

## Chapter 2

# Nomadic Mobility, Migration, and Environmental Pressure in Eurasian Prehistory

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### 2.1 Introduction

What factors shaped prehistoric mobility and how did ancient mobility—over long and short scales—contribute to population dispersals (migrations) across the world? While clinal patterns of regional population genetics and linguistics are recognizable, our ability to leverage ancient archaeological evidence to illustrate concrete migration processes is one of the most compelling, yet difficult, concerns for scientists today (for discussion, Frachetti 2011). This volume is concerned primarily with understanding the migratory history that linked Inner and northeastern Asia across the Bering Strait to North and South America nearly 15,000 years ago. As the chapters in the volume illustrate, there is an evident pattern of demographic displacement that defines a clear relationships between the earliest settlers in North America and antecedent populations of prehistoric hunters of the Siberian arctic. While many details of the mobility and settlement ecology of the Americas remain elusive to scientific recovery, analogies from later prehistoric archaeology allow us to relate the apparent pattern of migration that emerges at the large scale to the evident practicalities of mobility at the local scale.

In this chapter I explore the relationship between community mobility as a local-scale practice and migration as a long-term process, through an examination of Eurasian mobile pastoralists of the Middle Holocene (ca. 5,000–4,000 years BP). The goal of investigating later prehistoric mobile societies in light of their strategic use of mobility is to understand the relationship between social and ecological forces and their influence on the formation of social landscapes, or cultural perceptions and practical constructions of socio-ecological contexts that shape behavior, interaction, and social organization. Such a concern is relevant for understanding migratory processes generally and provides an analogue between patterns of Bronze Age mobility and those that occurred millennia before between Siberia and North America among regional hunters.

Of course, there are significant differences when comparing Pleistocene hunter-foragers from Siberia and North America to Bronze Age pastoralist populations of Central Eurasia. The mobility of Bronze Age pastoralists was largely dictated by the needs of domesticated animals like sheep, goat, and cattle, rather than the movements and herd structures of wild game. Yet given the historical relationship between these two modes of social economy, the question at hand is: what factors shape the travel of mobile groups (e.g., social, ecological, and environmental resources) and how do mobile groups make decisions about the extent and frequency of their mobility? By examining these

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relationships in both specific and general terms, I hope to contribute to our understanding of mobility among Pleistocene hunting groups and how their practices might have shaped wider-scale migratory processes leading to the peopling of the new world.

## 2.2 Mobility vs. Migration

The first important distinction to make is between the terms mobility and migration. Here, I use the term mobility to refer to geographic travel and more specifically the strategic movement of groups on a regular or prescribed schedule to capitalize on diverse resources (whether practical, political, ideological) to meet and interact with others, to make religious pilgrimages, or to explore a new environment. Numerous ethnographic cases from Africa, Eurasia, and the Americas provide examples of seasonally mobile communities whose annual travels take them between various home territories on regular and predictable schedules. Mountain pastoralists of Eurasia, such as those discussed below, typically spent wintertime in the lowlands in discrete environmental zones where resources are available and, in the summer, traveled to the highlands where wild pasture resources are commonly more abundant (Frachetti 2008b).

Since seasonal mobility patterns are established according to regionally specific environmental conditions as well as socio-political concerns, it is not enough to say the environment alone dictates seasonal mobility. One has to consider the broader spectrum of parameters that shape particular patterns of mobility (e.g., Barth 1966). Furthermore, mobility patterns can vary highly from year to year, and groups may be traced across diverse environments such as deserts, mountains, and forests. The diversity and contingency of annual and seasonal mobility patterns is especially relevant when discussing hunting and gathering communities as well as pastoral nomads (Ingold 2000).

Migration, as defined here, refers to directed, territorial (transregional) relocations that result in populations changing the epicenter of their practical (localized) mobility orbits—i.e., changing their “home territory.” The scalar and cartesian distinction between mobility and migration is important because migration is sometimes used to refer to cyclical movement from place to place as well (Khazanov 1994). Limiting the term “migration” to population displacement events distinguishes trajectories of demographic relocation from regional cycles of demographic oscillation. Of course, mobility can inculcate migration, or contribute to the process. Thus, it is at the point of intersection of these phenomena that we can envision processes of environmental learning, the development of novel strategies and adaptive innovations, and the transformation of social structures to accommodate new regional contexts, social partnerships, and resources (Zvelebil 1986).

## 2.3 Mobility and “Migration” Among Bronze Age Eurasian Pastoralists

Pastoralist communities of the steppe region of Central and Inner Eurasia developed different forms of specialized herding economies in different regions, from ca. 5,500 to 3,000 years BP. By 5,000 BP, mobile herders, many of whom existed alongside (and sometimes integrated with) farming communities and hunter/gatherers exploited most regions of Central and Northern Eurasia. Pastoralist communities of Eurasia provide an informative case study for understanding the practicalities of mobility and its relationship with migration—as defined above. In addition, the archaeology of these groups demands that we reassess the relationship between extractive and productive economies, mobility, and the anthropogenic development of specialized ecological settings. For mobile herders, seasonal changes in pasture have been shown to stimulate the growth and regeneration of rich microenvironments within otherwise semi-arid or soil-poor ecotones (Spengler et al. 2014). Such parameters of

“niche-construction” might have helped reduce the need to migrate long distances. Less well documented is the degree to which hunting and foraging communities shaped their resource catchments in early prehistory, and this may be a differentiating factor for understanding motivations for migration in the Late Pleistocene (but see Rowley-Conwy and Layton 2011).

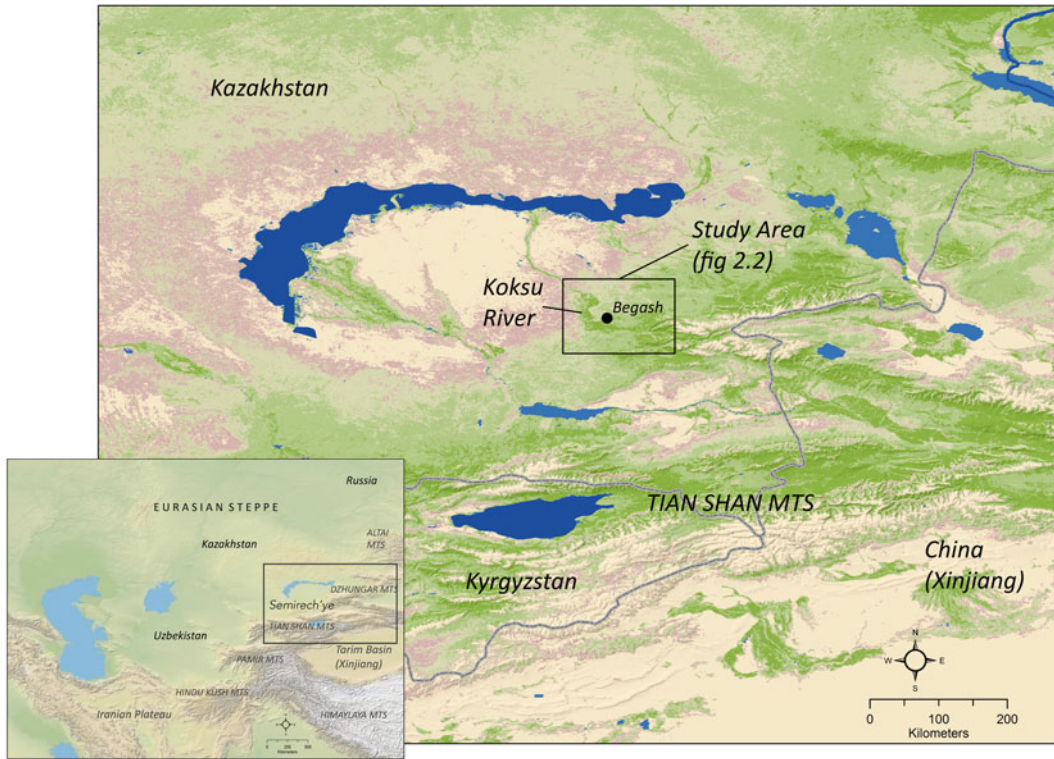
The canonical view of the earliest pastoralist communities in Central Eurasia is that their economy first emerged around 5,000 years ago in association with agricultural communities in the Black Sea region, effectively the steppe territory of western Eurasia. The model suggests that as they relied increasingly on mobility to support herding, these communities migrated eastward, crossing the steppe in sequential waves of regional demographic displacement 5–6,000 years ago, (Anthony 2007; Khazanov 1994). Supporting arguments for this proposed migration have typically derived from stylistic associations between regional material assemblages, namely similarities in ceramic decorations between societies of the west and supposedly later, similarly styled materials of east Eurasian communities. For decades, this “ethno-genetic” model has been used to explain the apparent migration of mobile communities and illustrate the diffusion of materials across the Eurasian steppe.

Recent in depth analysis of ceramic chronology and productive technology has convincingly illustrated that significant localized traditions of pottery manufacturing existed that predate Bronze Age migrations and continue into the period when “new” stylistic diffusions supposedly occurred (Doumani 2014). Paula Doumani’s Ph.D. thesis, which involved the analysis of thousands of ceramics in eastern Kazakhstan, challenges the typological associations that underlie major archaeological material assemblages that define regional variations of the “Andronovo Cultural Community.” Document work problematizes models of large-scale demographic migration as well, which allegedly sparked new domestic strategies and population shifts across the steppe region (also see Frachetti and Rouse 2012 for discussion). Furthermore, the idea of early Eurasian pastoralists moving eastward across the steppe in waves some 5,000 years ago must also be reconciled with basic facts about the absolute chronology of regional populations and the long-standing patterns of mobility evident in specific regions (cf. Anthony 2007).

The fact remains that nomadic pastoralists, especially those living in mountainous regions of Semirech’ye (Fig. 2.1), relied on relatively localized (ca. 10–40 km) seasonal mobility orbits to manage domesticated herds, which served as their primary basis of subsistence and socio-political economy. Ethnographically documented patterns of mobility recorded about eighteenth and nineteenth century Kazakh nomads in the open steppe zones depict longitudinal seasonal migrations of various distances ranging from 10 to 15 km up to hundreds of kilometers, mainly oriented North/South (Abramzon 1971). Thus both archaeology and ethnography reveal regular, seasonal oscillations rather than cumulative and sequential events of group displacement. Interestingly, little evidence exists among ancient and historical pastoralists of east to west mobility. In other words, the mobility patterns that operate at the scale of populations actually exploiting their Eurasian grassland environments were fairly regional or local, and brought populations back and forth repeatedly and only minimally shifted homeland territories (Fig. 2.1).

In many cases, environmental distribution affects this directionality. In territories like southeastern Kazakhstan defined by mountainous terrain, the distance between summer and winter pasture are short and elevation and associated pasture resources in the mountains largely impacts seasonality. From at least 5,000 years BP, pastoralist mobility was defined by transhumance, wherein populations traveled up and down the mountains rather than across vast distances. On the basis of the current prehistoric record from the steppe, pastoralist mobility was likely similar to what we see in the ethnographic record: seasonal mobility patterns of variable distance that brought populations between known ecological zones as they seasonally came into various stages of productivity.

Over a decade of archaeological research in the Dzhungar Mountains and Koksus River Valley (Eastern Kazakhstan) illustrates the relationship between pastoralist mobility, settlement geography, and the distribution of pasture resources much more clearly. The Dzhungar Mountains, situated between the larger Tien Shan Mountain range to the south and the Altai Mountain range to the north, defines the



**Fig. 2.1** Map of Semirech'ye (Zhetisu), Kazakhstan, and the location of the site of Begash. *Inset:* the Eurasian steppe showing location of Semirech'ye

border between Kazakhstan, Xinjiang (W. China), and southwestern Siberia. The mountains themselves are a high elevation range with the highest peaks upwards of 4,000 m. Furthermore, the Dzhungar Mountains rise abruptly from a desert basin west of Lake Balkhash. Over a distance of roughly 300 km, one travels from sand dune deserts less than 500 m above sea level to high altitude glaciers well over 4,000 m. The mountains rise dramatically and provide distinct pasture ecotones, starting around 700 m above sea level and ending in alpine meadows at roughly 3,000 m in elevation.

Over a decade of archaeological survey and excavation in the Dzhungar Mountains and lowland plains has revealed a number of key facts for understanding Bronze Age mobile societies in this region. First, our data shows clearly that middle and upper elevation ranges were populated for at least the last 5,000 years, without significant abandonment by local communities (Frachetti and Mar'yashev 2007). The archaeological record includes a vast array of rock art, with imagery linking prehistoric, historic, and modern communities to specific locales within the landscape. We may interpret such social investments in specific places as indicators of established home ranges, with apparent stylistic evolution of Early Bronze Age motifs into later Iron Age motifs, which are commonly carved directly over earlier images. In kind, Iron Age imagery is superimposed by later medieval motifs, and ultimately these are overwritten by historically dated graffiti. Likewise in the burial records, we see the earliest burial structures (dating as early as the late fifth millennium BP) overbuilt by burial structures of later date—namely the Iron Age and Medieval period. These locations, much like those that host rock art, illustrate a long-term reuse of socially significant places and the cultural articulation between contemporary locales and those that were in use continuously for thousands of years before.

Beyond the reuse of ritual spaces, the region's settlement archaeology also shows the long-term reuse of specific places on the part of mobile pastoralists. Until recently, prehistoric settlements eluded detection, largely because most archaeologists failed to investigate in detail historic period campsites, many which date to no more than the last couple 100 years. Indeed, on the surface these settlements were deemed "ethnographic" and thus were overlooked in terms of their ability to speak to the prehistoric past. Yet starting from the early 2000s, our research teams started to excavate these ethnographic settlements and found that they have substantially complex, prehistoric archaeological stratigraphy. Comprehensive radiocarbon dating at select campsites shows that mobile communities have used many historical settlement locations for millennia, some for more than 4,000 years. Seasonal campsites, such as Begash, illustrate a long-term reuse pattern which has fostered a transformation in our comprehension about prehistoric mobility and migration practices. The archaeological evidence, including thin cultural levels and frequent mixing of cultural horizons, indicate that these communities maintained a mobile lifestyle. They lived in an environment well suited for hunting and mobile pastoralism.

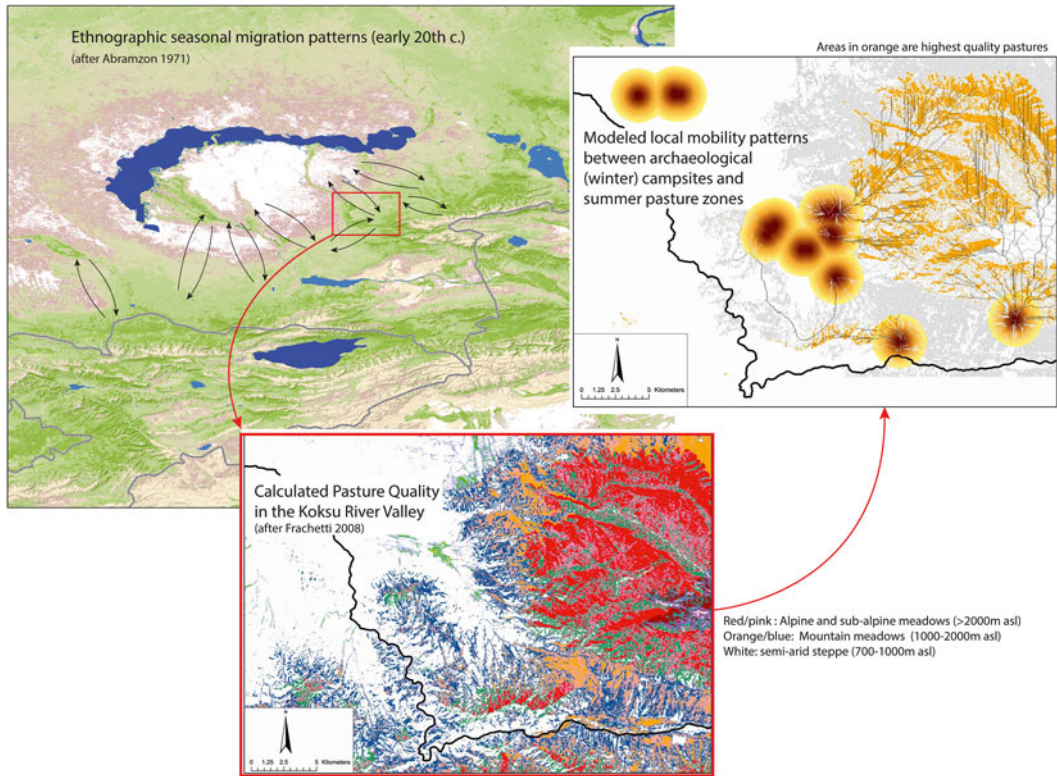
By placing the archaeological sites that we found within their environmental contexts, we can track the mobility patterns of these communities. Seasonality and altitude represent the dominant environmental pressures that shape mobility patterns in the Dzhungar Mountains and commonly influence mobility throughout most mountainous environments across Eurasia. Noted above, altitude directly correlates with a number of environmental conditions, most fundamentally rainfall, temperature, and solar radiation. These factors, in terms of the resources relevant to pastoral nomads, shape the biology and productivity of pasture grasses distributed across the piedmont and upper elevation territories of the Dzungar Mountains. Compared with the vegetation of the lowland territories (i.e., 800 m or below), highland productivity ranges from 50 to 90 % more productive, both in terms of the available pasture territory, nutrient quality of animal forage, and the density and diversity of forb and grass biomass (Fig. 2.2).

Thus, from an ecological perspective, there is a clear and obvious advantage to traveling to higher pastures during the summer where herbaceous plants cohorts are more abundant, and biodiverse. In many highland zones across Inner Asia, this simple localized pattern of mobility can support tens of thousands of herd animals. Similar, vertically transhumant mobility patterns are well documented in many mountainous environments, for example, among nomads of North and East Africa, Alpine Europe, and the Andes, to name a few.

In addition to elevation, seasonality plays a significant role in the frequency and distance of mobility. The relative quality of pastures discussed above is generally a consideration of the summer growing season, roughly late May to early September. Although highland pastures are extremely lush and rich during these months, high altitude zones fall under deep winter snow cover and grasses are deeply buried. Most herd animals have a difficult time accessing grass beneath more than 10–20 cm of snow, sometimes less for light stock (sheep/goat). Thus, during cold winter months, mobile communities seek warmer microenvironments where they can access winter forage, water, and protection from harsh winds. In some regions, winter campsites are near to agricultural communities, where fallow fields or crop stubble can be exploited (Khazanov 1994).

Given the environmental distribution of diverse resources at different altitudes and expected seasonal regimes of mobility and settlement, we have used GIS (Geographic Information Systems) to model ancient mobility patterns using the archaeological data recovered from landscape survey. This work illustrates the range of distance covered, given expected land use patterns iterated through prehistory according to the chronology and geographic distribution of ancient sites. Such analysis overwhelmingly shows that given relatively comparable environmental conditions and stable access to pasture resources, the distances traveled on a yearly basis by mobile herders has fluctuated very little throughout the last 4,000–5,000 years. There are minor deviations and sites that become more or less prevalent through time, but ultimately our data serves to demonstrate a range of mobility between 25 and 35 km, (maximum 50–70 km) between summer and winter camps annually (Fig. 2.2). With this





**Fig. 2.2** Ethnographic mobility patterns and simulated mobility patterns based on summer pasture quality (after Frachetti 2008a, b)

range as a baseline for functional/economic success, we can then explore other possible motivations for more distant travel. Of course, fluctuations in economic choices, kinship, trade, technology, political alliances or warfare all may be considered influential forces in group strategies, potentially reshaping the scope and boundaries of annual mobility rounds (Frachetti 2008a).

More than three seasons of archaeological excavation at the seasonal campsite Begash, located in the Koksū River Valley of southeastern Kazakhstan, has provided a host of evidence to explore some of these factors in greater detail. Begash is small settlement complex consisting of a few house foundations, tucked into a narrow canyon and situated along a small spring-fed stream (ca. 950 m elevation). Given its location and construction characteristics, the site represents a seasonal campsite (e.g. Fig. 2.3). The scale and architectural layout of the housing at Begash indicate a resident community of no more than 10–15 individuals at a given time. However, Begash is just one site among roughly 40 documented in the valley, with typical distances between settlements not more than 2 km. Given the abundance of available small springs and opportune locations for small-scale habitation, we imagine low-density populations interspersed throughout small valleys and ravines of valleys like the Koksū, where populations would spend the winter months in semi-subterranean stone homes in the lowlands and travel bi-annually to summer pastures in the highlands.

The chronology of Begash is derived from over 40 AMS/14C samples, illustrating that mobile herders have effectively occupied the same location for nearly 4,000 years, with only periodic abandonment and reconstruction (Frachetti and Mar'yashev 2007). The earliest cultural levels date to roughly 4,500 BP, with over 2 m of uninterrupted cultural stratigraphy lasting minimally until roughly 2,300 BP. After that time period, the site appears to be more stochastically occupied with subsequent settlement phases around the thirteenth century and then again in the eighteenth century.



**Fig. 2.3** Modern day seasonal campsite of highland Kyrgyz pastoralists (Photo by Author, 2011)

The zooarchaeology from Begash provides a window into economic motivations that shaped the mobility patterns of Bronze Age and later pastoralists in southeastern Kazakhstan. In fact, throughout the entire life of the site sheep and goat predominate, followed by cattle (Frachetti and Benecke 2009). While certainly a central element to Eurasian pastoralism overall, horses are surprisingly underrepresented at Begash until historical times, making up less than 5 % of the assemblage until after the thirteenth century. Wild animals comprise a relatively small but consistent percentage in the zooarchaeological record, roughly 5 % of total fauna from the earliest chronological phase into the historical era. This long-term stability in economic activity at the site exhibits the strategic employment of a mixed economy designed to exploit the broad range of environmental resources and zones that extend from more arid lowlands to highland alpine regions. Remains of desert animals, like Djeiran and goitered gazelle, provide proxy data to show how these groups traveled to arid lowlands while highland animals like red deer, elk, and antelopes demonstrate their mobility into the highlands as well. Thus, although only a small percentage of their overall economy, the wild animals show how mobile communities engaged in wide-ranging utilization of their landscape, determined by regular annual mobility orbits as well as longer excursions across a wider territory.

Given this pattern of regular seasonal mobility and periodic excursions, we were interested to document the extent and regularity of nomadic travel beyond the roughly 50 km home range that we established in the Koksu Valley. To address this question we executed an archaeological survey in the lowland desert areas located to the west of the foothill zones, where Begash and other sites in the Koksu survey were located (Frachetti et al. 2010). The results of the desert survey included archaeological sites that could be linked chronologically and typologically to mobile communities occupying the foothills and high mountains. However, this only added roughly 100 km to their migration pattern and the earliest occupations in the desert were dated after the middle part of the third millennium BP, about 3,000 years ago.

Thus, on the basis of our surveys across the range of ecologies (deserts to high mountains), we suggest that from 7,000 to 5,000 BP there was generally constrained mobility pattern, limited largely to the middle and upper-middle elevations (ca. 700–2,000 m). Periodic excursions into the arid lowlands occurred—likely for hunting—but annual mobility was not extensive among mountain pastoralists. Interestingly, around 3,500 BP, there is also evidence for the inclusion of small-scale seasonal farming among mobile pastoralists, which may have supplemented their domestic economy and potentially allowed for greater flexibility under conditions of environmental stress.

Around the start of the third millennium BP (the Iron Age) the data from the desert survey indicate a phase of more extensive mobility patterns, where mountain pastoralists seemingly expanded their home ranges and exploited a wider overall territory. Geographic evidence from the desert survey zone reveals consistent shoreline regression of small brackish lakes. Although the shoreline berms themselves are yet to be radiometrically dated, the location of diagnostic Iron Age burial mounds along the most extensive relict shorelines suggest that considerable aridization began in the region sometime at the start of the third millennium BP. At this stage we begin to see the potential to link extensions in annual mobility circuits and the larger scale migration processes. Provisionally, fluctuations in home-range mobility patterns may have led periodic extensions of seasonal territories and potential re-localization of the epicenter of mobility overall. Iterating this process over the course of many millennia, minor shifts in overall mobility and exploitation within particular regions could lead to a slow movement of population across wider territories, without evidence for rapid or orchestrated migration events.

## 2.4 Migration and Mobility in Wider View

To use this case study as an analogue for a broader examination of migration in Eurasia, we must consider the magnitude of environmental change (i.e., resource availability) or social pressure that might affect mobility patterns within particular regions. If we examine, first, the long-term paleoclimatic record, the examples discussed above reflect minor environmental shifts within the Middle to Late Holocene. For example, the scale of environmental fluctuation relevant to grassland productivity within a 100 km radius of the site of Begash was fairly nominal in comparison to the substantial environmental transitions documented north of 50° latitude between 16,000 and 10,000 years BP (cf. Frachetti 2004). During that climatic interval, paleoclimatic data indicate more drastic environmental changes, from warm to cold and back again (Graf 2010). In addition, mobility models for the Holocene must be adjusted to account for the different scales of perception that might exist within a population whose logistical mobility was oriented around hunting in vast forest/taiga/tundra ecotones. Indeed, the cross-cultural constitution of “local” versus “long-distance” mobility reflects a highly variable practical and notional reality.

Building from the recent work of Graf (2010), it pays to consider the combination of land use patterns and technologies that shaped Pleistocene hunting economies along with larger-scale ecological feedback loops that shaped the environmental milieu. As Graf argues, land use patterns relevant to arctic hunters and foragers are related to broader strategies of provisioning, the availability and provisioning of technology, and fluctuation in terms of distribution and availability of food resources within the context of extreme seasonality and restricted resource abundance.

Taking Graf’s case study of environmental change in the Altai Mountains 16,000–10,000 years ago as an example, we see a drastic shift from a glacial environment of limited productivity to a woodland environment largely covered with shrubs, an ideal environment for hunters. Such a significant shifts in environmental potential presents an ecological situation in which the Altai Mountains would have offered high yield refugia amidst otherwise severely restricted resource catchments. In a similar fashion, coastal refugia along the northeastern coast of Siberia and northwestern coast of North America



likely reflect rapidly changing environmental refugia during the time in question (15–10 kya). Thus, when considering population dispersal across Beringia, the draw of resource-rich refugia may indeed reflect a motivation for populations to strike out for new territories.

Above, I argued from an ecological perspective that diverse ecological pockets helped shape cyclical mobility patterns, which define in pastoralists' seasonal use of territories and exploitation of resources at different elevations. Numerous authors within this volume present evidence to suggest that Paleolithic hunters made the transition from northeastern Siberia to North America through only a few possible routes. In the period after crossing Beringia, the coastal route, perhaps best reflects a "string of pearls" migration model (developed upon further in several chapters in this volume, including Chaps. 6, 7, and 10). In this scenario, communities would have settled into available refugia to exploit coastal resources on a regular basis and then periodically move further along the coast to other new pockets. Depending on the size and productivity of environmental enclaves, we might expect a fairly limited resource potential, affected by seasonality and wider ocean ecology. Limited resource recovery along the coast may have sparked communities to periodically explore increasingly further south, following kelp ecosystems, for example (Brae, this volume). The "ice-free corridor" presents an alternative case where the "leap-frog" migration phenomenon may have greater explanatory strength. In this model, relatively well-established communities in the Alaskan plain would have rapidly moved south through an inland ice-free corridor, crossing the Yukon and northwestern Canada, rapidly moving towards sites in the Great Basin and northwestern USA (see Chap. 12 in this volume).

My goal in this chapter has been to illustrate through a recent archaeological example how mobility functions in territories throughout Central and Inner Asia and how these patterns of local (and wider scale) migration may serve to flesh-out our view of Paleolithic migrations that took place between Siberia and North America. We can imagine, from an ecological perspective, the reconciliation between the reality of seasonal mobility and the affordances of more sedentary lifestyles in coastal (or inland) refugia. To apply models from the Late Holocene to trans-Beringian populations living 16,000 and 10,000 years ago, one must assess the comparative productivity and availability of resources along with technological provisioning in relevant territories of habitation as well as smaller ecological pockets that could have been settled and exploited periodically to balance the risk of pioneer exploration in restricted biomes. Put another way, the realities of extensive migration should be considered from the perspective of comparative benefits of finding new productive territories and the risk of being locked into the yield of those very same environments. If a community was happily situated in a territory with ample resources and social comity, what would have inspired them to push into unknown regions? Whether the focus is Pleistocene hunters or Bronze Age pastoralists, our archaeological reconstructions must take into consideration the cyclical patterns of most mobility strategies while rectifying these movements in light of more extensive, stochastic migrations. Together, mobility and migration shaped a social and ecological process that populated the Americas in the Upper Pleistocene.

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