearth and a distinct find concentration (Nærøy 2000; Bjerck 2008b, 2008c; Åstveit 2009; Solheim & Olsen 2013; Breivik & Bjerck 2017, with references; Viken, chapter 2.2.3, this volume). The variation in size might be the effect of differences in dwelling construction, time span/number of occupations, season of occupation or household size (*cf.* O'Connell 1987; Nærøy 2000; Grøn 2003; Bjerck 2008b).

Based on their size, the medium and large find concentrations from the E18 Tvedestrand–Arendal sites may represent locations for dwellings, i.e. households. Most large find concentrations have traces of a central hearth, and none of these find concentrations are overlapping; consequently, each medium and large find concentration is interpreted as the possible remains of a household, i.e. dwelling. By looking into the distribution of the medium and large find concentrations, four out of seven sites could be residential sites or field camps. The sites Sagene B6 and Kvastad A1 each have traces of one medium sized household. Sagene B2 has traces of two households, one medium and one large. Sagene B1 has traces of five households; one medium and four large.

Sites with traces of a single household are likely to have had other functions than sites with traces of several contemporaneous households. Large sites with several households might have served as meeting places or safe harbours (*cf.* Åstveit 2014a: 100), i.e. base camps. Smaller sites with traces of one or two households may represent field camps where task groups have stayed during, for example, hunting expeditions, or residential sites where groups have stayed during residential moves between different base camps (*cf.* Binford 1983c). One possible way of distinguishing between single household residential sites and field camps is by looking into the presence of children's products, as these are more likely to be present at residential sites as opposed to locations, field camps and stations (*cf.* Eigeland 2015: 380; Viken & Darmark, chapter 3.7, this volume). Out of the seven sites analysed here, possible children's products were only identified on the sites Sagene B1 and Sagene B2 and on Kvastad A1 (Viken & Darmark, chapter 3.7, this volume), which can indicate that Sagene B2 and Kvastad A1 represent small residential sites, whereas Sagene B6 may represent a field camp. Sagene B1 stands out as a potential base camp, as this is the only site with traces of five households.

In order to recognize base camps, a question must be raised: what characteristics are Early Mesolithic base camps likely to encompass? Ethnographic studies of hunter-gatherers indicate that they often live in groups of around 25 people; this reduces risks, as a high degree of food sharing is often practised (Kelly 2003: 51, with references, 2013: 166–174). Other ethnographic data show that most activities on sites with co-residing households are carried out in the household area, which is flanked by special activity areas (e.g. O'Connell 1987). Further, co-residing hunter-gatherer groups tend to distribute family based dwellings within even distances on their occupational sites (O'Connell 1987). It should be noted that hunter-gatherer groups should not necessarily be expected to be family based. A study of 32 present-day

hunter-gatherer societies found that the co-residing groups are mainly composed of individuals either distantly related by kinship and/or marriage or even unrelated individuals; in fact primary kin make up less than 10 % of the co-residing groups (Hill *et al.* 2011: 1288). Finally, the base camp should be located close to the most productive resource exploited (Binford 1983c: 346, 350–351). According to Breivik (2014), the transition zone between fjords and archipelago had the highest marine productivity in coastal Early Mesolithic Norway. To sum up, Early Mesolithic base camps could be recognized by several large find concentrations, i.e. households, distributed evenly on the site. In addition, diverse activity areas in the form of small and medium find concentrations should be expected. Coastal base camps should be located close to sounds, in the transition zone between fjord and archipelago.

Sagene B1 is located in the transition zone between fjord and archipelago at a sheltered surface close to a sound by a fjord basin (Darmark *et al.*, chapter 3.4, this volume). The find distribution at Sagene B1 (fig. 3.5.6)

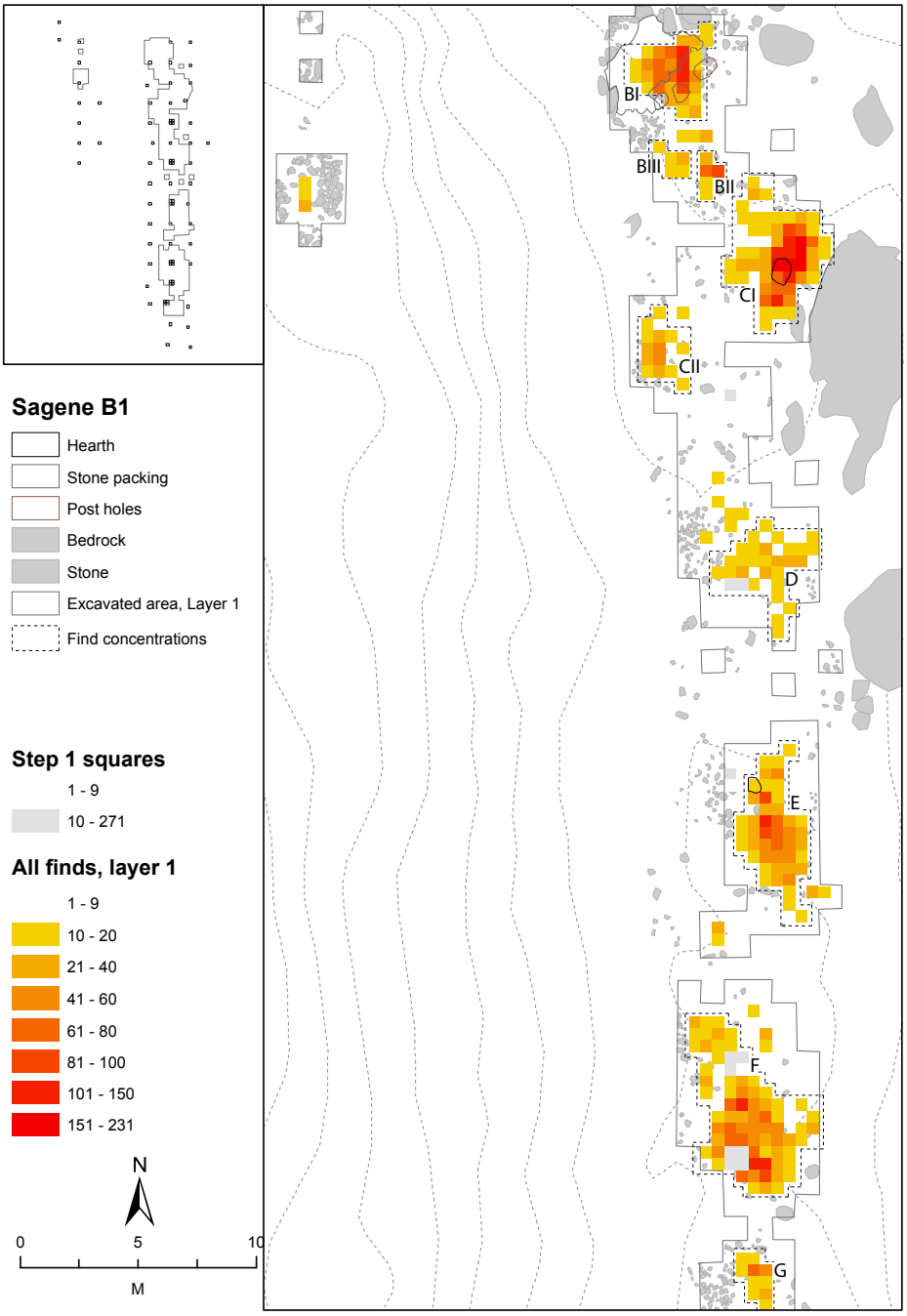

Figure 3.5.6: The find distribution in mechanical layer 1 (15 cm) at Sagene B1 with the identified find concentrations marked. Ill.: S. Viken / KHM

displays two large find concentrations on the northern part of the site, and two large find concentrations on the southern part. The only medium find concentration on the site is located centrally between these (fig. 3.5.6). The distance is quite similar between each of these find concentrations. There are no significant differences in elevation between the find concentrations at Sagene B1, and no signs of reoccupations in the form of overlapping find concentrations. Consequently, all find concentrations on the site are interpreted as contemporaneous. The large find concentrations identified at Sagene B1 are interpreted as traces of four households; the central medium find concentration is interpreted as a collective area, whereas several small find concentrations on the site are interpreted as, for example, knapping areas or toss zones (Viken, chapter 2.2.3, this volume). Evidence of unskilled flint knapping indicates that children were part of some of the households on the site (Eigeland, chapter 3.6; Viken & Darmark, chapter 3.7, this volume). Consequently, Sagene B1 may represent an Early Mesolithic base camp, perhaps within a residential mobility system. However, based on the observable variation between the E18 Tvedestrand–Arendal sites, this is unlikely. This variation will be further accentuated below, by a discussion on the small find concentrations.

On the Early Mesolithic sites investigated by the E18 Tvedestrand–Arendal project, small find concentrations are the most common type. Bjerck (2008b: 561) suggests that the absence of the broad spectrum of tools in the smaller find concentrations in Central Norway is a matter of representation rather than function. If the small find concentrations only appeared on sites where the other two find concentration categories were present, one could argue that they solely represented knapping areas or toss zones (*cf.* Nærøy 2000: 196). However, this analysis shows that some of the E18 Tvedestrand–Arendal sites *only* consist of one small find concentration: Sagene B4, Kvastad A5-6 and Kvastad A8. In addition, Kvastad A1 South could represent such a site, as the distance between Kvastad A1 South and North is approximately 30 metres and there is a significant difference in elevation between these find concentrations. The sites with a single small find concentration are *not* interpreted as places where small family groups carried out a set range of activities, but rather represent functionally different sites. Small find concentrations in subgroup A show traces of retooling activities, and might represent short-term field camps or stations: Kvastad A8 and Kvastad A5-6 are interpreted as specialized sites, for example hunting stands, where retooling has been the main activity (Darmark 2017b; Viken, chapter 2.2.7, this volume), and Kvastad A1 South may have had a similar function (Stokke *et al.*, chapter 2.2.5, this volume). The small find concentrations in subgroup B have a higher portion of local raw materials and often contain one or a few scrapers; this might reflect extraction activities: Sagene B4 is interpreted as a specialized site (location) where hide working has been a central activity (Darmark, chapter 2.2.2, this volume). Consequently, Early Mesolithic sites with a single small find concentration are likely to represent locations, stations or small field camps for collector task groups in a logistical mobility system.

CONCLUDING REMARKS AND IMPLICATIONS FOR FUTURE RESEARCH

This analysis has shown that Early Mesolithic sites are more diverse than what is reflected in the current research on the period in Norway. Variation is more often than not explained as being the result of residential mobility, where the occupations on each site have been short/long or single/multiple (e.g. Bjerck 2008a, 2008b, 2017; Breivik & Callanan 2016; but see T. Amundsen 2012c and discussions in Nærøy 2000: 202–207; Dugstad 2014; Breivik & Bjerck 2017). The results from this study suggest that this view should be modified. The four find concentration types identified at the E18 Tvedestrand–Arendal sites reflect a complex logistical mobility system, with a range of functionally differentiated sites (see also Bang-Andersen 1996).

Logistical mobility involves fewer residential moves, as task groups can gather resources from a larger area around the residential site (Binford 1983c: 349). Also, marine resources can tolerate higher hunting pressure than terrestrial mammals (*cf.* Breivik 2014, with references). This suggests that a collector strategy might be a better tactic in marine environments, where resources are abundant and frequent residential moves might be hazardous. The risks involved in moving the entire group from place to place were reduced by the use of task groups.

Such a mobility system would result in few residential bases (i.e. base camps) and several field camps, locations and stations. Bjerck (1990: 3–4) also noted that there might be fewer locations in coastal as opposed to inland collector systems, as the boat would be the location for many extraction activities in marine environments. This is in line with the results from this analysis of the seven Early Mesolithic sites from the E18 Tvedestrand–Arendal project. Only one base camp was identified (Sagene B1). Three sites (Sagene B2, Sagene B6 and Kvastad A1 North) can be viewed as

small residential sites or field camps. Four sites can be interpreted as stations (Kvastad A5-6, Kvastad A8 and Kvastad A1 South), locations (Sagene B4) or small field camps.

As the analysed sites only cover the time span *c.* 9000–8300 BC in a limited region, it still remains to be seen whether the same find concentration types can be identified in the earlier part of the Early Mesolithic and in other regions. The results from this analysis should be tested on a larger body of material and on material from other regions. An interregional study on the subject, combined with a location analysis, may shed light on whether some of the find concentration types or combinations are more common in certain landscapes or locations than others (archipelago, fjord, inland/mountain, sheltered/exposed, etc.). Bearing in mind that the mobility pattern practised might vary with the season and setting, and that hunter-gatherers often practise a combination of residential and logistical mobility, future large-scale studies will potentially reveal whether Early Mesolithic hunter-gatherers have operated primarily as collectors along the southeastern coast of Norway, and as foragers in other regions in Norway.