A zooarchaeological analysis of the faunal remains from Ratho Kroonkop, Limpopo Province, South Africa

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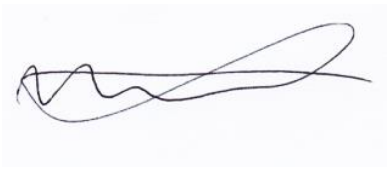
A thesis submitted to the University of Witwatersrand in fulfilment of the requirements for a Philosophiae Doctores

School of Geography, Archaeology and Environmental Studies

Declaration

I, Kathryn Deirdre Croll, declare that this work is my own original work. It is submitted for the degree of Doctor of Philosophy in the School of Geography, Archaeology and Environmental Studies at the University of Witwatersrand, Johannesburg. This work has not been previously submitted for another degree or examination at any other university.



Signed by: Kathryn Deirdre Croll on this the 20th day of March 2023

Student number: 441499

Dedication

I dedicate this thesis to my mother, for her infallible support and timeous mugs of tea; my Jack Russell, Fudge, for literally sitting behind me for most of this journey and my other dogs, Sophie, Odin and Skye for never leaving my side, and lastly, to Peter Morrissey, for happily being a sounding board. Thank you.

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Lastly, to Peter Morrissey, thank you for all the help (especially with the profile drawings), advice and support! And to my mum, for all the creature comforts and unending support and love.

Abstract

Ratho Kroonkop is one of several hilltop sites in the Shashe-Limpopo Confluence Area (SLCA) that Schoeman (2009; also see Brunton *et al.* 2013) interpreted as a rain-control site. Investigating how people (hunter-gatherers or farmers or both) selected, obtained, butchered and disposed of animal remains at Ratho Kroonkop, provides a window into people's relationship with animals in this liminal space on the edge of the SLCA, and possibly, more broadly in society as a whole.

In this study, I conducted taxonomic and taphonomic analyses on faunal remains from Ratho Kroonkop to elucidate engagement with animals between AD 900 and the 1600s. The identification of distinct temporally specific patterns in the Ratho Kroonkop faunal assemblage rests on a combination of my analyses of the faunal remains and radiocarbon dates. However, the interpretation of patterns in the data was informed by the comparison of the faunal assemblage with that from other sites in the region, and the integration of ethnography on both hunter-gatherers and farmers, and in particular, ethnographic accounts about rain control and beliefs related to animals.

It can be challenging for archaeologists to tease apart mundane and ritual use of animals by people in the past, especially when limited ethnography is available. A possible avenue for engaging with these nuances is through exploring patterns within datasets, for example, the differences in faunal processing between the three areas of activity at Ratho Kroonkop; the two rock tanks have taxa that would not ordinarily be consumed and have more evidence for 'ritual' use of fauna than the Central Area. Consequently, I suggest that the mid-second millennium faunal assemblage from the Central Area relates to mundane faunal remains processing, whereas the faunal assemblage in the two rock tanks relates to less mundane purposes from the early to mid-second millennium.

My study of the faunal remains from Ratho Kroonkop details the quotidian uses of animals at the site and delves into the human-animal relationships expressed at Ratho Kroonkop. Accepting Ratho Kroonkop as a rain-control site, the animals identified and their spatial locations at Ratho Kroonkop indicate that they transcended quotidian use. The animals were vital for rain control and particular animals (specifically *Ovis/Capra*

and very large mammals) had agency, potency and the power to prevent or withhold rain if treated inappropriately (in the case of hunter-gatherers).

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Chapter 1: Introduction

Zooarchaeological research has long focused on determining which animals past peoples selected to kill, or to scavenge, and how the carcasses were processed. These topics are particularly exciting to investigate in areas such as the Shashe-Limpopo Confluence Area (SLCA) (figure 1.1) in the period AD 500 to the 1600s, which is associated with state-level societies (including Khami, Great Zimbabwe and Mapungubwe). In the SLCA, animal symbolism and uses were shaped by interaction between hunter-gatherers and incoming farming communities, as well as interaction between different farming communities. Answering questions about issues involving animals, however, is made more complex by these interactions and the differences between how these groups viewed wild and domestic animals.

1.1 Human – animal relationships

Analysis of faunal skeletal elements can yield a plethora of information ranging from site function (Binford 1981) and animal processing methods (e.g., Kent 1993; Lupo 1995; Lyman 2005; Seetah 2008) to the influence of non-human agents, such as carnivores (e.g., Marean & Spencer 1991). Animals[1], however, not only serve as a food source for humans, they also are an avenue to express social concepts (J. Morris 2012) through feasting, ritual use, and as expressions of social identity (e.g., figurines and totems) (Matenga 1993; Hanisch & Maumela 2002; E.M. Anderson 2009; Dietler 2011).

One of the avenues into understanding the relationship between people and animals is animism. In short, this is the belief that inanimate objects and non-human animals can act like people and thus, participate in human society (Brown & Walker 2008; Porr & Bell 2012). Critiques of early approaches to animism (e.g., Tylor 1970) stressed that

[1] Throughout this thesis, I use animals as a category encompassing non-human mammals, fish, rodents, birds and reptiles. This category is arbitrary since the boundary between humans and animals is conceptually fluid, and recent research has provided insights such as non-human animals having 'human' traits, such as "language, tool use and manufacture and culture" (Russell 2012: 2) to non-human animals having more agency than we have attributed to them in the past (e.g., Ingold 2006; Insoll 2011a, 2011b).

these ideas were entangled with evolutionist thinking, and that animism was rooted in western understandings of the separation of religion from secular life, and the manifestation of religion in rituals (James 1963; Sahlins 1976).

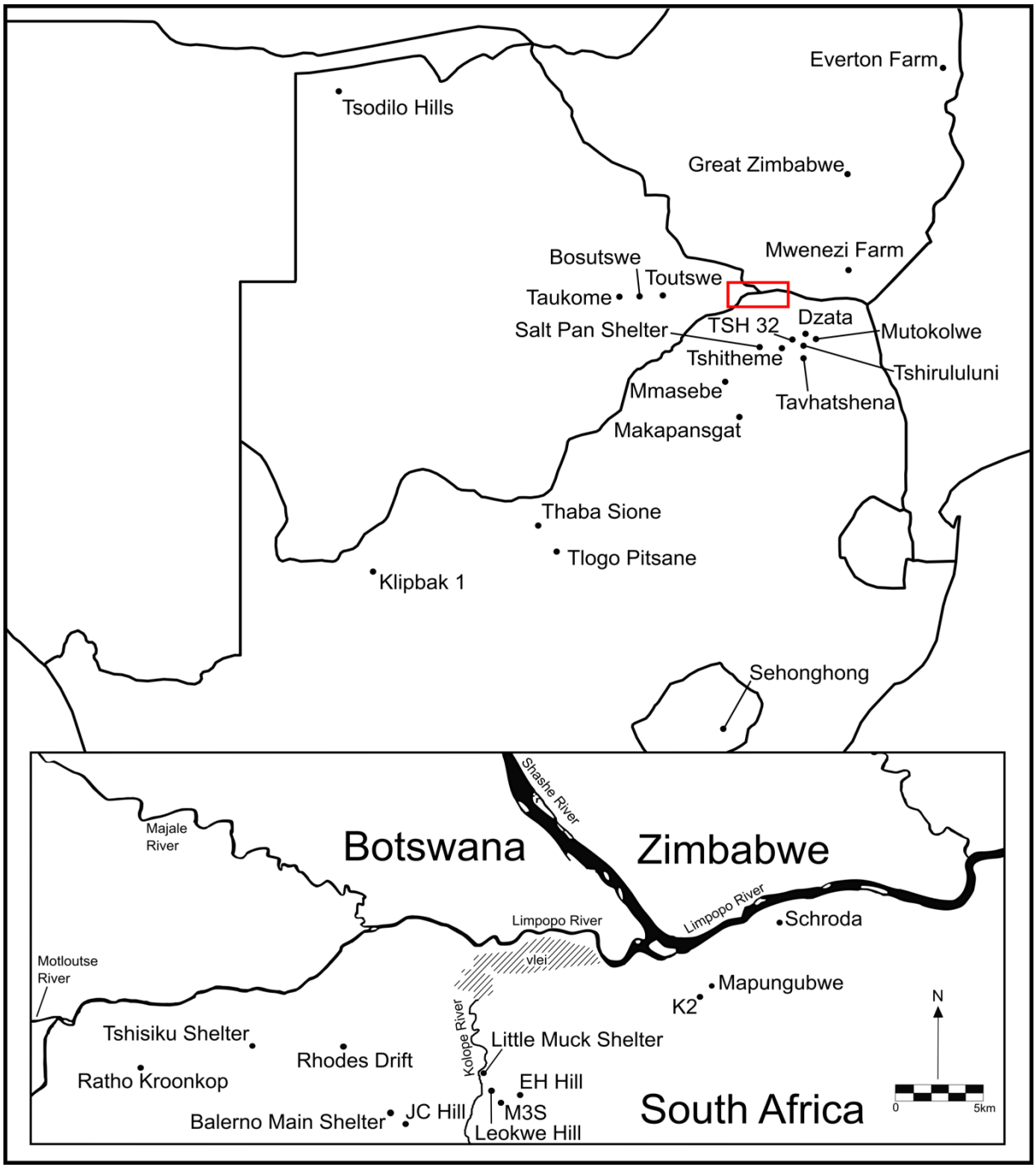


Figure 1.1: Map of the sites mentioned in this thesis, with the SLCA defined by the inset map (adapted from Fatherley [2009])

Pasarić and Warren (2019) criticised the use of older forms of animism to understand past societies in simplistic, general terms; for example, it has been argued that hunter-

gatherers saw animals as different kinds of people, with their own agency, and that they engaged in constant interactions with humans (Brown & Walker 2008; Hill 2013), whereas others have argued that farmers think of animals simply as property (Ingold 1994; Marciniak & Pollard 2015).

Contemporary approaches to animism (also referred to as neo-animism) break with problematic older approaches and instead, they explore relational epistemologies (Groleau 2009; Insoll 2011a) in which animals have agency and are conceptualised through the relationships they have with each other, and that we, as humans, have with them (Ingold 2000, 2006). Thinking of animals through this lens allows researchers to move away from assumptions that animals have inherent qualities and to analyse the contexts shaping the animations and agency ascribed to animals by people, instead (Groleau 2009).

Animism, as an ontology, is deeply embedded in everyday life and activities (Ingold 2000, 2006). Neo-animism also shifts the focus to the ontologies of non-Western people, and, through this, forces researchers to question their assumptions about human-animal relationships, thereby avoiding the silencing of indigenous voices (Brown & Walker 2008; Porr & Bell 2012; Aston 2021).

Early archaeological studies of ritual were occupied with the dichotomy of ritual/mundane and this resulted in the creation of discrete object categories, which separated the ritual from the mundane (Bell 1992, 2007). More recent studies of ritual have discarded this approach, and instead, embraced thinking of ritual as inextricably entwined with the mundane, recognising that so-called mundane activities can also be ritualised and vice versa (Bell 2007; Groleau 2009). A manifestation of this is the approach to archaeological material culture, and the trend to avoid distinguishing between ritual and mundane activities because mundane objects (including animals) can be transformed into ritualised objects through association with ritual practices (Groleau 2009).

One way of thinking of ritual as relational to other activities (Bell 2007) is to examine site-wide patterns of deposition rather than separate spaces in an area (Groleau 2009), and to construct object biographies that detail the uses and associations of an object during its ‘life’ (see e.g., Kopytoff 1986; Marshall & Gosden 1999; Pollard 2001).

Groleau (2009) contends that it is equally useful to analyse how mundane objects (and animals) are transformed into ritualised ones. Ritual also is no longer viewed as a fixed activity – instead, ritual is viewed as constantly changing, adapting and adjusting to the needs of the group performing the ritual (Aston 2021). Ultimately, by studying and exploring patterns of ritual refuse disposal and differences between ethnographic and archaeological examples, researchers can begin to understand how so-called ordinary objects and animals can be transformed into the extraordinary (Groleau 2009).

In southern Africa, the broader region in which my study is situated, the entanglement of animal-human relationships and ritual manifests itself in various material culture forms, such as rock art, figurines, rain-control[2] rituals, initiation rituals, feasting, bride wealth exchanges and others (e.g., Hammond-Tooke 1974a, b; Thackeray 1994; Schoeman 2006a, b).

1.2 Zooarchaeological studies of southern African farming and hunter-gatherer communities in the SLCA

The SLCA is a biodiverse landscape that extends across south-western Botswana, southern Zimbabwe, and north-eastern South Africa (figure 1.1). The archaeological record of the SLCA starts in the Earlier Stone Age (Kuman *et al.* 2005; Pollarolo & Kuman 2009), but my interest is in the last 2000 years. Excavated sites in the SLCA include Holocene hunter-gatherer sites, such as Balerno Main Shelter, Tshisiku Shelter (Van Doornum 2007, 2008) and Little Muck Shelter (e.g., Hall & Smith 2000; Forssman 2017, 2020); the late first millennium capital of Schroda (Hanisch 2002; Hanisch & Maumela 2002), the early second millennium capital sites of Mapungubwe and K2 (Fouché 1937; Voigt 1978, 1981a, 1983; Meyer 1980, 1998, 2000; Eloff & Meyer 1981; Hutten 2005; Abatino 2021), numerous commoner sites (e.g., Calabrese 2000a, 2005; Huffman 2000, 2001, 2007a) and rain-control hill sites (Schoeman 2006a, b, 2009; Murimbika 2006; Brunton *et al.* 2013). In addition to site specific research, archaeologists have studied interaction between hunter-gatherers, herders, and farmers as well as trade with the Indian Ocean Trade Network (figure 1.1) (e.g.,

[2] I use the umbrella term rain-control, rather than the narrower term rain-making throughout the thesis.

Hall & Smith 2000; Van Doornum 2007, 2008; Forssman 2013, 2015, 2017, 2019, 2020; Manyanga 2006; Manyanga & Chirikure 2019).

In the SLCA, previous faunal studies focusing on the Mapungubwe period (AD 1250 – 1300), as well as the preceding transitional K2 (TK2) (AD 1200 – 1250) and K2 and Leokwe (AD 1000 – 1200) periods have concentrated on developing an understanding of animal management (e.g., Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Raath 2014; A.R. Antonites *et al.* 2016a; Abatino 2021). Most of the SLCA faunal studies focused on assemblages from sites occupied by farming communities. This has left a distinct bias in the faunal record. Additionally, published studies that focused on hunter-gatherer sites have not included in-depth faunal analyses.

Whilst there are no in-depth analyses of the Later Stone Age faunal assemblages, basic analyses of material from Bronwen van Doornum's excavations provide insight into hunter-gatherer relationships with animals in the SLCA. Foremost is a study of the faunal assemblage from Balerno Main Shelter, a large shelter eroded into a domed sandstone koppie (small hill), located approximately 20km to the west of Mapungubwe (figure 1.1). It was occupied by hunter-gatherers from ca. BC 11 120 until the abandonment of Mapungubwe (ca. AD 1300) (Van Doornum 2008: 257). The faunal remains from this shelter mostly comprise tortoise carapace fragments and small bovids, with fish, small carnivores, birds, rodents and suids being less frequent – these are the kinds of animals more likely to be suitable for individual consumption (Van Doornum 2008).

Basing her interpretation on an increase in faunal remains and the inclusion of larger bovids and fish remains during the period AD 910 to 1020, Van Doornum (2008) suggested that there was an increase in the number of hunter-gatherers occupying the site, or that incoming farmer communities put pressure on hunter-gatherer resources. Interestingly, no domestic animal remains were identified in the layers associated with early contact between farmers and hunter-gatherers in the SLCA (AD 100 – 900), which indicates two possibilities: that hunter-gatherers did not receive domestic animals as payment for services or goods, or that these species were consumed elsewhere (Van Doornum 2008: 272).

Little Muck Shelter and Tshisiku Shelter, also located to the west of Mapungubwe, offer different perspectives from Balerno Main Shelter on the interaction between hunter-gatherers and farmers. At Little Muck Shelter, artefact densities (including faunal remains) increase during periods of interaction between the hunter-gatherers occupying Little Muck Shelter, who were producing craft goods for trade, and the Leokwe farmers occupying Leokwe Hill (AD 1050 – 1215) (Hall & Smith 2000; Van Doornum 2008). In contrast to this, artefact densities decrease at Tshisiku Shelter during this period, despite its proximity to Zhizo and K2 period farming community sites (Van Doornum 2007). The faunal remains at Tshisiku Shelter were analysed by Job Kibii (a faunal expert) who identified some species, but mostly classified the remains into faunal classes. Similar to Balerno Main Shelter, tortoise carapace fragments and fish remains occurred throughout the sequence (Van Doornum 2007). Other species commonly represented included reptiles and bovids as well as small carnivores, suids and birds in smaller quantities. The faunal assemblage from Tshisiku Shelter is similar to that from Balerno Main Shelter; it also comprises small mammals, which were likely snared. Matting needles are the most common examples of worked bone and occur infrequently throughout the sequence. Unlike Balerno Main Shelter, the densities of all classes of faunal remains decrease after contact with farming communities (Van Doornum 2007: 43).

The faunal assemblages of many farmer and hunter-gatherer sites throughout southern Africa show that human-animal relationships were complex, varied and adaptable (e.g., Voigt & Plug 1981; Plug & Voigt 1985; Hall & Smith 2000; Plug 2000; Hutten 2005; Van Doornum 2007, 2008; Fatherley 2009; Badenhorst 2011; Raath 2014; A.R. Antonites *et al.* 2016a, b; Badenhorst *et al.* 2016; Abatino 2021). Interaction between hunter-gatherers, herders and farmers in Botswana, Zimbabwe and South Africa produced sites and faunal assemblages which lay on a spectrum, from those considered ‘usual’ for hunter-gatherers to those considered ‘usual’ for farmers. Faunal assemblages from non-royal sites in Zimbabwe and South Africa suggest that people utilised different subsistence patterns, depending on where they were located, the surrounding environment and diseases which constrained the keeping of livestock. The assemblage from Mwenezi Farm, which is situated in a lowveld environment, for example, has higher ratios of wild to domestic taxa than other contemporaneous sites

(i.e., Mapungubwe, Great Zimbabwe and other sites in the Limpopo Valley and on the Zimbabwe Plateau), and a higher number of riverine resources, such as fish and freshwater mussels (Manyanga 2006; Badenhorst *et al*. 2011; A.R. Antonites, *et al.* 2016b).

Excavations of elite sites in Zimbabwe and South Africa, for example K2, Mapungubwe, and Great Zimbabwe, recovered faunal assemblages dominated by domestic species. Wild species were present in the assemblages from these sites, but at very low frequencies (Voigt 1981b, 1983; Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Raath 2014; Abatino 2021). There was variation, however, in the domesticated species presence at these sites. The faunal assemblages of pre-Mapungubwe SLCA farmer sites dating to between AD 900 and 1300 were dominated by caprine remains (e.g., Badenhorst 2011), whereas at Mapungubwe, cattle and caprine remains were found with equal frequency (Abatino 2021).

In Botswana, faunal assemblages from sites close to the Okavango Delta, dating to between AD 800 and 1300, were also dominated by domestic species, but the more remote archaeological sites were from the farmer capitals (Toutswe and Taukome), the higher the frequency of wild taxa became (Denbow 1984). In South Africa, faunal assemblages have revealed more variations in human-animal relationships. A zooarchaeological study of two sites in the Kruger National Park, for example, showed that rather than being ordinary farmer occupation sites, these two sites were occupied by specialised hunters who occupied the site repeatedly during prime hunting seasons (Grody 2016). Grody's (2016) study provides an alternative explanation for faunal assemblages at farmer sites that are dominated by wild taxa, namely that these could be specialist hunting camps rather than residential sites. Other faunal studies have investigated animal husbandry practices (e.g., Hutten 2005; Abatino 2021), the consumption of wild fauna and domesticates (e.g., Voigt 1981b, 1983; Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Raath 2014; A.R. Antonites *et al.* 2016b; Abatino 2021) and how animals are treated differently depending on human intentions (e.g., Plug 1987; Schoeman 2006a, b; Brunton *et al*. 2013).

1.3 Rationale

The SLCA is, and was, a biodiverse landscape, characterised archaeologically by a variety of expressions of interaction between hunter-gatherers and farmers (e.g., Schoeman 2006b; Van Doornum 2007, 2008; Forssman 2011, 2020). One of these expressions can be found in rituals of rain-control, which can be studied, in part, through analysis of the faunal remains resulting from these rituals and associated activities.

Of the faunal remains excavated from rain-control sites in the SLCA, only those from Rock Tank 2 on Ratho Kroonkop, one of the rain-control sites in the SLCA, have been analysed (see Brunton *et al.* 2013). This study replicates and expands Brunton *et al.*'s (2013) study by utilising the same methods and techniques employed in their study and by performing an intra-site comparison of the faunal remains recovered on Ratho Kroonkop. In addition to Brunton *et al.*'s (2013) identification of species, my taphonomic analysis of the faunal remains adds a dimension of depth to the study and details how the fauna were processed and collected for ritual uses. This kind of faunal analysis – both identification and taphonomic – has not yet been performed on the faunal remains from the rain-control sites in the SLCA.

On a more general level, the analysis of the faunal remains recovered from excavations at Ratho Kroonkop present an opportunity to study the material signature of ritual activities in the area and to reflect on the relationship between people and animals in the region.

1.4 Research question and objectives

My study aims to answer the question: What information do the faunal remains from Ratho Kroonkop provide about human-animal relationships in the context of rain-control in the SLCA?

The objectives of this study are as follows:

- To identify species abundance at Ratho Kroonkop
- To identify the micro- and macroscopic bone surface modifications on the faunal remains

- To explore the role fauna played in rain-control rituals
- To determine whether the faunal remains correlate with mentions of animals in the relevant ethnographies relating to rain-control
- To investigate the following intra-site patterns in the faunal remains:
    - Taxonomic representation
    - Bone surface modifications
    - Temporal patterns

1.5 Thesis organisation

Chapter one introduces the theoretical framework and broad local context within which this study is situated. Animism and ritual are briefly discussed, before the descriptions of the history of the SLCA, as well as the debates surrounding social complexity in southern Africa are provided. Also included in this chapter is the research question and objectives of my study, and the study rationale.

Chapter two describes the environmental and climactic setting of the SLCA before detailing Ratho Kroonkop, the archaeological site that is the focus of my study. The plan of Ratho Kroonkop and profile drawings from some of the excavations are provided, as well as general information on the published material culture, except for the faunal remains, from Ratho Kroonkop.

Chapter three focuses on the history and definitions of taphonomy as used by zooarchaeologists and archaeologists, before discussing animals as a resource, rituals and animals, and rain-control in southern Africa. I also review historical and ethnographic information about the way past peoples (both hunter-gatherers and farmers) thought about animals and integrate them into their respective cosmologies.

In **chapter four,** I set out the thesis methodology. This includes my approach to the identification of taxa, quantification, bone surface modifications, and the identification of worked bone. I also summarise the debates surrounding quantification methods and describe various taphonomic agents that act on faunal remains in the archaeological record.

In **chapter five** I report in detail on my findings, starting with the sample size and identified taxa. Following the report on the taxonomy, I describe the bone surface modifications, beginning with anthropogenic modifications of the faunal remains (cut marks, chop marks and intentional polish), followed by modifications by animals (tooth pits and scores) and natural modifications (weathering, rootlet etching and diagenesis).

Chapter six entails a discussion of the findings of my study within the context of the broader SLCA and ritual in general. These findings show that the archaeology of Ratho Kroonkop, like that of many sites in the SLCA, is complicated, with areas of 'mundane' activity and areas of 'ritual' activity, with considerable overlap. This makes it difficult to determine what is mundane and what is exclusively ritual. I also compare hunter-gatherer and farmer rituals recorded in ethnographies with the faunal remains from Ratho Kroonkop.

Chapter seven concludes this thesis and, drawing on the insights I gained through the research, I suggest worthwhile avenues for further study.

Chapter 2: Site context

2.1 Introduction

In this chapter, I situate the faunal assemblage from Ratho Kroonkop in its environmental and archaeological contexts. I begin by describing the environmental (including botanical, zoological, and geological) context of the Limpopo Valley, and the rainfall and temperature regimes of the region. I then summarise the occupation sequence of the Shashe-Limpopo Confluence Area (SLCA) starting with hunter-gatherers. I also discuss rain-control sites previously studied in the SLCA before describing Ratho Kroonkop and the excavations that took place there.

2.2 Environmental context

The Shashe and Limpopo River valleys are complex ecological systems, with several micro-climates and micro-ecosystems. Depending on the amount of rainfall and the season, the Limpopo Valley may be dry, sometimes with much grass, or lush and green with a bounty of mopane trees that allow scant grass to grow between them. The SLCA falls within the Mopane Bioregion of the Savanna Biome, one of the largest biomes in South Africa (Rutherford *et al.* 2010a). Ratho Kroonkop itself straddles Subtropical Alluvial Vegetation and Limpopo Ridge Bushveld (figure 2.2). Mopane, white seringa and baobabs are characteristic of Limpopo Ridge Bushveld, a region of uneven plains broken by ridges and hills, and poor ground cover (Rutherford *et al.* 2010b) (figure 2.2). The geology of the SLCA consists mostly of Karoo (Late Carboniferous to Early Jurassic) sediments, basalts, dolerite dykes and diabase dykes and sills (Johnson *et al.* 1996; Plug 2000: 117). The characteristic erosion-resistant sandstone hills and ridges are part of the Tshipise Member of the Clarens Formation of Karoo sandstone (Eastwood & Blundell 1999: 17) and many archaeological sites occur along them (Plug 2000).

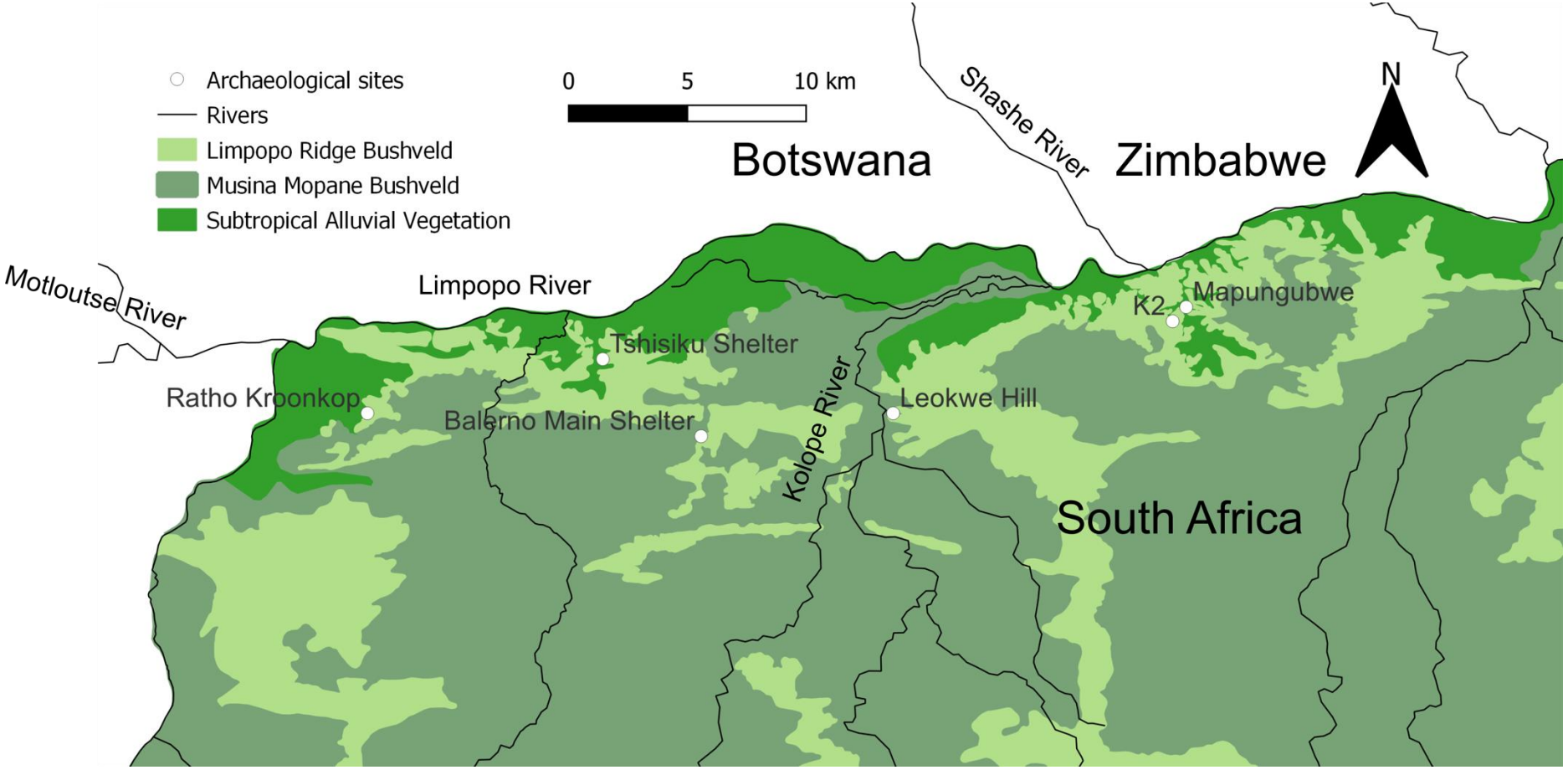


Figure 2.1: Map of the main rivers in the Shashe-Limpopo River Basin and the main vegetation types of the South African section (data from Department of Water Affairs and Forestry [2006] and the South African National Biodiversity Institute [2018])

In the west of the valley (along the border of South Africa and Botswana), rainfall averages 329mm annually. This part of the SLCA is less prone to flooding because the water that floods down the Shashe River into the Limpopo River seldom pushes back past Pont Drift (Schoeman pers. comm. 2022), approximately 30km from the confluence. The rainfall occurs almost entirely in the summer months from October to April (Briggs 2022). Rutherford *et al.* (2010a: 442) note that nowhere else in the Savanna Biome does the winter daily relative humidity reach the lows that it does in the Limpopo Valley, where relative humidity levels close to 0% have been recorded.

In summer, the highest annual rainfall average, of less than 400mm, is associated with the highest temperatures (±35°C) (Rutherford *et al.* 2010b). The temperatures in the SLCA can be extreme; in the west, where Ratho Kroonkop is situated, minimum temperatures may be as low as -7°C and maximum temperatures may be as high as 42°C. Average maximum temperatures around Mapungubwe Hill range between 35°C and 22°C during the summer, with humidity ranging between 40% and 70%, and average minimum temperatures range between 25°C and 5°C in the winter, with humidity ranging between 5% and 25% (South African Weather Service 2022; Briggs 2022).

Isotopic analyses of oxygen, nitrogen and carbon isotopes found in archaeological bone and baobab trees have determined paleoclimatic records for most of northern South Africa and southern Zimbabwe (e.g., J.M. Smith 2005; J.M. Smith *et al.* 2007; Woodborne *et al.* 2015). Collectively, this data suggests that rainfall and temperature in the SLCA varied between AD 900 and the present. The oxygen and nitrogen isotopic analyses have shown that the region was semi-arid between AD 880 and 1010 (rainfall averaging below 500mm per annum). It was wetter between AD 1010 and 1290 and an average rainfall of above 500mm per annum continued after AD 1290 (J.M. Smith 2005; J.M. Smith *et al.* 2007). The oxygen isotopes from baobab trees, however, indicate that there was a general trend of a decrease in rainfall between AD 1075 and AD 1805, with a relatively drier period beginning around AD 1600 (Woodborne *et al*. 2015). This data correlates with the recorded Little Ice Age (AD 1300 to 1800 [Tyson *et al.* 2000]) during which there was an approximately 1.4°C decrease in temperature and a corresponding decrease in rainfall in the SLCA (Woodborne *et al.* 2015).

The Limpopo River is fed by a number of smaller rivers and a number of non-perennial streams (figure 2.1). At the confluence of the Shashe and Limpopo rivers, near-permanent pools have formed, which provide water to people and animals. This may have been a deciding factor in attracting human settlement (Eastwood & Blundell 1999).

The vegetation in the west of the SLCA is predominantly dry grassland and mopane shrub. Grasses tend to be sparse but are palatable to grazers (Plug 2000). The numerous grass species include *Enneapogon cenchroides* and *Aristida adscensionis* (Rutherford *et al.* 2010a: 484). Across the SLCA, riparian forest abuts the mopane woodland and grassland, which support a diverse number of animals (Eastwood & Blundell 1999). Large trees found on the ridges and in the riparian forest include *Adansonia digitata* (baobab) and *Acacia nigrescens* (knobthorn). Smaller trees are also present on the ridges and throughout the area. These include *Colophospermum mopane* (mopane), *Commiphora glandulosa* (tall firethorn corkwood), *Ficus abutilifolia* (large-leaved rock fig) and *Kirkia acuminata* (white seringa). Small and large shrubs include *Catophractes alexandri* (trumpet thorn) and *Barleria affinis* (downy baleria).

Historically and currently, the Limpopo River Valley holds a plethora of wildlife ranging in size and across a variety of habitats (see table 2.1). These broad habitat types are not mutually exclusive, and many species move between them. Archaeologically, the same species have been recorded in the SLCA, with the addition of domestic species (cattle, sheep, goats, chickens, and dogs) (e.g., Voigt 1981a, b, 1983; A.R. Antonites *et al.* 2016a; Bradfield & A.R. Antonites 2018). Numerous reptiles are present in the SLCA, including monitor lizards, tortoises and smaller lizards and geckos (Alexander & Marais 2007); the rivers also hold a wide number of fish species, such as barbel (Skelton 2001). The SLCA also hosts a large variety of birds, ranging from large raptors and owls (e.g., the African fish eagle and Pel's fishing owl) to smaller birds, such as the lilac breasted roller (Chittenden *et al.* 2016).

Table 2.1: Historically and archaeologically occurring large mammal species and broad habitat types (e.g., du Plessis 1969; Voigt 1981a, b, 1983; Skinner & Chimimba 2005; A.R. Antonites et al. 2016a; Bradfield & A.R. Antonites 2018)

Species	Habitat type
Equus quagga (plains zebra), *Phacochoerus africanus* (warthog), *Sylvicapra grimmia* (grey duiker), *Aepyceros melampus* (impala)	Woodland
Rhinocerotidae (black and white rhinoceros), *Giraffa camelopardalis* (giraffe), *Raphicerus campestris* (steenbok), *Redunca* spp. (southern and mountain reedbuck), *Hippotragus equinus* (roan), *Hippotragus niger* (sable), *Damaliscus lunatus* (tsessebe), *Alcelaphus buselaphus* (red hartebeest), *Connochaetes taurinus* (blue wildebeest), *Tragelaphus strepsiceros* (kudu), *Tragelaphus oryx* (eland), *Syncerus caffer* (buffalo), *Loxodonta* (elephant)	Grassland/Savanna
Raphicerus sharpie (Sharpe's grysbok), *Oreotragus oreotragus* (klipspringer), *Pelea capreolus* (vaal rhebok)	Rocky hills
Hippopotamus amphibius (hippopotamus), *Kobus ellipsiprymnus* (waterbuck), *Tragelaphus scriptus* (bushbuck)	Water-based
Potamochoerus larvatus (bushpig)	Forest

2.3 Archaeological context

2.3.1 The Shashe-Limpopo Confluence Area occupation sequence

The SLCA was first occupied by hunter-gatherers and there is evidence of aggregations of hunter-gatherers extending back at least 6 000 years (Eastwood & Blundell 1999; Van Doornum 2005, 2007). Domestic species (sheep, goats, and cattle) arrived in the SLCA with herders and farmers, around AD 100 – 600 (Huffman 2000; Hall & Smith 2000), although there is debate on whether herders or farmer groups introduced domesticated species (specifically sheep/goat) (see e.g., Sadr 2015). Archaeologists (e.g., Schofield 1937) initially thought that when farming societies

moved into the SLCA, they subjugated the hunter-gatherers who then left the SLCA. More recent research, however, has convincingly shown that hunter-gatherers did not leave the SLCA, but rather, that they interacted and traded with farmers ((Hall & Smith 2000; Van Doornum 2007, 2008; Forssman 2014, 2017, 2020), and possibly provided ritual services for farmers (Schoeman 2006a). At Balerno Main Shelter, Tshisiku Shelter and Little Muck Shelter (Hall & Smith 2000; Van Doornum 2007, 2008; Forssman 2014, 2017, 2020), the interactions between hunter-gatherers and farmers exhibited a range of material expressions, and there is evidence that not all hunter-gatherers remained at the shelters when farmer settlements expanded into the SLCA.

Within this landscape there was also a succession of large, complex societies, beginning with the 10th century (Zhizo) village of Schroda in the Limpopo River Valley (Hanisch 1981a, 2002; Calabrese 2000b, 2005, 2007; Hanisch & Maumela 2002; Van Schalkwyk 2002; Nettleton 2002; Raath 2014), followed by K2 (aka Bambandyanalo) (Voigt 1978, 1981a; Eloff & Meyer 1981; Meyer 1998; Huffman 2000; Calabrese 2000b, 2005, 2007) and ending with Mapungubwe (Fouché 1937; Voigt 1978, 1981a, 1983; Calabrese 2000b, 2005, 2007; Huffman 1996, 2000, 2009, 2015a, b; A.R. Antonites *et al.* 2016a).

Some Mapungubwe commoners remained in the SLCA after the collapse of the Mapungubwe state at the end of the AD 1300s (Meyer 1998). The next clear archaeological evidence for complexity in the area relates to the Khami state, which developed in the mid-1400s. The Khami state's influence was widespread across Zimbabwe and reached beyond the Limpopo River into northernmost South Africa (Huffman & Hanisch 1987); it is likely that there was trade and interaction with the farmers already present in the region (Huffman & Hanisch 1987; Huffman 1996, 2007a; Schoeman 2020). The evidence for the reach of the Khami state into the SLCA comprises graphite and ochre banded and incised pattern pottery, residential terraced walling at elite sites, and the inclusion of check patterns in the walling (Huffman & Hanisch 1987; Huffman 2007a).

After a series of complex processes, Venda identity developed (around AD 1600) (see Loubser 1989, 1991, 2008 for a more detailed explanation; also see Schoeman [2020] for a summary), with a core being established around the Soutpansberg (Van Warmelo

1940, 1953). Dating of archaeological layers associated with Venda-speakers suggests that Venda polities were formalised by AD 1650 (Loubser 1989: 58).

The SLCA lay on the periphery of the core of this polity and was a frontier landscape into which a number of farmer groups moved, including Venda, Northern Sotho and mixed groups (e.g., Schoeman 2013). Importantly, some people that formed part of hunter-gatherer, Leokwe, K2, Mapungubwe and Khami communities continued to be present in the SLCA even when polities broke apart, and some remained when other groups moved into the landscape. Consequently, there was continuity in ideas and cultural material (see for e.g., Schoeman 2006a: 289). There is also evidence for independent hunter-gatherers 50km south of the SLCA on the Makgabeng Plateau (Bradfield *et al.* 2009), which may indicate that the surface material at some shelters in the SLCA constitutes traces of the continued presence of hunter-gatherers or hybrid hunter-gatherer/farmer descendant groups (Van Doornum 2008; Schoeman 2020). These hybrid groups in the north of South Africa referred to themselves as Kattea, but also were known as Vaalpense or Masele (Van Warmelo 1940; Van der Ryst 2003). The term Vaalpens is derogatory and previously it was used to refer to slaves or lesser-than-humans (in the case of Masele) (see Van der Ryst [2003] for a summary). I use the term they use to refer to themselves, Kattea.

2.3.2 Social relations Shashe-Limpopo Confluence Area

Hunter-gather sites have been identified by the presence of, among other forms of material culture, microlithic stone tools, bone tools and San rock art (e.g., Eastwood & Blundell 1999; Hall & Smith 2000; Eastwood 2003, 2006; Van Doornum 2005, 2007, 2008; Forssman 2011, 2013, 2020). The farmer communities in the SLCA have been mostly defined by ceramic traditions, starting with Happy Rest, located in the Soutpansberg, in the lowest levels of the archaeological deposits of the southern terrace of Mapungubwe and atop some of the rain-control hill sites in the SLCA (Hanisch 1981a, b; Huffman 2007a), followed by the Zhizo ceramic tradition which has been dated to around AD 800 – 900 and has been found at Schroda and other sites in Zimbabwe, Botswana and along the Limpopo River in South Africa (Hanisch 1981a; Meyer 1980, 1998, 2000; Calabrese 2005, 2007). This ceramic tradition was followed by Leopard's Kopje A and B, which are associated with the sites of K2 and

Mapungubwe respectively (Meyer 1980, 1998, 2000; Huffman 2000, 2007a; Calabrese 2005, 2007).

Interaction between these communities has been read from the presence of material culture associated with one community being present at sites dominated by material culture from other communities or the proximity of sites to zones associated with other communities (e.g., Van Doornum 2005; Calabrese 2000a, 2005, 2007; Schoeman 2006a).

Much of the debate on interaction has focused on inter-farmer relations (Huffman 1982, 1986, 2000, 2007b; Calabrese 2000a, b, 2005, 2007). Leokwe Hill, an archaeological site dating to the Zhizo period (there were some Happy Rest ceramics recovered during excavations, too), and which was occupied during the K2 and Mapungubwe periods and later by Venda-speakers, formed the basis of this discussion (Calabrese 2000a). Huffman's (1986) interpretation of the site and sequence was that Zhizo communities were displaced out of the SLCA when Leopard's Kopje people arrived, whereas Calabrese (2000a) argued that Zhizo people continued to occupy spaces in the SLCA and interacted with communities who made Leopard's Kopje pottery. Additionally, Calabrese (2005, 2007) argued for the existence of a class-based society at Leokwe Hill before the rise of K2 to power, and for status differentiation between Leokwe and K2 communities, with Leokwe people being of higher status than K2 people when K2 people first expanded into the SLCA.

Calabrese (2000a, b, 2005, 2007) built his model on the presence of elite markers, such as figurines, metal goods, glass beads and faunal remains. Huffman (2001, 2007a), however, argues that Leokwe people were always subordinate to K2 people, likely fulfilling specialised roles, such as herders, within K2 society. He based this argument on settlement layout (the Central Cattle Pattern [CCP], which is discussed further below), ceramic styles and faunal remains (Huffman 2001).

Given the overwhelming evidence from Botswana, Zimbabwe and the SLCA itself about interaction and the contemporaneity and continuity of hunter-gathers and various large farmer groups, it is likely that the society being formed in the SLCA was more complex than suggested in traditional hierarchical models.

2.3.3 Shashe Limpopo Confluence Area social complexity in context

The ferocity of the contestation of the place of Leokwe in the SLCA hierarchies and sequence stems from its intersection with broader debates about the origins of the Zimbabwe culture. The move from K2 to Mapungubwe is the first step in Huffman's (1986, 1996. 2000, 2007a) model for the development of the Zimbabwe settlement pattern.

Huffman (2000, 2007a) used the change from the CCP to the Zimbabwe pattern with the settlement of Mapungubwe and trade with the Indian Ocean trade network to justify his theory that the SLCA, and specifically Mapungubwe, was the first state-level society in southern Africa, and a precursor to Great Zimbabwe.

Huffman's (1982) CCP model was derived from Kuper's (1980, 1982a, b, cited in Huffman 2007a) structuralist model of South African Bantu-speaking people. The CCP is defined by a series of structuralist dichotomies – inside vs outside and male vs female. These are predicated on a patrilineal worldview in which cattle and men are held in high regard by society. This model has been heavily critiqued for its uncritical use of ethnographic texts (e.g., Hall 1984) and its projection of second millennium livestock keeping patterns into the first millennium (e.g., Hall 1986; Lane 1995, 1998; Badenhorst 2009a, b, c, 2011, 2012; Fraser & Badenhorst 2014). These concerns and criticisms are valid and difficult to escape; the CCP is a useful model, however, and can be used to explain settlement patterns, albeit in simplified terms that do not allow for much variation.

For Huffman (1986, 1996, 2000, 2007a), the Zimbabwe settlement pattern is different to the Central Cattle Pattern because it demonstrates a distinct architectural and spatial hierarchy, and the cattle byre is no longer in the centre of the settlement, but rather, on the outskirt. Within this Zimbabwe culture, Huffman (1986, 1996, 2000, 2007a) created three divisions based on architecture and ceramics; he divided the Zimbabwe culture sequence into three temporal-spatial units: the Leopard's Kopje Phase, the Great Zimbabwe Phase and the Khami Phase.

Huffman's model for the development of the Zimbabwe culture has been debated and contested for several decades, due to the existence of large farmer sites in Botswana

and Zimbabwe (see e.g., Denbow 1982, 1984, 1986, 1990; Pwiti 1996; Van Waarden 1998; Pikirayi 2013; Chirikure *et al.* 2017a; Manyanga & Chirikure 2019; Chirikure 2020) with Great Zimbabwe argued to be contemporaneous with, and perhaps controlling, Mapungubwe (see Chirikure *et al.* 2013). It is likely that complexity arose from multiple avenues, such as internal and external trade, multilinear successions, and interaction and/or competition between polities and other groups of people (Chirikure *et al.* 2012, 2013, 2017a; Manyanga & Chirikure 2019; Chirikure 2020).

A significant aspect of these criticisms derives from Huffman's (1981, 1996) use of Shona ethnography to explain the construction and use of Great Zimbabwe and to differentiate the site from Mapungubwe. Huffman (1981: 131) made use of historical Portuguese accounts of Shona-speakers and "nineteenth- and early twentieth century observations of Shona speakers on the premise that the ideology of this culture system persisted until then". This approach has been critiqued by Beach (1998: 50) because it relies too heavily on oral traditions which have yet to be proven as genuine transmissions of knowledge from prior to AD 1500 and colonial documents of "varying and often doubtful relevance or interpretation". Beach (1998) contends that there is a lack of non-archaeological evidence of the Shona construction of stone-walling in Zimbabwe, and that there are no clear oral traditions from the area around Great Zimbabwe. Instead, Beach (1998: 55) proposes a model to explain Great Zimbabwe from the premise that it was "a major Shona *political* centre" (Beach's emphasis) – with the acknowledgement that the sources he uses are contentious.

Huffman (1982, 1986, 1996, 2010b, 2011, 2015a; Huffman & Main 2021), however, continued to extend both Shona and Venda ethnography back in time to understand the Great Zimbabwe 'state' based on the thinking that people ancestral to Venda-speakers spoke Kalanga (a Western Shona dialect) before the incorporation of Sotho-Tswana, which led to the development of the modern Venda language. Additionally, Huffman and Main (2021) contend that Venda ethnography provides important models for understanding archaeological sites because they were less affected by 16th century Portuguese influence, the 19th century *difaqane* and British colonisation of Zimbabwe.

The first two decades of the 21st century saw a significant increase in critiques of Huffman's approach and the development of alternative models for the archaeological

sequence of the SLCA and Zimbabwe plateau. The majority of these are based on new readings of Shona ethnography, the regional archaeology and radiocarbon dating (e.g., Chirikure & Pikirayi 2008; Chirikure *et al.* 2012, 2013, 2016, 2017a; Manyanga & Chirikure 2019; Chirikure 2020). Consequently, the current consensus is that the succession of K2 to Mapungubwe to Great Zimbabwe to Khami is certainly more complex than Huffman (2000) originally suggested, and that intentionally integrating local knowledge into interpretations of archaeological sites leads to better explanations of the archaeology.

Significant for my research is Chirikure *et al.*'s (2016, 2017a) argument for multidirectional development of complexity in which they further refine their earlier approaches (e.g., Chirikure & Pikirayi 2008; Chirikure *et al.* 2012, 2013) which were aligned with the thinking of Denbow (1982, 1984, 1986, 1990), Van Waarden (1998), and Calabrese's (2000a, b, 2005, 2007) work. Chirikure *et al.* (2016, 2017a) argue for two paths to complexity in Zimbabwe, one on the central plateau leading to Great Zimbabwe, and a second, separate Leopard's Kopje pathway in western Zimbabwe and the Shashe-Limpopo Confluence Area that links K2, Mapungubwe, Khami and Venda. I find their arguments for multiple paths to complexity convincing, and consequently I shall not use general Shona ethnography in my interpretation of Mapungubwe and Khami period material, but rather favour Venda ethnographies, where relevant.

2.4 Rain-control in the SLCA

Adding to the social complexity in the SLCA are the rain-control sites, initially studied and excavated by Schoeman (2006a, b, 2009, 2013). Initially excavations were at JC Hill, M3S, EH Hill, and Rhodes Drift, and Ratho Kroonkop was excavated later (see Schoeman 2006a, b, 2009; Murimbika 2006; Brunton *et al.* 2013). According to Schoeman (2006a, b, 2009), these sites are similar to each other in a number of ways: they are located atop sandstone hills in the SLCA, are difficult to access, cupules occur frequently around the hills and archaeological deposits located in or close to rock tanks on these sites can be linked to rain-control.

Schoeman (2020) suggests that this use of hilltops for rain-control was a place-and time-specific decision due to the lack of evidence from early farmers (Zhizo) and the

as-yet lack of such sites in Botswana and Zimbabwe. The material culture recovered from these excavations included glass and shell beads, Leopard's Kopje ceramics, informal stone tools, faunal remains, botanical remains, figurine fragments, gravel floors and features and the remnants of temporary grain bins (Schoeman 2006a, b).

A number of the botanical remains from these hills relate to rain-control: *Grewia flava* (velvet raisin) and *Strychnos* sp. (monkey orange) are mentioned in Tsonga ethnographies (Junod 1962, cited in Schoeman 2006a) in connection with lightning protecting medicine and *Vignaigna subterranea* (Bambara groundnut) is used in drought prevention (Schoeman 2006a). Additionally, the botanical remains possibly correlate to the time of the year when rain-control and drought prevention rituals took place among farming communities (typically October and November onwards) (Schoeman 2006a); the *Strychnos* and *Xanthoxercis* (nyala berry) recovered from EH Hill were fresh when burnt, which indicates that they were burnt around springtime (September to November) (Schoeman 2006a).

Murimbika (2006) excavated Rhodesdrift to determine whether the material from rain-control rituals is evident archaeologically. Very few well-preserved bone fragments were recovered[3] and some worked bone was also present (Murimbika 2006). Murimbika (2006) indicated that Rhodesdrift was not a residential site, and that it was similar to other identified rain-control sites in the SLCA (also see Schoeman 2006a) in that it is difficult to access the summit and is isolated from farmer settlements. Additionally, he noted that the stone platforms and *dagha* features were contemporaneous, which likely indicates that Rhodesdrift was used by a single ritual specialist during his career, on multiple occasions (Murimbika 2006). The material culture from the rain-control hills places their use in the K2 and K2-Mapungubwe transition periods (AD 900 – 1200) and indicates their use by hunter-gatherer and farmer ritual specialists. Schoeman (2006a, b, 2009) proposes that these rain-control sites were another site of interaction between hunter-gatherers and farmers in a material and spiritual sense. It is possible that the hills were also used historically (after AD 1600) because there were Letaba ceramics (which are associated with Venda-

[3] These were not identified.

speakers) identified on several of the hilltops (Schoeman 2020). Loubser (1991, 2008) suggests that Venda-speakers associated hills and hilltops with royal power and pools of water with ritual control, which may have been the reasoning behind the historical use of Ratho Kroonkop (Schoeman 2020). Rain-control in hunter-gatherer and farmer thinking is discussed further in chapter 3.

Huffman (2007a: 73) agrees to a certain extent with Schoeman (2006a, b) and Murimbika's (2006) ideas about rain-control occurring on hills in the SLCA. He, however, stresses that, because the hilltops examined by Schoeman (2006a) and Murimbika (2006) were not accessible by cattle and thus lack evidence for the Central Cattle Pattern (CCP), they would not have been inhabited. Instead, they were only used temporarily by rainmakers.

More controversially, Huffman (2007a, 2009) argues that the burning of huts and granaries on non-hilltop sites also formed part of rain-control rituals during the K2 period. Huffman (2007a) also suggests that the move from K2 to Mapungubwe Hill represented the king taking over rain-control duties by moving to the site of rain-control. Chirikure *et al*. (2014) argue against this by presenting evidence of a hilltop in Zimbabwe (Mapela Hill), which has the same archaeological markers for rain-control as the sites studied by Schoeman (2006a), but pre-dates Mapungubwe and has architectural features suggesting that it was inhabited. Huffman (2015b) has criticised this interpretation, citing the evidence that Chirikure *et al.* (2014) present, namely that the material culture present at Mapela Hill indicates that the site dates to the Woolandale period (ca. AD 1250 – 1400), which post-dates Mapungubwe. Chirikure *et al*. (2013, 2014) make the case for an interpretation of rain-control that is not limited to a linear time scale or one place on the landscape.

2.5 Ratho Kroonkop in context

Ratho Kroonkop is situated in the far west of the SLCA in South Africa. It is the furthest west of the rain-control hills from Mapungubwe Hill (approximately 35km from Mapungubwe) (Schoeman 2009). It is a steep-sided sandstone hill that has an elevation of approximately 650m above the valley floor. It is 'crowned' by uneroded sandstone and flanked to the east by a sandstone ridge (figure 2.2).

Figure 2.2: Context image of Ratho Kroonkop taken looking northwest in winter, 2019

A long sandstone ridge to the north of Ratho Kroonkop runs along the river until it turns south. A Khami petty chief (level 3) *muzinda* (palace) is located on this sandstone ridge (Huffman & Hanisch 1987). Access to the *muzinda* was via residential sites on the slope of the ridge, and behind the *muzinda* was a possible initiation site (Huffman & Hanisch 1987: 102).

South of the ridge and to the west of Ratho Kroonkop is a flat plain, probably subject to flooding from the Limpopo River (figures 2.3 and 2.4). Mopane trees interspersed with grasses dominate in areas that are not currently farmed. The western edge of the flat plain is marked by a riparian forest along the Limpopo River, which is 4.14km from Ratho Kroonkop as the crow flies.

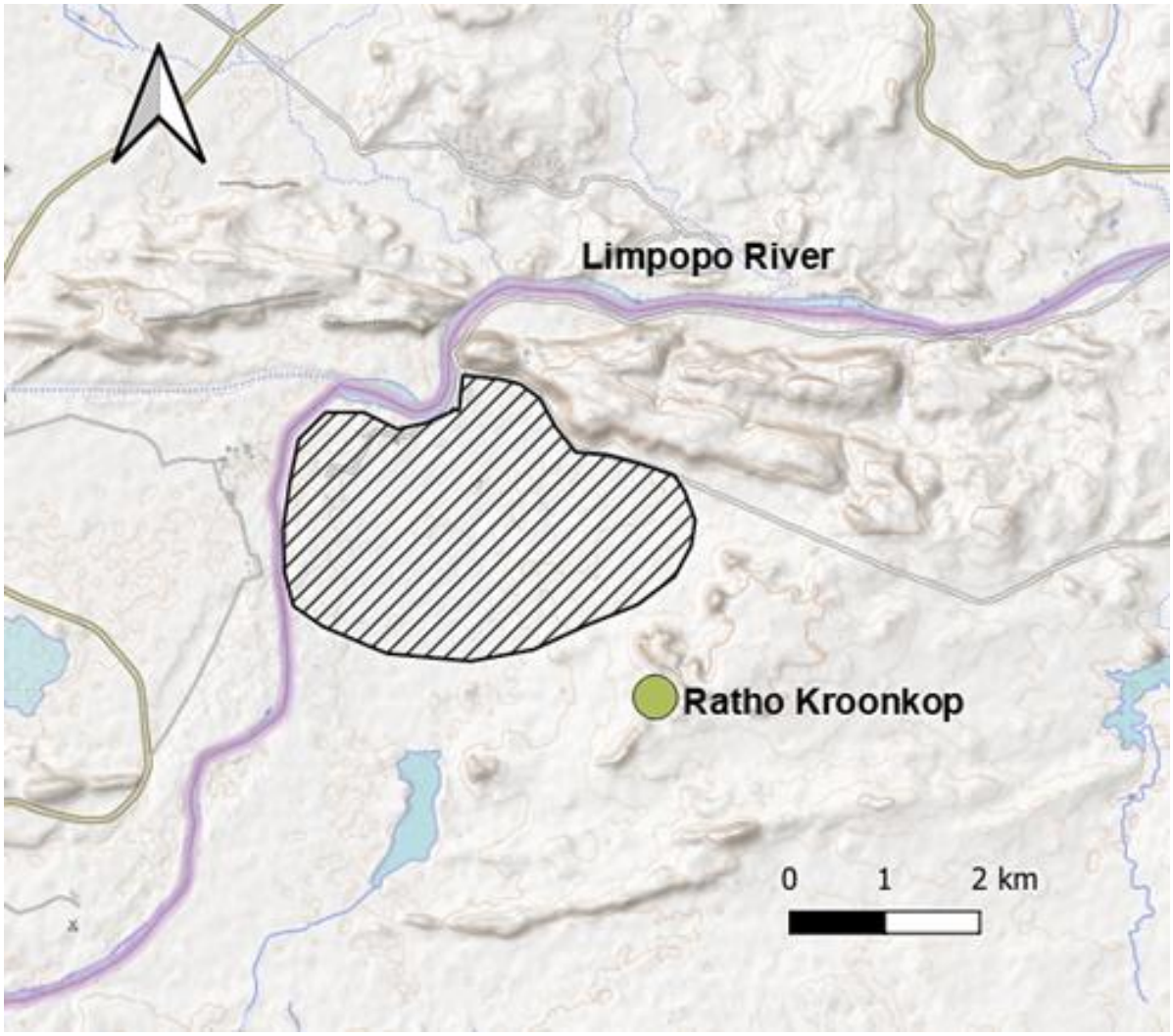


Figure 2.3: Context map of Ratho with the possible floodplain in the hashed area and the sandstone ridge to the north

Several Zhizo, K2 and Mapungubwe farmer homesteads dot the plain between Ratho Kroonkop and the Limpopo River. These sites include the event horizon of a larger settlement that is visible in a bulldozer cutting made for a dirt road along with surface scatters of ceramics that spans the Zhizo to Mapungubwe periods (Schoeman pers. comm. 2022).

Figure 2.4: The view from the summit from Ratho Kroonkop looking northwest towards the sandstone ridge along the Limpopo River (photograph by A. Schoeman)

To the north-west of the crown of Ratho Kroonkop lies Ratho Boulder Shelter (RBS), a massive boulder, which overhangs the northern and southern edges. Several painted rock art images, some of humans and some of animals are present on the boulder. The art is painted in two distinct styles: the first resembles San rock art found throughout the SLCA and the other is painted in white pigment (figure 2.5). Bronwen van Doornum excavated Later Stone Age material, including Khami pottery, stone tools, faunal remains, and other material culture, from underneath these overhangs and the art was traced by David Pearce and Lara Mallen (Schoeman pers. comm. 2022). A date was obtained for RBS on charcoal from a hearth – 1507 – 1792 cal. AD (at 95.4% probability) (Pearce 2019).

Figure 2.5: A painted image of a rhinoceros on one of the walls of Ratho Boulder Shelter

Around the lower slopes of Ratho Kroonkop, before these flatten out onto the valley floor, the remnants of cattle enclosures are evidenced by vitrified dung and the remains of grain bin bases (figure 2.6). Access to the summit of Ratho Kroonkop is not easy; there are two possible entry points, one to the east and one to the northwest. To access the eastern entry point, one would have to scale an almost sheer rock face with few footholds; the north-western entry point is an easier climb up a slope (there is a ladder over this slope now) and then through a passage under overhanging rock (figure 2.7).

Figure 2.6: Vitrified dung (left) and the remains of a grain bin base (right, in circle)

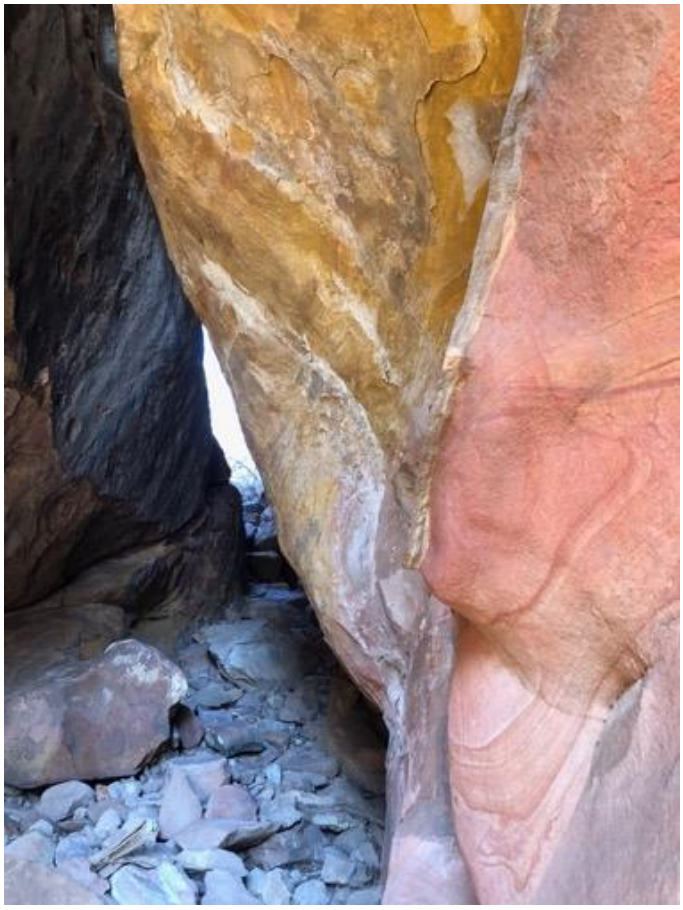


Figure 2.7: The north-western entrance to the summit of Ratho Kroonkop, photograph taken from the top of the ladder

On the summit of Ratho Kroonkop, many cupules were made into the sandstone, as was a *mankala* board near the top of the entrance 'tunnel' (figure 2.8). *Mankala* boards and seeds or stones or other round objects (see Townshend [1979]) for further description) are used in a game played throughout Africa. There are four obvious rock tanks on Ratho Kroonkop and two of them contained material culture. The term 'rock tank' denotes an eroded depression in the sandstone where water would have collected (see Schoeman 2006a). The Central Area of Ratho Kroonkop also contained material culture, as well as gravel features (concentrations of gravel in a circular area that may be remnants of floors) and *dagha* fragments. I discuss the excavations in more detail below.

Figure 2.8: Example of cupules on Ratho Kroonkop and the mankala board (bottom right) looking north

2.6 Ratho Kroonkop excavations

Ratho Kroonkop was excavated by Alex Schoeman, Bronwen van Doornum and staff and students from the Universities of Pretoria and Botswana during three field seasons in 2006, 2007 and 2008. They used standard archaeological techniques, and all material was dry-sieved through a double sieve. The upper sieve had a 5mm mesh and the lower mesh was a fly screen (<1mm). Within Rock Tank 1, 1m^2 was excavated;

Rock Tank 2 had 3m^2 excavated and the Central Area excavation was spread over 33m^2 (figure 2.9). Bedrock was reached in all excavated squares except in Rock Tank 2 where the termite activity prevented further excavation due to the hardness of the sediment. The previous faunal study from Ratho Kroonkop (Brunton *et al*. 2013) analysed the faunal material from Rock Tank 2 only and, based on the taxa list and ethnographic analogies drawn, concluded that Ratho Kroonkop was a rain-control site.

2.6.1 Rock Tank 1

Rock Tank 1 is located on the south-western edge of Ratho Kroonkop, separated from the rest of Ratho Kroonkop by a crevice. Van Doornum excavated the initial 0.50mx0.50m test square into the deposit. It contained a high density of faunal remains and there were well-stratified deposits, although some mottling, possibly indicating disturbances, was noted. Ceramics and faunal remains were on the surface and Schoeman subsequently expanded the excavation to 1m^2. This yielded more faunal remains, as well as Leopard's Kopje ceramics, metal helixes and fragments, glass and shell beads, charcoal, and shell fragments. The finds were unevenly distributed and clustered in certain stratigraphic layers; a cluster of faunal remains was located in spits 1B to 2B, which overlay the grey-charcoal layer. This thick layer was excavated in spits, after which the excavation followed the stratigraphy. Two more bone clusters were located, at the base of the grey-khaki layer and at the end of the grey charcoal layer (see Schoeman [2009] for more details) (figures 2.10, 2.11 and 2.12). Rock Tank 1 also yielded carnivore coprolites and bird of prey pellets (Schoeman 2009).

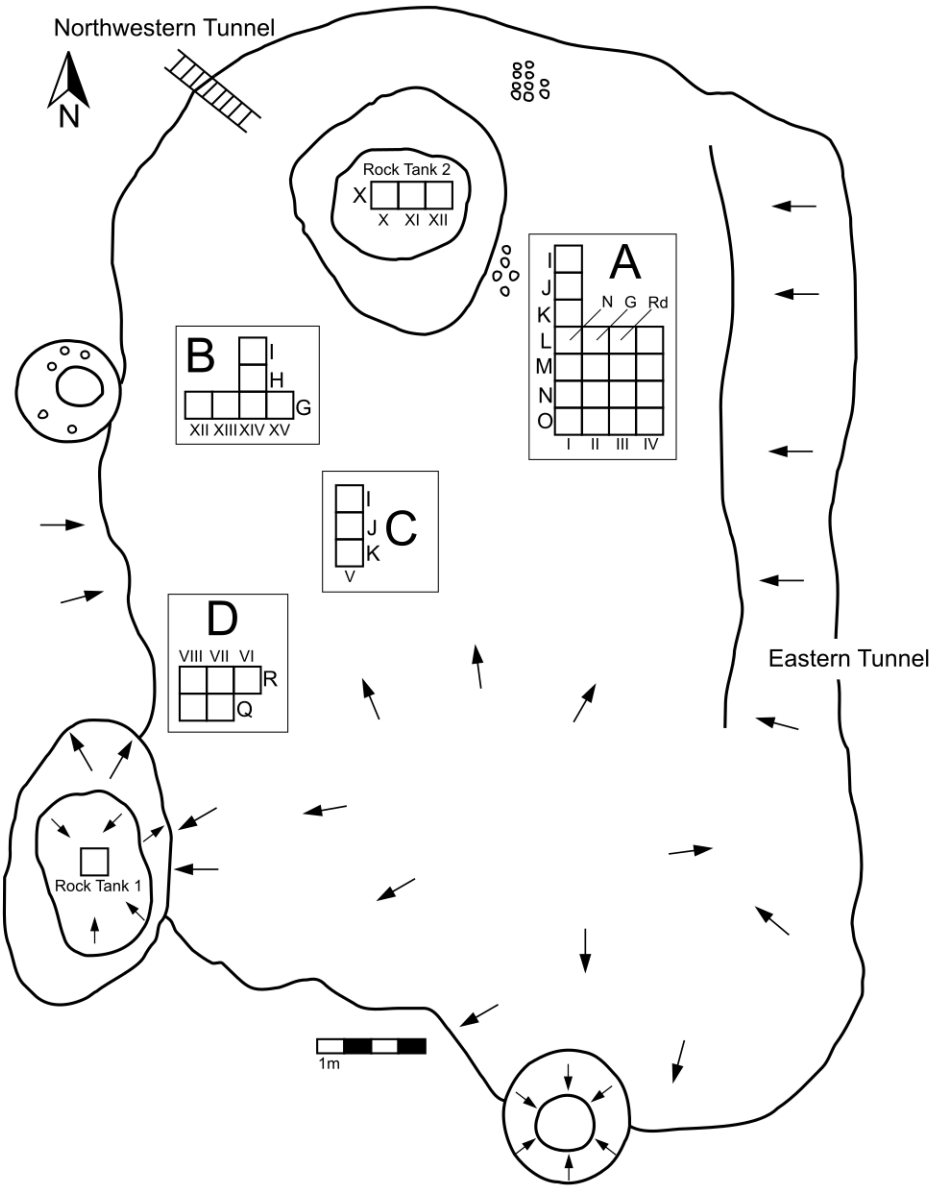


Figure 2.9: Excavators' plan of Ratho Kroonkop showing the location of the excavation squares (arrows indicate slope) (figure redrawn from excavators' map by A. Schoeman)

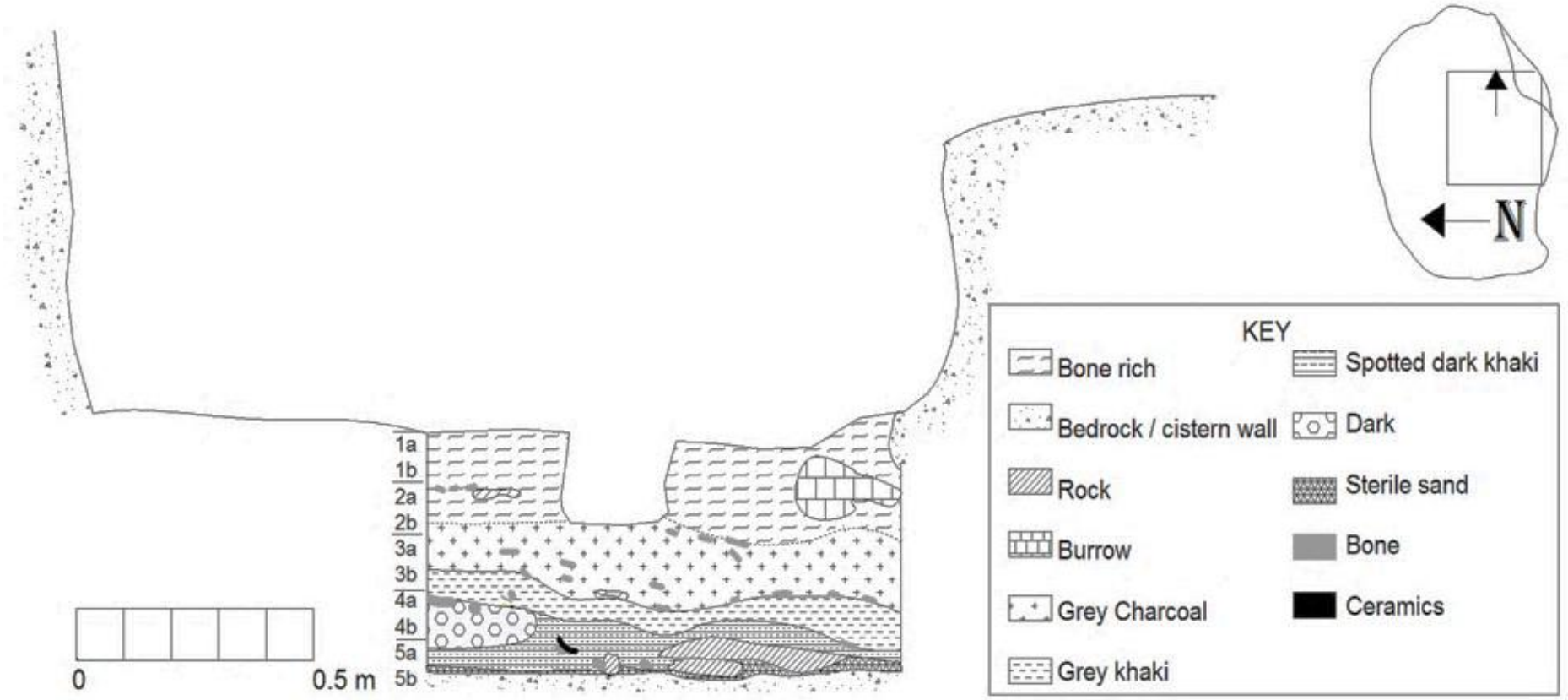


Figure 2.10: Rock Tank 1 cross-section eastern profile of the excavation (A. Schoeman [2009], used with permission)

Figure 2.11: Photograph from the north of bone cluster in Rock Tank 1 (photograph by A. Schoeman, used with permission)

Figure 2.12: Photograph of eastern profile of Rock Tank 1 (photograph by A. Schoeman, used with permission)

2.6.2 Rock Tank 2

Rock Tank 2 is located on the northern edge of Ratho Kroonkop (Schoeman 2009). A 1mx3m trench was excavated into the deposit in Rock Tank 2. A large, 1.5m wide mound of faunal remains and cultural material was located approximately 10cm below the surface and only two 1m squares were excavated beyond this mound (Schoeman 2009). The several deposition episodes in the tank and one bone cluster (figure 2.13), yielded faunal remains, ceramics, metal helixes, glass and shell beads, charcoal, freshwater mussel and *Achatina* sp. shell fragments (Schoeman 2009: 286). Below the mound was red-brown soil which overlaid evidence of termite activity. Excavation of 10cm of the termite 'mound' uncovered a 15cm deep ash pit on the southern side of the trench (figure 2.14). Excavation stopped once an augured core into the termite mound revealed no cultural material.

Figure 2.13: Photograph facing north of bone cluster in Rock Tank 2 (photograph by A. Schoeman, used with permission)

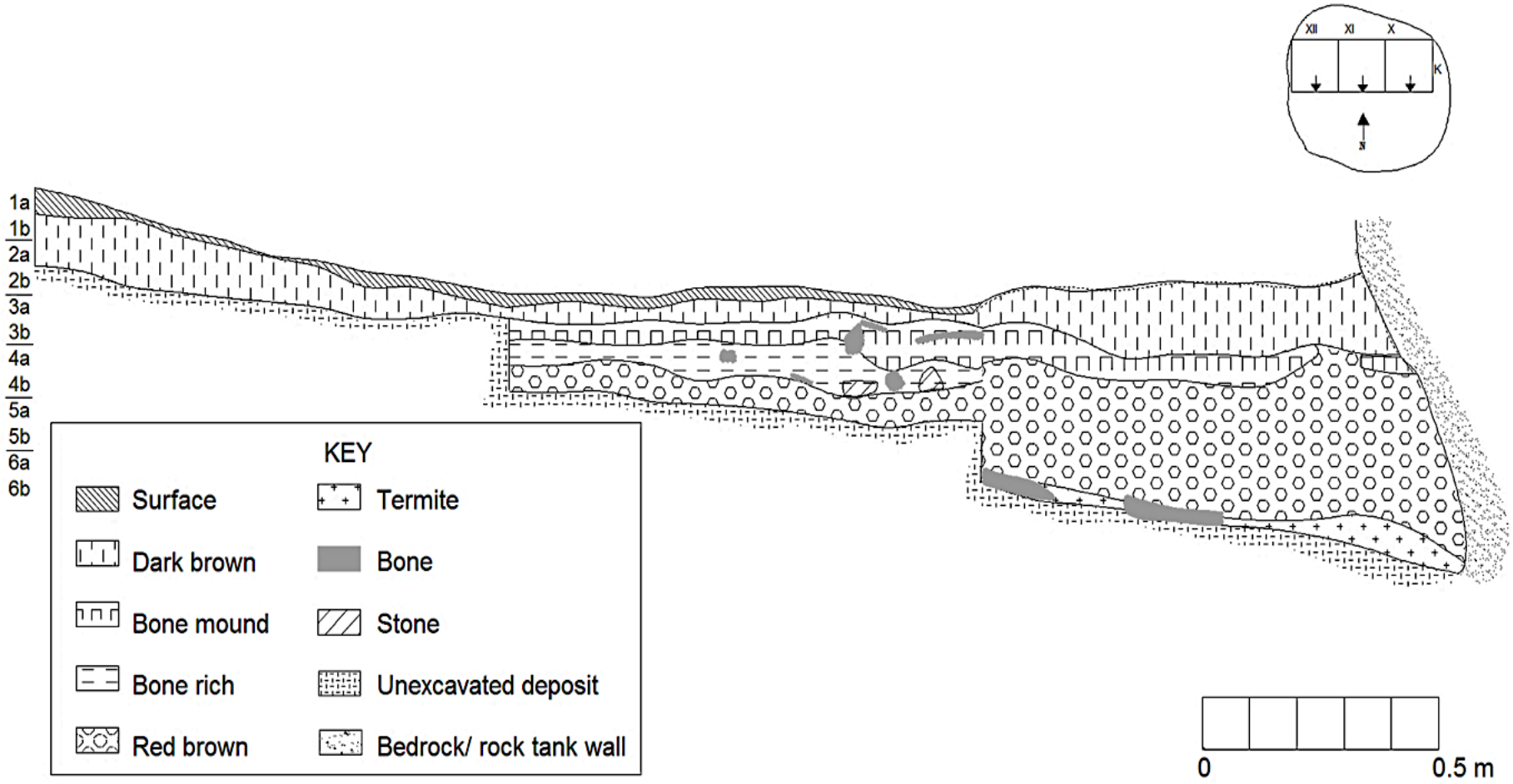


Figure 2.14: Rock Tank 2 southern profile and western edge of rock tank (A. Schoeman [2009], used with permission)

2.6.3 Central Area

A total of 33m^2 was excavated in the Central Area of Ratho Kroonkop. This was split into four areas (A to D) – I to O/I to IV (19m^2, Area A); I to G/XII to XV (6m^2, Area B); I to K/V (3m^2, Area C) and R and Q/VI to VIII (5m^2, Area D) (see figure 2.9). Each area (A to D) is discussed separately.

The excavation of Area A revealed defined stratigraphy, two gravel floors/features and *dagha* fragments showing the base of a grain bin (see figure 2.15). Faunal remains, ceramics, glass and shell beads, shell fragments and charcoal were also recovered. Several Later Stone Age lithics were located at the base of square L/I (not shown in the profile), which was 85cm below the surface and the deepest part of the excavation.

No appropriate profile drawings for Area B were located, but excavation notes detail that spits 1A to 1B comprised a light grey powdery soil, which contained both decorated and undecorated ceramics, numerous faunal remains, shell fragments, charcoal and a small number of beads. Spits 2A and 2B comprised dark grey soil, which contained the same material culture as the previous two spits. At the base of spit 2B, there was a gravel floor that spread across most of the excavated area, with the eastern portion covered by *dagha* fragments.

Area C was poorly stratified compared to the other areas. A fine powdery topsoil overlay brown soil with inclusions, which in turn, overlay dark brown soil also with inclusions (figure 2.16). This excavation was closed after a small amount of cultural material was recovered.

In Area D, after the topsoil was removed, a large cluster of bone, as well as ceramics and charcoal, were uncovered in ashy fine soil with gravel inclusions. Another smaller bone cluster was revealed at the base of spit 1B and another at the end of spit 2A. *Dagha* was located at the base of spit 3B and at the base of spit 4B. Area D also had a gravel feature above the bedrock (figure 2.17).

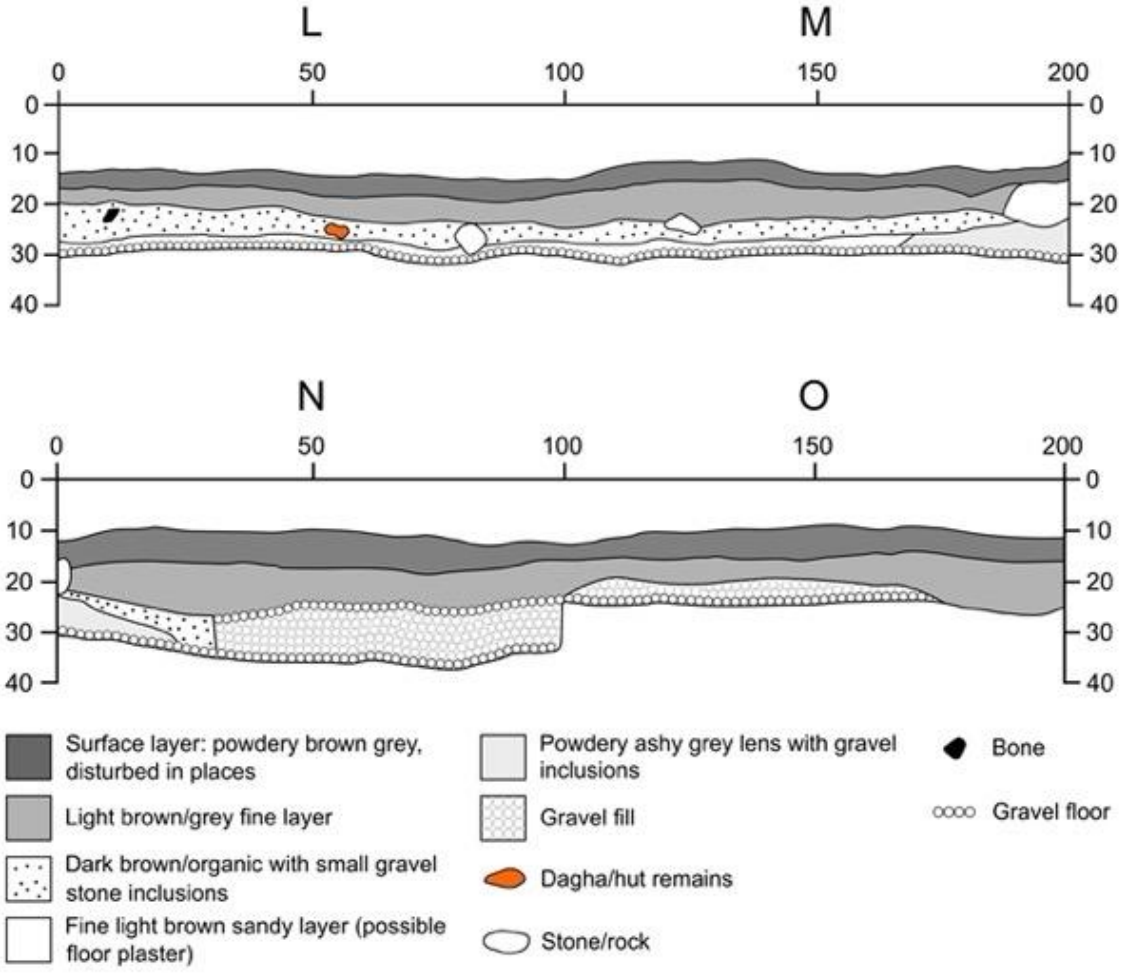


Figure 2.15: Central Area A eastern profile for squares L/III, M/III, N/III and O/III (profile drawing by P. Morrissey)

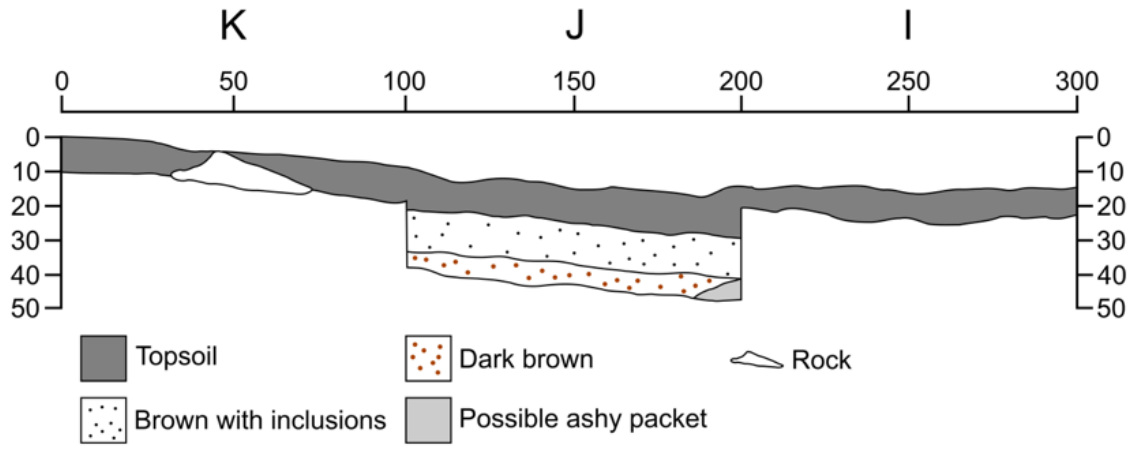


Figure 2.16: Central Area C western profile of squares I/V, J/V and K/V (profile drawing by P. Morrissey)

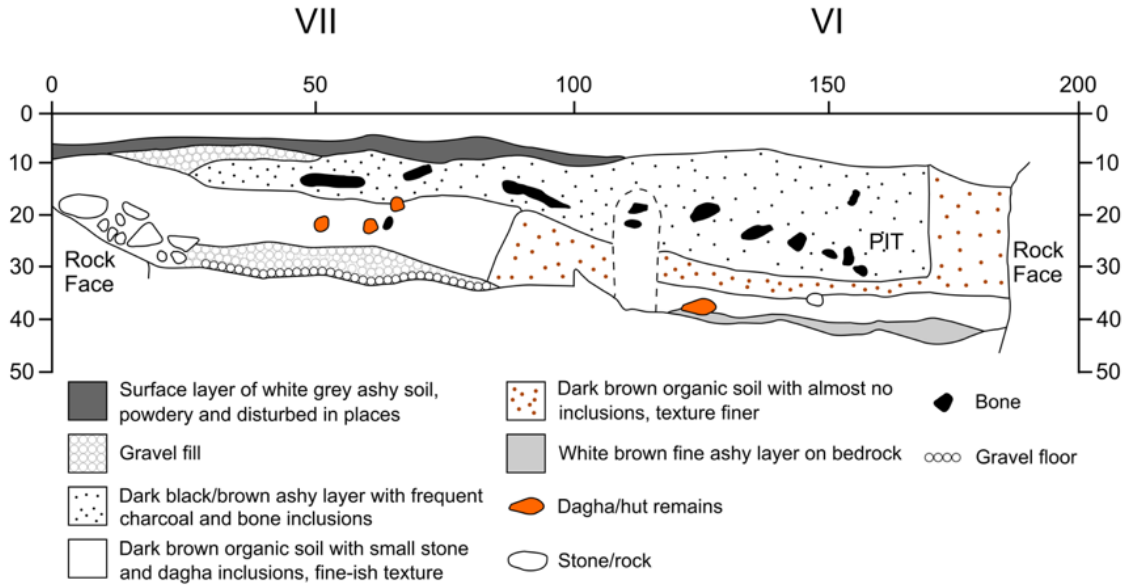


Figure 2.17: Central Area D southern profile of squares Q/VI and Q/VII (profile drawing by P. Morrissey)

2.7 Radiocarbon dating and Ratho Kroonkop

A major critique by Chirikure *et al.* (2012) of archaeological studies on farming societies in South Africa is that there has been a tendency by archaeologists to use absolute dating methods to understand concepts, such as social hierarchies and organisation, as well as intra-settlement temporal sequences. This critique was aimed particularly at Huffman's (e.g., 2007a) conceptualisation of the rise of complex

societies in the SLCA moving in a linear trajectory, based on settlement patterns and ceramics, coupled with some absolute dates (e.g., Chirikure *et al.* 2012). This is an issue because placing too much confidence in radiocarbon dates with large error margins causes the archaeological record to become muddied with interpretations that may not be realistic or in agreement with indigenous perspectives which may contend that the timeline or people are different to what the dating suggests (Chirikure *et al.* 2012). The issue continues to trouble archaeologists (e.g., Burleigh 1974; Wylie 2020).

I acknowledge these concerns, and I present the radiocarbon dates from various areas of Ratho Kroonkop not as precise dates, but rather, to indicate a general probable period of use/occupation of the site in order to establish which ethnographies may be relevant, and to suggest which sites might be contemporaneous with Ratho Kroonkop. Only charcoal which was collected in situ at the site was used for dating purposes; but the species of charcoal wood was not identified before the specimens were sent for dating and, without further analysis of the charcoal, the possibility of the 'old wood' effect cannot be eliminated. The dates obtained from Beta Analytical, were calibrated with OxCal (see Bronk Ramsey 2009, 2021) and SHCal20 (see Hogg *et al.* 2020) (see Table 2.2; figure 2.18).

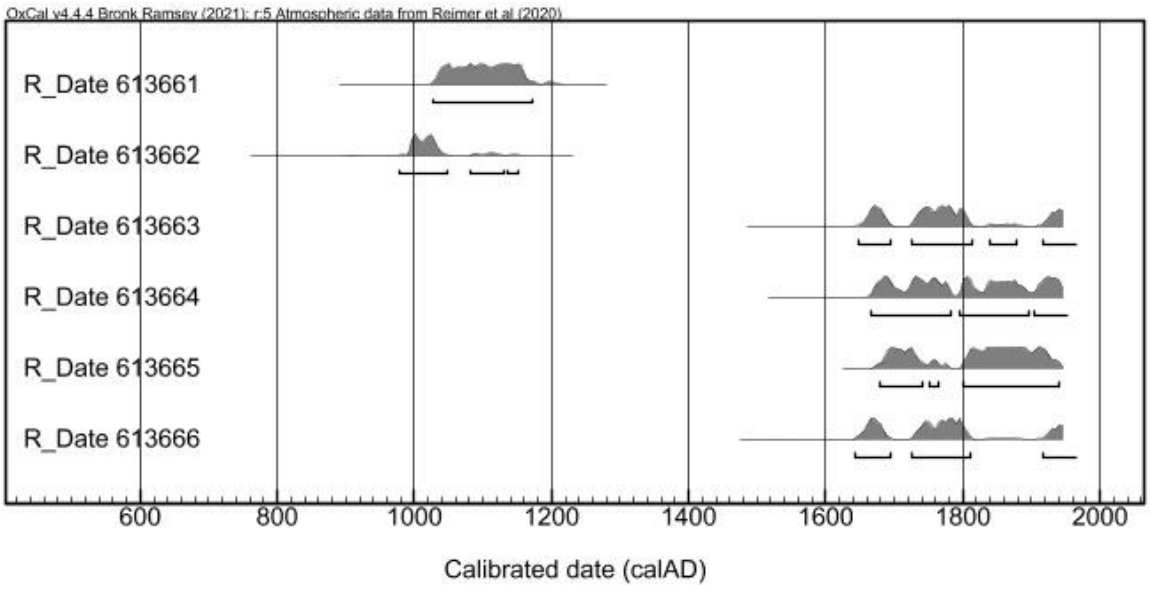


Figure 2.18: Calibrated dates for Ratho Kroonkop

These dates from Ratho Kroonkop came from charcoal from the Central Area (Beta-613661, 613662 and 613663) and Rock Tank 1 (Beta-613664, 613665 and 613666);

the date from Rock Tank 2 (Beta-28653), 860 ± 40 BP (AD 1040 – 1240), was reported in Brunton *et al.* (2013). Together, the dates indicate use and/or occupation of Ratho Kroonkop during the K2 and K2-Mapungubwe transition period, as well as historical use. The dates from Rock Tank 1 were obtained from charcoal from the bottom, middle and top of the deposit in the rock tank and the dates from the Central Area were obtained from charcoal associated with gravel features and faunal clusters. These dates indicate that the different spatial areas were likely used at different times: first, during the K2 and TK2 periods and second, during the Venda and/or historical period.

Table 2.2: List of calibrated dates and their locations

Laboratory number	Location	Calibrated date	Probability	IRMS δ13C (‰)
Beta-613661	Central Area I/L 38cm in situ charcoal	AD 1045 – 1218 (930 ± 30 BP)	95.4%	-22.2
Beta-613662	Central Area III/M FP 2A charcoal	AD 994 – 1152 (1030 ± 30 BP)	95.4%	-24.5
Beta-613663	Central Area V/J 2B	AD 1666 – post 1950 (190 ± 30 BP)	95.4%	-23.7
Beta-613664	Rock Tank 1 Last Spotted Dark Khaki	AD 1684 – post 1950 (150 ± 30 BP)	95.4%	-23.2
Beta-613665	Rock Tank 1 Dark Khaki	AD 1696 – 1948 (130 ± 30 BP)	95.4%	-24.5
Beta-613666	Rock Tank 1 1A	AD 1665 – post 1950 (200 ± 30 BP)	95.4%	-25.2
Beta-28653	Rock Tank 2 (Brunton *et al*. 2013)	AD 1040 – AD 1240 (860 ± 40 BP)	95.4%	

2.8 Summary

This chapter described the general environment of the SLCA, and the game that would have roamed the SLCA historically. It also gave an account of the archaeological context of the faunal remains, including profile drawings, descriptions of the excavated material culture and radiocarbon dates from Ratho Kroonkop. The introduction to social relations and complexity is provided in the next chapter, which includes contextual information on human-animal relationships, ritual and rain-control.

Chapter 3: People and animals: ethnographic and archaeological examples

3.1 Introduction

Throughout modern human existence, animals have been viewed along a spectrum: from food to a source of symbolism (Gifford-Gonzalez 2007; Russell 2012). In this chapter, I discuss the use of taphonomy in zooarchaeological studies before exploring mundane, as well as more symbolic or ritual perspectives about animals (e.g., Val *et al.* 2020). In addition, 32 archaeological sites are discussed to contextualise my study (see figure 1.1).

3.2 The importance of taphonomy in zooarchaeological studies

The term 'taphonomy' was first coined by Isaac Efremov (1940) to describe the study of animal remains in order to understand the agents that modified them before deposition, as well as the processes which acted on the bone post deposition (Lyman 1994; Gifford-Gonzalez 2018). Studying the taphonomy of an assemblage of faunal remains is essential for differentiating human modifiers from natural and non-human modifiers (Lyman 1994; Gifford-Gonzalez 2018). Investigation of the taphonomy of a faunal assemblage also allows zooarchaeologists to untangle processes of preservation, and how those processes affect interpretations of the assemblage (Behrensmeyer & Kidwell 1985: 105). The taphonomic modifications analysed in my study are defined and explained in chapter 4. They are breakage patterns, the level of burning (exposure to heat), anthropogenic (human) modifications, including worked bone, zoogenic (animal) modifications, natural modifications, including weathering, diagenesis, and root etching.

Two main goals of early taphonomic analysis established by Gifford (1981) are: a) to identify the original biological community from which the faunal assemblage is derived, and b) to determine and list the taphonomic influences on the faunal assemblage. These two goals are not mutually exclusive and underpin much of zooarchaeology itself (Lyman 1994). For example, using taphonomy to determine how a faunal assemblage was accumulated through the examination of cut marks, tooth marks and

skeletal completeness can establish whether the assemblage was accumulated by humans, animals or through natural processes; this example is simple, but many assemblages are formed through complex processes (Lyman 1994) (figure 3.1). The implications of conducting an in-depth taphonomic analysis on faunal assemblages have long been recognised (Behrensmeyer 1975, 1978; Noe-Nygaard 1977; Behrensmeyer & Hill 1980; Behrensmeyer & Kidwell 1985; Shipman 1981).

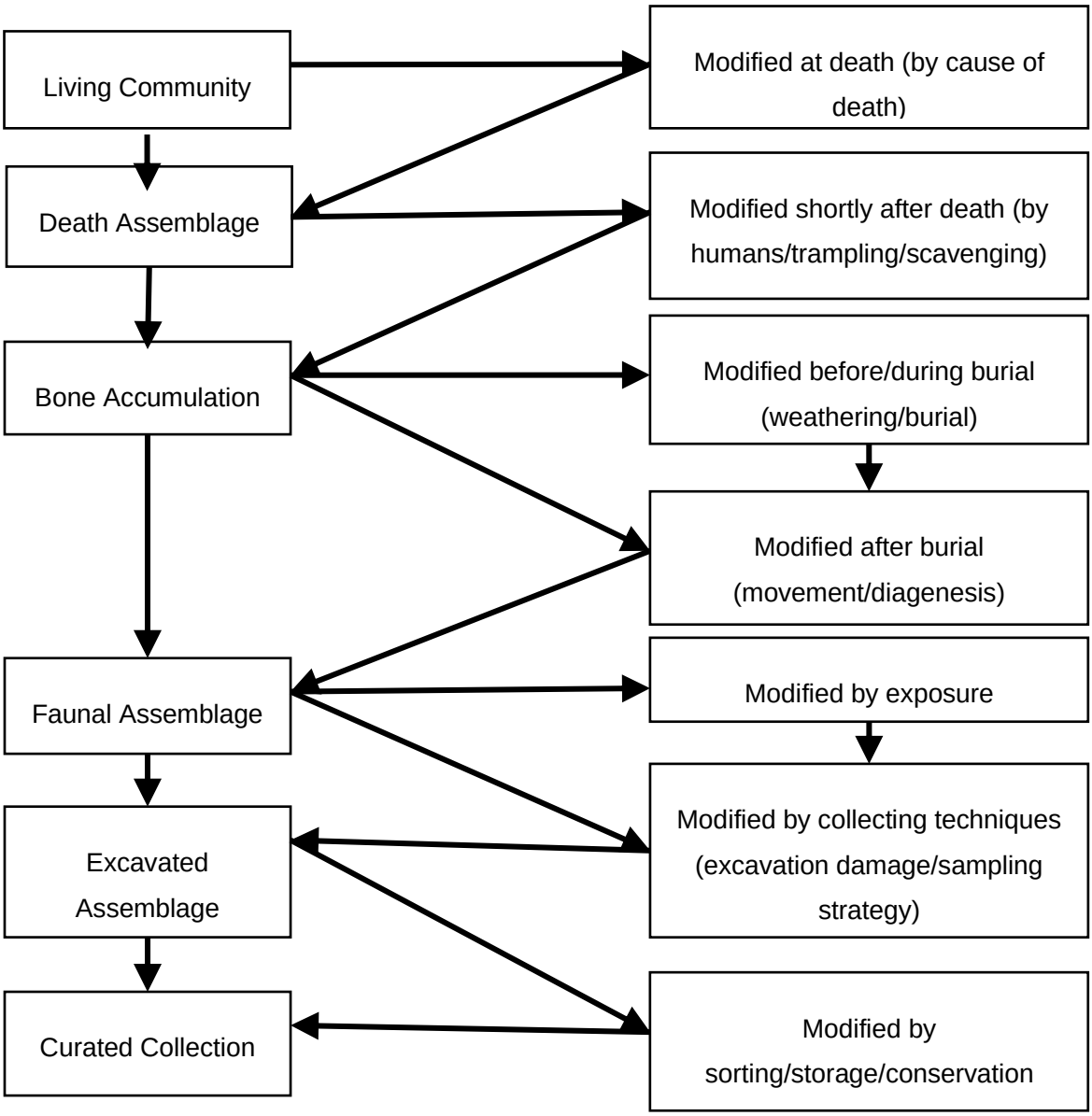


Figure 3.1: Complex taphonomic process affecting a faunal assemblage (adapted from Andrews and Cook's [1985] model)

Identification of the taphonomic modifications that acted on a faunal assemblage aids with interpreting the formation of an assemblage (Gilbert & Singer 1982; Lyman 1995). Five types of assemblage formation factors influence an assemblage, they all

intersect, contain biases that influence them and are not mutually exclusive (see Gilbert and Singer [1982: 23] for a summary). The five factors tend to be successive to each other, starting with destructive and dispersal factors, which take place during dismemberment, decay and burial, followed by taphonomic influences post-burial and during possible re-exposure (Lyman 1995).

Brain's (1981) seminal work titled "*The hunters or the hunted? An introduction to African cave taphonomy*" represents one of the first in-depth taphonomic studies of faunal assemblages in southern Africa. His work adapted and improved the work by Dart (1958), which theorised that early hominids in Makapansgat had a bone tool culture (an osteodontokeratic culture – i.e., the use of bone, teeth, and horns as tools) (Brain 1981).

Since Brain's (1981) work, many palaeozoologists and zooarchaeologists have conducted microscopic analyses of bone surface modifications as integral parts of their faunal analysis (e.g., Marean & Ehrhardt 1995; Marean *et al.* 2000; Pargeter & Bradfield 2012; Bradfield 2015; Thompson *et al.* 2015; A.R. Antonites *et al.* 2016a; Bradfield & A.R. Antonites 2018; Reynard & Henshilwood 2019; Bradfield *et al.* 2020). Too frequently, zooarchaeological studies on farmer-accumulated assemblages have been limited to a macroscopic analysis of the faunal remains (e.g., Voigt 1979, 1978, 1981b, 1983; Voigt & Plug 1981; Plug 1996b, 2000; Fread 2007; Badenhorst 2015, 2018), or have omitted the taphonomy altogether when reporting the analysis (e.g., Fatherley 2009).

Performing an in-depth microscopic analysis of bone surface modifications is essential for determining the intention that shaped the faunal assemblage – whether it is as a result of normal consumption patterns, or as a result of ritual activities. Throughout this chapter, I provide examples of the usefulness of a taphonomic analysis within particular contexts.

3.3 Human-animal relationships in southern Africa

Animals have long meant more to human societies than simply a food source (Russell 2012) and have fulfilled numerous roles in past societies, from pets to symbols of wealth and objects of sacrifice. A number of human-animal interactions can be seen

globally, for example, the use of animal characteristics as metaphors for human traits and the anthropomorphism of animals in folklore and myths and legends (J. Morris 2012). As humans, we also anthropomorphise animals to understand them, and we use animal characteristics to understand ourselves (Russell 2012). One perspective to understand these entanglements is through relational ontologies.

A relational ontology can be defined as a system of viewing animals and other non-human things as independent and as having agency, which is embodied through action (Hill 2013). A relational ontology is only one of multiple lenses through which human-animal interaction can be understood and different societies have different ontologies (Hill 2013).

Neo-animism is one avenue through which these human-animal relationships are studied in archaeology. As a relational ontology, neo-animism also acknowledges that human-animal relationships form an integral part of everyday life and go beyond a simple food-based reliance. As discussed in my introduction, neo-animism is a relational epistemology, which allows for thinking about animals in terms of their relationships with each other and humans (Ingold 2000, 2006). Importantly, neo-animist theorists have moved away from evolutionist thinking by including indigenous perspectives and ontologies when developing understandings of human-animal relationships (see e.g., Ingold 2000, 2006; Brown & Walker 2008; Groleau 2009; Porr & Bell 2012; Aston 2021).

Human-animal relationships in southern Africa are (and were) complex, varied and adaptable. These relationships lie on a spectrum, ranging from purely economic and subsistence based to the spiritual and cosmological (e.g., Voigt 1981, 1983; Voigt & Plug 1981; Plug & Voigt 1985; Plug 1987, 2000; Hutten 2005; Schoeman 2006a, b; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Brunton *et al*. 2013; Raath 2014; A.R. Antonites *et al.* 2016; Abatino 2021). They are often mutually dependent, with humans relating to and relying on animals, and animals relying on humans.

In the next section, I discuss these human-animal relationships amongst hunter-gatherer and farmer groups in southern Africa using the following sections: mundane, feasting, ritual, sacrifice and 'general' rituals, and rain-control rituals specifically. These

divisions are arbitrary as the boundaries between them are often blurred or non-existent. This discussion draws from ethnographic, archaeological and ethnoarchaeological studies in southern Africa with the acknowledgement that the ethnographies consulted are temporally specific and may not record cultural practices used by all members of a particular group or be exactly equivalent to practices in the past.

3.4 Mundane relationships

Animals formed part of the diet of both hunter-gatherers and farmers. Numerous ethnographic and archaeological studies have been conducted in southern Africa to record, investigate and understand the faunal consumption patterns of both these groups of people (e.g., Voigt 1978, 1979, 1981a, 1981b, 1983; Plug 1989, 1996a, 2000; Badenhorst 2011, 2015; Badenhorst *et al.* 2011, 2016). These studies have ranged from ethnoarchaeological studies of living hunter-gatherer groups in Botswana (Yellen 1977, 1993a, b) to archaeological studies of the faunal assemblages at important sites in the SLCA (e.g., Voigt 1983). Although the past focus within the SLCA has been on farming communities (e.g., Huffman [2007a, b, 2008, 2009, 2014]), further research has shown a particularly layered landscape of interaction between hunter-gatherers, herders, and farmers (Hall & Smith 2000; Van Doornum, 2007, 2008; Forssman 2011, 2013, 2020; A. Antonites 2014; A.R. Antonites *et al.* 2016a). This interaction is visible through a multitude of responses by the different groups to each other, which can be studied through the material culture and rock art (Hall & Smith 2000).

Mundane human-animal relationships in the SLCA have a lengthy history, which can be traced back to ca. 11 120 BC when Balerno Main Shelter was occupied (Van Doornum 2008). Archaeological studies of several important shelters (e.g., Little Muck Shelter, Balerno Main Shelter and Tshisiku Shelter) associated with hunter-gatherers in the SLCA (previously discussed in the introduction) have shown that people mostly consumed small animals. These would have been snared or scavenged and were likely eaten by individuals rather than shared between groups, as suggested by Hall and Smith (2000) and Van Doornum (2007, 2008). According to Van Doornum (2008), the increase in the diversity of faunal resources utilised, as well as the increase in

large mammals after the hunter-gatherers living at Balerno Main Shelter encountered farmers indicates two possibilities. Her interpretation is first, that this was a response to increasing farmer presence on the landscape and additional pressure on resources and secondly, that the farmer communities forced the hunter-gatherers to aggregate in certain places (Van Doornum 2008).

Ethnographically documented hunter-gatherer groups in the central Kalahari predominantly hunted using bows and arrows or spears after tracking or chasing the game (Tanaka 1996) and they used traps for smaller game mammals and birds (Tanaka 1996). This could provide an explanation for the procurement of small mammals by hunter-gatherers at Balerno Main. During the 1960s, the main animals hunted with bows and arrows by the ≠Kade San were kudu, gemsbok, eland, wildebeest, and hartebeest (Tanaka 1996). Traps and snares were usually set for small bovids such as steenbok and duiker and birds and small carnivores. Springhares were also hunted, usually during the day when the hares were in their burrows (Tanaka 1996).

Ethnoarchaeological research on the Ju/'hoansi (a San group in the Kalahari) by Yellen (1993a, b) can also provide insights into how hunter-gatherer groups processed carcasses of larger mammals; these insights can be used to infer processing of larger mammals whose remains were excavated from Balerno Main Shelter and Tshisiku Shelter. Yellen (1993a, b) found four different cultural factors that influenced the composition of faunal assemblages created by discard, as well as the location of these assemblages. First is the differential treatment of small and large animal carcasses; secondly, the circumstances and distance from base camp of the kill/scavenging encounter; thirdly, who made up the hunting party and fourthly, how the meat was cooked.

The composition of the faunal assemblage was also affected by sharing, Yellen (1977) found that there was higher taxonomic diversity at sites that were part of a sharing network and that small mammals were not shared. Kill and butchery sites, on the other hand were often not preserved on the landscape because most of the remains were taken to the base camp for consumption (Yellen 1993b). He also noted that the bones of large mammals were broken open for marrow extraction after being boiled, whereas

small mammals tended to be boiled whole and the bones were discarded without processing for marrow extraction. The level of preservation of the faunal assemblage at the base camp was further determined by trampling, scavenger access and the length of occupation of the camp (Yellen 1993a, b). The hunting and consumption patterns form a range of personal and impersonal relationships between the hunter and the hunted animal (Guenther 2015, 2017). These relationships are reflexive and grounded in ontologies and cosmological concepts and are discussed in section 3.7.

In the SLCA, domestic species were introduced around AD 570 (Plug 2000), namely, caprines (sheep/goats), cattle, dogs and chickens, and animal husbandry practised by herders and agropastoralists became one of the main modes of subsistence. Historically, herders lived in close association with farmers in savanna and semi-arid areas to ensure food security (Tanaka 1996). The presence of pastoralists/herders (Sadr 2008) in the SLCA may have impacted faunal assemblages and Guillemard (2020) offers caution against simply equating identity with economy – the reality is far more complex. For herders, the main foods consumed were grains, milk, and meat, but because livestock keeping and herd management were the main intentions, livestock meat was rarely consumed (Evans-Pritchard 1940).

Faunal assemblages from the early periods of farmer occupation (AD 300 – 1300) (Badenhorst 2011, 2018) indicate that caprines dominated, whereas during the later period (AD 1300 – 1840) cattle dominate faunal assemblages (Badenhorst 2011, 2012; Fraser & Badenhorst 2014). There are exceptions to this trend of caprines dominating faunal assemblages found during the Toutswe (AD 700 – 800) and Taukome (AD 800 – 1200) phases at Bosutswe (Plug 1996a) among others, where cattle dominate the faunal assemblage (Fraser & Badenhorst 2014). This faunal pattern was established using the Cattle Index (Badenhorst 2011).

The Cattle Index is a simple ratio calculated using Number of Identified Specimens (NISP) values (discussed in chapter 4). To determine the Cattle Index for an assemblage the NISP value for cattle is divided by the total NISP of cattle and caprines (see Badenhorst 2011). Badenhorst (2010) argues that a change from a caprine-based economy to a cattle-based economy is based on a change from a matrilineal to a patrilineal society during the 1300s. Badenhorst (2009a, 2010, 2011, 2012; Fraser

& Badenhorst 2014) also argues that contrary to Huffman (2007a), the Cattle Index in the Middle Limpopo Valley indicated that cattle wealth was not the central reason behind socio-political developments in the area in the period AD 900 to 1300. This supports Calabrese's (2005, 2007) suggestion, contra Huffman (2000), that rather than restricted ownership of cattle causing a shift of the cattle away from the K2 capital, this shift was due to religious and ideological changes, which reinforced the social and political identity of Leopard's Kopje people. Huffman's (2010a) response to Badenhorst's (2010) criticism of the CCP centres on the established centrality of cattle to Eastern Bantu-speaking peoples (hence their location in the centre of the homestead) and the underlying patrilineal worldview of these people. Additionally, Huffman (2010a) emphasises that the use of simple ratios to explain settlement patterns has its drawback because it does not consider sampling biases that occur as a result of cultural choices and other taphonomic influences on faunal remains.

Among historical Bantu-speaking farmers during the 19th century in southern Africa, caprines were killed for a supply of meat and skins, with their milk being less important (Krige 1957; Krige & Krige 1980; Badenhorst 2018). Across all historical Bantu language-speaking farmers, sheep and goats were valued less than cattle (e.g., Huffman 2010a; Badenhorst 2018). Archaeologically, in the SLCA among the first farmers in the region, caprines were also more commonly killed for their resource than cattle, which Huffman (1983, 2010a) argues is one additional reason for the Cattle Index from these sites indicating a lower frequency of cattle versus sheep remains.

Zooarchaeological studies of fauna from Venda settlements and settlements of groups ancestral to Venda that clustered around the Soutpansberg mountains to the south-east of the SLCA (ca. 15th to 18th centuries [Loubser 1991; de Wet-Bronner 1994a]), have revealed a variety of human-animal relationships. These studies, for example, established that cattle herds were managed through timed slaughters of these animals to maintain herd size (Thorp 1984; de Wet-Bronner 1994a). There also were site-specific patterns.

At TSH 32 located in the Ha-Tshirundu Mountains, possible confirmation of historical events at the site was found in the faunal remains. The faunal remains from the first occupation, defined by stability under the leadership of a wealthy chief, showed access

to a variety of species, both wild and domestic, and included riverine resources; there were fewer cattle than caprine remains, which was likely due to the rinderpest epidemic, which occurred during the 1890s in the northern part of South Africa. In addition, the use of the site by a diviner is potentially confirmed by the association of small bovid, tortoise and bird remains with a de-toothed crocodile skull (A.R. Antonites & Kruger 2012).

The faunal pattern at TSH 32 contrasts with that found at other Venda sites nearby. The faunal assemblages of Tavhatshena, Tshitheme, Dzata, and Tshirululuni are dominated by cattle remains, with caprines and wild animals represented in lower frequencies (de Wet-Bronner 1994a, b, 1995a, b). The faunal assemblages at Dzata and Tshitheme showed that, within the settlement, there was status differentiation and possible divination within the court (De Wet-Bronner 1995a, b).

From 1400 AD onwards, people in South Africa kept cattle, sheep, and goats near to their settlement, if not in the middle of the settlement, very close to the court (e.g., Huffman 2007a, 2010a; Badenhorst 2009b, 2011). Several of these communities, including those at K2 and Mapungubwe, practised transhumance, a herd management strategy that involves movement of the herd around the landscape to better pastures (e.g., Voigt 1983; Hutten 2005; J.M. Smith 2005; J.M. Smith *et al.* 2010; Badenhorst 2011; Ndobochani 2020). Sheep and goats were kept in smaller enclosures, often within the boundaries of the settlements (Badenhorst 2009b). These domestic species, in particular, were extremely important to farmer groups, and were part of a number of symbolic actions, which I discuss in detail in sections 3.7 and 3.8.

Hunting, snaring, and trapping were also common among farmer communities (Badenhorst 2015; Badenhorst *et al.* 2016). Badenhorst (2015) found that using the Game Index at Bosutswe (a farmer site dated to between AD 700 and 1700), cattle gained importance over time, while the importance of hunting for meat acquisition declined. The Game Index is a simple ratio similar to the Cattle Index and is calculated by dividing the NISP of low-ranked game (i.e., small mammals) by the total NISP of low and high-ranked game (i.e., medium, and large mammals) (Badenhorst 2015: 45). Badenhorst *et al.* (2016) found that as agriculture increased from ca. AD 700 to 1700, there was an increased need for driving off or killing pests from crops. These pests

included birds, rodents, antelopes, baboons, and large mammals, such as hippopotami and elephants (Badenhorst *et al.* 2016).

Unfortunately, taphonomic analyses are lacking and there is no data from these studies on the taphonomic markers of hunting, snaring, and trapping by farmers. Additionally, the dearth of taphonomic data on small mammals found at these sites means that it is difficult to draw conclusions regarding the accumulators of this fauna. For example, small mammals, such as hyraxes and leporids, habitually occur in rocky areas and may die of natural causes or be accumulated by carnivores or birds of prey; their remains may then be incorporated into deposits at archaeological sites. Without significant taphonomic research on a faunal assemblage, the usefulness of the Game Index is reduced because people cannot be assumed to be the sole accumulators of the 'low-ranked' game. Indeed, even with adequate taphonomic data, it is likely that this data will indicate mixed accumulators.

Wild and domestic mammals were not the only taxa that farmers consumed, fish also contributed to their protein intake. According to Shaw (1974), historical farming societies, with the exception of the Tsonga, Mpodomise, and occasionally, Venda boys, did not normally practise fishing. Unlike hunting, fishing was not regarded as a sport, but rather was done to supplement the diet. Mpondo men fished using spears in shallow pools whereas Tsonga women used conical woven baskets situated at the mouths of water sources (e.g., streams and rivers), and Venda boys used traps set near weirs, as well as bows and arrows (Shaw 1974). Even though there are many ethnographically recorded taboos about fish and eating fish (e.g., Quinn 1959; Stayt 1968; Mönning 1978), fish have been recorded in the archaeological record along the Eastern coast of South Africa (Whitelaw 2009). Whitelaw (2009) argues that this evidence, along with outliers in the Kruger National Park (Plug 1997), suggests that archaeologists should not take the presence of fish remains at farmer sites as an indicator of boys' activity or poverty.

The diet of hybrid groups, such as the Korana (see Ouzman 2005), a group of people living predominantly in the Northern Cape in the 19th Century, consisted of meat, milk and edible bulbs and roots, as well as fresh-water fish including barbels (Engelbrecht 1936). Among the Korana, the preferred method of hunting was pit-hunting whereby

a group of animals (usually antelope) were driven into a series of pits before being killed (Engelbrecht 1936). The juvenile animals were usually released rather than killed. Engelbrecht (1936) noted that hartebeest, quagga, and springbok, among others, were hunted in this way.

When hippopotami were hunted, barbed assegais were used (Engelbrecht 1936). Once an animal was killed, it was first skinned and disembowelled before the fore- and hindlimbs were removed, and the entire spinal column (including sacrum and coccyx) was divided among the men (Engelbrecht 1936). Hall's (1977) study of a series of pits in KwaZulu-Natal, South Africa, found that once these pits were dug, they were used several times, and sometimes dug deeper after initial use. These pits were often camouflaged using brush. To ensure that animals did not bypass the pits, the gaps between them were sometimes blocked using natural bushes or man-made barriers of bushes or fences (Hall 1977). Based on the lack of faunal remains recovered from excavations of these pits, Hall (1977) suggested that butchering occurred elsewhere, or that scavengers destroyed the remains that were left behind. Additionally, due to the size and depth of the pits, Hall (1977) surmises that they were likely used to catch large animals such as elephant, buffalo, and hippopotamus.

Driving animals into a place from which they cannot escape is a widespread phenomenon and one way of doing so is by using kite-like structures; these are found throughout the Middle East, North America, Central Asia, and in South Africa (Crassard *et al.* 2015; Van der Walt & Lombard 2018). Desert kites, found specifically in the Middle East and South Africa, are funnel-like structures constructed using large stones to form low walls that lead into an enclosure. Game would be driven into the enclosure before being killed; alternately, domestic animals would be driven into it as a form of animal management (Crassard *et al.* 2015; Van der Walt & Lombard 2018). Van der Walt and Lombard (2018) suggested that hunter-gatherers used the desert kites in South Africa. They based their proposition on ethnographic accounts of the kinds of traps used by hunter-gatherers, as well as the kites' continued use of the landscape for the last 2000 years.

Another hybrid group, likely descended from hunter-gatherers and farmers, is the Kattea (Van der Ryst 2003). The Kattea lived in a large region in northern South Africa,

including and stretching from the Waterberg Mountains to the southern banks of the Limpopo River (see figure 3.2). The Kattea interacted with farmer groups in the area, offering leopard and dassie skins to the Northern Ndebele as tribute (Schlömann [1898] cited in Van der Ryst [2003]). Sadly, the Kattea were often treated as slaves, or as lesser-than-humans by Europeans and farmers (A.A. Anderson 1888; Breutz 1958). According to Van der Ryst (2003), the men wore steenbok-skin loincloths, and the women wore skin aprons. Kirby ([1940], cited in Van der Ryst [2003]), describes their weapons as spears and poisoned arrows which could kill elephants. Schlömann ([1896], cited in Van der Ryst [2003]) provides an example of the involvement of Kattea in rain-control and ritual use of shelters with rock art, which is discussed in section 3.8. In addition to the pelts provided as tribute, the Kattea also acquired ostrich feathers, ivory and skins for trade, and skinned game for Boers in exchange for a portion of meat (Van der Ryst 2003).

There are similarities in the hunting techniques of small and large mammals between hunter-gatherers and farmers. For example, both ethnographically documented hunter-gatherers and farmers snare smaller animals, such as birds, hares and rodents (e.g., Tanaka 1996; Badenhorst 2015, Badenhorst *et al*. 2016). Pit hunting has also been documented among hybrid and farmer groups (e.g., Engelbrecht 1936; Hall 1977) and this practice may extend further back in time. The primary difference between hunter-gatherers' and farmers' meat consumption lies in the introduction, keeping and management of domestic livestock (e.g., Thorp 1984; de Wet-Bronner 1994a; Huffman 1983, 2010a; Badenhorst 2011, 2018).

Figure 3.2: Merensky's 1881 map of the Transvaal region of South Africa with the Kattea distribution highlighted in the box

Source: https://upload.wikimedia.org/wikipedia/commons/2/2b/Original_map_of_the_Transvaal_or_South-African_Republic_including_the_Gold_and_Diamondfields..._by_A._Merensky%2C_Superintendent_of_the_Berlin_Mission_in_Transvaal%2C_b.jpg (accessed 28/03/2022)

Importantly, mundane consumption of animals among hunter-gatherer and farming societies was guided by abstract or spiritual concepts. For example, killing hamerkop birds was avoided because doing so might invoke damaging storms and flooding (Van Schalkwyk 2002). Another major factor in the avoidance of killing and eating certain animals relates to the totems associated with farming groups. Certain groups, however, such as the Northern Sotho, distinguished between revering a totem, and abstaining from killing or eating an animal (Van Schalkwyk 2002: 73). Among the hunter-gatherer |Gui and ||Gama groups, several species were proscribed during certain times in a persons' life and included foods which people did not want to eat (Imamura 2001: 134). These encompassed pangolin, kori bustard, two species of tortoise and specifically, the marrow from red hartebeests and kudu. Species avoided by hunter-gatherer groups in the central Kalahari included lions, raptors, vultures and hyenas, the latter two because they are scavengers (Tanaka 1996).

3.4.1 Use of animal by-products

Among historical farming societies in South Africa, whistles and musical horns, snuff boxes, spoons, and awls were made from bovid horns, whereas ivory was traded and carved into ornaments and jewellery (Shaw 1974). Historically, the skins of animals, both wild and domestic, were used and sometimes traded (Denbow 1984; Grody 2016). Domestic animals were also kept for their milk (Krige 1957). Historically, in post-colonial times, cattle were work animals. Their role included pulling ploughs, a practice which facilitated the expansion and intensification of agriculture and long-distance trade with the use of cattle-drawn carts (Greenfield *et al.* 1988; Greenfield 2010). This hard labour on the part of cattle shows in pathologies evident their bones (Bartosiewicz *et al.* 1997).

Several examples of bone tools and ornaments have been recovered from archaeological contexts associated with hunter-gatherer and farming societies in southern Africa (e.g., A.R. Antonites *et al.* 2016b; Bradfield *et al.* 2019). For example, bone tools were recovered from Pont Drift, K2 and Mapungubwe, among others (Voigt 1983; Plug 2000; Hutten 2005; Abatino 2021). Use-wear analysis of scapula blades from Pont Drift and K2 has shown that it is likely that they were used as bone hoes for cultivation (Bradfield & A.R. Antonites 2018). Bone ornaments include ivory fragments

and finished ivory products from K2 and Mapungubwe, which might have been traded, and bone needles, awls and points (Voigt 1981, 1983). Informal bone tools have also been linked to marula pip extraction (Moifatswane, 1990).

Other animal by-products that were important in hunter-gatherer, herder and farmer society were hides and skins. Among hunter-gatherers, herders and farmers, hides were worked and processed predominantly by men (Badenhorst 2009a). According to Badenhorst (2009a), fat, plant materials and water feature prominently in hide processing for all three groups. Additionally, he indicates that historically, people (males, females, and children) worked the hide by scraping it with a stone and sand, rubbing it with plant materials and stamping it with their feet (Badenhorst 2009a). Archaeologically, many of the materials used in hide processing are ephemeral and generally do not preserve, but the stones, animal teeth, iron implements and bones used to process hides are sometimes recovered (Voigt 1983; Badenhorst & Plug 2001; Badenhorst 2009a; A.R. Antonites *et al*. 2016b). The use of animal by-products, such as milk or hides, is often seen as part of mundane experiences. This extended interaction with an animal carcass, however, reinforces the relationship and often extends beyond the 'ordinary', in the same way that repeated actions, such as hide processing, especially when done as a group activity, become transformed into ritual activities (e.g., Groleau 2009).

3.5 Feasting

Feasting, a communal activity where food and drink are consumed (Dietler & Hayden 2001), is a strategically-used event. For example, it displays and reinforces power and/or wealth through the provision and consumption of plentiful food and drink. Often this includes foods (e.g., large fauna and domestic species) that are consumed only at such events (Hayden 2001, 2009; Magoma *et al.* 2018). Feasting is one of many spheres where social identity is negotiated and solidified (Hayden 2001; Magoma *et al.* 2018). This section focuses on feasting among historical farming groups in southern Africa.

Feasting is common among farmer groups in southern Africa but is seldom recognised archaeologically (but see Sadr 2004; Badenhorst 2008; Fleisher 2010). In part, this is due to feasting being difficult to identify because other activities, such as using the

same area to discard mundane faunal remains, can mimic feasting events (Magoma *et al.* 2018). Additionally, sampling biases and excavation size can influence the amount of material recovered (Twiss 2008). Faunal signatures of feasting include: the quantity of bone waste (i.e., an abnormally high concentration of bone in an area and/or stratigraphic unit), evidence of the wastage of excess food in the form of articulated elements, such as whole limbs, the inclusion of animals which would be labour-intensive to hunt (e.g., rhinoceros and hippopotamus), and the intense exploitation of a particular species (Hayden 2001: 40-41).

Feasting among the Venda, a foremost historical community of relevance to my study, is relatively well-studied ethnographically and archaeologically (Stayt 1968; Badenhorst 2008; Magoma *et al.* 2018). Venda feasting is a public event which takes place at important moments, such as at a chief's death or the installation of a new chief (Magoma *et al.* 2018) and often involves the slaughter of a number of cattle (Stayt 1968). Magoma *et al.*'s (2018) study on the faunal remains from a high-status Venda site, Mutokolwe, found that the remains were remarkably well-preserved, showcasing the usual characteristics from feasting, such as the presence of whole elements indicating food wastage and the dominance of cattle, followed by caprines in the assemblage. The whole elements recovered from Mutokolwe, which were interpreted by Magoma *et al.* (2018) as indicating feasting, include whole metapodials, mandibles, phalanges, sesamoids and astragalii.

3.6 Ritual

Before I shift to the use of animals in ritual, I briefly clarify my understanding of what ritual is. I start with Hammond-Tooke (1974b: 344), who viewed ritual as a "stereotyped behaviour pattern, usually expressing its aim symbolically, that is believed to maintain or to affect a significant change in man's relationship with the supernatural". Wilson (1957, 1959, cited in Hammond-Tooke 1974b) divided ritual among historical farming groups in southern Africa into two categories: communal and rituals of kinship. Rituals of kinship are associated with ancestor-centric religions and can be further divided into lifecycle rituals, which occur at particular stages in a person's life (e.g., initiation) and contingent rituals which occur in response to certain stimuli (e.g., illness) (Hammond-Tooke 1974b). Communal rituals helped these historical farmer groups to secure and

maintain group well-being, examples of these are: rain-control ceremonies, festivals of first fruits, harvest celebrations, and rituals performed to enhance the performance of an army (Hammond-Tooke 1974b: 354).

Within a similar framework, Renfrew and Bahn (2000: 405 – 407) defined archaeological indicators of ritual, using several characteristics. Relevant to this study is: a) ritual may take place in a particular place which holds significant value to the people who use it (e.g., hills, shelters); b) the area in which the rituals are held is often replete in repeated symbols (e.g., cupules); c) maintenance of this special place may be evident in terms of cleanliness and areas set aside for disposal of ritual goods; d) sacrifice is practised (either animals or humans); e) consumable goods (such as food or drink) may be brought to the place as offerings; and, finally, f) other non-consumable goods may also be brought for use. Renfrew's (1994; Renfrew & Bahn 2000) view of ritual as a communal activity, which serves to maintain social relations, also allows archaeologists to examine how different ritual sites, and the material culture associated with them, express these social relations.

Unsurprisingly, these attempts at universal definitions of ritual have been challenged (but see Kyriakidis [2007] who suggests that definitions can still be useful even if they are not universal). The challenges stem from a variety of concerns, ranging from the variation in the functions of ritual (Bell 2007), to the need to decentre Western understandings (Bowie 2000). In this regard, it has been noted that by viewing ritual as inherently 'other', we impose our (Western and modern) assumptions and views about what is different onto the culture we are studying (Insoll 2011a, b; J. Morris 2012).

Unfortunately, even when using ethnography to try to understand past cultures and therefore attempting to bring an indigenous view into play, it is impossible to escape inherent bias, especially since most ethnographies were gathered by outsiders (e.g., Lane 1995; Porr & Bell 2012). For example, both Hammond-Tooke's (1974b) and Renfrew and Bahn's (2000) definitions of ritual seek out the assumed 'other' in the anthropological and archaeological records. Alternative approaches to ritual include viewing it as an abstract action (or series of actions), which reaffirms or establishes social relations or relationships between humans and the natural and/or spiritual world,

usually on a large scale (see Gazin-Schwartz 2001). This new approach to ritual by Gazin-Schwartz (2001: 268) also includes the everyday or ordinary by thinking of ritual as being on a “continuum of repetitive, structured activities”.

Even with the assistance of ethnographies and historical documents, the relationship between material culture, everyday life and ritual is difficult to comprehend (Gazin-Schwartz 2001). It is only through understanding how material culture, ritual and everyday life are intimately linked, that we, as archaeologists, can begin to grapple with the ritual use of material culture (Gazin-Schwartz 2001). Consequently, J. Morris (2012) suggests that, instead of examining ritual from a ‘meta-level’, archaeologists should discard the use of the term altogether and instead examine the ‘rationality’ behind actions. In other words, we should attempt to understand *why* people are doing things without imposing our own assumptions regarding the ordinary and extraordinary on the contexts we study.

One way of doing this through faunal studies is by viewing the fauna in terms of its ‘life history’, a biographical approach drawing on Kopytoff (1986), who suggested that artefacts should be studied from multiple perspectives and at different points in their life span, from creation to excavation. This allows the artefacts to take on a secondary agency – they do not themselves initiate anything but are embodied with agency by the individuals who make use of them (Insoll 2011a; J. Morris 2012).

This approach is similar to neo-animism in ascribing agency to objects (including animals and their remains) and allowing said objects to play a role in the society of which they are a part. Taking a biographical approach to faunal remains allows archaeologists to have a baseline from which we can view human alterations to the bone, as well as any non-human taphonomic alterations, thus allowing us to create a picture of the events that led to the deposition of the faunal remains in the archaeological record (J. Morris 2012).

Such an approach is useful because establishing what caused these alterations allows us to identify processing methods and other uses of the faunal remains. It, however, is important to acknowledge when analysing fauna, that the taphonomic signature of ritual is likely very similar to every-day butchery (J. Morris 2012). Therefore, anthropogenic alterations to bone may be the same in both ritual and mundane

contexts even though the two have different reasons for the same action (J. Morris 2012). This also holds true for how the faunal remains are treated post sacrifice/slaughter because some societies treat both sets of faunal remains (i.e., those used ritually and those not) in the same way, which is impossible to discern archaeologically (J. Morris 2012). Using J. Morris' (2012: 18) biographical approach to faunal remains thus allows archaeologists to view the deposits as "the end result of a series of intertwined events and human actions".

An example of past societies treating ritual and mundane faunal remains differently comes from Hill's (2000) study of faunal remains from archaeological sites in the American Southwest. From these sites, Hill (2000: 363-365) identified three types of animal burial: a) animal sacrifice and discard as ceremonial rubbish; b) burial as an offering; and c) expedient disposal. The first type of animal burial was identified based by evidence on the faunal remains that the animals had been intentionally killed (before burial) and then disposed of and buried according to cultural norms for ritual objects. The second type was characterised by (usually) articulated skeletons buried in a specific area (e.g., a prepared pit) as deliberate offering, and the third type was identified through the lack of evidence of either perimortem trauma or architectural association (Hill 2000). A major factor in the identification of the ritual burial of animals in the American Southwest was the taxa represented in those contexts, namely, birds and sometimes canids, and the representation of those taxa in ethnographies and rock art (Hill 2000). Even with these complementary streams of evidence (taphonomy, context, ethnography, and rock art), the third type of animal burial was necessary because not all of the faunal remains could be classed as ritual interment, even if they could be a product of ritual.

3.7 Sacrifice and 'general' rituals

Alongside mundane human-animal interactions are more symbolic relationships, some of which play out in the spiritual realm. I deliberately use the word alongside because many mundane interactions were, and are, informed and guided by symbolic human-animal relationships (e.g., Imamura 2001). This next section deals with the sacrifice of animals in the context of 'general' rituals using ethnographic, archaeological and ethnoarchaeological accounts. Here, the term 'general' ritual is

used to categorise rituals that formed part of every-day life for hunter-gatherers and farmers, including initiation and coming-of-age rituals. For convenience sake, I deal with hunter-gatherers and farmers separately, but with the acknowledgement that thousands of years of interaction between these groups has meant the transmission of ideas and concepts between them (e.g., Forssman 2016, 2020).

Symbolic behaviour has extensive temporal depth, for example, the famous engraved ochre and bone from Blombos, associated with *Homo sapiens* remains, dates to ca. 75 000 years ago (d'Errico *et al.* 2001). A recent study on faunal remains from Diepkloof Rock Shelter, in the Western Cape province, South Africa has provided further evidence of symbolic behaviour, specifically relating to carnivores and their pelts; there are cut-marked phalanges, tarsals and metapodials, which are related to skinning processes (Val *et al.* 2020). This extensive temporal depth is not limited to southern Africa; in Europe, there is evidence for symbolic behaviour that dates to before the Middle-Upper Paleolithic Transition (i.e., before 40 000 to 50 000 years ago) (Henshilwood *et al.* 2001a, b; d'Errico *et al.* 2003).

3.7.1 Hunter-gatherer groups

Animals feature prominently in the daily lives of hunter-gatherers and farmers. For hunter-gatherers, animals were crucial to their survival, both physical and spiritual. There are two primary sources for our understanding of this importance: the ethnographies gathered after colonial contact and many years after contact with farming societies, and the rock art painted across southern African by hunter-gatherers (see e.g., Orpen 1874; Bleek & Lloyd 1911; Bleek 1933a, b; L. Marshall 1962; Lewis-Williams 1997, 2003; Lewis-Williams & Pearce 2004; McGranaghan *et al.* 2013).

San cosmology is complex and intricately tied in with ideas about nature and animals. Animals feature prominently in many San myths and were embodied during the trance dances (Lewis-Williams 2003). Hunted animals were spiritually powerful or potent to hunter-gatherers as is evidenced in the plethora of zoomorphic rock art found throughout southern Africa. Animals, such as eland and kudu, were considered particularly potent and were used and embodied in many spiritual ways, such as in the healing dance and a dance to ensure a good hunt (e.g., Lewis-Williams 1997; McGranaghan & Challis 2016).

As part of an ethnoarchaeological study, Imamura (2001) lived among the |Gui and ||Gana hunter-gatherer groups in the Kalahari Desert. Imamura (2001: 126) found that for the |Gui/||Gana, the concept of 'water' formed the essence of all rituals performed by them – this 'water' was not simply water, it included seminal fluid, blood, sweat, saliva, urine, and other bodily excretions and was what humans were made of. During rituals, this 'water' sometimes was combined with other materials such as plant matter and parts of animals (Imamura 2001). Particularly for rituals lifting food taboos, the relevant animals' hooves, hair and intestines are roasted or, in the case of the hair, scraped off the skin to be mixed into the medicine (Imamura 2001).

Importantly, for the |Gui/||Gana, rituals lie on a spectrum, from public to private and from defined times of the year or in a person's life to when the need arises (Imamura 2001). Imamura (2001) provides several examples where important animals, such as the eland and lion, are personified as part of dances and trances. From a neo-animism perspective, the |Gui/||Gana's ontologies were informed by their relationships with the animals they encountered, hunted, and utilised for rituals and by-products. That animals were also made of 'water' further blurred the boundaries between animals and humans for them (Imamura 2001); this blurring of boundaries is pervasive in hunter-gatherer thought (Tanaka 1996).

The cosmology of hunter-gatherers was linked intimately with hunting due to its inherent blurring of the boundaries between human and animal, and hunting was one way that hunter-gatherers interacted with their environment (Imamarua 2001; Tanaka 1996; Lewis-Williams 2003; Guenther 2017). The hunting methods of hunter-gatherers have already been detailed, and I discuss hunting in terms of neo-animism. Guenther (2017) argues that, for hunter-gatherers, human-animal ontologies became blurred during two main types of hunt: that which involved the tracking of an animal shot with slow acting poison and that which involved chasing the animal until both the hunter and the animal were exhausted.

In San thought, some large and very large mammals (e.g., eland, kudu, rhinoceros) possessed *n!ow* (a concept discussed in more detail in section 3.8) which enabled these animals to interact with the hunter in a favourable or unfavourable manner. This transformed the human-animal relationship during the hunt into one that was bi-

directional (Guenther 2017). Sometimes before a hunt, the hunter connected with the animal, which, in a way, had identified itself for hunting through ‘tappings’ on the hunters’ body in places, which mimicked and thus identified the animal (Bleek & Lloyd 1911: 331; Keeney & Keeney 2015: 171).

These tappings sometimes started the process of the merging of the hunter and the hunted (Guenther 2015, 2017). Depending on the type of hunt and the animal being hunted, the boundaries between human and animal became more and more blurred (Guenther 2017). For example, during the hunt where an animal was being chased to exhaustion, the hunter started to embody the animal and started thinking like the animal (Rusch 2016). At the end of the chase, when the animal lay down, a moment of self-reflection happened when the hunter looked the animal in the eyes, a moment in which the hunter’s mind was the animal’s mind (Liebenberg 2006: 1024). This contrasts with the hunting of small animals and birds which were trapped, to whom the hunter did not feel a connection and who, in turn, did not connect with the hunter (Guenther 2017).

For hunter-gatherers in southern Africa, another way of relating to animals was through myths and folklore. Almost all of our knowledge of this comes from ethnographies that were gathered from the 1800s onwards by authors, such as Bleek and Lloyd, Orpen, the Marshall family, Biesele and Guenther. McGranaghan *et al.* (2013) argue that by viewing the ethnography gathered by Orpen within the context of the Bleek and Lloyd collection, it becomes more contextualised and easier to use to understand San rock art.

Orpen's (1874) informant, Qing, related several myths from the Maluti Mountains, which straddle South Africa and Lesotho. One such myth is about !kaggen, a mischievous god who “made all things” (Orpen 1874; McGranaghan *et al.* 2013: 153). !Kaggen is often represented by a praying mantis (cf. *Mantodea*), but can also transform into other animals, such as a snake, an eland and a hartebeest, and, from Bleek and Lloyd’s informants, !kaggen created the eland, had fights with meerkats and created the moon (Lewis-Williams 1997). In the folklore recited to Orpen and Bleek and Lloyd, !kaggen and the other animals are personified, which enables people hearing the stories to relate to them. Lewis-Williams (1997) contends that through

performance of the myths, hunter-gatherer shamans entrenched their place in their society, negotiated intra- and inter-group conflict and performed other tasks, such as rain-control. These myths (and the performances of them) were powerful in hunter-gatherer society because hunter-gatherers believed that they originated in an “ancient time when animals behaved as if they were people” (Lewis-Williams 1997: 212).

Different people around the world have used animals in a similar manner in their myths, legends, and fables. Some examples of fables from Africa include “*The greedy hyena*”; “*Elephant learns some manners*” (both Shona fables) and “*The foolishness of the ostrich*” (a hunter-gatherer fable) (Greaves 2000). These fables teach moral values.

Some of these past understandings are traceable through rock art because this is one of the spheres in which these human-animal relationships were negotiated and materialised. A lengthy discussion about rain-control and rock art is in section 3.8. Briefly, large mammals, such as eland, kudu, rhinoceros, and giraffe feature prominently in rock art authored by hunter-gatherers and farmers. There are regional differences in hunter-gatherer rock art (e.g., Van Riet Lowe 1952) and because of this, I focus on the rock art of the Kalahari and the northern provinces of South Africa.

The interpretations of southern African rock art (painted or engraved) have changed over time due to shifts in theoretical paradigms (e.g., Lewis-Williams 1984; Lewis-Williams & Dowson 1990, 1993; Thackeray 1994; Lewis-Williams & Pearce 2004; McGranaghan *et al.* 2013). Other arguments for the motivation of painting animals involve sympathetic magic (e.g., Thackeray 2005; Keyser & Whitley 2006), initiation rituals (e.g., Jolly 1996; Zubieta 2006; Parkington & Paterson 2022) and depictions of shamanistic trances (e.g., Lewis-Williams & Dowson 1990, 1993; Lewis-Williams 2003; Lewis-Williams & Pearce 2004; Challis 2005; Challis *et al.* 2008, 2013; McGranaghan & Challis 2016).

Rock art produced by hunter-gatherer, pastoralist, farmer, and hybrid groups is found across southern Africa. According to Eastwood (2003: 14), the rock art in the Limpopo Valley can be divided into four areas, based on geography: the SLCA, the Soutpansberg, north-eastern Venda and the Makabeng Plateau. In addition to these divisions, the rock art of the whole valley can also be classed into several engraving

categories and three different rock painting traditions, namely, San fine-line monochrome, bichrome and polychrome paintings, red finger-painting possibly authored by Khoekhoe people (Hall & Smith 2000), and lastly, white finger-painted images authored by farmers. This latter category of painting is geographically constrained to the western Soutpansberg and the Makabeng Plateau (Eastwood 2003).

In the SLCA, Eastwood and Blundell (1999) identified five categories of rock engravings: schematic designs, animal images, animal spoor, cupules, and incised lines (grooves in rock created through repeated incisions into the rock face). The animal images, animal spoor and cupules are of particular interest to my study. The engravings of animals throughout the SLCA include giraffe, rhinoceros, zebra, kudu, and gemsbok, as well as indeterminate animal engravings (Eastwood & Blundell 1999). Identified animal spoor include those of the zebra, kudu, elephant and impala and these engravings are often polished and associated with cupules and cut marks (Eastwood & Blundell 1999).

According to Eastwood (2006), the relatively recent age of some of the paintings, the historical presence of San in the SLCA (Dornan 1917), and the distribution of the San for the past 2000 years on the eastern edge of the Kalahari (Barnard 1992), all indicate that many of the paintings in the SLCA were likely authored by the San. Consequently, Eastwood (2006) utilised ethnographic information from Central San groups because the Nharo, G/wi and Kwe share linguistic similarities with the Hietshware who were historically in the SLCA (see Dornan 1917). This presumed authorship of the art means that San ethnographies can be used to interpret and understand at least the painted rock art of the SLCA. When considering paintings depicting kudu, giraffe, elephant, eland, tsessebe, impala, wildebeest, reedbuck, and sable antelope, through the lens of Central San ethnography, depictions of these antelope and other large animals (rhinoceros, hippopotamus and buffalo are also painted) can be interpreted as representing potent and spiritually important animals (Eastwood & Blundell 1999). Unlike elsewhere in southern Africa, the co-occurrence of painted and engraved rock art in shelters in the SLCA hints at the rock art of this region being a different tradition to those found in the rest of South Africa, as well as to traditions found in Botswana and Zimbabwe (Eastwood & Blundell 1999).

In the SLCA, the kudu is the most frequently painted animal, and occurs at almost 600 sites (Eastwood 2006). Initial studies (Eastwood & Cnoops 1999; Eastwood & Blundell 1999) suggested that images of kudu in particular contexts and poses were associated with San concepts of supernatural potency. This interpretation presented ethnographic examples of the kudu's potency in San thought and argued that images of female kudu in a mating pose symbolised female initiation and readiness for marriage and childbearing. Subsequently, Eastwood (2006) suggested that the images of both male and female kudu could be understood in terms of the concepts of good hunting and adequate rainfall, among others; in other words, they are the embodiment of what the medicine men of the San strive to achieve.

Rock art at Tsodilo Hills in Botswana is also relevant to this thesis. Tsodilo Hills is a geographically isolated site from other rock art sites in southern Africa (see figure 1.1) (Campbell *et al.* 1994). The site contains over 2000 rock art images authored by hunter-gatherers, pastoralists and farmers and is located in an area that, during the first millennium was inhabited by KhoeSan and Bantu speakers (Campbell *et al.* 1994). Among the thousands of images are depictions of eland, kudu, elephant, giraffe and cattle, as well as humans and geometric shapes, some of which are associated with each other. There are also depictions of 'rain animals' associated with cattle and geometric shapes (Campbell *et al.* 1994). The Tsodilo Hills are important because the rock art, combined with the material culture, emphasises that interaction between hunter-gatherers and farmers occurred even in liminal spaces, away from settlements (Denbow 1984; Campbell *et al.* 1994).

From the above, it is clear that the larger mammals (giraffe, elephant, rhinoceros, and kudu) were viewed as particularly potent animals, often represented in rock art and in dances among the hunter-gatherer groups discussed. These animals continued to be important in farmer ontologies for a variety of reasons, discussed below.

The Kattea, whom I mentioned earlier in this thesis, probably were involved in ritual activities, including rain-control in the region they inhabited (Van der Ryst 2003). Van der Ryst (2003) relates a story collected by Marais (1920, 1964, cited in Van der Ryst [2003]). In this, a sheep was killed by a jackal and some of the tail fat from this sheep, a smoothed piece of rhinoceros horn, and a copper neck ring were handed to a rain-

maker. He, with his skin glistening from the tail fat that was rubbed into it, sang the Song of the Rain while looking into the piece of rhinoceros horn.

For the Kattea, much like many hunter-gatherer and farmer groups, animal products such as blood, fat, horns and tails were important in rituals, and were used because of the power of these body parts (Van der Ryst 2003). Van der Ryst (2003) asserts that this, as well as the reference to the sheep tail fat in the above story, has strong ties to references of the spiritual potency associated with fat in hunter-gatherer ontology. Van der Ryst (2003) also argues that it is possible that the rough, white paintings of animals at Salt Pan Shelter, identified as farmer-authored by Hall and Smith (2000), may have been made by the Kattea. She bases her argument on the overlap of Kattea distribution with many sites that have these white paintings.

3.7.2 Farmer groups

As mentioned previously, rock art is a sphere in which human-animal relationships were negotiated and materialised, and rock art was not made by hunter-gatherer groups only. Salt Pan Shelter, located in the Soutpansberg to the south of the SLCA, shows clear signs of interaction and continuity of concepts relating to spiritual potency (Hall & Smith 2000). Along with the San rock art, there are finger-painted geometric images, which sometimes overlay the hunter-gatherer art and sometimes underlay it. This superposition of the art is evidence that the San and herders (the proposed authors of finger-painted geometric art) co-existed in the same landscape and competed for spiritual superiority (Hall & Smith 2000). Hall and Smith (2000) also argue that hunter-gatherer paintings of fat-tailed sheep are evidence of this interaction and spiritual competition. They state that two factors are important for their creation. First, these depictions are deliberate ‘othering’ of intruders into the landscape as a spiritual response. Secondly, these depictions of fat-tailed sheep are a deliberate incorporation of these potent animals into their cosmology as a way of overcoming the spiritual power that the herders held through their control of the sheep (Hall & Smith 2000). This is important because, unlike the kudu, the sheep were controlled by a group which was competing with the hunter-gatherers for resources and who had dispossessed them of a spiritually powerful space (Hall & Smith 2000).

Salt Pan Shelter also has farmer-authored rock art. Interestingly, the rock art of the farmers at Salt Pan Shelter shows a return to some concepts that the hunter-gatherers introduced. This is shown by a farmer-painted image of a kudu walking into a recess in the rock (Hall & Smith 2000). The kudu features rarely in farmer cosmology; however, it is prominent in the cosmology of the hunter-gatherers in Limpopo (Hall & Smith 2000). Hall and Smith (2000) argue that this kudu shows that, by the time farmers appropriated the shelter for their own purposes, it was no longer potentially dangerous to acknowledge the spiritual power of the hunter-gatherers. The much later addition of a farmer-painted cow shows a complete replacement of the previous cosmologies displayed through the rock art at Salt Pan Shelter (Hall & Smith 2000).

Another symbolically significant site, which was appropriated from hunter-gatherers by farmers and more recently by the Zionist Christian Church (ZCC) is Thaba Sione (Ouzman 1995, 1996). This site is located in the North West Province of South Africa and has hundreds of rock engravings, likely authored by hunter-gatherers (Ouzman 1996). Thaba Sione, even more so than Salt Pan Shelter, offers an opportunity to study the continuity of ideas from hunter-gatherers to farmers and, particularly at this site, current Tswana-speakers (Ouzman 1995).

Among the 559 identifiable images, baboon, buffalo, elephant, feline carnivores, giraffe, rhinoceros, and zebra are depicted with the recent addition of chickens and crosses (Ouzman 1996). Of these animals, Ouzman (1996) states that the rhinoceros was the most prominent and powerful animal to the hunter-gatherers who engraved the site, His argument rests on five engraved rhinoceroses, which have unusual, ‘imagined’ features added to them, such as protuberances from their backs, and from the inclusion of rhinoceros features in human-animal blended images (therianthropes). The rhinoceros is well-represented in southern African engraved rock art (Ouzman [1996], citing Wilman n.d. and Schertz n.d.) and has been associated with shamanistic contexts in hunter-gatherer groups (Stow & Bleek [1930], cited in Ouzman [1996]).

Other examples of the physical representation of animals include carvings and figurines of animals. In southern Africa, in modern farming societies, figurines of animals, especially oxen, were made by children from clay (Shaw 1974). Shaw (1974) highlighted that the style of oxen created was stylistically similar across southern

Africa, with wide horns and the humped back of Zebu cattle. This tradition of depicting domestic animals in clay figurines extends back at least to when farming societies arrived in the SLCA (ca. AD 900 [Hanisch 2002]) and Zimbabwe (ca. AD 200 - 600 [Matenga 1993]).

In Zimbabwe, five categories of figurines have been established: human and human genitalia, domestic animals, wild animals, fungi, and unidentified objects (Matenga 1993). The two categories describing animals have been further divided into cattle, goat, sheep, and dog (for domestic animal figurines) and mammals, reptiles, birds, frogs, and unidentified animals (for wild animal figurines) (Matenga 1993). Of the 144 clay cattle figurines, from 32 sites across Zimbabwe and from several periods, 60 are humped, which Matenga (1993) correlates with zebu cattle (as highlighted by Shaw [1974]) and 88 have horns. The three clay sheep figurines were identified by their thick, tapering tails and the 14 clay goat figurines were identified by a tail pointing upwards. Only one dog figurine was identified (Matenga 1993). Of the mammals identified, two lions were carved from ivory, one baboon and one hare were carved from soapstone, and seven porcupines, one elephant, one hyrax, two duikers, and three hippopotami were crafted from clay (Matenga 1993).

An especially interesting sub-category is unidentified animals: all 20 clay figurines were found on Everton Farm, a site unfortunately as-yet undated (Schoeman 2017) and with uncertain context as the figurines were unearthed during ploughing (Matenga 1993). These unidentified animal figurines are similar to the rain-animals depicted in rock art discussed later in this section. They are an amalgamation of several kinds of animals with unusual features, or imaginary animals (Matenga 1993).

An archaeological site which shows the temporal depth of figurine crafting in the SLCA is Schroda (AD 900 [Hanisch 2002]). Schroda is located close to the Shashe-Limpopo confluence and is guarded to the south by a sandstone ridge (Hanisch 2002). As well as the numerous figurines that were excavated, ivory pieces (fragments, broken bangles and one tusk end), bone ornaments, tools and weapons, beads, metal tools, weapons, ornaments, and seeds were recovered. In two excavated areas, deliberate pit burials of pots with associated faunal remains were found. Some of the faunal

remains were articulated. No long bones and pelvic fragments were located in these pit burials (Hanisch [2002], citing Voigt [1976]).

Figurines were recovered from all excavated areas at Schroda but occurred in clusters (Hanisch 2002). One cluster was located up against the western edge of a cattle kraal, and comprised a diverse array of animals and birds, as well as stylised humans and anthropomorphic humans (Hanisch 2002). In a different area of Schroda, on either side of a series of burnt posts, the figurines could be grouped according to the composition of the clay used. Coarse clay was used for the cluster on the northern side of the posts and had been moulded into large figurines of wild animals, birds, anthropomorphised animals, and stylised humans, as well as some phallic objects and a few cattle and sheep. Fine clay was used for much smaller fired figurines found to the south-west of the posts (Hanisch 2002). These figurines represented domestic species (cattle, sheep, goats, and possible dogs) (Hanisch 2002). Subsequent research combing ceramic and bead typologies with radiocarbon dating has established that the figurines belong to the later Leokwe occupation of the site (between AD 1000 to ca. AD 1230) (A.R. Antonites 2018).

Archaeologists also recovered animal and human figurines from Mapungubwe (ca. AD 1200 to 1300) and most of the animal figurines were domestic species (cattle, sheep and goats) (Voigt 1983). Distinctive horns, humps and the number of teats present identified the cattle figurines, the goats were differentiated from sheep by their horns and tails and the two sheep figurines bore the distinctive shape of an ewe’s rear end (Voigt 1983). Four wild animal figurines were also recovered from Mapungubwe: a springhare, a giraffe, a possible hippopotamus and, perhaps the most famous, a rhinoceros made from gold plates tacked onto a core (Voigt 1983).

Although Voigt (1983) does not put forward an interpretation for the figurines from Mapungubwe, she posits that it is more likely that these figurines were not made for children, and that they held symbolic meaning. When offering an interpretation of the animal figurines from Zimbabwe, Matenga (1993) notes that the domestic species represented by figurines match the species identified in the faunal remains from the same sites in the same ratios (i.e., the number of cattle figurines outnumbers those of sheep and goats and the same is true of the faunal remains).

Although Matenga (1993) makes use of Shona ethnography and his own lived experience as a *muShona*, he acknowledges that the ethnographies are limited in that they are not explicit about figurines or the intention behind crafting the figurines. Matenga (1993) concludes that the figurines represented an expression probably related to female fertility, and this is likely correct for the human figures and the domestic species represented in the figurines from Zimbabwe.

The wild animal figurines are more difficult to explain – some of them may represent totems; it is likely, however, that some of them were used during initiation ceremonies to scare initiates or to represent an animal that should be faced with courage and bravery (Van Schalkwyk 2002). Figurines of humans and non-humans feature prominently in initiation rituals for boys and girls, as well as in other rites of passage (e.g., marriage, birth, and death) in many southern African farming societies (Van Schalkwyk 2002).

Animal figurines are involved in initiation rites, but live animals are also involved and are slaughtered and eaten (Van der Vliet 1974). Among some historical farming groups, animals were slaughtered during various important rites of passage (e.g., birth, marriage and death) and cattle are still considered particularly important for marriage (Shaw 1974; Van der Vliet 1974). Also, among some farming societies, animals were slaughtered in celebration of a good harvest and in preparation for battle (Aukema 1989).

Caprines also have a ceremonial purpose in South African farming communities: among traditional Zulu communities, goats were killed for marriage and funeral ceremonies (Krige 1957), and among Tswana and Lovedu communities, sheep were used for bride-wealth payments (Krige & Krige 1980; Schapera 1984). Pedi groups used sheep in a number of ceremonies from rain-making to initiations (Quinn 1959) and they were of economic importance as well (Mönning 1978; Quinn 1959). Sheep, and black sheep in particular, were considered exceptionally potent. Sheep were treated like a person and could be considered as a replacement for a human sacrifice; additionally, sheep are quiet animals which do not disturb the ancestors when sacrificed (de Heusch 1985). De Heusch (1985) suggested that the blackness of the sheep was linked to sorcery, rainstorms and the night.

Animals formed an integral part of hunter-gatherer and farmer life and, due to this, were integrated into abstract and symbolic thought (e.g., Quinn 1959; Mönning 1978; de Heusch 1985; Lewis-Williams & Dowson 1990, 1993; Lewis-Williams 2003; Eastwood 2003, 2006; Lewis-Williams & Pearce 2004; Challis 2005; Challis *et al.* 2008, 2013; McGranaghan & Challis 2016). This was actualised through a variety of actions such as rock art, figurines, feasting and ritual behaviour. It is unsurprising that the particular animals of importance shifted from wild animals (for hunter-gatherers) to domestic animals (for farmers) given the ideological shift that arrived with this new lifeway. The appropriation or reinterpretation of hunter-gatherer thinking of wild animals follows if one assumes that incoming farmers saw hunter-gatherers as 'First People' and utilised their knowledge of the land and animals (e.g., Aukema 1989; Hammond-Tooke 1974b; Schoeman 2006, a, b, 2009; Wilmsen 2014). One area where this appropriation of hunter-gatherer thinking into farmer society can be studied is rain-control.

3.8 Rain-control

Ratho Kroonkop, the focus of this study, has been previously described as a rain-control site (Brunton *et al.* 2013) and as a site similar to other rain-control sites in the SLCA (Schoeman 2006b, 2009). Rain-control rituals were important to past societies that relied on rain, because rain influenced the movement of animals and therefore people (in the case of hunter-gatherers) and because rain and the seasons influenced when the best grazing periods were, or when to plant certain crops (e.g., Bleek 1933a, b; Hammond-Tooke 1974b; Barnard 1992; Ouzman 1996).

A prime example of animals appearing in a spiritual/ritual context comes from the Bleek and Lloyd collections, dictated to Bleek and Lloyd by Dia!kwain, about making rain:

> *"Therefore, they speak to the medicine men about it, and these promise that they will really make rain fall for them. Then they go and sling a thong over the water-bull's horns, they lead it out, they make it walk when they have slung the thong over its horns. They make it walk along and kill it on the way, that the rain may fall. They cut it up, and rain falls at the place where they threw it down… "*
> (Bleek, 1933a: 376)

In the above quote, the rain is embodied as a water-bull, which is hunted by medicine men, caught, and slaughtered in order for the rain to fall. It is worth noting that the collections were gathered well into the 19th century, which is why the rain is made using a water-bull rather than another animal, due to contact with farming societies. This contact changed the animal from what it was (a large animal ranging from a large snake to a large mammal such as a rhinoceros) to a domestic animal (Bleek 1933a). The /Xam informants spoke to Bleek and Lloyd about other rain animals too, including fish, frogs, tortoises, and snakes (Bleek 1933b; Brunton *et al.* 2013).

Among the !Kung, there is the concept of *n!ow*, a force which can influence the weather and is present in all humans and in some large mammals (Barnard 1992). Much like other San descriptions of rain, there are two kinds of *n!ow*: good (rain-bringing) or bad (cold-bringing). Examples of large mammals which have *n!ow* are giraffe, eland, gemsbok, kudu, hartebeest and wildebeest – when these are hunted and killed, their *n!ow* is released and a complex interaction between the animals' *n!ow* and the hunters' *n!ow* determines whether rain will fall (Barnard 1992).

Rain-control is also represented in rock art authored by San groups. Orpen (1874) showed a San informant, Qing, several images from three sites in the Maloti-Drakensberg Mountains, which he (Qing) subsequently interpreted. Qing's interpretation of these paintings remains the only account from a person for whom rock art production was a living tradition (Challis *et al.* 2008). One particular image that Qing commented on, and that has implications for rain-control concepts in San thought, is at a site close to Sehonghong Shelter in Lesotho, Rain Snake Shelter. The painted image is of a massive snake which weaves in and out of the rock face and interacts with numerous figures around it (Challis *et al.* 2013). The 'water's things' were important in San cosmology and included rain-snakes (which may have been pythons and boas [Bleek, 1956: 484]) and other animals associated with water (Challis *et al.* 2013).

Challis *et al.*'s (2008) study expands the known area of rock art sites with images associated with rain into the Lesotho highlands. A rock art site they describe has images of fish, rain animals, and a possible rhinoceros therianthrope (an image that is a mix of human and animal features). Challis *et al.* (2008) consider whether, within

one of the panels, the shamans were accessing the potency of the eland to make rain and whether the association of rain with successful fishing on a large scale and the associated social aggregation resulted in this particular site being especially suitable for rain-control rituals. There is a strong possibility that the proximity of the site to a large river that has many fish is a reason for its use and that the loud sounds from the river facilitated private rituals (Challis *et al.* 2008).

Cupules are another modification of rock surfaces with possible ritual associations. Cupules can be defined as small (less than 30cm wide) round 'cups' carved or pecked into a rock face using stone. Due to the nature of cupules, rainwater often pools in them, thus making cupules a 'wet' place. Cupules were produced by hunter-gatherer and farmer groups. Eastwood and Blundell (1999) posit that they were more symbolic than functional, although the authors acknowledge that their meaning probably varied from place to place.

One site where cupules and engravings were interpreted as both functional *and* symbolic is Klipbak 1, located in the Tswalu Kalahari Reserve in the Northern Cape Province, South Africa (Rifkin 2009). The Klipbak 1 engravings comprise engraved human and animal figures and circular motifs with numerous cupules located near a sandy area and near a rock bowl or tank (*klipbak* in Afrikaans). Material culture found on top of Klipbak hill suggests occupation throughout the Stone Age, as well as later interaction between hunter-gatherers and farmers (Rifkin 2009).

Rifkin (2009) argues that the engravings of giraffe and eland signify that Klipbak 1 was a significant site for rain-control. This is because both the eland and giraffe are considered the most potent animals among the south San and central San respectively. Among the San, the capture and slaughter of a rain animal (*!kwa:-ka xoro*) by a rain-maker (*!kwa:ka !gi:ten*) was crucial to making rain (Bleek 1933a: 378). Rain-making usually occurred at night atop a hill close to where the San group were staying. Importantly, according to //Kabbo, an informant of Bleek and Lloyd (1933a: 309), an appeal was made to the rain-controller in the following way "you must please go and cut the rain at the great waterpits which are on the mountain". It is possible that these waterpits resemble the rock bowls or tanks, which occur at Klipbak 1. Combining the evidence of ethnography about rain-control, the use of sound involving the use of

rocks pounded onto other rocks, the occurrence of gong rocks and the engravings of potent animals, Rifkin (2009) concludes that Klipbak 1 is an example of a soundscape which was used for both functional (grinding aromatic and medicinal plants) and symbolic (rain- and sound-making) purposes.

Schoeman and Murimbika (2006-7; also, Schoeman 2006a, b) suggest that the cupules located on the rain-hills JC Hill, M3S, EH Hill and Rhodes Drift were made as part of rain-control rituals during the K2-Mapungubwe period. Cupules were used by the Venda to make rain and to give thanks to God for the arrival of rain (see Stayt 1968).

Another site associated with rain is Thaba Sione, an engraved rock art site, discussed earlier (Section 3.7.2). Thaba Sione is associated with rain-control due to the prominence of five rhinoceros engravings – a rhinoceros has strong connections with, and similarities to, the rain-animals discussed above – depicted in scenes including figures chasing a rhinoceros, figures in trance states (see Lewis-Williams [2003] for a summary of these poses) and other unusual and unrealistic features (Ouzman 1996). One of these scenes certainly strengthens Ouzman's (1996) argument for the rhinoceros being associated with rain. The scene contains an adult and a juvenile rhinoceros, and an eland surrounded by hammer- and peck-marks. Hammer- and peck-marks are found in the appropriate position for ribs on the engraving of the adult rhinoceros. Ouzman (1996) contends that this engraving was used literally, following /Han≠kasso's statement to Bleek and Lloyd: "the rain's medicine men seize and break the rain's ribs. Then they throw them along, when the wind lies over there (north), that wind is the rain wind, it lies over there" (Bleek 1933a: 387). Thus, Ouzman (1996) argues that the engravings of Thaba Sione were not only representations of rain-animals but also formed part of the rain-control ritual performed by the hunter-gatherer shamans.

As mentioned earlier, Thaba Sione continues to hold a place of importance among those who reside in the area, and it is still considered important for rain-control. Traditionally, among Tswana-speakers, rain-control fell under the purview of the chief (Schapera 1971; Comaroff 1974). According to Ouzman (1995), Gilbert Mshwete (previous chief of Thaba Sione and father of the current chief) was a renowned rain-

maker who built his house and rain-kraal at the base of Thaba Sione hill and incorporated three engraved boulders into the walls of this kraal. One of these boulders has an engraving of a rain-animal. An informant told Ouzman (1995) that when the chiefs' ordinary rain-control is ineffective, a public meeting is held on top of the hill to pray to the ancestors for rain. When the area around Thaba Sione was affected by a drought between 1990 and 1992, members of the ZCC accompanied by diviners and prophets congregated at the top of the hill and prayed for rain – the diviners 'threw the bones' and rolled dice to determine where the rain was, the ZCC members danced, sang Christian songs and beat drums, and the prophets recited excerpts from the Bible and made predictions (Ouzman 1995). Ouzman (1995) links the beating of the drums by the ZCC members to the hammering of the rocks by hunter-gatherers in the past.

Similar to traditions amongst the !Kung, it is believed that a Korana person who had been born while it rained could break a long spell of drought by going on a journey, or by killing a game animal (Engelbrecht 1936). The Korana have a number of rituals performed when rain is needed: old men would go into the veld and sacrifice one head of cattle, and one rib from each side and the clavicular portions was roasted over a fire. The rest of the meat was then cooked, and all the old men would eat some of this meat. Finally, the bones and fat were burnt because it was the "pleasant smell of the fat which had to ascend to heaven" for rain to occur (Engelbrecht 1936). Alternatively, young men were sent to find reeds for flutes, after which the people gathered, many cattle were slaughtered and some of the meat was boiled, and some was roasted. Once all the meat had been consumed, the bones were burnt to ask for rain (Engelbrecht 1936).

Rain-control and first fruits festival were also performed by farming communities in southern Africa (Hammond-Tooke 1974: 354). For these communities, rain-control rituals served to strengthen social ties and assist with dealing with the natural world. The rituals also incorporated cosmological ideas about ancestors, usually those of the chief (Murimbika 2006). According to Schapera (1984: 61), most farming communities in southern Africa performed or paid someone to perform a rain-control ritual at the start of the annual rainy season. This ritual was usually performed by the chief who was assisted by 'rain-doctors' and was done to appeal first to the chief's ancestors

and, in more extreme cases, to the spirits and deities, to bring rain to ensure sufficient grazing for livestock and a good crop (Aukema 1989).

These rain-control ceremonies could take place in the private and/or the public sphere. The private ceremonies were performed only by the ritual specialist or the chief, without assistants present, whereas public ceremonies involved the whole community (e.g., Hammond-Tooke 1974b, 1993; de Heusch 1985; Aukema 1989). Both ceremonies took place in caves, shelters, and clefts in rock, which were considered sacred spaces, inhabited by spirits or deities (Aukema 1989; Murimbika 2006). These sacred spaces were visited only when contact needed to be made with the spirits or deities. According to Aukema (1989: 71), communal rituals which occurred in these spaces were those associated with rain-control, the "annual festival of the first fruits" and to strengthen the chief and the army. Ceramic pots and grindstones were used for the preparation of rain-medicine and the ingredients of this medicine varied from group to group (Aukema 1989).

In one of the earliest ethnographies, Colonel McClean (1906), the Chief Commissioner in British Kaffraria[4] (an area in the current Eastern Cape Province, South Africa), was deliberately derogatory about the rain-control rituals performed by the farming communities he surveyed. In McClean's (1906) account of rain-making, a 'beast'[5] was offered as a sacrifice by the paramount Chief, with the expectation that rain would fall within a day of the bones of the 'beast' being burnt (usually three days after the sacrifice). McClean (1906: 109) also noted that if the rain did not fall within a "reasonable" time, then one of the "excuses" used by the rain-controller was that "another [beast] of a different colour is required".

Ethnographies collected later were more explicit about the animals that were used in rain-control and for sacrifices. According to Hammond-Tooke (1974a, b), for farming

[4] The name for this area and term from which it derives are considered derogatory. I use them only to refer to the geographical area and to accurately reference the ethnography. I do not agree with their wider use and have changed these terms where possible.

[5] He was not specific about which animal was required to make rain, instead using the word 'beast' to refer to it.

societies in southern Africa, after centralisation of power, the responsibility of rain-control rested with the chief who was sometimes assisted by a rain-doctor (depending on the group). Generally, the appeal for rain was to the group's ancestors, but Venda and Pedi communities directed their appeal to a 'Supreme Being'.

In Tswana, Tsonga, Pedi, Venda, Mpondo, Bhaca, Zulu and Lobedu communities, among others, rain-control involved the sacrifice of a black-coloured animal (Hammond-Tooke 1974b; Feddema 1966). The blackness of the animal was said to invoke sympathetic magic in the sense that the black symbolised the blackness of the full rain clouds, much like the burning of the rain medicine to create black smoke was said to call rain clouds (Murimbika 2006). According to de Heusch (1985), black sheep were the preferred sacrificial animal for rain-control because they were quiet and could be substituted for a human, however, goats could be used if they were kept silent (de Heusch 1985).

This is in contrast to sacrifices made to the ancestors directly, where goats and cattle, both noisy animals, could be used to draw the attention of the ancestors (de Heusch, 1985). Past Mpondomise chiefs relied on San families who lived in the Tsolo area for rain-making until c. 1910 and they paid these families in recognition of their services (Hammond-Tooke 1974a, b). Among Tswana and Pedi communities, if the initial rain-control failed, then the rain-controller called for a special animal to be added to the large rain-pot. This special animal was often a guinea fowl or a hyrax (Feddema 1966; Murimbika 2006).

A recent ethnoarchaeological study by Murimbika (2006: 9) indicated that the Hananwa from the Makgabeng in Limpopo Province also conduct rain-control ceremonies in a cyclical manner, usually at sacred spaces such as caves, mountains, and water pools (Murimbika 2006). The cosmology of the Hananwa contains some continuity of ideas from hunter-gatherers, specifically in the form of the 'rain-snake', a snake so large, according to Hananwa legend, that when one went to supplicate it, one would not see its head or tail, and one had to take a chunk of its fat and leave without looking back (Murimbika 2006).

This is very similar to the snake (or rain-animal) Dia!kwain described to Bleek and Lloyd (Bleek 1933a: 275). Within the Makgabeng, legend has it that there is a pool

and a sacred rain-control site on Thabana Nhlana GaMmasebe Mountain (Murimbika 2006). Close to Mmasebe Village, there are several pools which have formed in the sandstone; these never used dry completely, and the largest rock pool has a number of boulders on which are hunter-gatherer paintings of rhinoceros and elephant (Murimbika 2006).

The concept of a huge snake is not limited to the Makgabeng; another can supposedly be found in the North West Province, South Africa, at Tlogo Pisane, which means ‘horse’s head’ (related to Hollmann [2007]). Hollmann's (2007) informant, Mr Josia Modise Rapoto, who had worked at the nearby Wonderstone Mine for 20 years, told to him that this name refers to the massive snake that comes out to bask on two outcrops of wonderstone, and whose shadow resembles a horse’s head. This snake is also active at night, and can swim, fly and walk like a large reptile (Hollmann 2007).

The properties and features attributed to this snake all correlate with the rain- or water-snake described by Khoe- and Bantu-speakers (Schmidt 1975; Hoff 1997; Hollmann 2007). Continuity in spiritual ideas is not unique to the Hananwa. Tswana cosmology also considers the eland as important for rain, as well as a large snake that lives in a rock pool (Murimbika 2006). During final preparation for the rain ceremony, the rain-controller slaughters a black sheep – the black representing the soft, dark clouds, which bring a soaking rain without lightning and thunder (Murimbika 2006).

Sheep and snakes, specifically the python, play an integral role in rain-control among Zulu communities (de Heusch 1985). Once a black sheep or a muzzled goat is sacrificed and skinned, the skin is carried by the rain-maker to a boulder in the middle of a stream or river where he puts on the skin and spends the night. During the night, a python comes and licks the fat off the sheep’s skin and lies on the medicine horns to ‘cool’ them before vanishing (de Heusch 1985). In this case, the medicine horns are those of the animal sacrificed (sheep or goat) (de Heusch 1985).

Tswana communities store their rain-medicine in sacred horns and, even though the composition of the medicine is kept secret, some ingredients are known – frogs, portions of a lightning bird (a fish eagle for the Tswana), the skin from a crocodile and the fat from a rain-snake (Schapera 1971; Murimbika 2006). These rain horns used to

be horns from a rhinoceros, but more recently a gemsbok horn was used (Schapera 1971).

Anti-thunder medicine requires part of a python as well as fat from a *likkawaan* (*Varanus* sp.), the skin and fat from a hyrax and tortoise meat, among other ingredients (de Heusch 1985). The *likkawaan* is required because it is considered fearless, even of thunder; the hyrax is thought to prevent violent rain associated with thunder because it hides when it rains (de Heusch 1985, citing Berglund 1975).

When a Tswana rain-control specialist feels that the usual rain-control procedures were not enough to bring rain, a special hunt is called for in order to capture a specific animal, usually a klipspringer (*Oreotragus oreotragus*) because of its association with hills and its agility (Schapera 1971: 102). This animal is slaughtered and processed in the same way as the black sheep or goat used in the usual rain rituals. Some parts of the animal are added to the rain-medicine and the stomach contents are burnt to call the rain (Murimbika 2006).

The Lovedu are perhaps the most famous rain-controllers in southern Africa. Their territories are located in the Limpopo Province. The group is led by Queen Modjadji and her descendant daughters to whom power passes after the queen's death (Hammond-Tooke 1993: 77). The responsibility of keeping the relationships between her people and their ancestors stable and also of bringing rain rests with Queen Modjadji (Krige 1940). Krige (1940: 172 – 173) was able to identify scales from a pangolin and the feathers from a lightning bird (although which particular bird is not specified) among the rain-medicine. Occasionally parts of a black sheep are added to strengthen the medicine.

Shona communities, historically present in the SLCA (Murimbika 2006), similar to other farmer groups, such as Tswana communities, hold their rain-control rituals in a cyclical manner. Although Murimbika (2006) does not explicitly name which domestic animals are slaughtered as part of Shona rain-control rituals, domestic animals are slaughtered and wild animals, such as the lion are symbolically present at the ceremony.

Stayt (1968) details the procedure and materials used in Venda rain-control, such as the taboos surrounding killing a python (a ‘cool’ animal), the creation of a paste from crab and bird remains to rub on sticks or spears and the burning of this paste to create smoke. Murimibika (2006) ascertained that any rain-control ritual takes place only after the thanksgiving ritual (*thevula*) at which a black bull is slaughtered. The chief summons the rain-controller and gives them a young female goat, whose bones, once slaughtered, are buried in a wetland alongside other rain medicines (Murimibika 2006). Unlike the other farming communities discussed, Venda communities hold only one rain-control ritual annually (Murimbika 2006).

One more commonality of rain-control among farming communities is the use of ‘wet’ products (such as wet branches used to make black smoke and animals associated with water) and the storage of rain-medicine in ‘wet’ places, such as shelters and caves (Eiselen 1928; Schapera 1930, 1971; Stayt 1968; Berglund 1976; Mönning 1978).

A distinction between cooked and raw medicine is also emphasised. Cooked medicines are those which are public, i.e., often used for public ceremonies and during feasts (e.g., Magoma *et al.* 2018), whereas rain-medicine is always private and raw, often left to ferment with the other rain medicines in the ‘wet’ places, including cupules (see e.g., Eiselen 1928; Schapera 1930, 1971; Stayt 1968; Berglund 1976; Mönning 1978). The only time rain medicines come close to a heat source is when they are burnt to produce smoke (the only time when an originally private ceremony becomes visible to public) (e.g., de Heusch 1985; Murimbika 2006; also see Schoeman 2006a for the K2 period in the SLCA). The avoidance of heat and ‘hot’ things is to ensure that the rain medicines remain ‘cool’ and thus bring the rain (e.g., de Heusch 1985; Stayt 1968).

It is important to discuss an aspect of Shona religion known as *mukwerera* or *kukumbira mvura*, which translates to asking for rain (Chirikure *et al*. 2017b: 15). In an effort to record locally-centred knowledge, Chirikure *et al.* (2017b) interviewed several ‘experts’ (such as archaeologists and historians), traditional leaders, village elders and members of the general public to gather their perspectives on *mukwerera.* The aim was to discredit earlier misinterpretations that resulted in the misnomer of ‘rainmaking’

to describe the ceremonies performed to ask *Mwari* or God (through the ancestors as intermediaries) for rain (Chirikure *et al.* 2017b).

Importantly, the answers Chirikure *et al.* (2017b) gathered from their interviews and questionnaires were double checked by the communities themselves, which provided a grass-roots approach to information verification. Chirikure *et al.* (2017b) identified a number of important aspects of the Shona tradition of *mukwerera*: first, that only God could provide rain and the officials who petitioned the ancestors for rain did not control the rain. Secondly, and related to the first point, rain-control was practised only by witches or magicians to do harm to others by controlling lightning. Thirdly, that the material culture associated with this petitioning to the ancestors predominantly remained in the homesteads, and if any was left in the bush or on the sacred mountains, it was either cleared or kept in some pots (Chirikure *et al.* 2017b). It is for these reasons and the considerable debates surrounding the temporal depth of the Shona (see e.g., Huffman 1981, 1982, 1986, 2015a; Beach 1998, Chirikure & Pikirayi 2008 and Chirikure *et al*. 2014) that I have chosen to focus on hunter-gatherer, Sotho-Tswana and Venda ethnography to understand the faunal remains from Ratho Kroonkop.

3.9 Summary

This chapter focused on research into animal-human relationships in the context of southern African hunter-gatherers and farmers. It started with a short history and definitions of taphonomy as used by zooarchaeologists and archaeologists, before discussing animals as a resource in terms of food, bone tools and as working animals. Next, I focused on definitions of ritual and animals used in rituals and rain-control in southern Africa. Throughout this chapter, I highlighted what past peoples (both hunter-gatherers and farmers) in the region thought about animals and how they integrated them into their respective cosmologies.

Chapter 4: Faunal analysis

4.1 Introduction

The in-depth analysis of the faunal specimens excavated from Ratho Kroonkop was two-fold: first, a taxonomic analysis was conducted to determine what taxa were present in the assemblage and secondly, macro- and micro-taphonomic analyses were conducted to determine the processes that affected the faunal remains up until excavation. This chapter details the methods and techniques utilised, the quantification units used, the debates surrounding faunal quantification in zooarchaeology, and provides justification for the methods used.

4.2 Identification of specimens

Faunal analysis in palaeontology and archaeology is well-established and there are conventions that a faunal analyst should follow when analysing faunal remains. These methods have changed over time and there are some differences between studies, depending on the research questions. Once the faunal remains from an archaeological site have been sorted from the other cultural material, the first step in zooarchaeological research is to divide the assemblage into 'identifiable' and 'unidentifiable' specimens (Klein & Cruz-Uribe 1984). The ratio of identifiable to unidentifiable bone is influenced by a number of factors, such as bone preservation, method of recovery, as well as what skeletal elements researchers consider as identifiable (Klein & Cruz-Uribe 1984).

The identification of skeletal remains rests on two main assumptions. The first is that most taxonomic groups are easily identifiable by several characteristics, some of which are not preserved archaeologically, and many individual skeletal elements have enough diagnostic signatures to be identified (Driver 1991: 39). The second assumption is that identification methods have been tested sufficiently, so that most identifications of skeletal elements do not need to be justified, except in certain circumstances (Driver 1991: 39).

Many zooarchaeologists use three main methods to identify faunal remains to species. In these, the remains are compared to: a) comparative collections, b) published

guides, including drawings, and c) measurement systems. All three of these methods and techniques rely on comprehensive data. Many comparative collections are incomplete, however, and the use of guides and measurement systems relies on those having been drawn from an extensive database (Driver 1991). Even so, most zooarchaeologists use comparative collections and published guides in a complementary fashion and measurement systems are generally only used when deciding between two similar species (Gobalet 2001).

4.2.1 Standardised zooarchaeological methods

For the identification of faunal specimens, two methods are widely used in southern Africa: one established by Brain (1974) and expanded by Voigt (1983), and the other by Driver (1991, 2005). Brain's (1974: 2) method states that only those faunal remains that could be confidently identified using diagnostic characteristics should be called identifiable. Brain (1974) emphasised that identification must be done with a comparative faunal collection. Both Voigt (1983) and Brain (1974) regard many skeletal elements as unidentifiable, for example, vertebrae, ribs, tooth enamel fragments and cranial fragments.

Driver (1991, 2005) argued that faunal remains can be classified as identifiable only when they can be identified to element. Importantly, Driver (1991, 2005) also emphasised that identification of faunal remains can be done by using characteristics such as bone thickness or surface characteristics, such as the location of foramen or muscle attachments, to identify the specimen to order or class.

This distinction between Driver's (1991) and Brain's (1974) approaches is especially important for fragmentary faunal remains from archaeological sites because Driver's (1991, 2005) method allows for the identification of more faunal remains because of the inclusion of more elements in the identification process, for example, ribs and vertebrae. Importantly, Driver's (1991, 2005) main aim for the establishment of his method was to standardise methods for zooarchaeologists to use and to ensure that comparisons between assemblages were reliable. Several analysts of faunal material used Brain's (1974) and Voigt's (1983) method of identification (e.g., Thackeray 1979; Mason *et al.* 1983; Plug 1989, 1996b) whereas others have used Driver's (1991, 2005) methods of identification (e.g., Badenhorst 2003; Badenhorst *et al.* 2011; Badenhorst

& Plug 2012; Reynard *et al.* 2016; Reynard & Henshilwood 2019; Van Pletzen-Vos *et al.* 2019).

My study utilised Driver's (1991, 2005) method of identification because this meant that my results could be compared with the previous study on the faunal remains from Ratho Kroonkop (see Brunton *et al.* 2013), which also used Driver's (1991, 2005) methods. Some of the principles derived from Driver's (1991, 2005) methods, which guided this study, are:

1) each faunal fragment must be identified on its own characteristics, and not because of association with other faunal remains fragments;
2) the faunal study must establish which elements of the skeleton are classed as identifiable (either to size class or to taxon);
3) the faunal study must establish which taxa are found within the study area; and
4) the faunal study must be explicit regarding which methods are used and how the quantification of the data is determined.

I considered specimens that I could identify anatomically as identifiable. Based on Driver's (1991, 2005) methods, these are elements such as mandible and maxilla fragments, hyoids, sternums, ribs, vertebrae, scapulae, humeri, ulnae, radii, innominate or pelvis fragments, femurs, patellae, tibiae, metapodia, carpals, tarsals, phalanges, and sesamoids. This method allowed me to include far more faunal material in my analysis except for long bone shaft fragments not identifiable to taxa.

Since only some of the material excavated from Ratho Kroonkop had been sorted from other cultural material, the study began with sorting the remaining faunal remains from other cultural material from Ratho Kroonkop. Once this was done, the faunal remains were categorised into identifiable and unidentifiable specimens, as defined by Driver (2005). During this sorting, faunal remains that were identified to element were also analysed microscopically for bone surface modifications (see section 4.4 for more detail).

The identifiable faunal specimens were then sorted into broad categories and size classes and finally, the faunal collection at the Evolutionary Studies Institute at the University of the Witwatersrand and the faunal collection housed at the Ditsong

National Museum of Natural History in Pretoria were used as comparative collections to identify the faunal specimens to taxa, where possible. The faunal specimens that could not be identified to skeletal element (Driver 1991, 2005) were counted, the number of burnt bones in each excavated unit was tallied, and any worked bones and bone flakes, which could be identified were separated from the unidentified remains. The methods of Dobney and Reilly (1988) were also utilised to assign element zones.

Lastly, the descriptions and diagrams of the first and third phalanges and metapodia by Peters (1988) were used to differentiate between particularly large cattle specimens and buffalo. Large cattle and buffalo specimens were also differentiated using the collection at Ditsong where the determination made, using Peters (1988), was confirmed and cattle and buffalo molars were compared; their axis vertebrae were also compared. This study utilised the methods of Payne (1985), Prummel and Frisch (1986), Halstead *et al.* (2002), Zeder and Pilaar (2010), Zeder and Lapham (2010) to identify *Ovis/Capra* specimens, with the acknowledgment that the species in the above are predominantly European. Comparisons were made at Ditsong to confirm identification. Species classification follows Meester *et al.* (1986).

In order to allow for intra-site comparisons to be drawn, I arranged all the identified faunal remains by excavated area (i.e., Rock Tank 1, Rock Tank 2 and Central Areas A, B, C and D). I further divided the remains according to the spits from which they were excavated. This was done across the whole of Ratho Kroonkop for consistency because most of the site was excavated by spit rather than according to stratigraphy. Rock Tank 1 was excavated stratigraphically, but many finds were assigned only to spits, with no information available on the stratigraphic units from which they were recovered. Because the finds assigned to stratigraphic units also had information on the spits they were excavated from, the only option available to include all the faunal remains was to group all the material from Rock Tank 1 by spit rather than stratigraphic unit. This has resulted in a loss of stratigraphic data as spits often simultaneously group material from different stratigraphic units and separate finds from the same units (Harris 1989; Ward *et al.* 2016). However, the use of spits still allows for the recognition of temporal patterns in assemblages (despite the loss of nuance), and this is considered preferable over the loss of data that would occur if material assigned only to spits were excluded. To create the diagrams demonstrating skeletal element

representation I used illustrations by Coutureau (1996a, b, 2004, 2005, 2014, 2015, 2016) downloaded from archaeozoo.org.

4.2.2 Size classes

When taxon identification is not possible, Brain (1974) suggested the use of broader taxonomic groupings such as 'suid', 'bovid' and 'carnivore'. Brain (1974) proposed the use of four size categories for bovids. He distinguished these categories on the live weights of the animals (Table 4.1). Brain's (1974) classification of bovids was used in this study to classify all bovid specimens that could not be identified to genus or species. These size-based categories are designed for use in southern Africa where there are numerous species of bovids that are frequently identified in archaeological sites, but that are often morphologically difficult to distinguish (Clark 2017; Scott & Plug 2019). This study also used intermediate size classes (i.e., Bov I/II or Bov II/III) to indicate specimens which fell between the established size classes.

Table 4.1: Bovid size groupings adapted from Brain (1974: 2)

	Live-weight range	**Species examples**
Bov I	0-23kg	*Sylvicapra grimmia* (common duiker)
Bov II	23-84kg	*Aepyceros melampus* (impala), *Ovis/Capra* (sheep/goat)
Bov III	84-296kg	*Kobus ellipsiprymnus* (Waterbuck), *Bos taurus* (cattle)
Bov IV	More than 296kg	*Syncerus caffer* (African buffalo), *Tragelaphus oryx* (eland)

Size categories for indeterminate mammals, carnivores and rodents were established according to their live weights recorded in Skinner and Chimimba (2005) (see table 4.2). Due to the large number of fish vertebrae, which could not be identified to species, size groups for fish were distinguished by vertebra length.

Table 4.2: Groups and examples of indeterminate mammals, carnivores and rodents (adapted from Reynard et al. [2016]).

Group	Mammal	Carnivore	Rodent
Small	Bov I, hyrax	Small wild cat	Mouse, shrew
Medium	Bov II, pig	Jackal, dog	Rat
Large	Bov III, horse	Lion, leopard	Porcupine
Very large	Bov IV, elephant		

The lengths of specimens were given codes as follows: 1 (0 – 0.9cm); 2 (1 – 1.9cm); 3 (2 – 2.9cm) and so on. This was done for all specimens except for fish where the groupings were: small fish (0 – 0.3cm); medium fish (0.4 – 0.6cm) and large fish (<0.7cm). These are arbitrary categories and not related to real fish sizes; the majority of the fish specimens were vertebrae, which range from very small to large within one fish.

4.3 Quantification of data

Quantification of faunal remains has been based on two main determinations: the Number of Identified Specimens (NISP) and the Minimum Number of Individuals (MNI). Both these measurements have advantages and disadvantages and, as a result, they have been the centre of the major debate within zooarchaeology (e.g., Grayson 1984; Lyman 2008). I calculated the NISP, the normed NISP (nNISP), the Number of Taxa (NTAXA) and the ratio of the number of specimens/number of unidentified specimens (NSP/NUSP), all of which are defined in this section.

4.3.1 Abundance

NISP can be defined as “the number of skeletal elements (bones and teeth) and fragments thereof – all specimens – identified as to the taxon they represent” (Lyman 2008: 27; see also: Klein & Cruz-Uribe 1984; Lyman 1984; Davis 1987). This measurement is linked to another quantification unit – the Number of Specimens (NSP) – which is a tally of all the bones (identified and unidentified) in the sample. The

other measure applied to faunal collections, the Minimum Number of Individuals (MNI), is used by many zooarchaeologists because it addresses many of the issues associated with NISP, especially the issue of NISP exaggerating sample sizes of different taxa. When researchers use NISP values as ratio scale measures of abundance of taxa, they assume that each faunal specimen is independent of all other specimens of that taxa (Lyman 2018; Lyman 2019a, b). It is likely, however, that NISP values count the same individual multiple times, in other words, the specimens that make up the NISP values are interdependent rather than independent of one another (Lyman 2019a). Furthermore, different taxa fragment at different rates and the intensity of fragmentation determines the NISP per individual (Holtzman 1979; Gilbert & Singer 1982; Klein & Cruz-Uribe 1984). Lyman's (2019a, b) biggest concern regarding NISP is that the relationship between the NISP value and the actual number of individuals in an assemblage is unclear.

MNI has been defined as: "the number that is sufficient to account for all the bones assigned to the species; the most abundant body part" (Klein 1980: 227); "essentially the sample frequency of the most abundant skeletal part" (Plug & Plug 1990: 54) and "the higher of the left- and right-side counts … is taken as the smallest number of individual animals which could account for the sample" (O'Connor 2000: 59). The measure's popularity was partially due to the perceptions of researchers that MNI was a more reliable indicator of species' importance at site (B. Smith [1975]; Payne [1973: 14]). Determining the MNI for any given assemblage is highly variable, is not standardised, and many researchers do not explicitly state how the assemblage is organised (e.g., by stratigraphic context or by excavated square) (see White 1953; Casteel & Grayson 1977; Grayson 1984; Klein & Cruz-Uribe 1984; Chase & Hagaman 1986 for more definitions of MNI).

A major critique of MNI as a measure of abundance is that it tends to exaggerate the abundance of taxa with lower amounts of skeletal elements (Grayson 1978). Grayson (1973, 1978) stresses that the foremost flaw of the MNI measure is the lack of a standard definition and method of calculation (see Gilbert & Singer 1982; Marshall & Pilgrim 1993; see Ringrose 1993 and Aldenderfer 1998 for further criticisms of MNI and NISP). Lyman (2019a) points out that this variability in definition does not mean that NISP is inherently a more accurate measure of the actual abundance than MNI,

but rather that it means that MNI values are far more variable and fluctuate between researchers, even for the same assemblage. Indeed, NISP as a measure has been criticised as much as MNI.

Despite the criticisms of the use of MNI in faunal studies, it strongly correlates with the NISP and therefore “the information on taxonomic abundances provided by MNI are also often provided by NISP” (Lyman 2008: 79). Grayson (1984) noted that even when multiple faunal samples are being studied, the NISP per sample per taxon does not change if the spatial boundaries of the sample are changed. This is not the case with MNI (Lyman 2019a). Thus, the NISP value was used in this study to quantify the faunal remains because most of the NISP values can be used in much the same way as MNI values. A second reason to use NISP as the main measure in this study was that these values provided a measure of relative taxonomic abundance at Ratho Kroonkop (Lyman 2019a).

In addition to using NISP to measure the relative taxonomic abundance of the faunal remains from Ratho Kroonkop, this study also utilised other well-established quantitative units, such as the number of taxa identified (NTAXA), and the number of specimens/number of unidentified specimens (NSP/NUSP). Importantly, the NTAXA values were calculated by tallying specimens to only one taxonomic level (i.e., genus or species). NTAXA values can reflect taxonomic richness or the abundance of difference types of taxa within an assemblage (Lyman 2008). The NSP/NUSP values were used to measure the level of fragmentation of the faunal remains. I measured the identification saturation of my sample by generating graphs of the NTAXA *vs* NISP, following Badenhorst *et al*. (2022).

4.3.2 Normalisation

This study utilised NISP values as they are defined, namely, a simple count of the number of identified specimens. NISP values were normalised following the method described in Van Pletzen-Vos *et al.* (2019). To normalise the NISP (nNISP) value of a skeletal element (e.g., femur or humerus), the NISP value is divided by the number of times that element occurs in a whole carcass (Grayson 1984; Grayson & Frey 2004; Van Pletzen-Vos *et al.* 2019).

Many of the above-mentioned quantitative units were measured on an ordinal scale (Lyman 2008), which was limited to nonparametric tests, and the types of statistical analyses that could be performed using those measurements (Gifford-Gonzalez 2018). However, Gifford-Gonzalez (2018) noted that the NISP measurement seems to have the properties of an interval scale variable and that it has one property required of a ratio scale variable. This opened up the NISP approach to parametric testing and held true except for use of the NISP to test for proportional representation of taxa within a given sample; the problem of specimen independence meant that nonparametric tests had to be used. Other indices have been created to analyse the proportions of certain taxa compared to other taxa, for example, the cattle, caprine and game indices (Badenhorst 2011, 2018; Badenhorst *et al.* 2016).

As mentioned earlier, my study calculated nNISP values for the skeletal elements of bovids and other mammals. The nNISP values were used in Chi-squared tests to determine whether there were any significant differences in particular taphonomic modifications between the three activity areas. I also generated graphs of the NISP against the nTAXA to determine at which point in my study the rate of taxa identified slowed, following Badenhorst *et al.* (2022). This was only done for mammalian taxa and was not applied to molluscs and fish. The visualisation of NISP *vs* nTAXA is done to potentially identify a minimum sample size needed to identify most of the taxa. It is not applicable to every faunal assemblage, however, because each is accumulated through various factors which differ from site to site (Badenhorst *et al.* 2022). Additionally, determining a minimum sample size can only be done once the entire assemblage has been analysed and Badenhorst *et al.* (2022) do not advocate for the analysis to be halted once the minimum sample has been reached.

4.3.3 Aging of specimens

The mortality profiles of animals have been studied for many decades with the aim of linking these patterns with animal management or human and non-human predation methods (Stiner 1990; Discamps & Costamagno 2015; Gifford-Gonzalez 2018). Estimating age-at-death of faunal remains is usually done by evaluating the level of closure of cranial sutures and the level of fusion of epiphyses (Table 4.3) (Silver 1963; Lewall & Cowan 1963; P. Morris 1972; Noddle 1974; Purdue 1983; Moran & O'Connor

1994). Although the ages at which epiphyses fuse is well known for domestic species (sheep, goat, and cattle) (Silver 1963; Chaplin 1971; Wilson *et al.* 1982; Ruscillo 2006), the ages of fusion are less well known for many wild species. It is important to note that these ages of fusion are variable both inter- and intra-taxa (Gifford-Gonzalez 2018) and should be viewed as age estimates.

Tooth eruption can also be used to age tooth specimens, and maxillae and mandibles with associated teeth (Silver 1963; Payne 1972; Bullock & Rackham 1982; Deniz & Payne 1982; Payne 1987; Halstead *et al.* 2002; Zeder & Pilaar 2010). Payne (1985) first developed criteria to distinguish between juvenile sheep and goats using their milk incisors, molars and their unworn first molar. These criteria were further developed to include the permanent premolars and subsequently all adult teeth (Halstead *et al.*, 2002). This study utilised Payne (1985), Prummel and Frisch (1986), Halstead *et al.* (2002), Zeder and Pilaar (2010) and Zeder and Lapham (2010) to age and identify *ovis/capra* specimens, with the acknowledgment that the species in the above are predominantly European, and the type of fusion observed at both proximal and distal ends of long bones was recorded for all long bones for all taxa. Neonatal specimens identified to species were analysed using the comparative collection at Ditsong. I did not identify the sex of any of the faunal remains from Ratho Kroonkop due to a lack of skeletal element parts which could be used to determine sex.

Table 4.3: Description of the stages of fusion following Noddle (1974), Purdue (1983), and Reitz and Wing (2008)

Fusion	Description
Unfused	The epiphysis of the long bone has not ossified to the shaft, the long bone is in three separate pieces, where the epiphyses join to the shaft is rough and the pieces of the long bone are porous
Just fused	There is a visible line where the epiphyseal plate has started to ossify to the shaft of the long bone
Fused	The long bone is now complete, the line of fusion has disappeared, and the two epiphyses cannot be easily separated from the shaft

4.4 Taphonomic analysis

The term taphonomy was first coined by Efremov (1940) to describe the study of the agents that modified animal remains before deposition, as well as processes that acted on bone post deposition (Gifford-Gonzalez 2018). Evidence for taphonomic agents can be derived from modern experiments and examples in the archaeological and palaeontological record (Gilbert & Singer 1982). Studying the taphonomy of an assemblage of faunal remains is essential for differentiating human modifiers from natural and non-human modifiers (Behrensmeyer 1975; Behrensmeyer & Hill 1980; Shipman 1981; Lyman 2010, 2019a).

This study followed a general microscopic bone surface modification analysis (Lyman 2019a), and recorded a range of taphonomic signatures, namely: breakage patterns, anthropogenic (e.g., cut marks and percussion marks) and zoogenic modifications (e.g., tooth pits and acid etching), and natural modifications (e.g., weathering and diagenic staining). These are discussed in more detail below. The microscopes used were an Olympus SZ61 that has magnifications of x0.67, x0.8, x1 and more than x1.5, and a Wild M3 that has magnifications of x6.4, x16 and x40 with oblique lighting. Specific specimens were selected for photographing and this was done using an Olympus EP50 at the University of the Witwatersrand. Photographs were also taken using a Canon M50 and a camera stand at the University of the Witwatersrand. Recording whether the faunal remains from Ratho Kroonkop had taphonomic modifications was necessary because such an analysis assists with distinguishing whether the faunal remains were accumulated by humans or animals or through natural death at the site. Once this is established, interpretations can be made about the utilisation and processing of the animals by the people who occupied the site (Lawrence 1968; Behrensmeyer 1975; Behrensmeyer & Hill 1980; Shipman 1981; Brain 1981; Lyman 1994, 2010; Martin 1999; Cain 2006; Orton 2012).

4.4.1 Breakage patterns

Breakage patterns are key for determining whether the bones were broken when they were fresh (e.g., for marrow extraction) (Outram 2001, 2002) or dry (e.g., as a result of trampling). Bone comprises two materials, bone collagen and hydroxyapatite, and

the proportions of these two materials present in the bone determine how the bone responds to stress (Johnson 1985; Villa & Mahieu 1991; Sala *et al.* 2015).

These responses to stress allow zooarchaeologists to determine what state the bone was in when it was broken and, when combined with other bone surface modifications, such as tooth marks, how that break occurred. Fresh bone (bone with more collagen) fractures differently to dry bone (bone with less collagen); excavation damage to bone, however, looks similar to dry breakage of bone (Sala *et al.* 2015). Using this knowledge, zooarchaeologists are able to determine not only the state the bone when it fractured, but also what type of taphonomic agent was responsible for the fracture; this is, however, only definitively possible when the surface modification (e.g., percussion or tooth marks) is visible on the bone (Sala *et al.* 2015). Table 4.4 provides a summary of the types of breaks recorded only for the proximal and distal ends of long bones.

Table 4.4: A summary of bone breakage (from Gifford-Gonzalez 2018: 221)

Bone condition	Outline forms	Break angle	Surface texture
Fresh/moist	Longer, spiral	Acute, obtuse or 90^0	Smooth
Dry	Transverse common, some spiral fractures	Acute, obtuse or 90^0	Smooth or stepped
Weathered	Longitudinal or transverse	Obtuse or 90^0	Jagged
Heated	Transverse	Almost 90^0	Jagged

By analysing the breakage patterns evident in faunal remains, zooarchaeologists can establish the taphonomic agents involved in faunal assemblage formation or what behaviour (human or non-human) impacted the faunal remains when this data is combined with other taphonomic proxies, as discussed above (Brain 1981; Cain 2006; Sala *et al.* 2015).

This study analysed, at a macroscopic scale, the breakage patterns evident on the faunal remains from Ratho Kroonkop and recorded the type of fracture (using the

outline forms described in Table 4.4) evident at both ends of all identified long bones and long bone fragments, and evident on a small sub-sample of unidentified long bone fragments. Long bones include femora, humerii, ulnae, radii, tibiae, and metapodia. Various systems for describing long-bone breaks and textures have been developed (Sadek-Kooros 1972; Biddick & Taylor 1975; Haynes 1983; Johnson 1985; Morlan 1984; F. Marshall 1986; Marean & Spencer 1991; Villa & Mahieu 1991). I used the criteria from Gifford-Gonzalez (2018) presented in table 4.4.

4.4.2 Level of burning

One of the markers of anthropogenic influence on faunal remains is the presence of burnt bone. Burnt bone can occur as the result of cooking or discard as rubbish in a fire or around a hearth and is evidence that the animals were eaten by people (Nicholson 1993; Brain 1993; Stiner *et al.* 1995). There are equifinality issues, however, because the source of exposure to heat and thermal alteration to bone can be due to natural fires, as well as deliberate action by people. Inferences should, therefore, be made cautiously and only after systematically examining the context of the bone and the effects created by the different types of thermal alteration (Gifford-Gonzalez 2018).

One of the easiest methods to determine whether a bone has been burnt is to observe and record its colour. Several studies have published colour scales for experimentally burnt bone and they relate the colour of the bone to the temperature of the fire (e.g., Shipman *et al.* 1984; Nicholson 1993; Stiner *et al.* 1995; Bennett 1999). All of these studies show that there is a typical progression in the colour of burnt bone from “brown through black, grey, bluish white to white” (Nicholson 1993: 415). Nicholson’s (1993) study showed considerable differences between the colours of burnt mammal, bird and fish bone achieved at different temperatures and, importantly, noted that the colour of bone is not only influenced by burning but also by biogenic or soil staining.

Experimental burning studies have also shown that, especially for open-air fires, proximity to the fire and the duration of the fire influence the colour of the bones (Nicholson 1993). Importantly, Shipman *et al.* (1984) emphasise that savanna or grassland fires seldom reach the temperatures required to visibly change the colour

of bone. Whether the bone is fleshed or defleshed also determines the colour of the burnt bone (De Graaf 1961; Shipman *et al.* 1984; Nicholson 1993; Brain 1993).

Stiner *et al.*'s (1995) study showed that burnt bone is also more fragile than unburnt bone, which results in a higher level of fragmentation of faunal remains. They found that bones that were buried beneath a fire could also be visibly burnt, which has implications for determining whether the bones were part of a meal being cooked or rubbish discarded after a meal (De Graaf 1961; Stiner *et al.* 1995). Stiner *et al.* (1995) emphasise that the presence of burnt bone only indicates that the specimen was in close proximity to the source of the heat at some point.

This study recorded burning by performing macroscopic and microscopic analyses of the faunal remains from Ratho Kroonkop. These data were recorded by noting the level of burning on a scale of 0 to 5 and the colour of the bone as shown in Table 4.5. The colour descriptor of the bone was determined by the dominant colour (more than 50%) of the surface of the specimen examined.

Table 4.5: Recording of burnt bone (adapted from Gifford-Gonzalez 2018)

Burning scale?		**Colour**	
		Bg	Beige
0	Brown	Br	Brown
1	Localised	Br/Bl	Brown/Black
2	Black	Bl	Black
3	Grey	Gr	Grey
4	White	Wh	White
5	Very white	v. Wh	Very white

4.4.3 Anthropogenic modifications

Cut marks and percussion marks are indicators of anthropogenic influence on faunal remains from archaeological sites. The location and frequency of cut marks and percussion marks can help zooarchaeologists to document butchery activities (e.g., Egeland 2003), ritual (e.g., Meier 2020) and whether the animals were scavenged or hunted (e.g., Grody 2016), among others.

The intensity of carcass processing is important for zooarchaeologists to determine because it allows for inferences about human subsistence patterns, which include decision-making around carcass transport, hunting, or scavenging and differences in butchery skill (Bunn 1986; Bunn & Kroll 1986; Egeland 2003). Egeland (2003) stresses that the analysis of the intensity of carcass processing rests on the assumption that the intensity is correlated with the frequency of the occurrence of cut marks and percussion marks on bones. The analysis of the intensity of carcass processing and the intensity of faunal exploitation is, however, more nuanced and includes other factors such as the presence of small prey animals, the processing of skeletal elements that provide low meat and marrow returns and evidence for the increased occupation of a site (Reynard & Henshilwood 2017). The frequency of butchery marks on faunal remains is influenced by a variety of other factors too, for example, the inexperience of the butcher, the type of tool used and its raw material, and the species selected for consumption (Rixon 1989; Kenyon 1997; Lyman 1995; Seetah 2002; Domínguez-Rodrigo *et al.* 2009; Egeland *et al.* 2014).

Often, tools are not used to butcher small animals (Charles & Jacobi 1994), although archaeological evidence of marrow extraction in small animals has been identified (e.g., Hockett 1991). Val *et al.* (2016) showed, through experimental work, that small to medium-sized birds, such as doves and pigeons, can be butchered without using any tools other than hands or teeth. Lloveras *et al.* (2009b) conducted an experimental study on the butchery of rabbits involving skinning and disarticulation using tools and found that, when tools are used, butchery marks are abundant on rabbit remains.

When referring to cut marks specifically, Lyman (1995, 2005) stressed that they cannot be assumed to result from repetitive and intentional impacts to the bone and zooarchaeologists, therefore, should avoid using cut marks alone to make inferences

about butchery intensity or processing intentions. Rather, cut marks, along with other anthropogenic marks, such as percussion marks and chop marks, should be used to make inferences about carcass processing (Binford 1991; Lyman 1995, 2005). Importantly, cut marks and other anthropogenic modifications have been linked to specific cultural practices (such as sharing of carcasses) and different methods of skeletal processing (such as marrow extraction) (Binford 1981; 1984a, b) (Table 4.6).

Table 4.6: Descriptions of anthropogenic modifications

Modification type	Description
Chop mark	A wide depth-to-width ratio in cross section (Walker & Long 1977), often with fractures from point of impact (Gifford-Gonzalez 2018)
Cut/slice mark	V-shaped in cross section with parallel striations in groove and fairly straight groove trajectory (Shipman & Rose 1983; Domínguez-Rodrigo *et al.* 2009)
Scrape mark	Broad, parallel shallow grooves over a wide surface (Christidou 2008; Gifford-Gonzalez 2018)
Percussion pit	A small patch of micro-striations or a pit with micro-striations (Blumenschine & Selvaggio 1988)
Percussion notch	Often accompanied by the removal of a bone flake, a small groove with micro-striations and fractures radiating from point of impact (Blumenschine & Selvaggio 1988; Blumenschine *et al.* 1996)
Intentional polish	Differentiated from trampling marks by parallel striations (Domínguez-Rodrigo *et al.* 2009; d'Errico *et al.* 2012)

It is important to note first, that the cut and chop mark characteristics were identified during experiments with stone tools on defleshed bone and, second, that not all the above characteristics of cut marks are present in actual butchery due to soft tissues preventing the butchery tool from marking the bone surface (Lyman 1994). The differences between metal cutting tools and stone cutting tools have also been studied (Binford 1981; Bunn 1981; Potts & Shipman 1981; Shipman & Rose 1983; Gifford-Gonzalez 1989; Lupo 1994; Walker & Long 1997; Greenfield 1999; Val *et al.* 2017). Experimental work with stone and metal cutting tools has found that metal tools, depending on the blade sharpness and type, produce a smoothed v- or u-shaped

groove whereas stone tools tend to create a groove that is uneven on one side and even on the other (Greenfield 1999).

Chop marks are caused by both metal and stone tools and there are very few differences between the marks produced. Scrape marks produced by metal implements tend to be more uniform in pattern and when used repeatedly, metal implements can produce polish (Christidou 2008). The characteristics of chop marks and scrape marks were determined through experimental studies on defleshed bone only and thus the observations should not necessarily be considered applicable to butchery on flesh-covered bone. Percussion marks are evidence of marrow extraction, and their identification is essential for determining whether marrow extraction was the aim of past processing by people (Blumenschine & Selvaggio 1988).

In Egeland (2003) and Egeland *et al.*'s (2014) method of quantifying cut marks, the number of specimens that exhibit one or more cutmarks is tallied and the frequency of cutmarks on each specimen is recorded. Using this method, it is expected that the number of specimens with at least one anthropogenic mark is proportional to the number of skeletal elements that were butchered; Egeland (2003) referred to this as the butchery specimen count. It is also expected that the higher the frequency of cutmarks or percussion marks on a skeletal element, the higher the number of tool strokes used to butcher the element (Egeland 2003). For her taphonomic study, Grody (2016) noted that even though the NISP of butchered specimens is considered a good indicator of processing intensity (Egeland 2003; Lyman 2005), Seetah (2006) highlighted that tool damage to bone may be influenced more by the butcher's skills and goals than by the processing intensity involved. This led Grody (2016) to analyse the NISP of butchered specimens and the frequency with which tool marks occurred on certain portions of certain elements. She also included elements identified to class (i.e., small, medium or large mammal) so as not to lose a large portion of the taphonomic data based on taxonomic identification. For my study, I counted the number of elements with anthropogenic marks and placed the number of marks on a scale of 1 to 3, 1 representing only one mark and 3 representing more than three marks, to record the amount of tool damage (Egeland 2003; Lyman 2005; Seetah 2006).

I identified cut marks such as slice marks and chop marks macroscopically and microscopically and compared them to known examples of cut, chop, percussion, and scrape marks presented by Gifford-Gonzalez (2018). It is important to note that Blumenschine *et al.* (1996) found that anthropogenic and zoogenic modifications to bone can be distinguished without the use of high-powered microscopes, that a hand-lens and a low-powered microscope with angled lighting are adequate to identify marks that are discernible and indiscernible (to the naked eye), and that minimal training is needed for novices to discern marks. I also followed Grody (2016) in not excluding those specimens only identified to family from my taphonomic analysis.

4.4.4 Zoogenic modifications

Past zooarchaeological research on zoogenic modifications has focused on the marks left on bone by North American predators (e.g., wolves or bears) (Binford 1981), domestic dogs and African predators, for example, lion (*Panthera leo*), leopard (*Panthera pardus*) and hyena (*Crocuta crocuta*) (Haynes 1980a, b; Binford *et al.* 1988; Marean & Spencer 1991; Marean *et al.* 1992; Blumenschine 1995; Fisher 1995; de Ruiter & Berger 2000; Domínguez-Rodrigo & Piqueras 2003; Pickering *et al.* 2004; Domínguez-Rodrigo & Barba 2006; Young *et al.* 2015) and identifying whether birds have modified bones (Andrews 1990; Msuya 1993; Berger & Clarke 1995; Bochenski *et al.* 1997; Hoffman 1998; Komar & Beattie 1998; Lloveras *et al.* 2008a, b, 2009a).

The analysis and identification of zoogenic modifications, such as tooth pits and scores, gnaw marks from rodents and acid etching from digestion is critical to understand how the faunal assemblage was accumulated (Pickering *et al.* 2004). Numerous studies have been done with the aim of establishing methods to distinguish between the taphonomic effects of the different large carnivores present in Africa (see e.g., Haynes 1983; Selvaggio & Wilder 2001; Domínguez-Rodrigo & Piqueras 2003).

My study analysed the faunal remains from Ratho Kroonkop for tooth pits, tooth scores, rodent gnaw marks and acid etching (see Table 4.7). These zoogenic modifications were recorded as present/absent and on a scale of 1 to 3 for intensity, in the same way as was done for cut marks. Tooth pits can be defined as bone modifications made by animal chewing which “appear as discrete, roughly circular marks in plain view” (Pickering & Wallis 1997: 1120). Tooth scores are defined as

“grooves usually produced on cortical bone by anterior premolars or carnassials. They are made as a tooth cusp drags over the compact bone surface…Longer scores usually curve slightly and scores are U-shaped in cross section compared to cut marks” (Gifford-Gonzalez 2018: 234). In contrast to carnivore tooth pits and scores, rodent gnaw marks are parallel concave furrows, examples of which can be found in Brain (1981). Refer to Table 4.7 for details.

Table 4.7: Descriptions of zoogenic modifications

Zoogenic modification	Description
Tooth pit	Dips in the bone surface, roughly circular when viewed from above, crushing evident (Pickering & Wallis 1997; Pobiner 2008)
Tooth score	Grooves on bone surface, U-shaped in cross section (Blumenschine 1988; Marean & Spencer 1991; Selvaggio & Wilder 2001; Pickering *et al.* 2004)
Rodent gnawing	Parallel, concave furrows, usually along the shaft edges (Brain 1981)
Stomach acid etching	Corrosion of cancellous bone, rounding and smoothing of edges (Boaz *et al.* 2000; Dewar & Jerardino 2007)

Experiments by Blumenschine (1988) found that it is possible to determine whether faunal assemblages were first accessed by carnivores or by humans. Based on these experiments, Hutson and Cain (2008) contend that analysis of the frequency of tooth marks and percussion marks on limb shafts and epiphyses shows this differential assemblage accumulation. They state that evidence of hammerstone use on limb shafts, usually to access marrow, indicated that humans accessed the carcass before carnivores (Hutson & Cain 2008) (see also Selvaggio & Wilder 2001; Domínguez-Rodrigo & Piqueras 2003; Domínguez-Rodrigo *et al.* 2014).

4.4.5 Natural modifications

Weathering is an important taphonomic agent because it affects bone fragmentation as well as bone surface preservation and can inform zooarchaeologists on how long the bone has been exposed to the elements (such as sun, wind and sand).

Behrensmeyer's (1978) study of the effects of weathering on modern mammal bones in Kenya forms the basis of many weathering analyses in zooarchaeology. Behrensmeyer (1978) described six stages of weathering in detail. Other natural modifications include rootlet etching and diagenesis (Nielsen-Marsh & Hedges 2000; Hedges 2002; Tjelldén *et al.* 2015). I recorded weathering using the same scale as Behrensmeyer (1978), rootlet etching as present/absent, diagenesis as present/absent and whether it was small spots or patched and trampling as present/absent (Table 4.8).

Table 4.8: Descriptions of natural modifications

Natural modification	Description
Weathering	Alteration of the bone surface due to exposure, resulting in cracking and colour changes (Behrensmeyer 1978)
Rootlet etching	Conical grooves on bone surface with rounded edges, do not run parallel, no micro-striations, sometimes whiter than surrounding bone (White & Folkens 2005; Tjelldén *et al.* 2015; Fernández-Jalvo & Andrews 2016)
Diagenesis	Often due to hydrology, results in changes in colour, porosity and crystallisation of hydro-apatite in bone, in-filling of pores with minerals (includes manganese staining) (Nielsen-Marsh & Hedges 2000; Hedges 2002)
Trampling	Striae on the cortical surface of the bone caused by abrasion from sediments or trampling by animals (e.g., d'Errico 1993)

Lyman and Fox (1989), after assessing weathering analyses in zooarchaeological studies, found that stages of weathering alone should not be used to infer pre-depositional accumulation. They expressed several concerns. First, weathering profiles created from the frequencies of recorded weathering stages on bone hide the combination of numerous factors that affect the stages of weathering described by Behrensmeyer (1978). Second, archaeological accumulations of bone differ from the experimental accumulation of bone that Behrensmeyer (1978) described because human selection of faunal remains often differs from animal carcasses deposited by non-human agency and left on the surface to decay. I used Behrensmeyer's (1978) methods and weathering stages. In my study, Stage 1 refers to weathering that covers

more than 1cm^2 of the bone surface on the surface of long bone shafts and the flat surfaces of bones such as the pelvis and ribs. The ends of bones where evidence of other damage was visible, were excluded (Behrensmeyer 1978). The stages of weathering (see Table 4.9) were recorded for the faunal remains from Ratho Kroonkop to answer questions concerning the length of time bones were exposed before burial (Behrensmeyer 1978; Lyman & Fox 1989; Fread 2007).

Table 4.9: Stages of weathering (adapted from Behrensmeyer 1978)

Weathering stages	
Stage	**Description**
0	Bone surface shows no sign of cracking or flaking due to weathering. Usually bone is still greasy, marrow cavities contain tissue, skin and muscle/ligament may cover part or all of the bone surface.
1	Bone shows cracking, normally parallel to the fibre structure (e.g., longitudinal in long bones). Mosaic cracking of covering tissue sometimes present on articular surface and/or on the bone itself. Covers >1cm^2. Fat, skin, and other tissue may or may not be present.
2	Outermost concentric thin layers of bone show flaking, usually associated with cracks (the bone edges along the cracks tend to separate first). Long thin flakes, with one or more sides still attached to the bone are common in the initial part of Stage 2. Deeper and more extensive flaking follows, until most of the outermost bone is gone. Crack edges are usually angular in cross-section. Remnants of ligaments, cartilage and skin may be present.
3	Bone surface is characterised by patches of rough, homogenously. weathered compact bone, resulting in a fibrous texture. In these patches, all the external, concentrically layered bone has been removed. Gradually the patches extend to cover the entire bone surface. Weathering does not penetrate deeper than 1.0-1.5mm and bone fibres are still firmly attached to each other. Crack edges are usually rounded in cross-section. Tissue rarely present.
4	Bone surface is coarsely fibrous and rough in texture; large and small splinters occur and may be loose enough to fall away from the bone when it is moved. Weathering penetrates into inner cavities. Cracks are open and have splintered or rounded edges.
5	Bone is falling apart in situ, with large splinters lying around what remains of the whole, which is fragile and easily broken by moving. Original bone shape may be difficult to determine. Cancellous bone usually exposed.

4.5 Use of ethnographies

Archaeologists have made use of ethnographies and historical documents to aid with the interpretation of the archaeological record (e.g., Ascher 1961; Morwood 1975; Lane 1995, 1998; Murimbika 2006; Seetah 2008). This use has sometimes been uncritical and without caution (see e.g., Huffman 1982; M. Hall 1984; Lane 1995). The most common use of ethnography in archaeology is through analogy, which is made by drawing on multiple ethnographies and by identifying multiple similarities between the archaeological record and the ethnographic one (Lewis-Williams 1991; Lane 1998).

The use of ethnography to interpret the archaeological record rests on uniformitarian assumptions (i.e., that aspects of the past resemble aspects of the present) (Ascher 1961). These assumptions exist because all humans have certain biological and behavioural characteristics in common and thus it is believed that accounts of historical indigenous communities can be used as analogues for pre-historic communities from which they may be descended (Lane 1998) (this has its roots in evolutionary ideology [Ascher 1961]). Unfortunately, past use of ethnography assumed too much similarity between the past and the present due to the ahistorical nature of many ethnographical studies (Lane 1998).

Early critics of the use of analogy in archaeology had a deep distrust of its use and declared that simple analogical inference “inevitably distorts and limits archaeologists’ understandings of the past” (Gould & Watson 1982; Wylie 1985: 64). These criticisms came after Ascher (1961) proposed methods for improving the use of analogy in archaeology, one of which was the development and use of multiple, relevant, ethnographies in a systematic manner that would better support the use of analogy (Wylie 1985).

These criticisms continued after Ascher’s (1961) ‘new analogy’ which demanded formal boundaries for analogies and a thorough consideration of the ethnography used for analogy (Ascher 1961). It was thus recommended that ethnographies from communities with similar technology, environments, and cosmologies would be the most suitable to draw from, for analogy creation (Clark 1951; Childe 1956; Ascher 1961). It must be emphasised that, even with formalised boundaries and careful

selection of ethnography, those ethnographies can only provide models to explore for an explanation of the archaeological record and should not be used as a direct explanation (Childe 1956; Ascher 1961). Thus, Wylie (1985: 80) contends that "analogical conclusions must be treated tentatively and must consciously be held open to revision as archaeologists expand and refine the background knowledge (and archaeological evidence) on which they are based". Additionally, Wylie (1985: 107) argues that even though analogy is inevitably subject to errors, it can be used circumspectly and that analogical inferences can avoid "simple assimilation of the unfamiliar to the familiar".

The best method of using analogy in archaeological contexts is two-fold: first, one should select the analogy that is best suited to explaining the archaeological record, drawn from multiple sources that correlate with that record; second, when one finds the ethnographic record inadequate for use, one should conduct an ethnoarchaeological study and study living communities and compare this new ethnography to the archaeological record (Ascher 1961; Murimbika 2006; Seetah 2008). Lane (1995, 1998) criticises the validity of the use of ethnographies from the 19th and 20th centuries because historic studies have shown convincingly that there were many interactions between Europeans and indigenous communities which resulted in major social, economic, political, and cultural transformations during these two centuries in southern Africa, in particular.

My study attempts to overcome these criticisms by drawing from multiple ethnographies collected from both hunter-gatherer and farmer groups, and the ethnoarchaeological study by Murimbika (2006) to form analogies to interpret the faunal remains from Ratho Kroonkop. Specifically, for hunter-gatherers, I utilised ethnographic accounts of the ≠Kade San (Tanaka 1996), the Ju/'hoansi (Yellen 1993a, b) and the |Gui and ||Gama groups (Immamura 2001) from the Central Kalahari, recorded in the late 19th and early 20th centuries and the accounts of Drakensburg San from Orpen (1874) and the Bleek and Lloyd collections (Bleek 1933a). For farming groups, I used ethnographic accounts of the Tswana, Zulu, Tsonga, Pedi and Mpondomise (Krige 1957; Quinn 1959; Stayt 1968; Shaw 1974; Hammond-Tooke 1974a, b; Mönning 1978; Schapera 1984; de Heusch 1985; Aukema 1989; Matenga 1993; Murimbika 2006). I have not included Shona ethnography for two reasons: the

extensive debates surrounding the temporal depth of the Shona people (see e.g., Huffman 1981, 1982, 1986, 2015a; Beach 1998, Chirikure & Pikirayi 2008 and Chirikure *et al*. 2014) and the types of ceremonies Shona hold for giving thanks for rain (rather than performing rain control) (see Chirikure *et al*. 2017b). Lastly, for hybrid groups I used accounts of the Korana from the Northern Cape in the 19th century (Engelbrecht 1936) and descriptions provided by Van der Ryst (2003) of the Kattea in Limpopo Province.

4.6 Summary

This chapter detailed the methods used by this study, as well as the debates surrounding them. It also provided justification for the methods and quantification of data. In the next chapter, I discuss my results.

Chapter 5: Taxonomic and taphonomic data

5.1 Introduction

This chapter details the results from my taxonomic and taphonomic analyses of the faunal remains from Ratho Kroonkop, based on the methods described in the previous chapter and informed by the literature review. The data are divided into three spatial sets: Rock Tank 1, Rock Tank 2 and the Central Area (for detail see chapter 2), which enabled spatial comparison across the site.

5.2 The faunal assemblage from Ratho Kroonkop

The taxonomic analysis of the faunal remains from Ratho Kroonkop followed the methods outlined in chapter 4. The total sample size, specimen lengths, taxa identified, skeletal part representation of bovids and mammals, and ageing of taxa are presented below with additional data presented in Appendix A. I start with an overview of the faunal assemblage from Ratho Kroonkop before contextualising the excavated areas and spits.

5.2.1 Sample size

The total amount of faunal remains analysed for this study is 252 540, which includes both those specimens identified to taxa and those which have not been identified (table 5.1). Across Ratho Kroonkop, 13% of the total faunal remains analysed were identified to taxa. Rock Tank 1 produced the highest percentage of identified faunal remains (N = 9 299; 26%). Rock Tank 2 had the most specimens in total (both identified and unidentified) (N = 137 627). When the nTAXA is plotted against NISP, the asymptote is reached around 1000 NISP; it is at this point that rate of identified taxa decreases. This graph is representative of only the mammal specimens from Ratho Kroonkop and does not include birds, fish and reptiles (figure 5.1).

Table 5.1: Sample size of faunal remains from Ratho Kroonkop

Location	# Identified specimens	# Unidentified specimens	Total # of specimens	% ID	% non-ID
Rock Tank 1	9 299	27 767	37 066	25%	75%
Rock Tank 2	9 814	127 813	137 627	7%	93%
Central Area A	4 865	25 042	29 907	16%	84%
Central Area B	3 679	20 603	24 282	15%	85%
Central Area C	1 747	17 317	19 064	9%	91%
Central Area D	1 844	14 250	16 094	12%	88%
TOTAL	**31 248**	**232 792**	**264 040**		

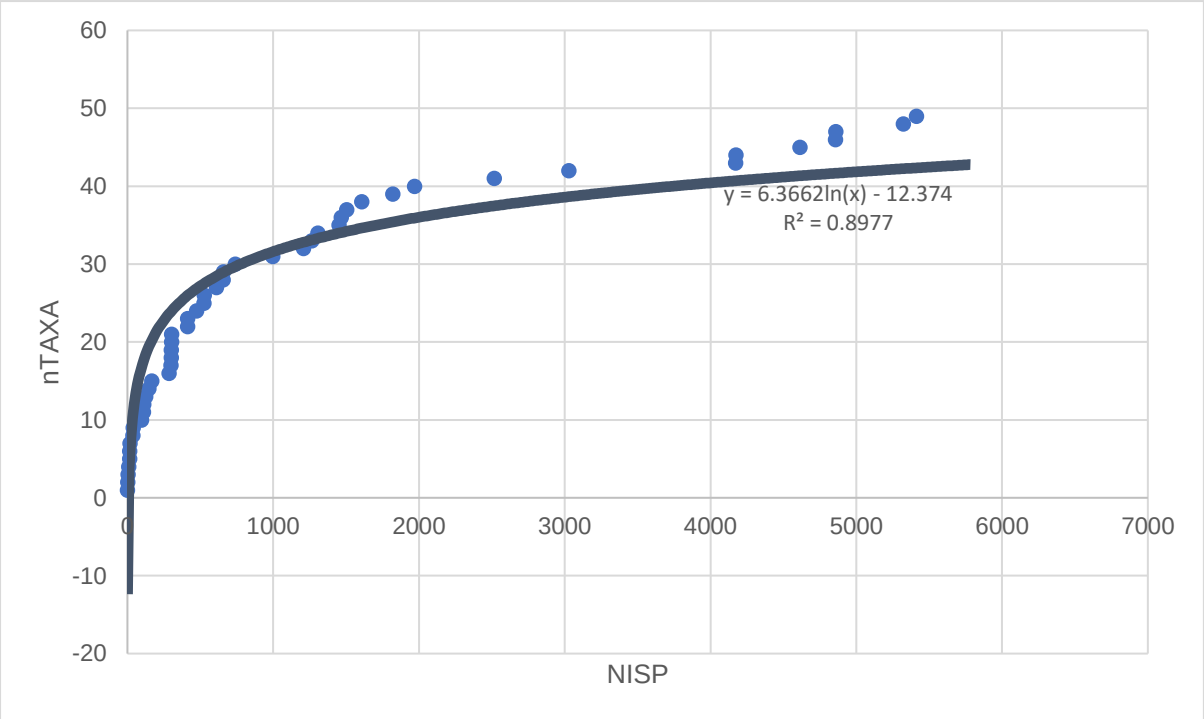


Figure 5.1: Graph of nTAXA vs NISP of all mammals identified in the Ratho Kroonkop faunal assemblage

5.2.2 Taxa present

A total of 49 taxa were identified from the faunal remains from Ratho Kroonkop (table 5.2) and these included mammals, birds, reptiles, fish, and molluscs. The most common animals identified were small fish (NISP = 8103), small terrestrial gastropods (NISP = 5992), and medium-sized mammals (NISP = 4017). The most commonly identified bovid size class was Bov II (NISP = 965), followed by Bov I (NISP = 272).

The most common bovid identified to genus/species were *Aepyceros melampus* (impala) (95 NISP) and *Redunca* sp. (e.g., reedbuck) (NISP = 33).

Of note are *Diceros bicornis/Ceratotherium simum* (rhinoceros) (NISP = 14), *Hippopotamus amphibius* (hippopotamus) (NISP = 3) and *Giraffa camelopardalis* (giraffe) (NISP = 3). Only one definite *Ovis aries* (sheep) specimen was identified. It was found in the Central Area. In addition, 20 remains *Ovis/Capra* (sheep/goat) were recovered from the Central Area, ten remains of sheep/goat from Rock Tank 1, and only two sheep/goat were recovered from Rock Tank 2. Almost all of the carnivore specimens were recovered from the Central Area. The differences in my and Brunton *et al.*'s (2013) taxa list are likely due to preservation and curation issues as well as time constraints.

Table 5.2: Number of Identified Specimens (NISP) at Ratho Kroonkop

Taxa	Common Name	Rock Tank 1	Rock Tank 2	Central excavation	Total	NISP from Brunton *et al*. (2013)
cf. *Soricidae*	Possible shrews		11	3	**14**	
Panthera pardus	Leopard			1	**1**	
Hyaenidae gen. et sp. indet.				1	**1**	
Felis sylvestris	African wild cat			1	**1**	
Genetta cf. *genetta*	Possible small-spotted genet	1			**1**	
Herpestidae gen. et sp. indet.	Possible mongoose			2	**2**	
Carnivore small		6	3	23	**32**	2
Carnivore medium		7		7	**14**	
Rhinocerotidae gen. et sp. indet.	Black or White rhinoceros	8	6		**14**	13

Taxa	Common Name	Rock Tank 1	Rock Tank 2	Central excavation	Total	NISP from Brunton *et al*. (2013)
Equus quagga	Plains zebra	11	2	11	**24**	2
Procavia capensis	Rock hyrax	79	14	44	**137**	4
Potamochoerus larvatus	Bushpig			2	**2**	1
Phacochoerus africanus	Common warthog			2	**2**	
Hippopotamus amphibius	Hippo			3	**3**	
Giraffa camelopardalis	Giraffe		1	2	**3**	1
Connochaetes taurinus	Blue wildebeest		1		**1**	
Alcelaphus buselaphus	Red hartebeest			1	**1**	
Sylvicapra grimmia	Common duiker	1	1	7	**9**	3
Oreotragus oreotragus	Klipspringer	13	0	3	**16**	
Raphicerus campestris	Steenbok	11	4	11	**26**	2
Aepyceros melampus	Impala	25	15	55	**95**	1
Pelea capreolus	Vaal rhebok		1	1	**2**	
Hippotragus equinus	Roan			1	**1**	
Hippotragus niger	Sable			3	**3**	
Syncerus caffer	Buffalo	3		3	**6**	1
Tragelaphus strepsiceros	Greater Kudu		1		**1**	1

Taxa	Common Name	Rock Tank 1	Rock Tank 2	Central excavation	Total	NISP from Brunton *et al*. (2013)
Tragelaphus scriptus	Bushbuck	1		3	**4**	
Taurotragus oryx	Eland	2		2	**4**	1
Tragelaphus gen. et sp. indet.		2	2	4	**8**	
Redunca arundinum	Reedbuck	6	1	4	**11**	9
Redunca fulvorufula	Mountain reedbuck		2	1	**3**	
Redunca gen. et sp. indet.		7	8	22	**37**	1
Kobus ellipsiprymnus	Waterbuck	1			**1**	
Bos taurus	Cattle	1	1	5	**7**	4
Ovis aries	Sheep			1	**1**	
Ovis/Capra	Sheep/Goat	10	2	20	**32**	
Bov I		74	38	160	**272**	7
Bov I/II				6	**6**	
Bov II (Non-Domestic)		4	1	4	**9**	38
Bov II		217	184	564	**965**	16
Bov II/III			1		**1**	
Bov III (Non-Domestic)				2	**2**	16
Bov III		73	60	109	**242**	10
Bov III/IV		3	2	2	**7**	
Bov IV		1	1	10	**12**	
Pronolagus randensis	Jameson's red rock rabbit	1		1	**2**	
Lagomorph gen. et sp. indet.		5	7	6	**18**	2
Pedetes capensis	Springhare	10	2	16	**28**	6

Taxa	Common Name	Rock Tank 1	Rock Tank 2	Central excavation	Total	NISP from Brunton *et al*. (2013)
Aethomys cf. *chrysophilis*	Rock mouse		3		**3**	1
Steatomys cf. *pratensis*	Fat mouse		1		**1**	1
Rodent Small		369	992	428	**1789**	405
Rodent Med		21	7	18	**46**	12
Rodent Large		1		1	**2**	2
Mammal Small		1124	265	567	**1956**	42
Mammal Med		717	608	2692	**4017**	28
Mammal Large		72	115	115	**302**	15
Mammal Very Large		14	10	28	**52**	16
Struthio camelus	Ostrich (eggshell only)	12	42	125	**179**	10
Accipitridae sp.	e.g. Vulture			1	**1**	
Numididae sp.	e.g. Guinea fowl		12	2	**14**	
Francolinus sp.	e.g. Francolin	2	2	2	**6**	
Bird Small		5	33	16	**54**	53
Bird Small/Med		93	176	29	**298**	
Bird Med		31	63	60	**154**	48
Bird Med/Large		1			**1**	1
Bird Large		1			**1**	2
Stigmochelys pardalis	Leopard tortoise	13	1	14	**28**	

Taxa	Common Name	Rock Tank 1	Rock Tank 2	Central excavation	Total	NISP from Brunton *et al*. (2013)
Chelonia sp.	Terrapin/Tortoise (carapace)	56	160	137	**353**	57
Varanus sp.	Monitor lizard			7	**7**	
Lizard Small				46	**46**	10
Lizard Large		5			**5**	
Reptile Small		29	80	44	**153**	2
Reptile Med		137	41	32	**210**	6
Clarias gen. et sp. indet.	Barbel	174	170	252	**596**	65
Fish		5761	3649	2184	**8103**	1903
Achatina immaculata	Giant land snail		1		**1**	
Achatina sp.		17	190	1371	**1578**	14
Mollusca gen. et sp. indet.	Small terrestrial snail	55	2802	3135	**5992**	1762
Unionidae gen. et sp. indet.	Freshwater mussel	6	19	224	**249**	3
Total		**9299**	**9814**	**12659**	**31772**	

5.2.3 Indeterminate mammal skeletal part abundance

From all areas of Ratho Kroonkop, indeterminate medium mammal skeletal elements contributed the majority of skeletal elements identified (NISP = 3995), followed by small mammals (NISP = 1949) and large mammals (NISP = 292) (table 5.3). The NISPs and nNISPs for the mammal size classes from the entire faunal assemblage of Ratho Kroonkop can be found in Appendix A.2. This data was not differentiated according to spatial areas or depth.

5.2.4 Bovid skeletal part abundance

The majority of identified bovid skeletal elements are from bovid size class II (NISP = 1133), followed by bovid size class I (NISP = 324) and bovid size class III (NISP = 267). Of the skeletal elements for all bovids (table 5.4), teeth and tooth fragments are the most frequently identified (NISP = 566) with phalanges being the second most common (NISP = 339). Metapodia (NISP = 117), sesamoids (NISP = 149) and carpals (NISP = 112) were also identified frequently. For bovid size class I, mandibles (4 nNISP) and carpals (3 nNISP) were the most abundant. Mandibles (15.5 nNISP), humeri (14.5 nNISP) and tibiae (20.5 nNISP) were the most abundant bovid size class II elements followed by phalanges (9.5 nNISP). As with the mammal data, this bovid data was from the whole of the Ratho Kroonkop faunal assemblage and spatial considerations were not taken into account (see Appendix A.3).

5.2.5 Aging

For all taxa identified, the majority of post-cranial elements were fully fused (i.e., adult individuals) (NISP = 6715) (table 5.3). Unfused (NISP = 932), just fused (NISP = 119), and neonate (NISP = 58) comprised the rest of the sample. The highest number of neonatal specimens identified to taxa and size class were identified as impala (NISP = 8) and bovid size class II (NISP = 9) (see Appendix A for more details). Other taxa represented by juvenile specimens were *Procavia capensis, Pedes capensis, Genetta* sp., indeterminate medium-sized carnivore, rhinoceros, *Equus quagga, Syncerus caffer, Sylvicapra grimmia, Redunca arundium, Redunca fulvorfula, Oreotragus oreotragus,* indeterminate bovid size class II, III and IV, and indeterminate small and medium sized birds. More neonatal faunal remains were identified from Rock Tank 1 (NISP = 28) than elsewhere on Ratho Kroonkop and an equal number of just fused faunal remains were identified from Rock Tank 1 and the Central Area (NISP = 51) (see Appendix A.1 for a breakdown of the aging of specimens by taxa).

Table 5.3: Aging of specimens organised by area; N = number of specimens; %NISP is N/Total NISP as a percentage

Location	Total specimens (N)	Neonate	Unfused	Just fused	Fused
		N (%N)	N (%N)	N (%N)	N (%N)
Rock Tank 1	**2940**	28 (1%)	392 (13.3%)	51 (1.7%)	2469 (84%)
Rock Tank 2	**1896**	14 (0.7%)	214 (11.3%)	17 (0.9%)	1651 (87%)
Central Area	**2988**	16 (0.5%)	326 (10.9%)	51 (1.7%)	2595 (86.9%)
Total	**7824**	**58 (0.7%)**	**932 (11.9%)**	**119 (1.5%)**	**6715 (85.8%)**

5.3 Spatial context and bone surface modifications

This section details the distribution of the skeletal elements of mammals (small to large) bovids (size class 1 to IV), birds (small to medium sized) and fish (small to large) by excavated area and spit. This was done to demonstrate the bone clusters in the two rock tanks and to avoid conflating the data further. For all skeletal element diagrams, groups were created to enhance visualisation of the frequencies recovered. These groups are: 1-2 specimens; 3-4 specimens; 5-6 specimens; 7-8 specimens and more than 9 specimens. The anthropogenic, zoogenic, and natural bone surface modifications are also detailed in this section. Throughout, figures and diagrams have been created only when the sample size has been large enough.

5.3.1 Rock Tank 1

The animals in Rock Tank 1 were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 5 to spit 1 (figure 5.2). Small mammals, including *Procavia capensis* (dassie), *Pronolagus randensis* (Jameson's red rock rabbit) and *Pedetes capensis* (springhare), were the most numerous specimens from Rock Tank 1 and had the most zoogenic modifications. *Aepyceros melampus* (impala) were the most numerous of the identified bovid size class II specimens. Aside from the wild species, several *Ovis/Capra* (sheep/goat) specimens

were also identified, as well as a single *Bos taurus* (cattle) specimen. Other important species identified were: *Rhinocerotidae* spp. (black/white rhinoceros), *Equus quagga* (plains zebra), *Synercus caffer* (African buffalo), *Tragelaphus scriptus* (bushbuck), *Taurotragus oryx* (eland), *Redunca arundinum* (reedbuck), *Kobus ellipsiprymnus* (waterbuck) and *Oreotragus oreotragus* (klipspringer).

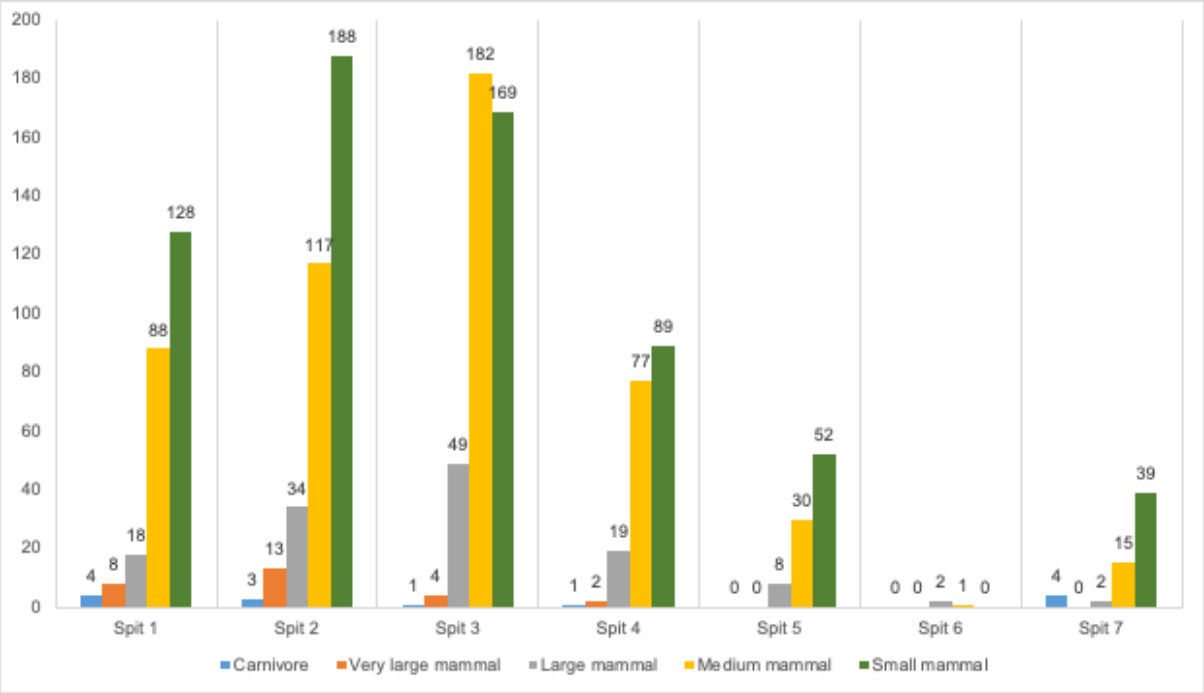


Figure 5.2: Distribution of animals throughout Rock Tank 1, per spit

Small and medium mammals from all spits were represented mainly by axial and cranial elements and very few limb specimens were present (see figures 5.3 and 5.4 for small mammals and figures 5.5 to 5.7 for medium mammals). The anthropogenic modifications on medium mammal specimens were located predominately on axial elements and at limb joints. I have not made figures for spit 6 due to the small sample size.

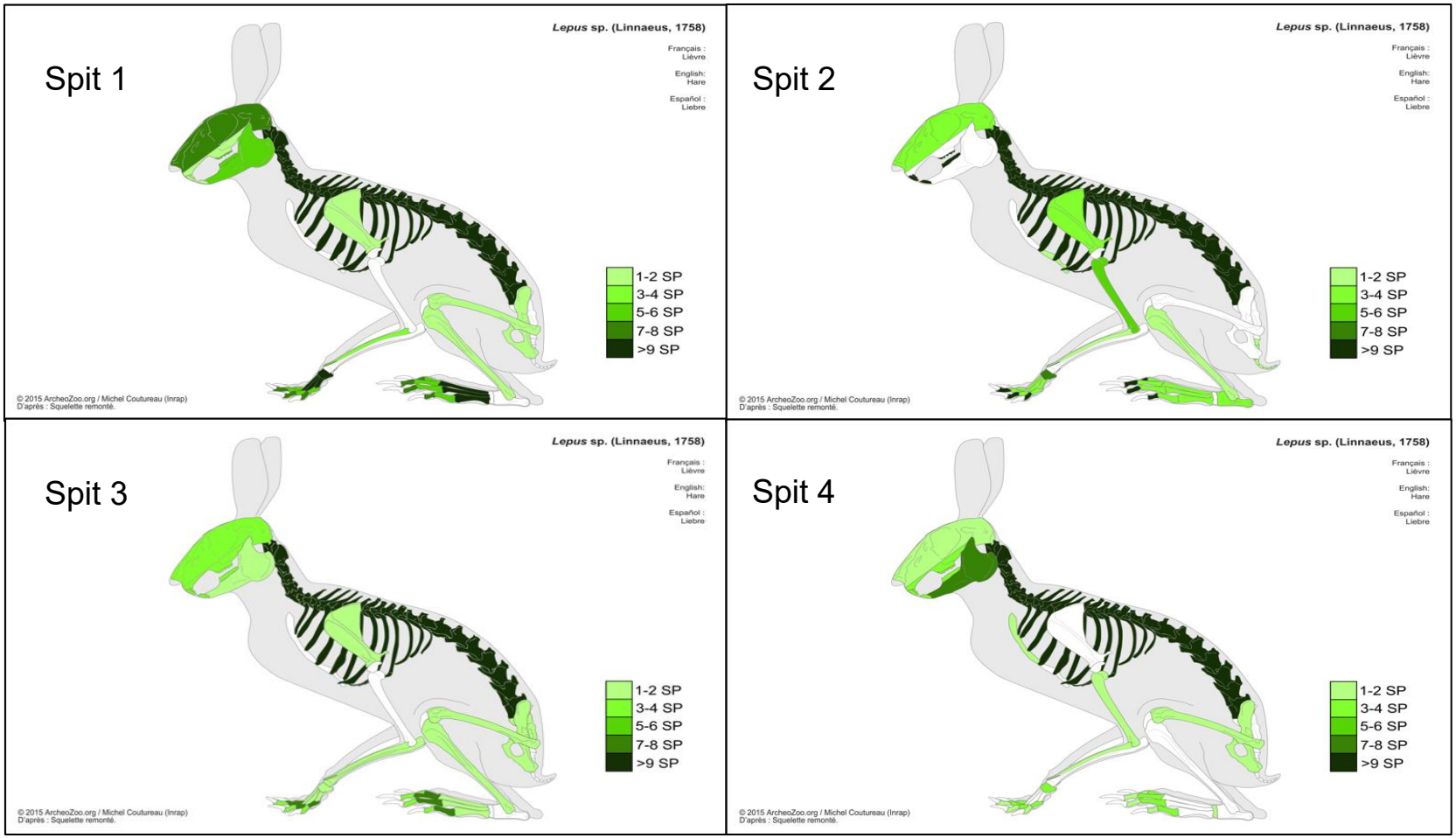


Figure 5.3: Skeletal element representation of small mammal remains from Rock Tank 1, Spits 1 - 4 (clockwise).

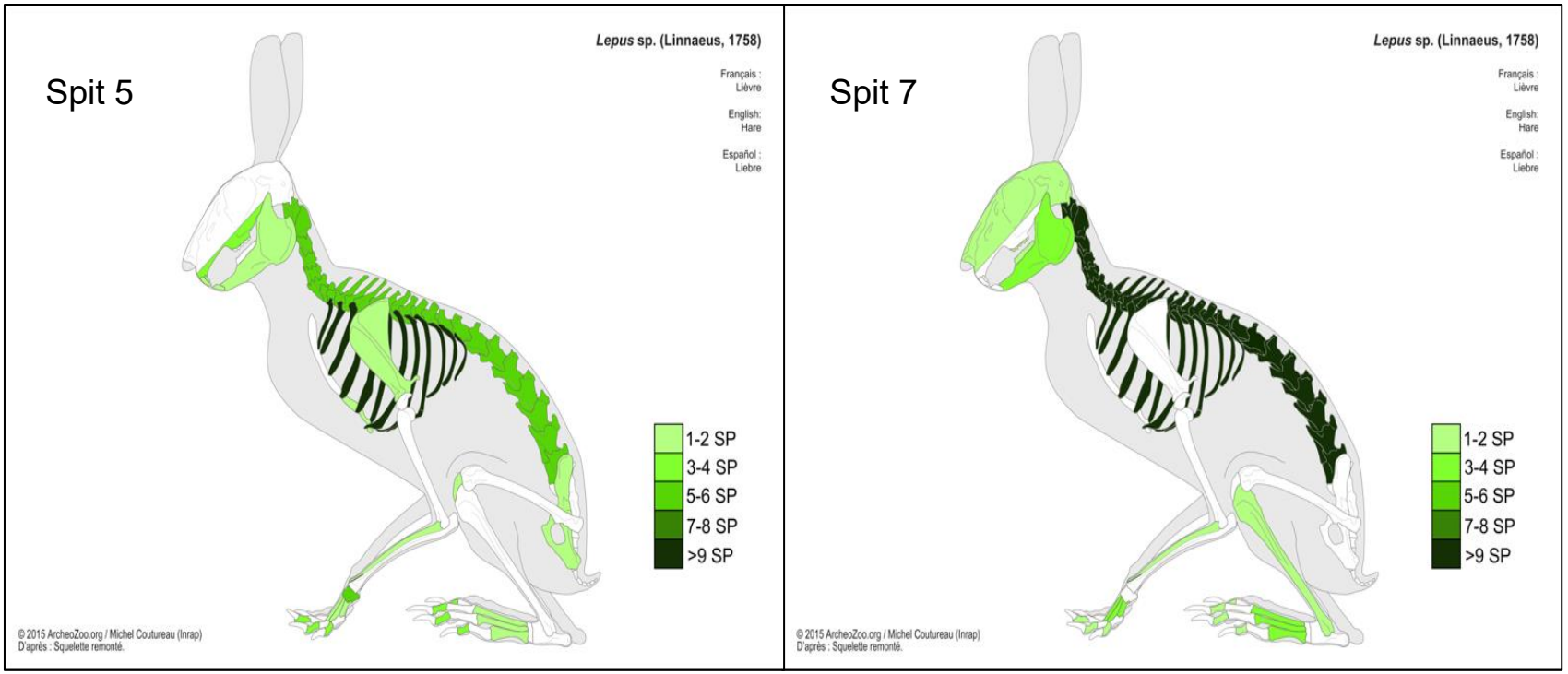


Figure 5.4: Skeletal element representation of small mammal remains from Rock Tank 1, Spits 1 and 7

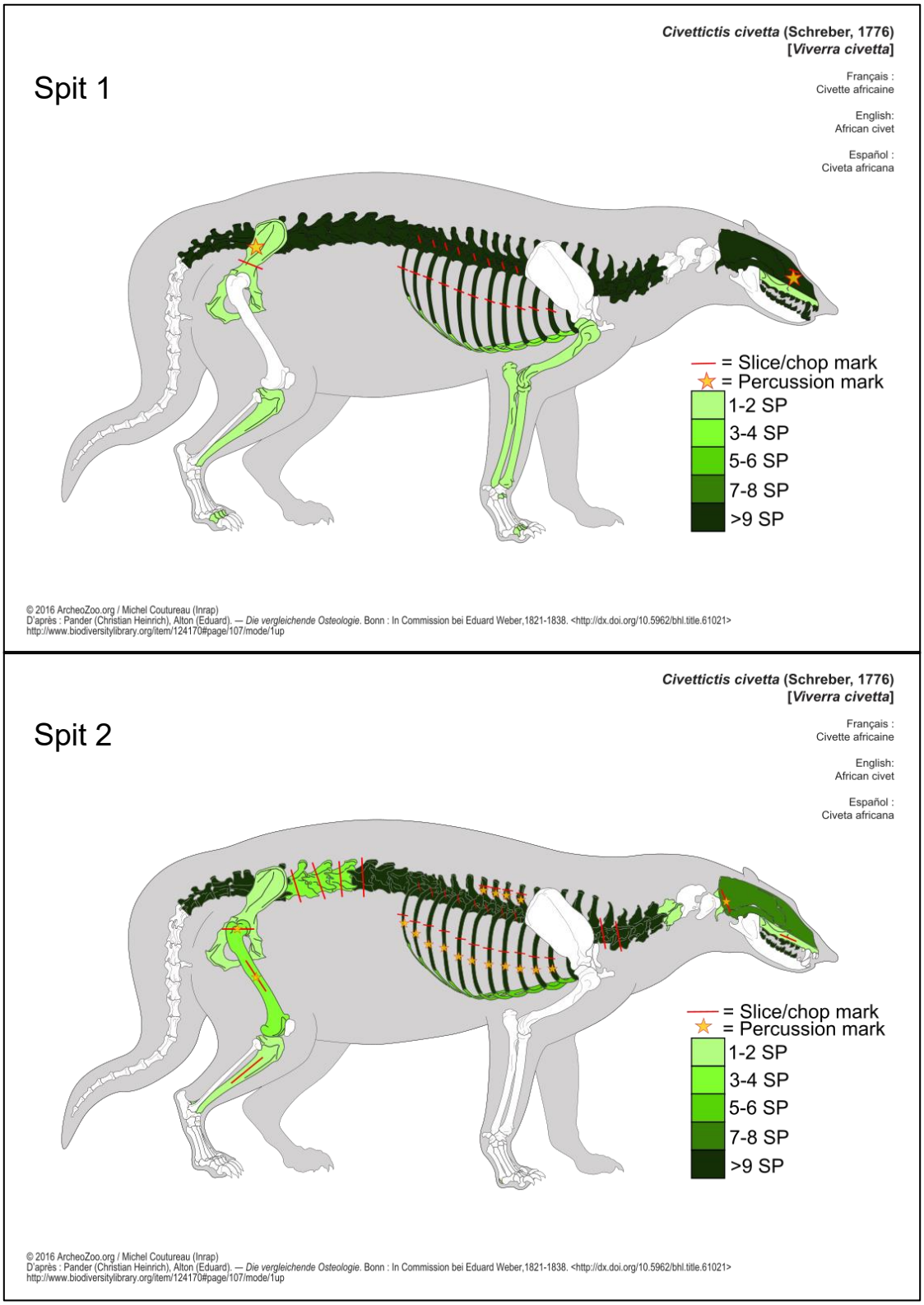


Figure 5.5: Skeletal element representation and anthropogenic modifications on medium mammal remains from Rock Tank 1, Spits 1 and 2

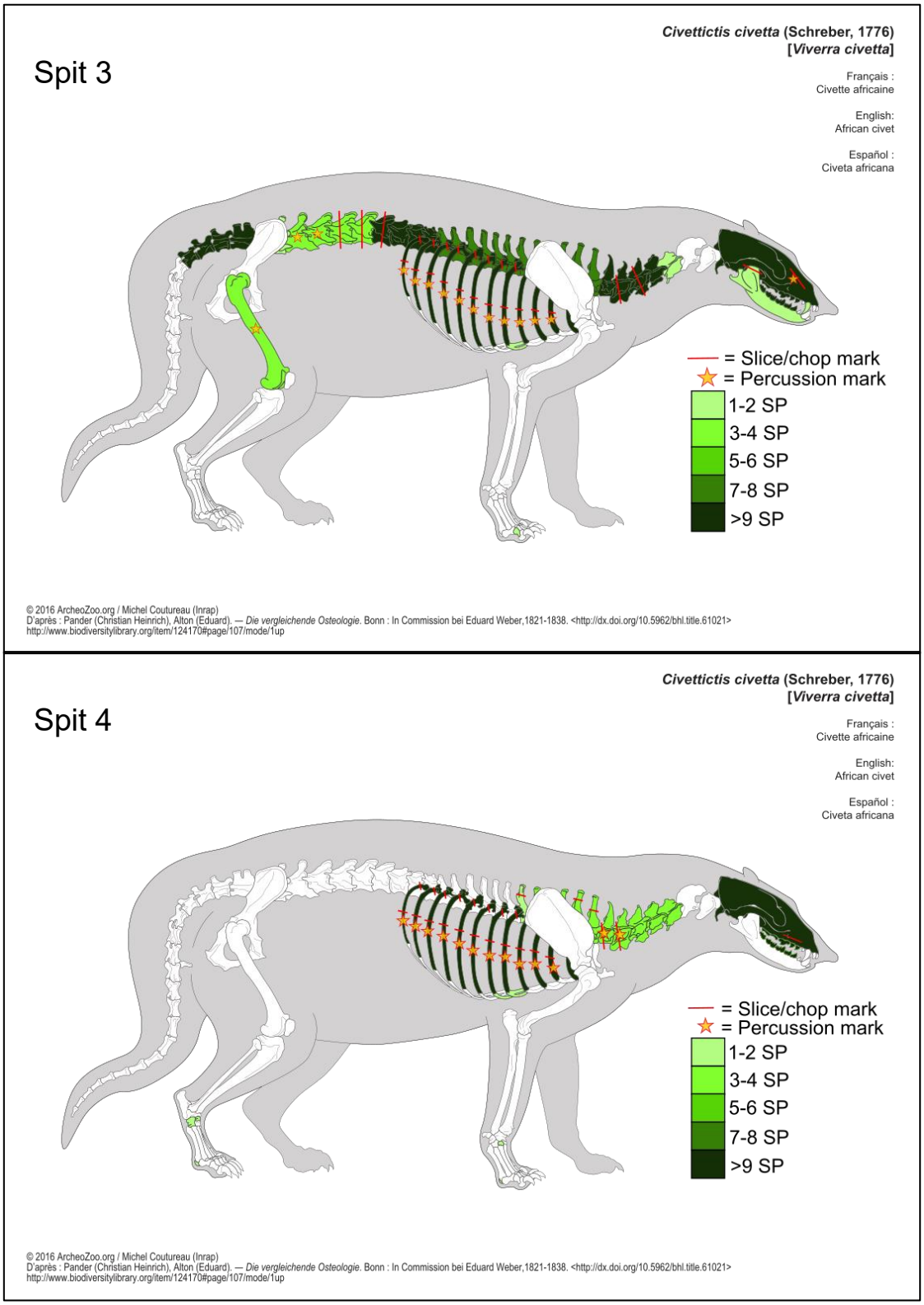


Figure 5.6: Skeletal element representation and anthropogenic modifications on medium mammal remains from Rock Tank 1, Spits 3 and 4

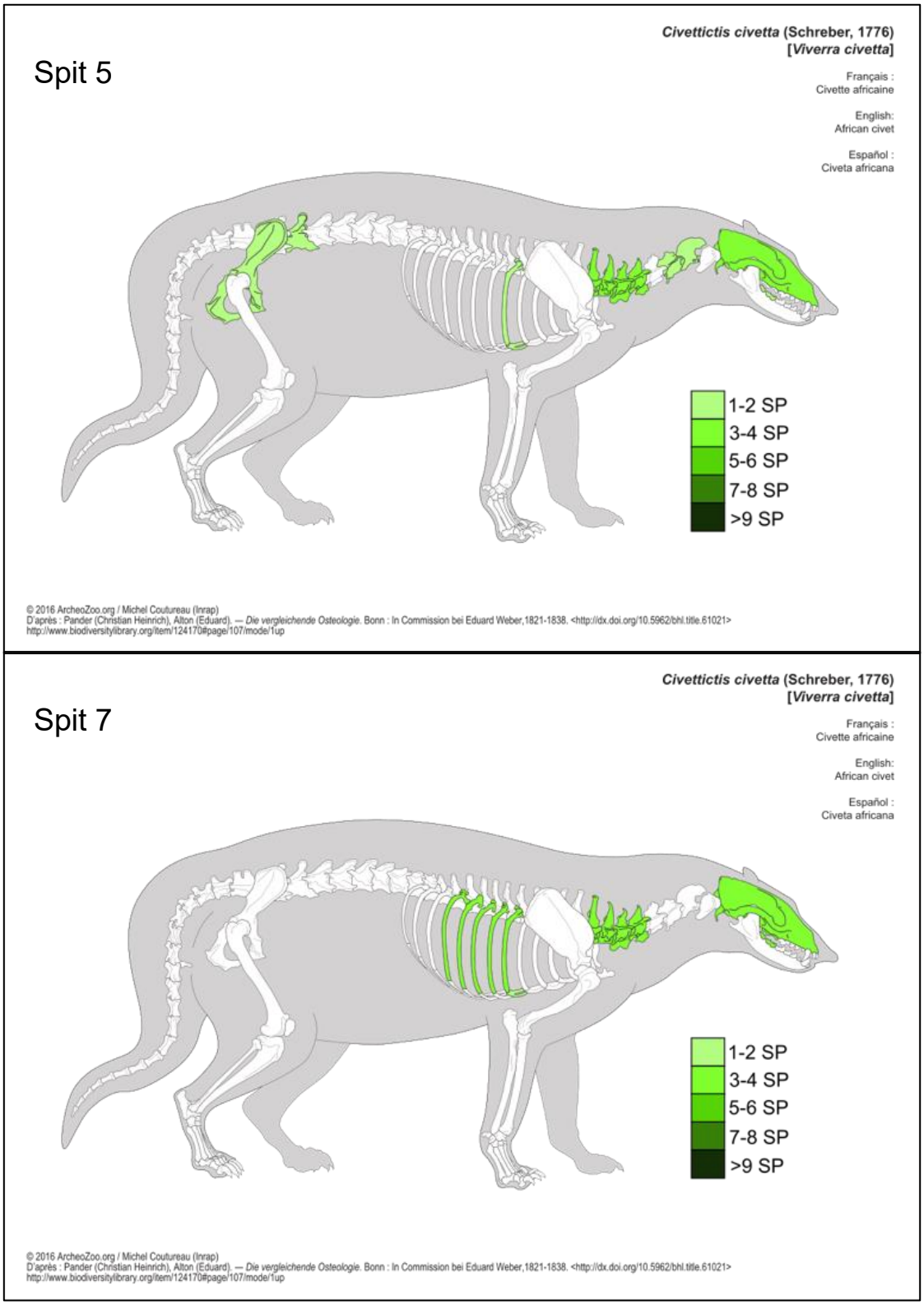


Figure 5.7: Skeletal element representation and anthropogenic modifications on medium mammal remains from Rock Tank 1, Spits 5 and 7

Bovid size class I from all spits were represented by fore- and hind-limb specimens, teeth, maxillae, and mandibles (figures 5.8 to 5.11). The anthropogenic modifications occurred mainly at limb joints. Bovid size class II from all spits were represented variously by fore- and hind limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae and teeth (see figures 5.12 to 5.14).

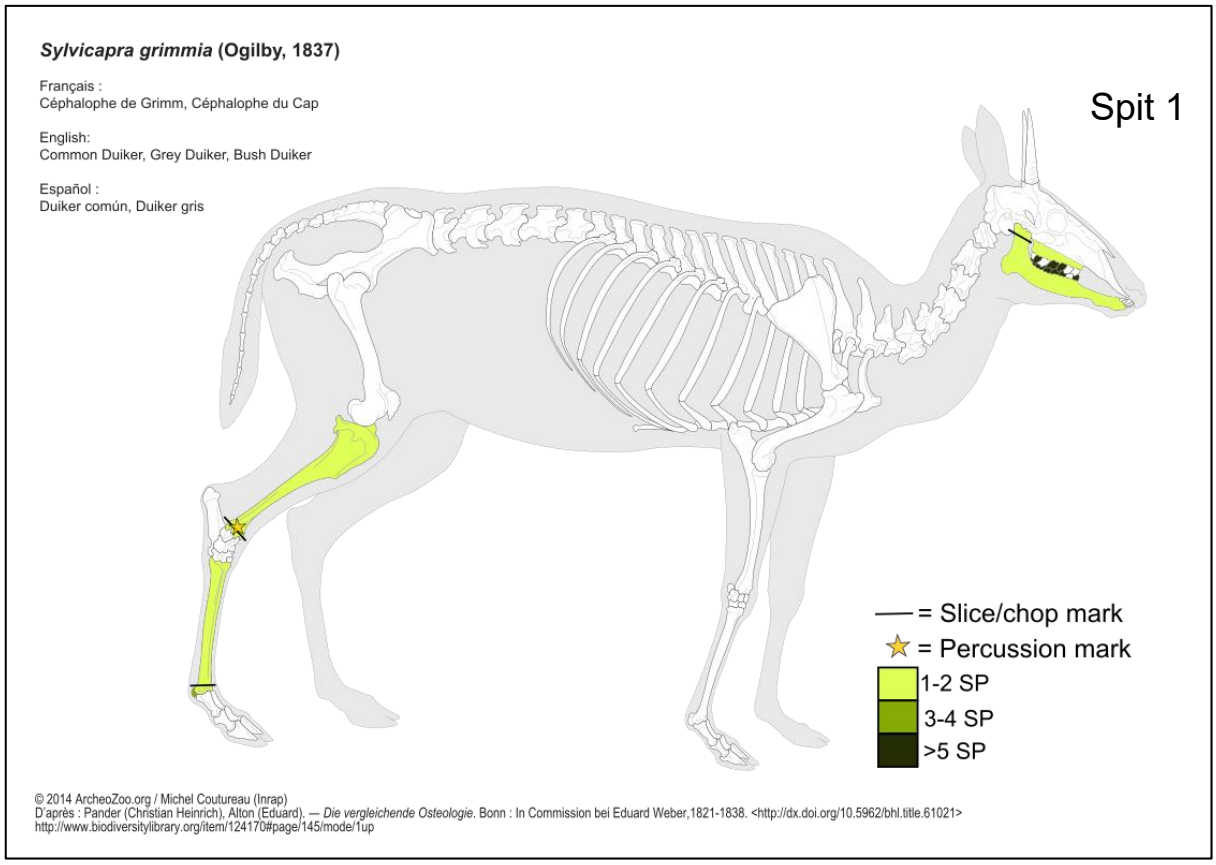
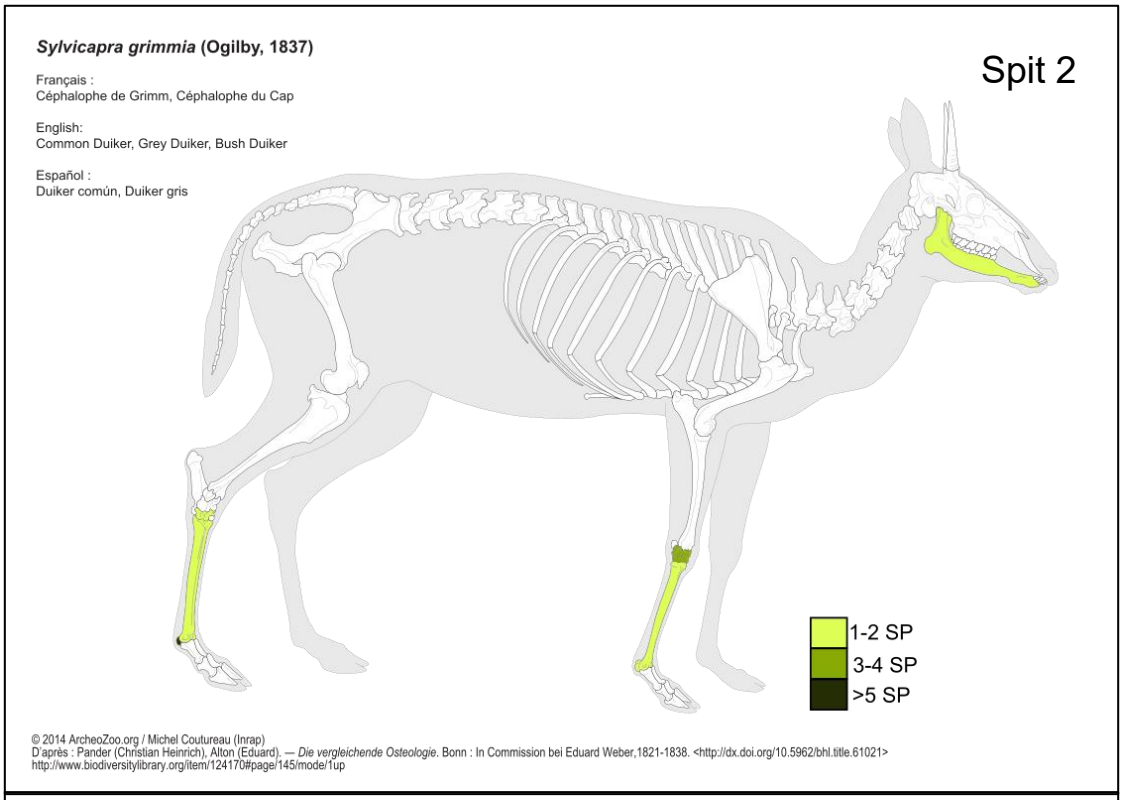


Figure 5.8: Skeletal element representation and anthropogenic modifications on bovid size class I remains from Rock Tank 1, Spit 1



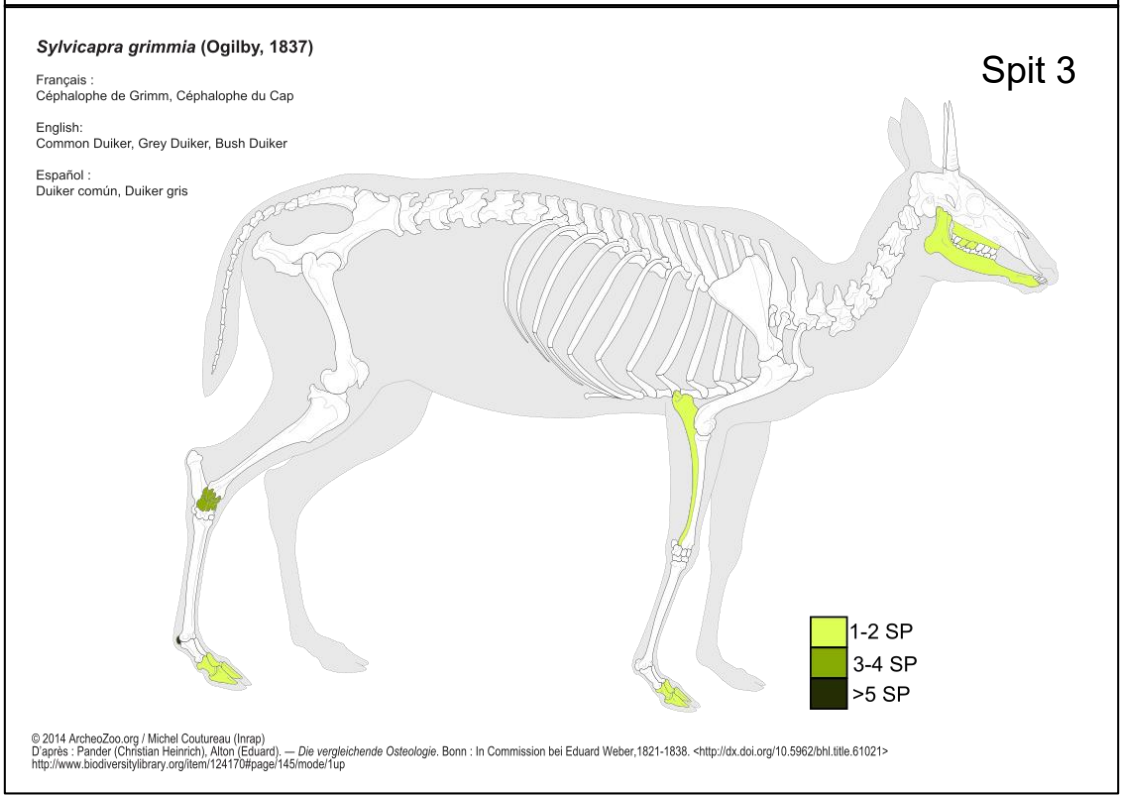


Figure 5.9: Skeletal element representation of bovid size class I remains from Rock Tank 1, Spits 2 and 3

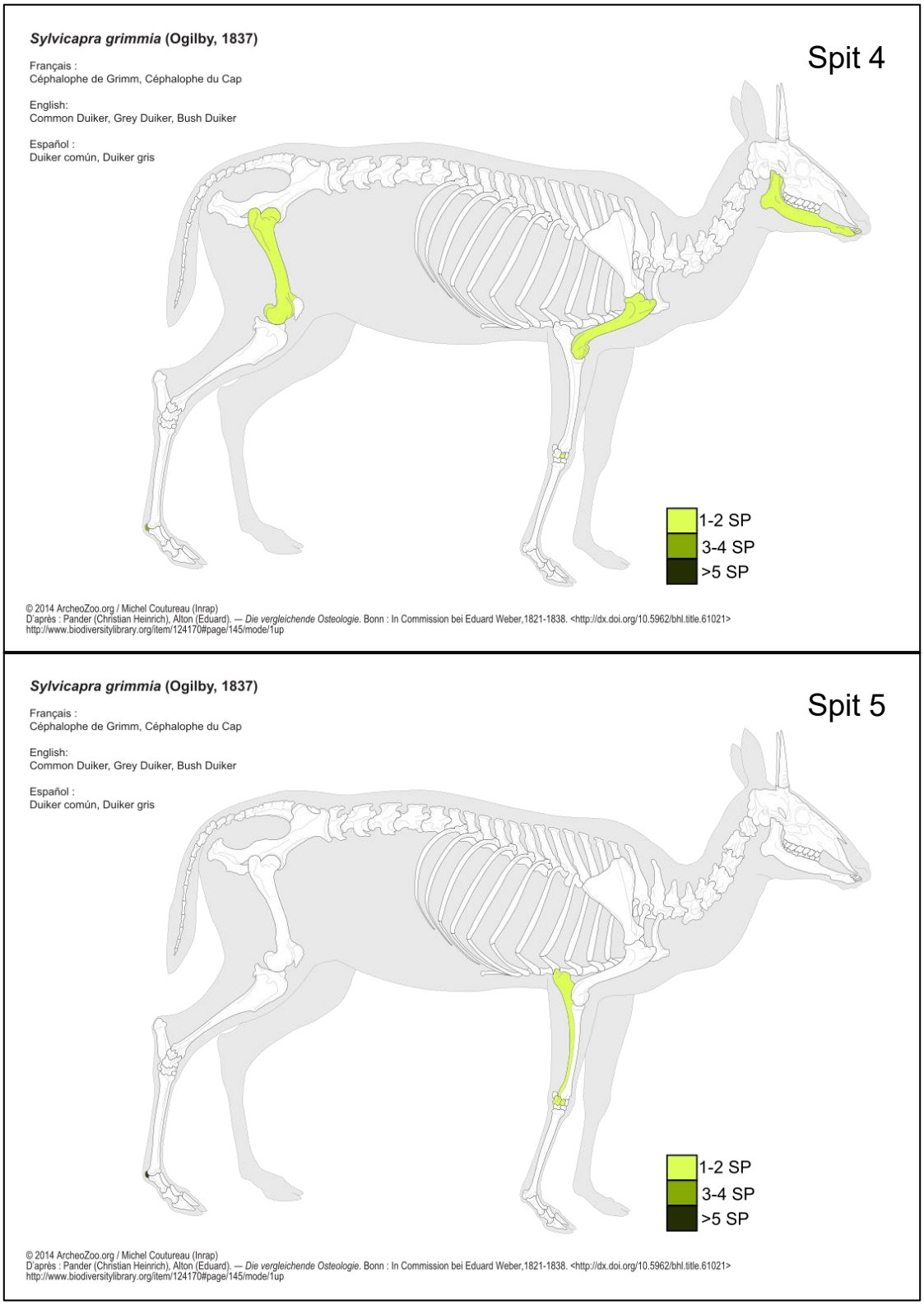


Figure 5.10: Skeletal element representation of bovid size class I remains from Rock Tank 1, Spits 4 and 5

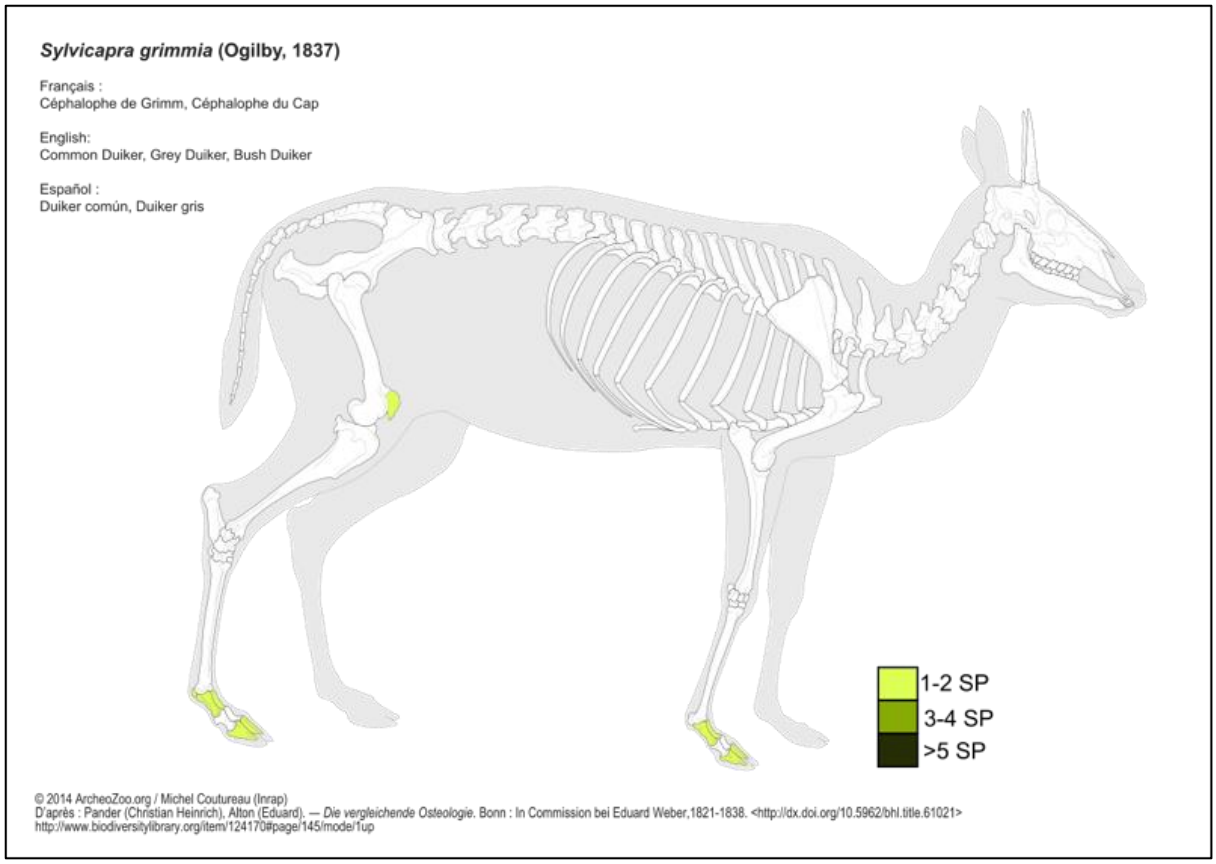


Figure 5.11: Skeletal element representation of bovid size class I from Rock Tank 1, Spit 7

Anthropogenic modifications on bovid size class II specimens occurred at limb joints, at the base of the cranium and along long bone shafts. The skeletal element representation for bovid size class III was very similar to that of bovid size class I and II from Rock Tank 1 (figures 5.15 to 5.16). The anthropogenic modifications on bovid size class III specimens were also very similar to bovid size class I and II.

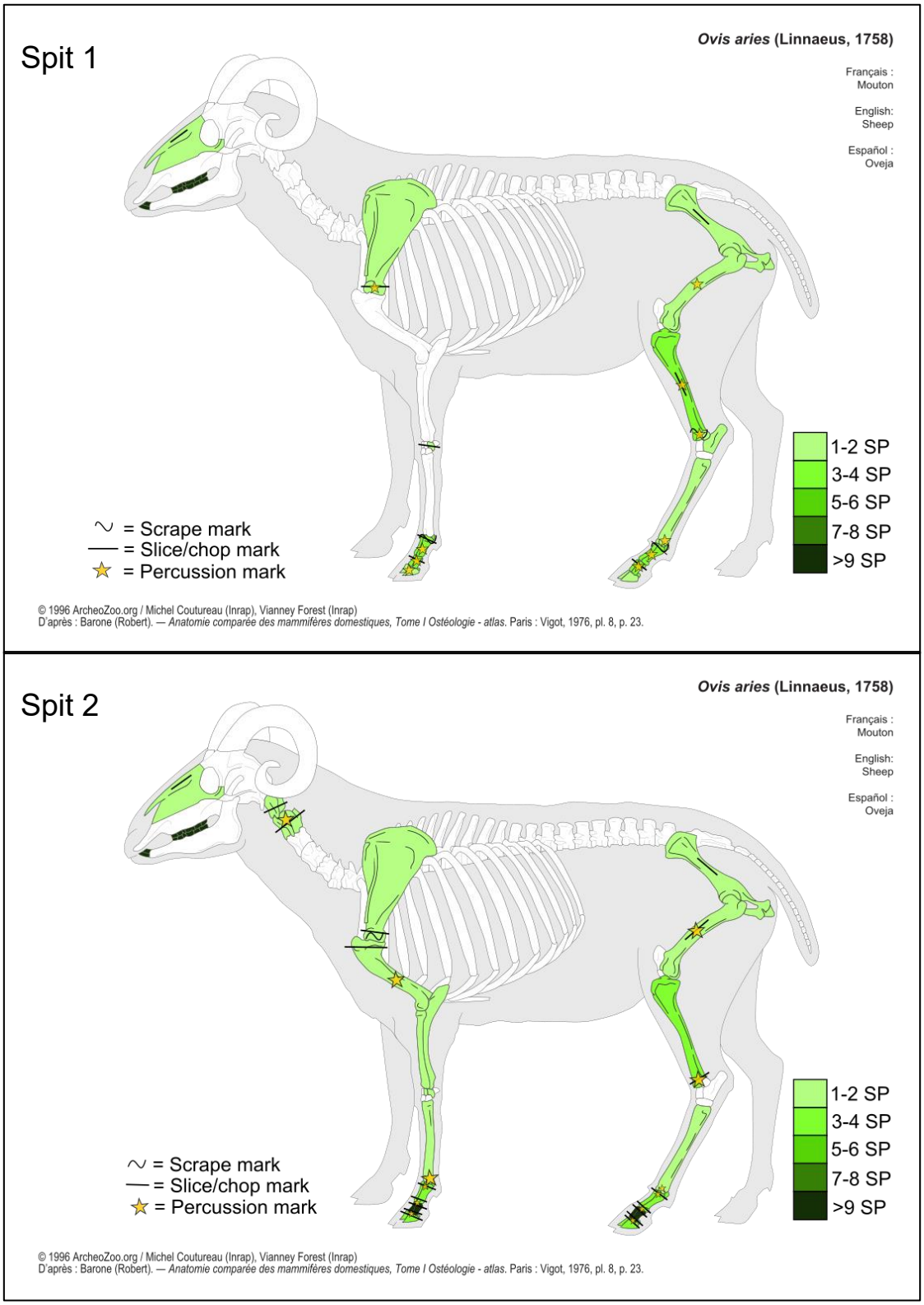


Figure 5.12: Skeletal element representation and anthropogenic modifications on bovid size class II remains from Rock Tank 1, Spits 1 and 2

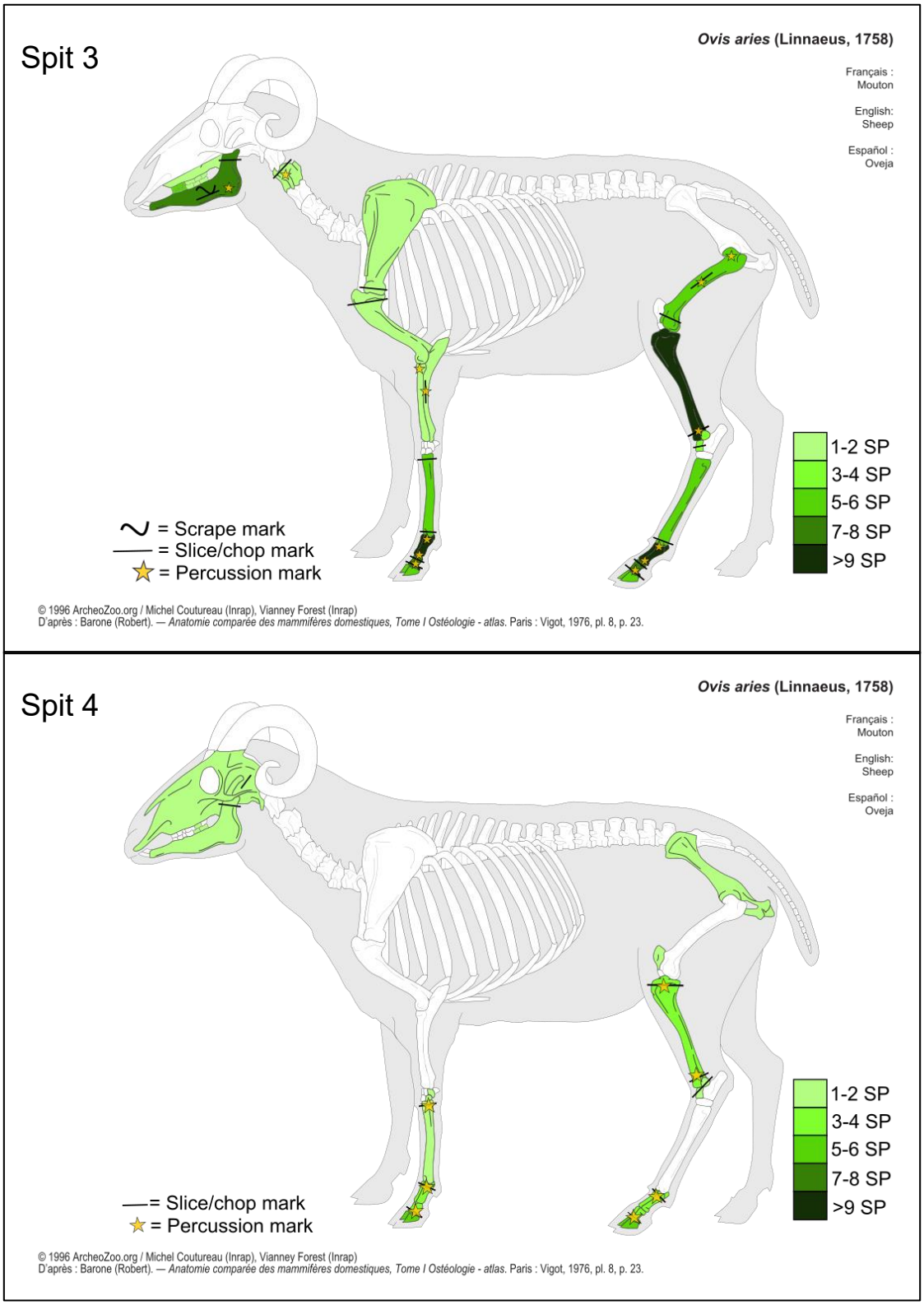


Figure 5.13: Skeletal element representation and anthropogenic modifications on bovid size class II remains from Rock Tank 1, Spits 3 and 4

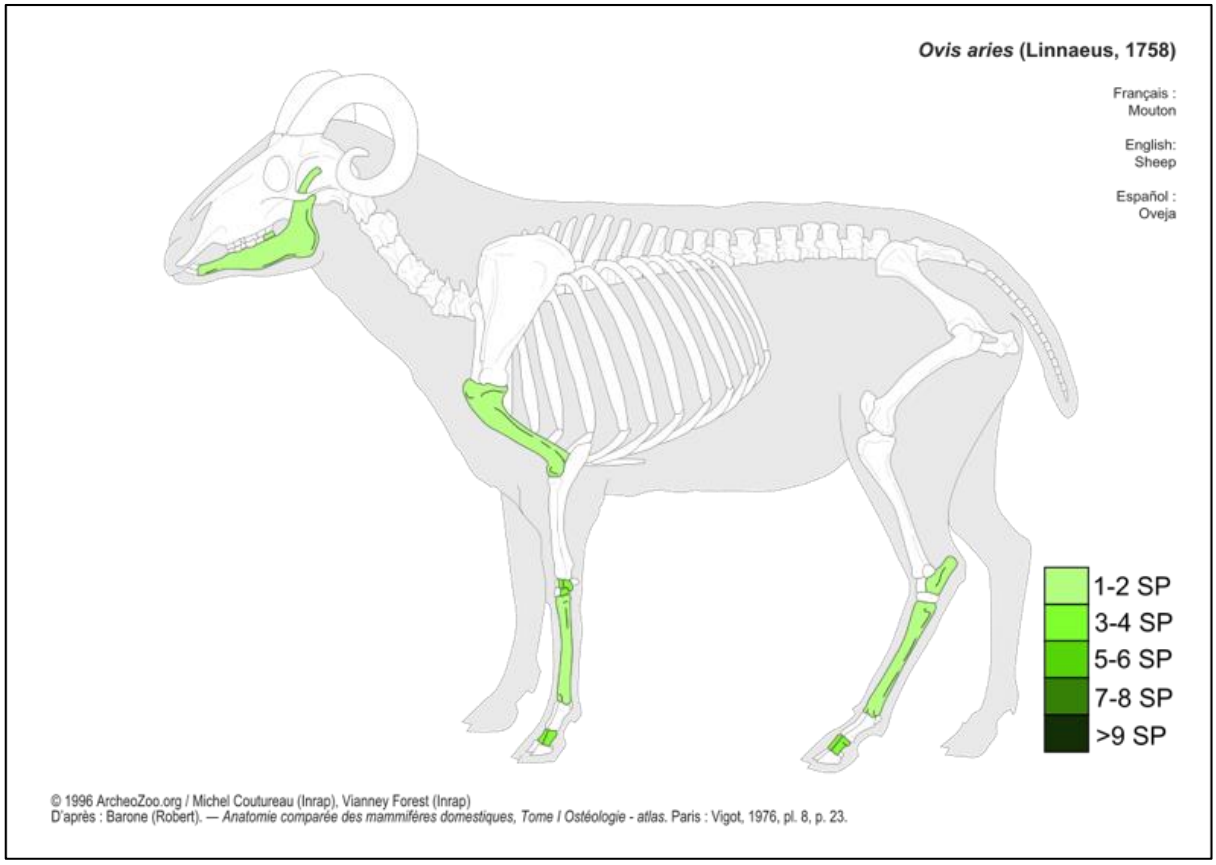


Figure 5.14: Skeletal element representation of bovid size class II remains from Rock Tank 1, Spit 5

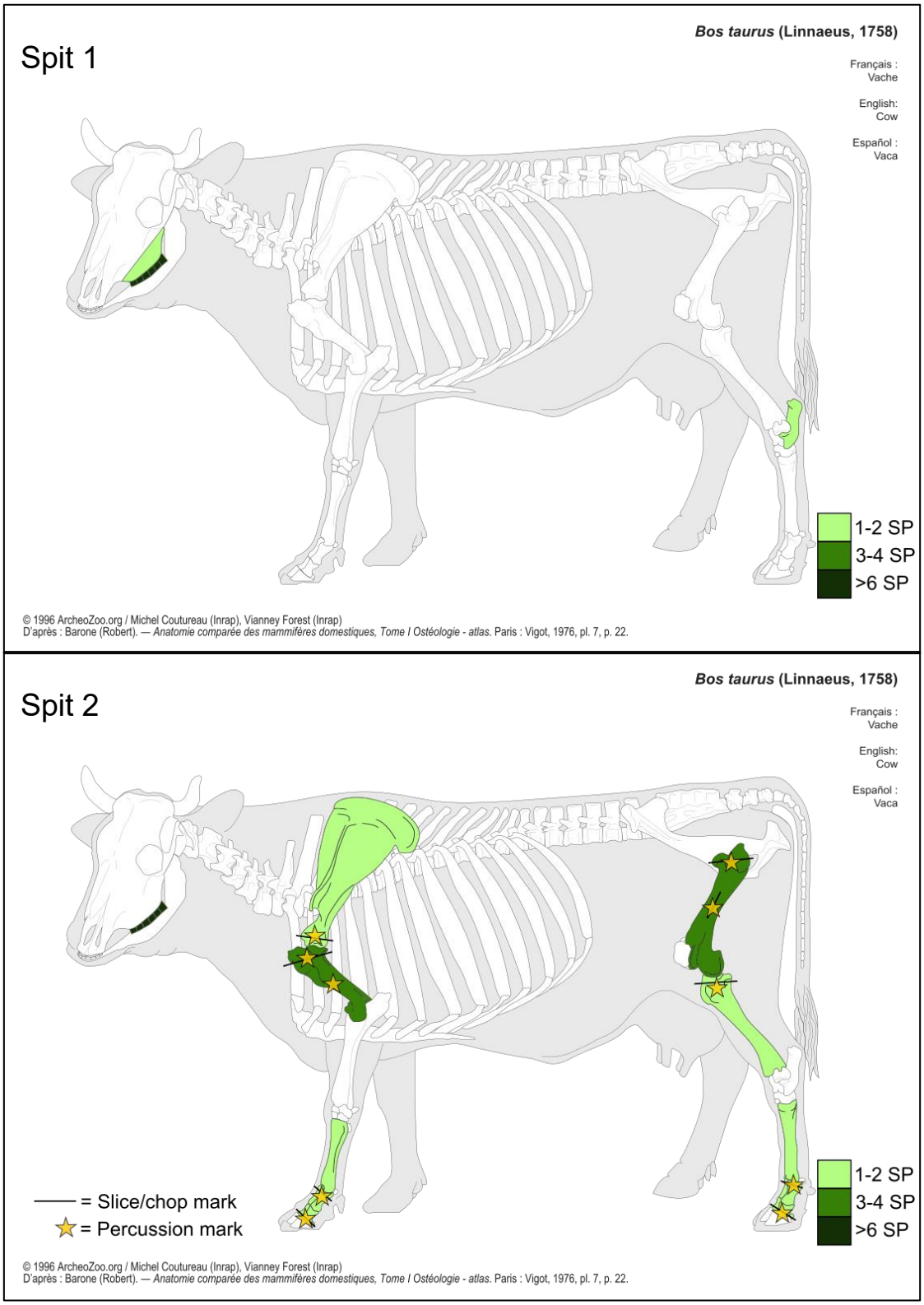


Figure 5.15: Skeletal element representation of bovid size class III remains from Rock Tank 1, Spits 1 and 2. The diagram for Spit 2 also has anthropogenic modifications.

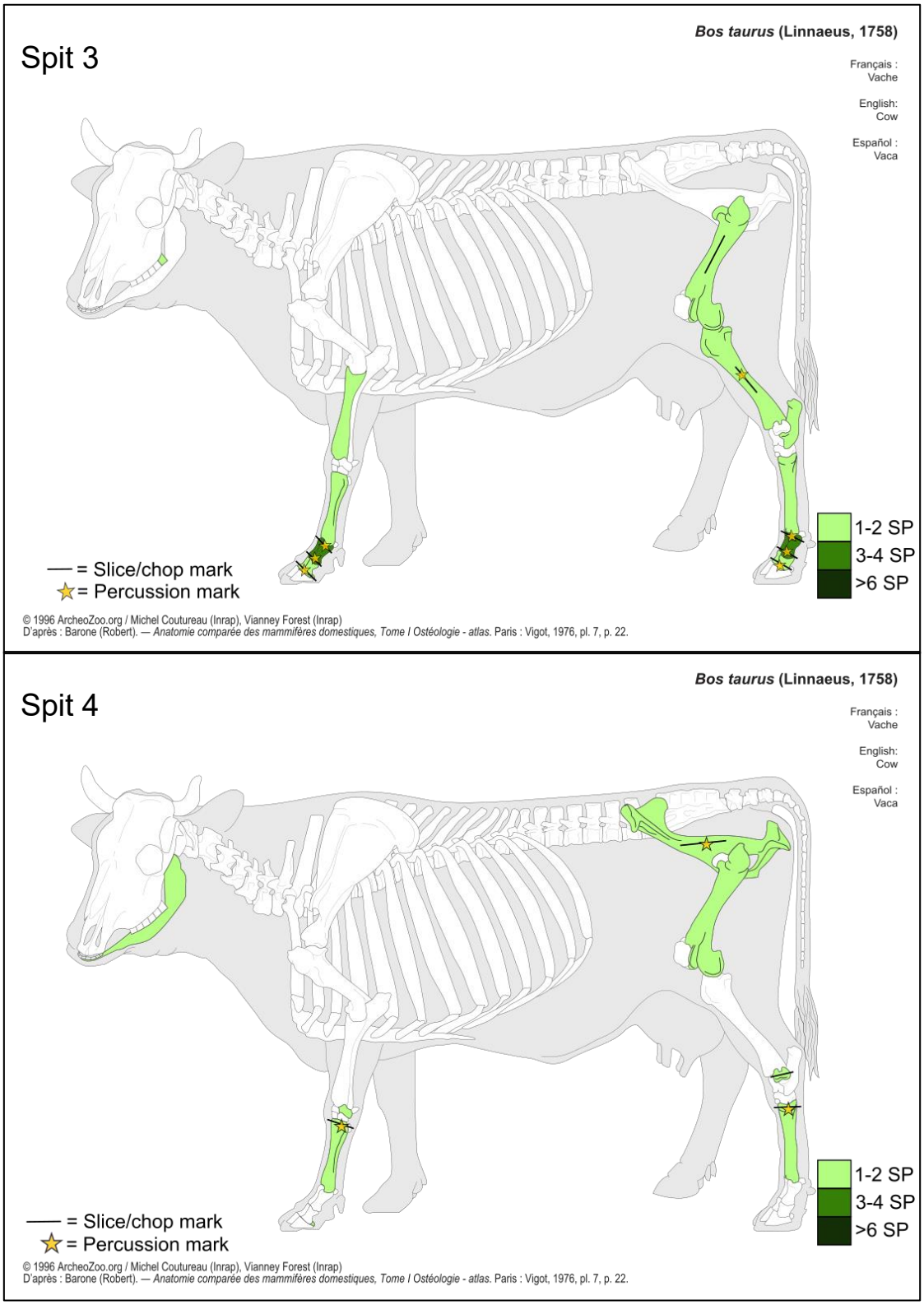


Figure 5.16: Skeletal element representation and anthropogenic modifications of bovid size class III remains from Rock Tank 1, Spits 3 and 4

Birds from spits 1 and 2 were represented by limb and wing elements and from spit 3 they were represented by axial elements, limb and wing elements (figures 5.17 to 5.19).

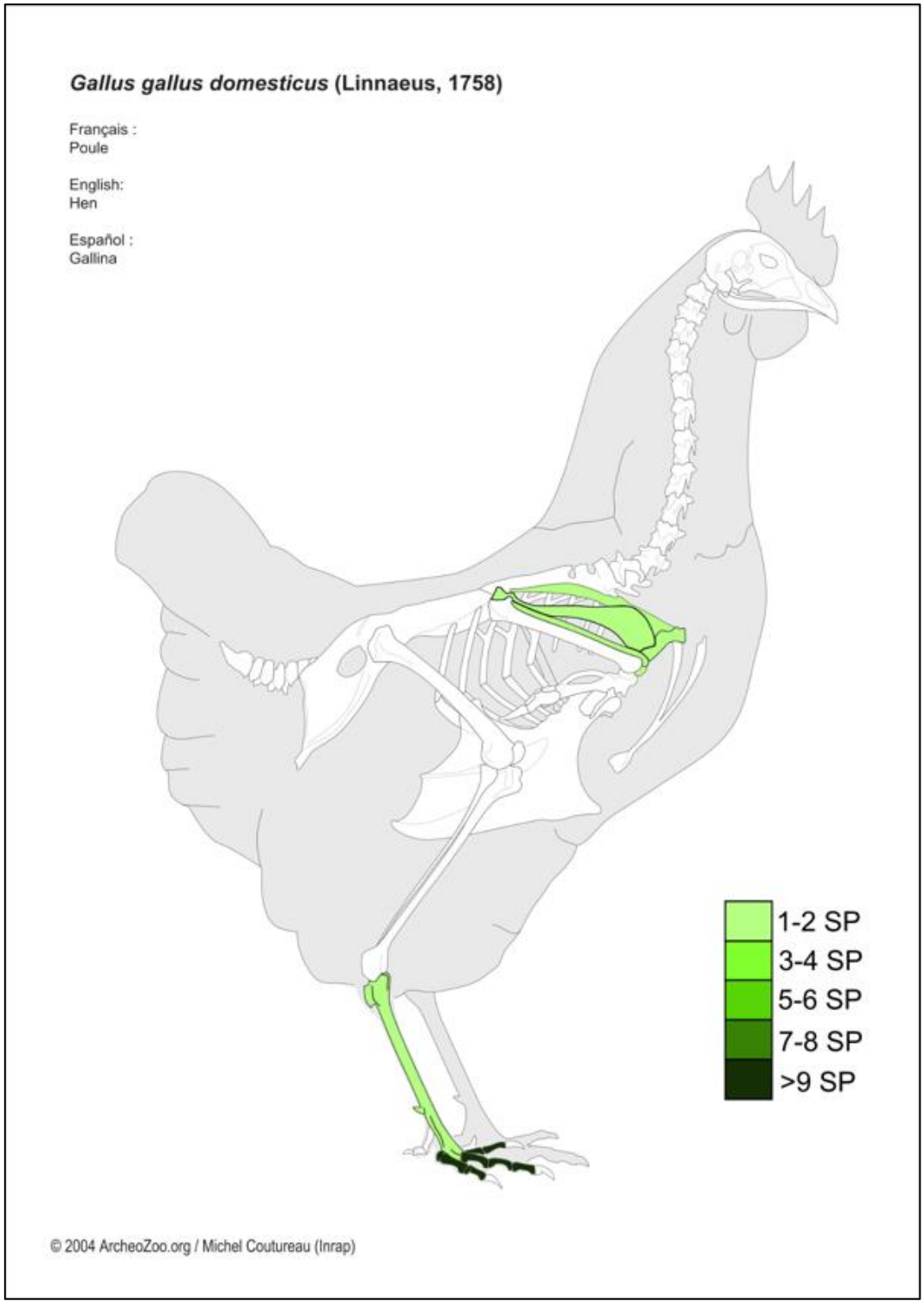


Figure 5.17: Skeletal element representation of bird remains from Rock Tank 1, Spit 1

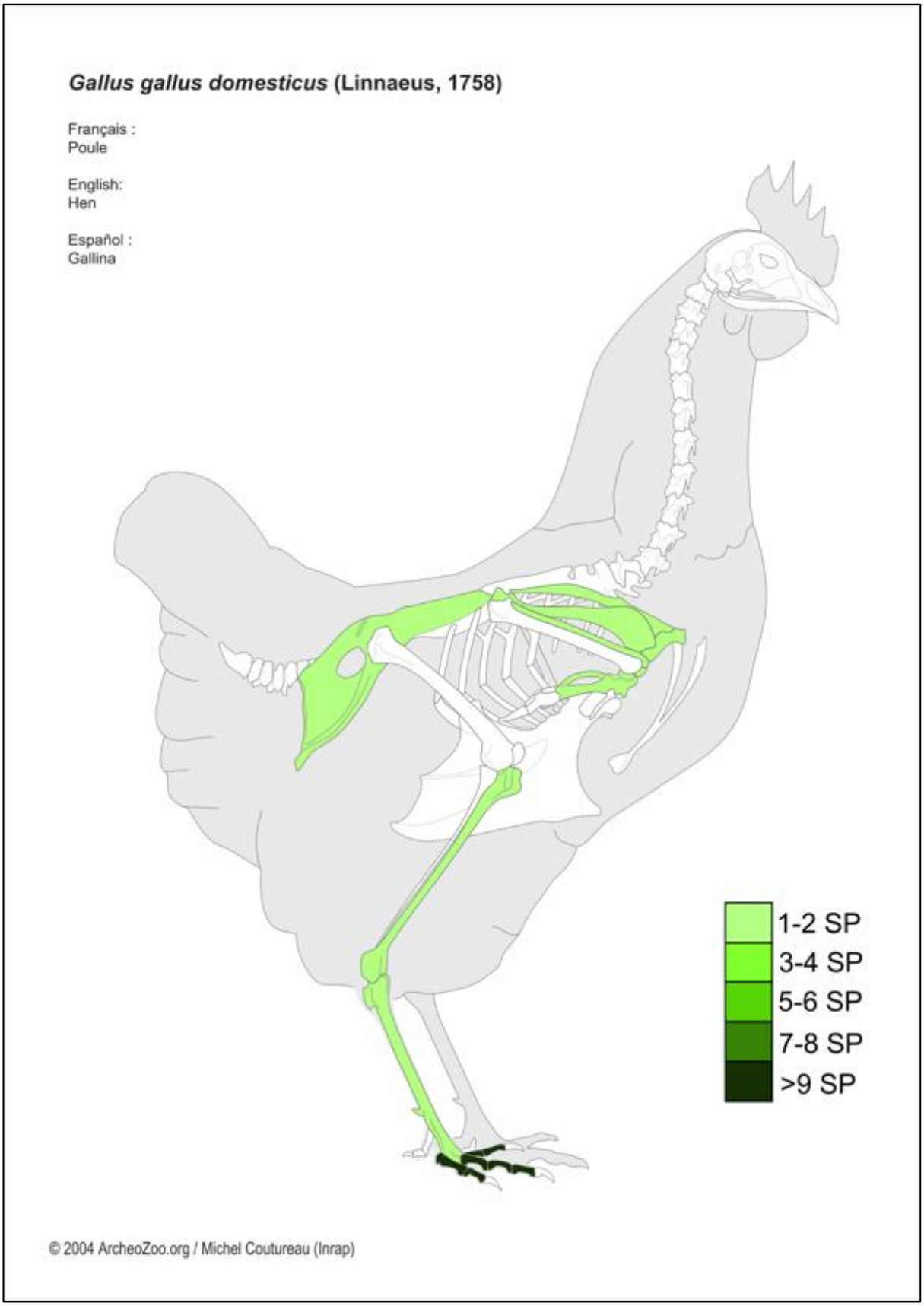


Figure 5.18: Skeletal element representation of bird remains from Rock Tank 1, spit 2

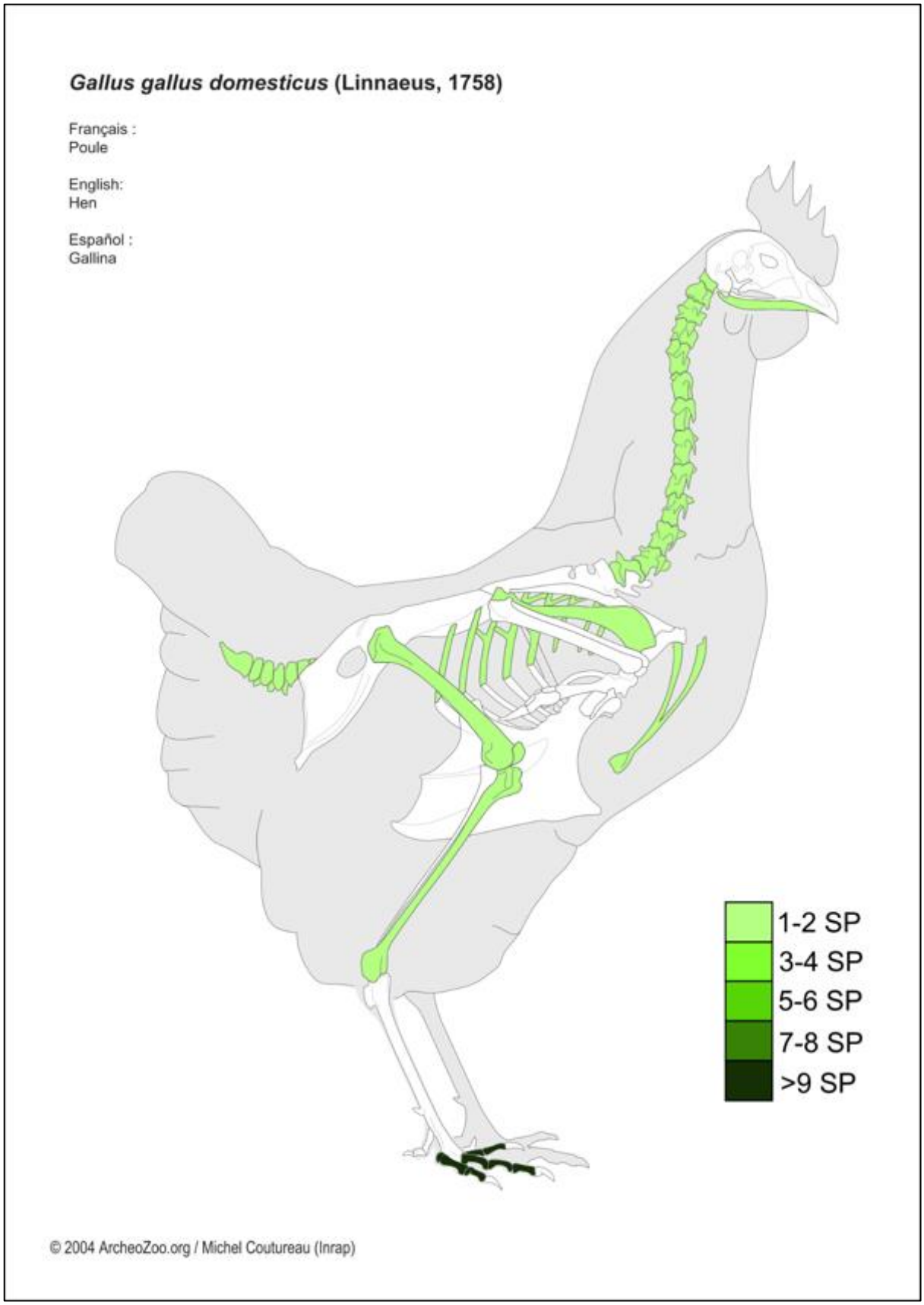


Figure 5.19: Skeletal element representation of bird remains from Rock Tank 1, spit 3

The fish specimens from Rock Tank 1 were numerous (NISP = 5935), only some of which were burnt. In spits 1 to 4, 5% of fish bones were burnt. Spit 3 had the most fish specimens (a total of 1918 specimens) (see figures 5.20, 5.21 and 5.22). In figure 5.20, the number of specimens includes the number of burnt bones.

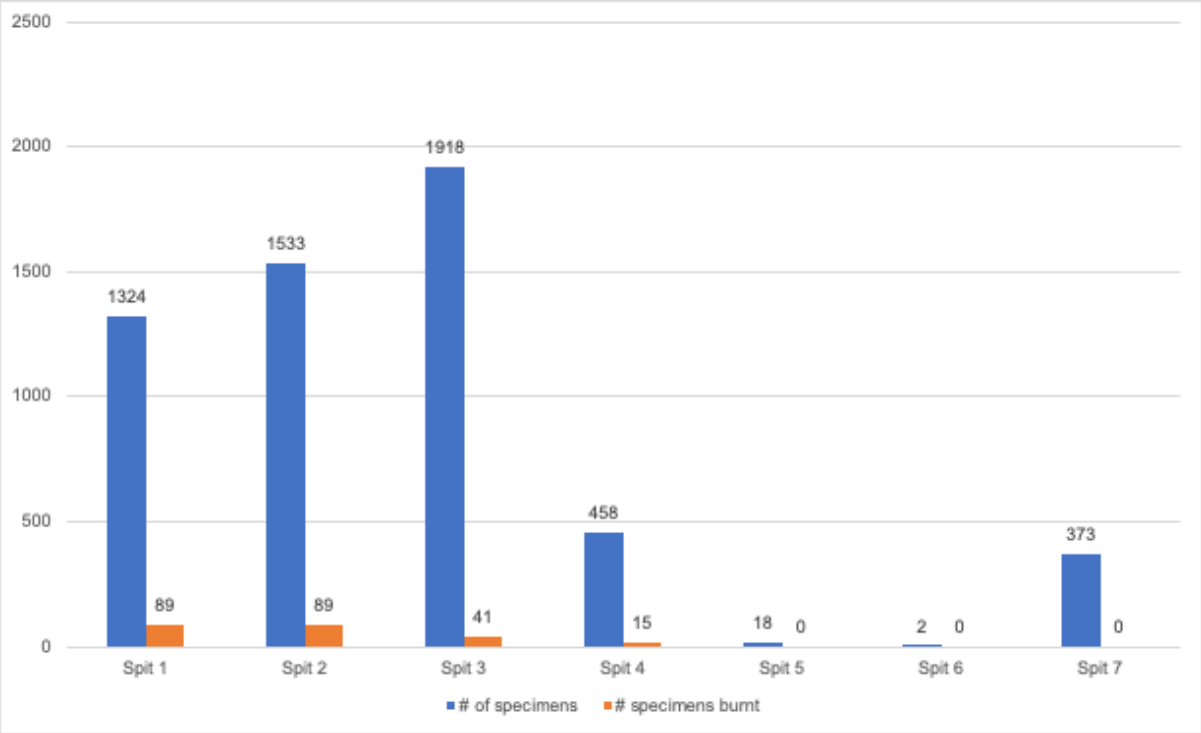


Figure 5.20: Frequency of fish specimens (including burnt specimens) in Rock Tank 1, per spit. Burnt fish are indicated separately, and included in the total frequency per spit

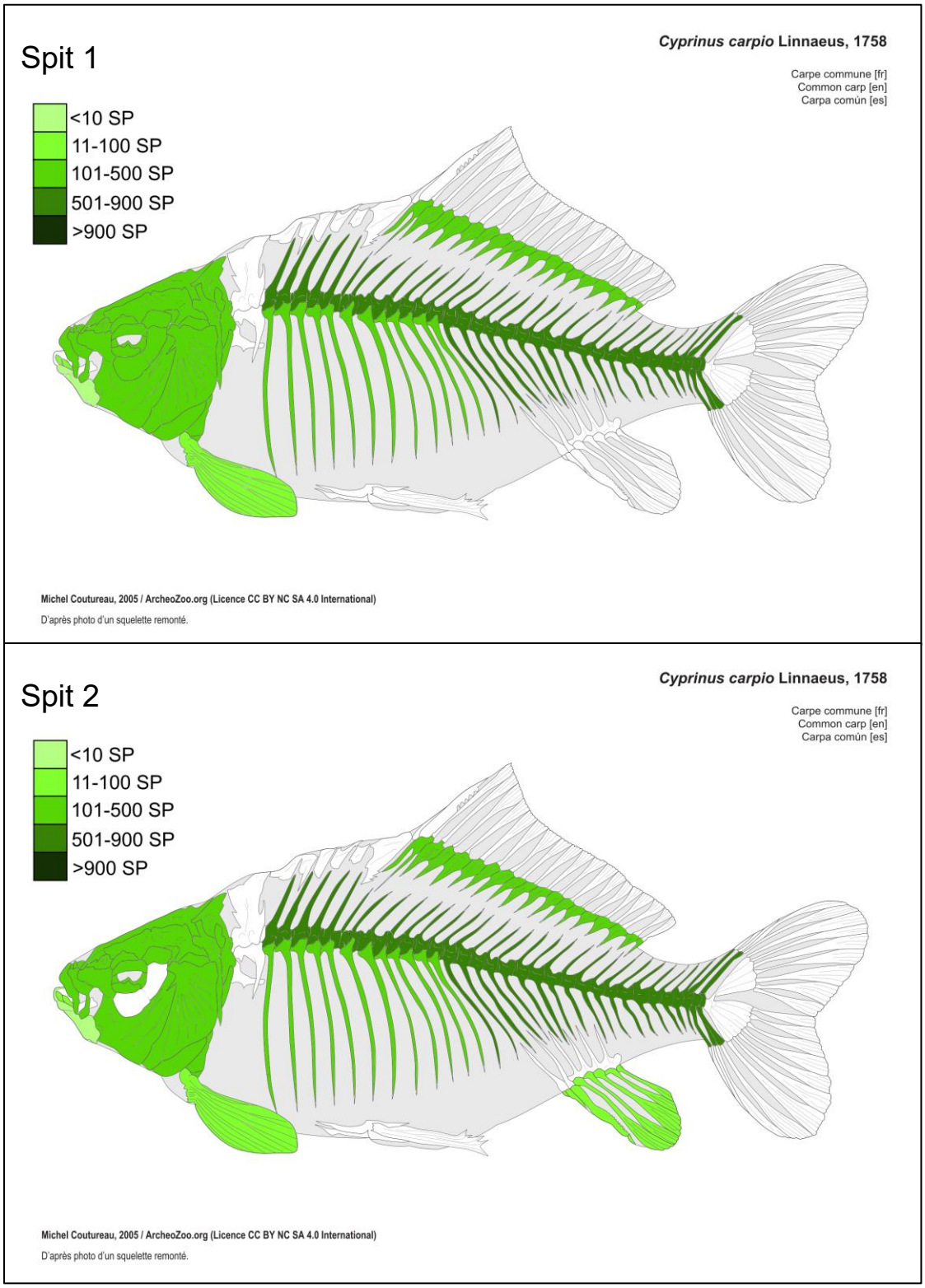


Figure 5.21: Skeletal element represent of fish remains from Rock Tank 1, Spits 1 and 2

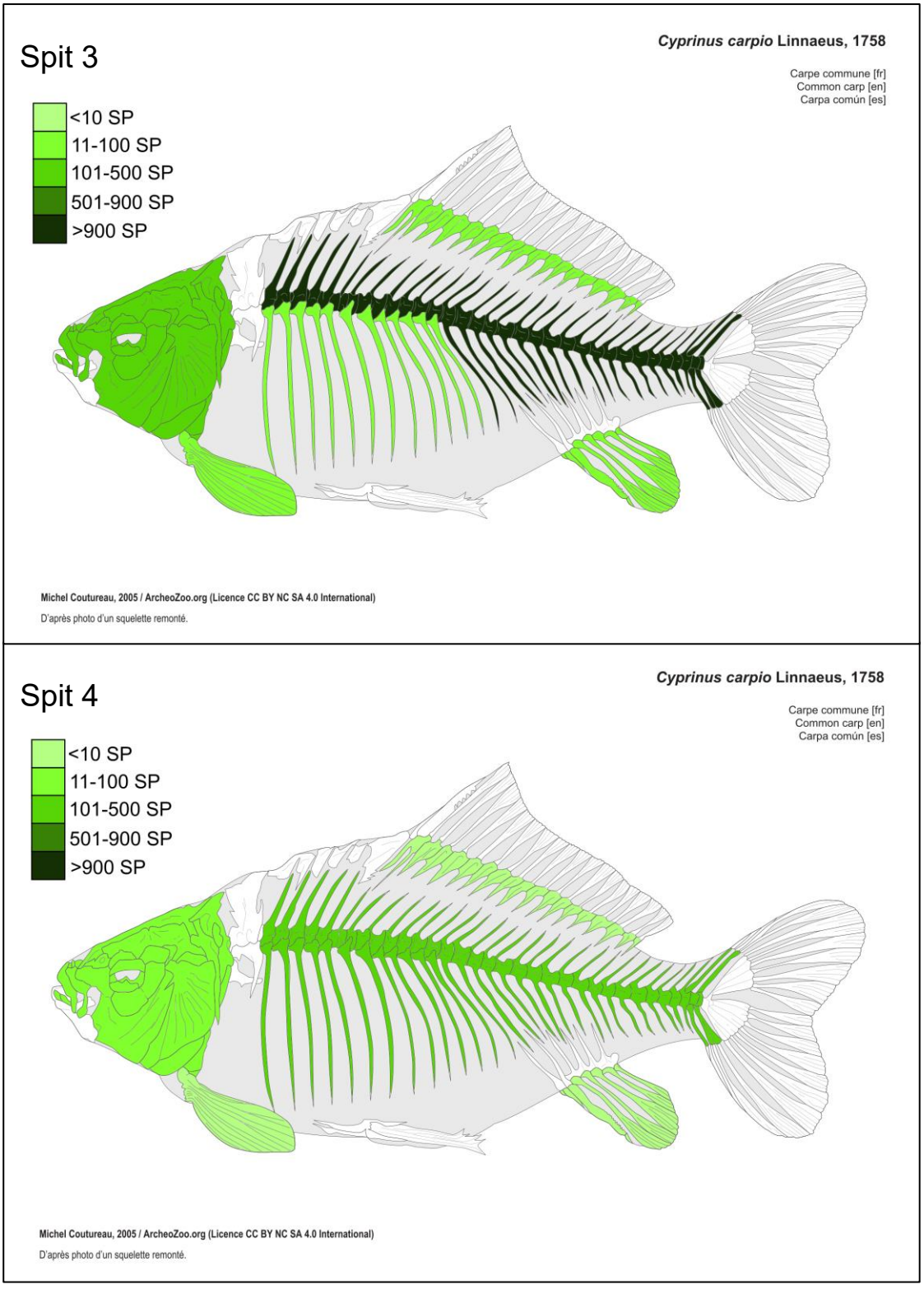


Figure 5.22: Skeletal element represent of fish remains from Rock Tank 1, Spits 3 and 4

Bone surface modifications on identified specimens from Rock Tank 1 increased in frequency from spit 5 to spit 1. The largest frequency of modification to the faunal remains occurred in spits 2 and 3 with cut marks outnumbering any other type of surface modification (figure 5.23). Small mammal specimens had the most zoogenic modifications (tooth marks and acid etching).

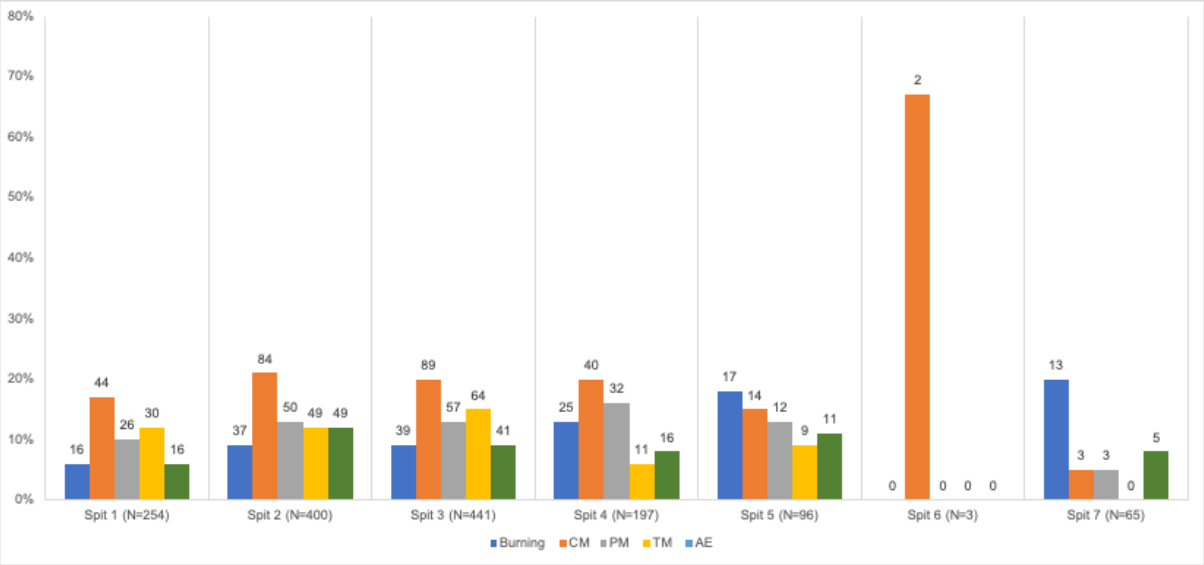


Figure 5.23: The bone surface modifications on all identified specimens from Rock Tank 1, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Rock Tank 1 were not weathered (i.e., Stage 0, on the weathering scale table [table 4.9]), (figure 5.24). The proportion of weathered specimens, however, increased from spit 5 to spit 1.

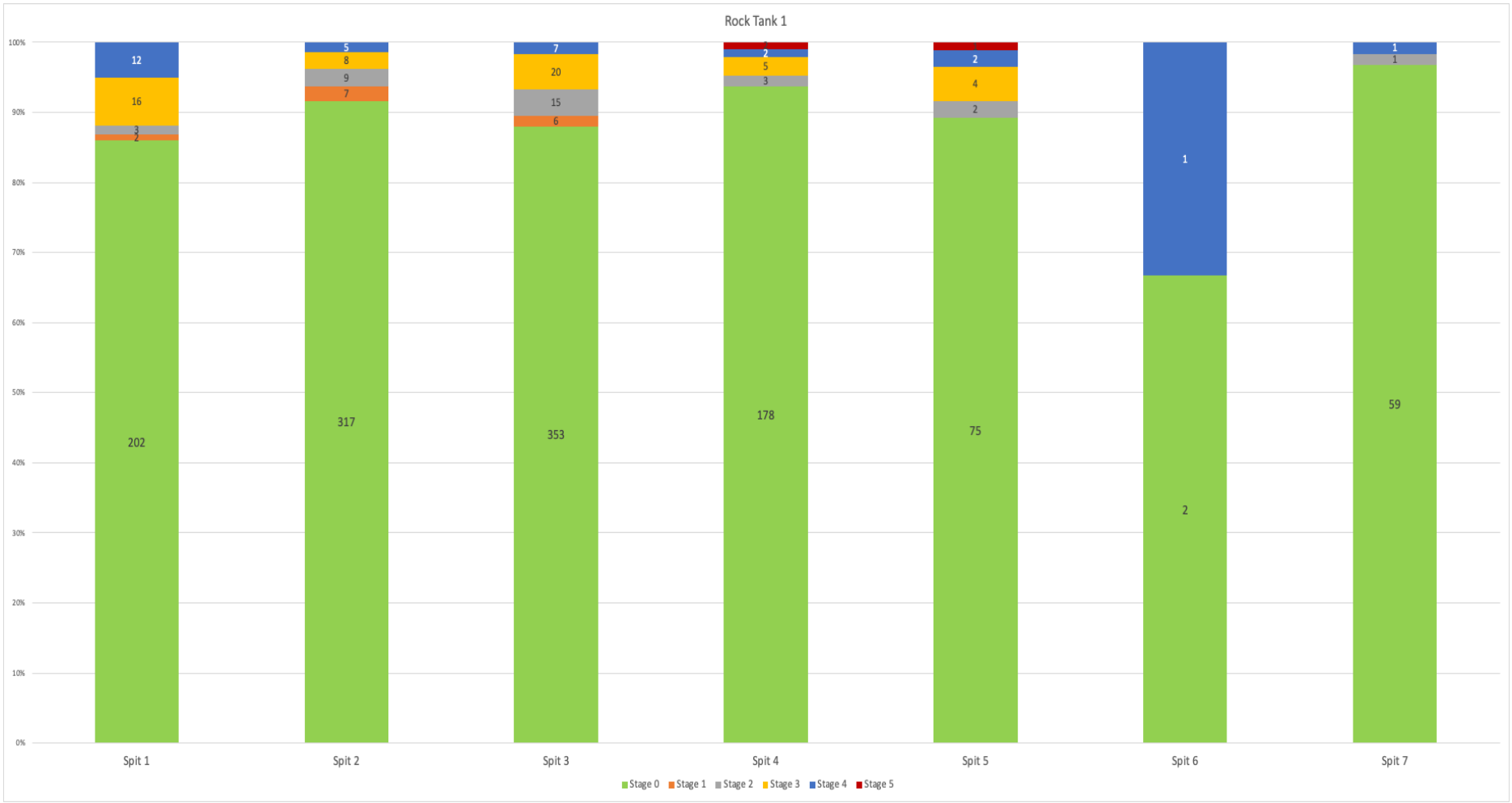


Figure 5.24: Weathering stages (table 4.9) recorded for Rock Tank 1, per spit. See Table 4.9 for definitions of weathering stages from Stage 0 (no evidence of weathering) to Stage 5 (bone disintegrating).

Very few specimens from Rock Tank 1 were trampled (NISP = 77) and far more specimens had diagenic staining (NISP = 195). Both trampling and diagenic staining increased in frequency from spit 5 to spit 3 (figure 5.25).

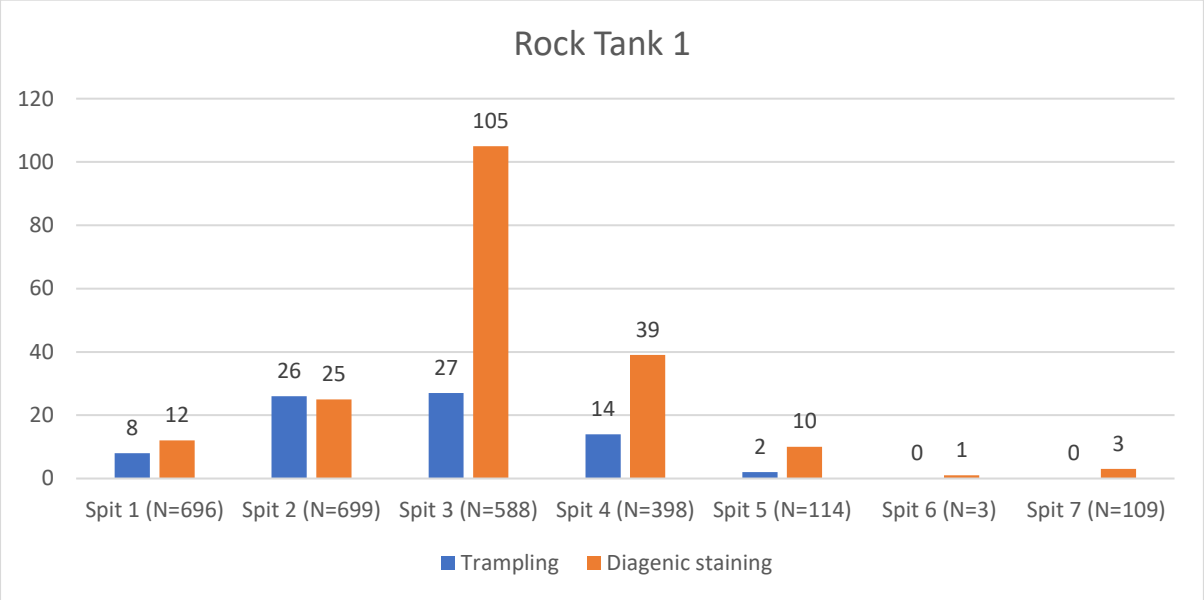


Figure 5.25: Trampling and diagenic staining recorded for Rock Tank 1, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.3.2 Rock Tank 2

The animals in Rock Tank 2 were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 2 to spit 1 (figure 5.26). Small mammals, including *Procavia capensis* (dassie) and *Pedetes capensis* (springhare), had proportionally the most zoogenic modifications. *Aepyceros melampus* (impala) are the most numerous of the identified bovid size class II specimens. Additionally, the two *Ovis/Capra* (sheep/goat) specimens and single *Bos taurus* (cattle) specimen were also identified. Other important species identified are: Rhinocerotidae sp. (rhinoceros), *Equus quagga* (plains zebra), *Giraffa camelopardalis* (giraffe), *Tragelaphus strepsiceros* (greater kudu), *Connochaetes taurinus* (blue wildebeest), *Redunca arundinum* (reedbuck) and *Pelea capreolus* (vaal rhebok).

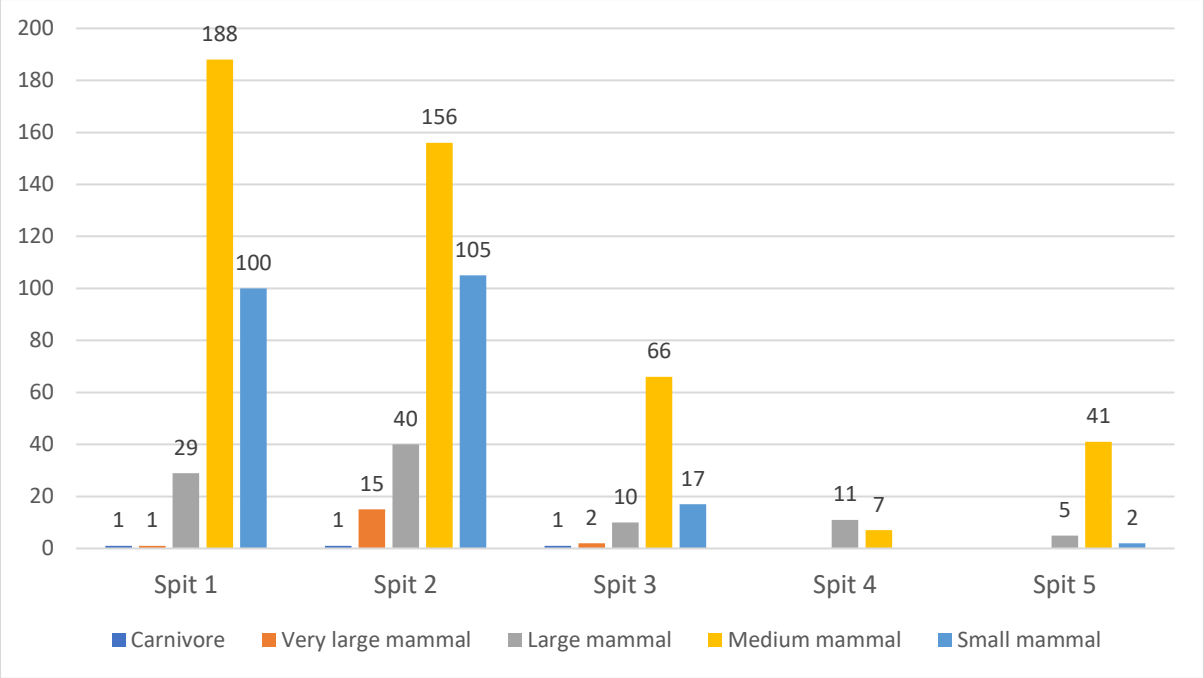


Figure 5.26: Distribution of animals throughout Rock Tank 2, per spit

Small and medium mammals from all spits were represented predominately by axial and cranial elements, and there were very few limb elements (see figure 5.27 for small mammals and figures 5.28 and 5.29 for medium mammals). The anthropogenic modifications on medium mammal specimens were located predominately on axial elements and at limb joints.

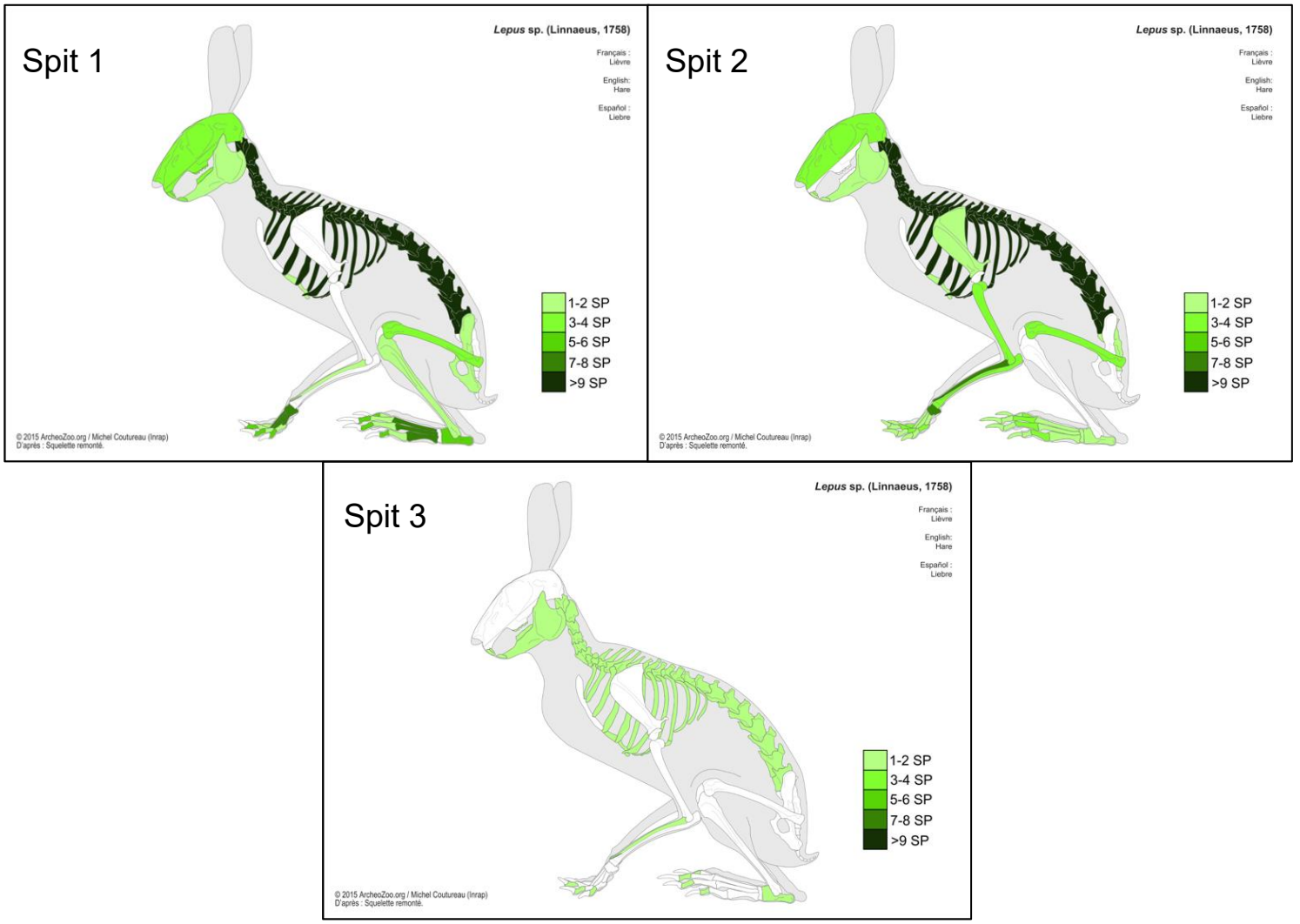


Figure 5.27: Skeletal element representation of small mammal remains from Rock Tank 2, Spits 1, 2 and 3

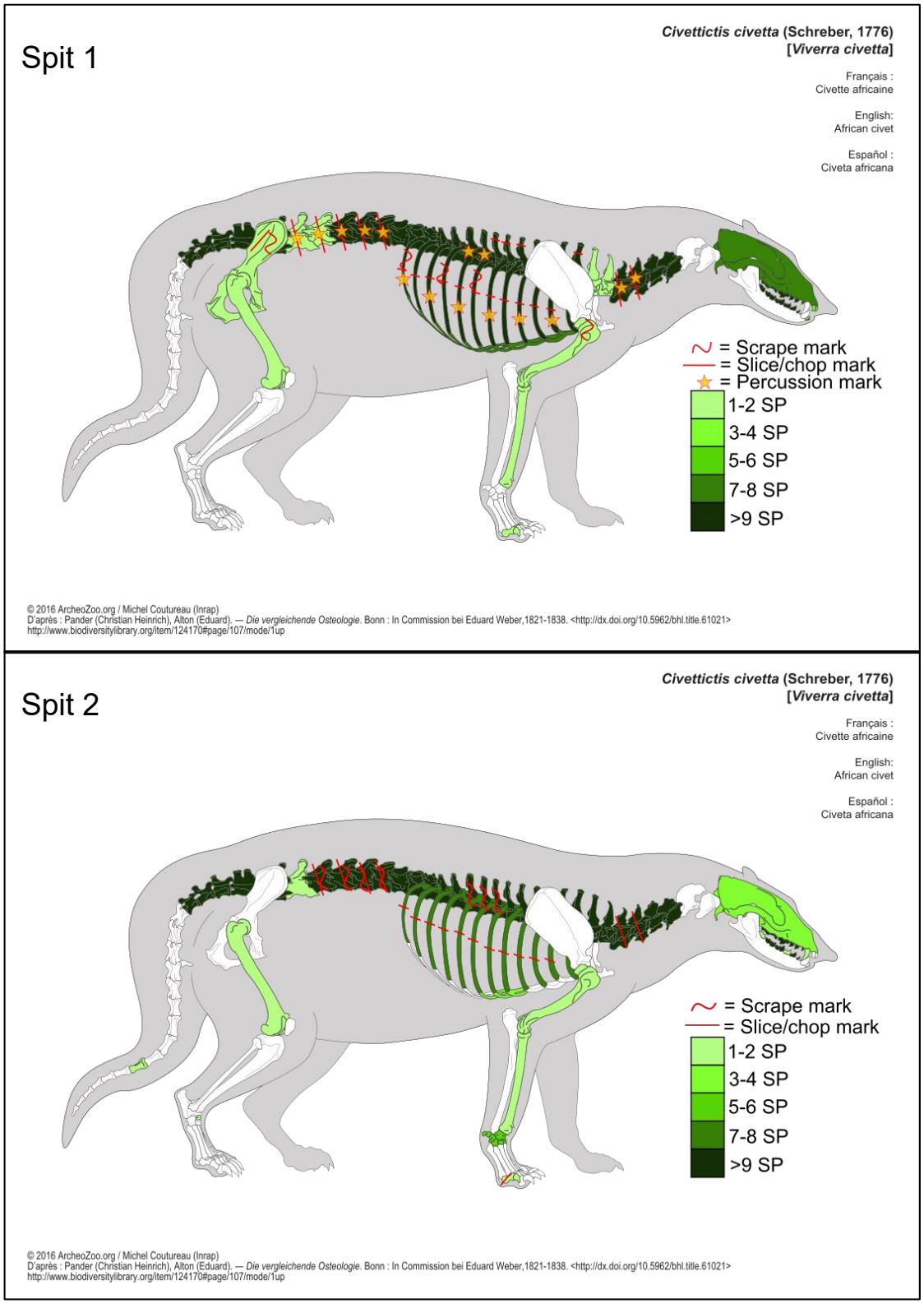


Figure 5.28: Skeletal element representation and anthropogenic modifications of medium mammal remains from Rock Tank 2, Spits 1 and 2

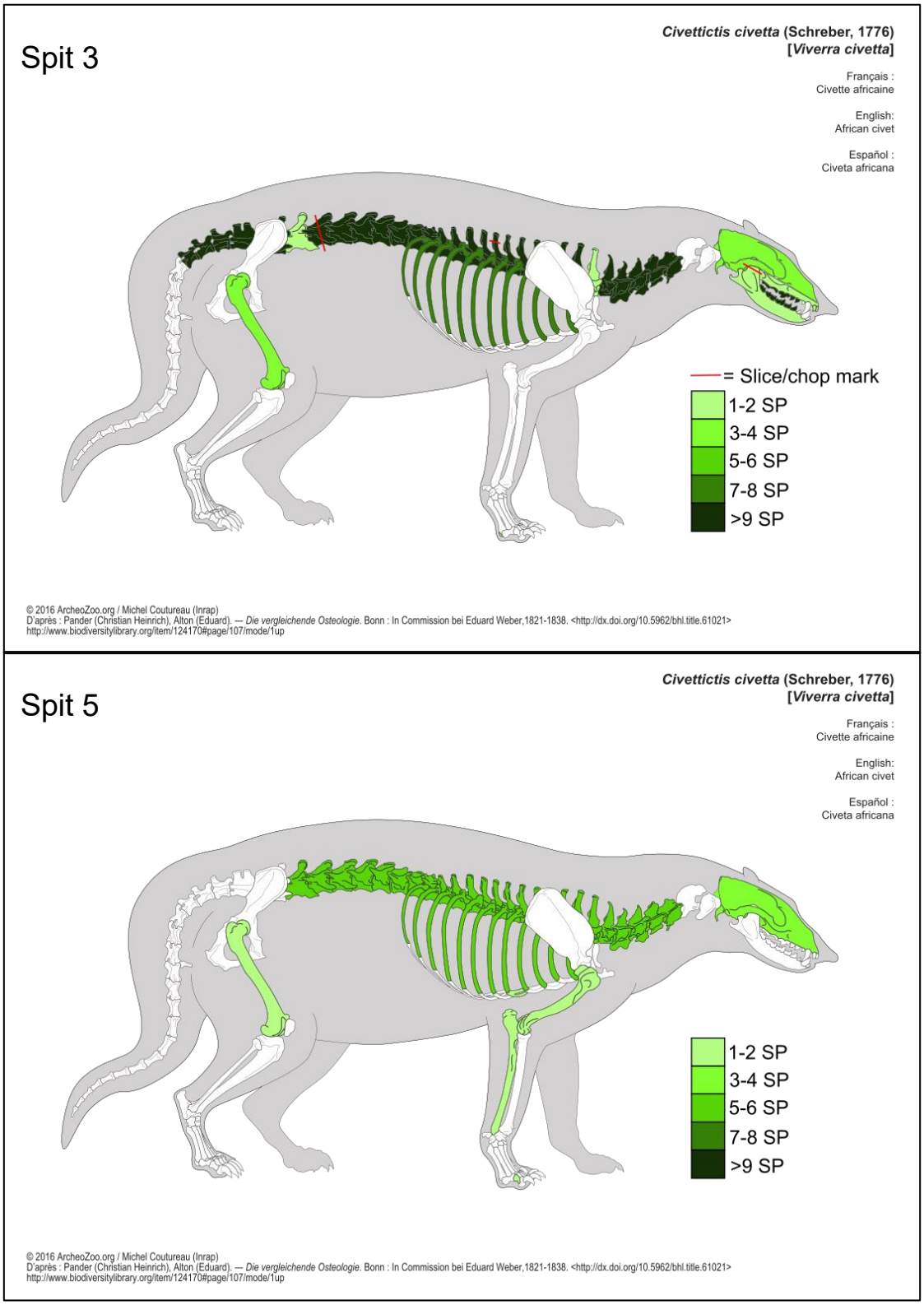


Figure 5.29: Skeletal element representation of medium mammal remains from Rock Tank 2, Spits 3 and 5. The diagram from Spit 3 also has anthropogenic modifications

Bovid size class I from all spits were represented by fore- and hind-limb specimens, teeth, maxillae, and mandibles (figures 5.30 and 5.31). Bovid size class II from all spits were represented by fore- and hind-limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae, and teeth (see figure 5.32 to 5.34).

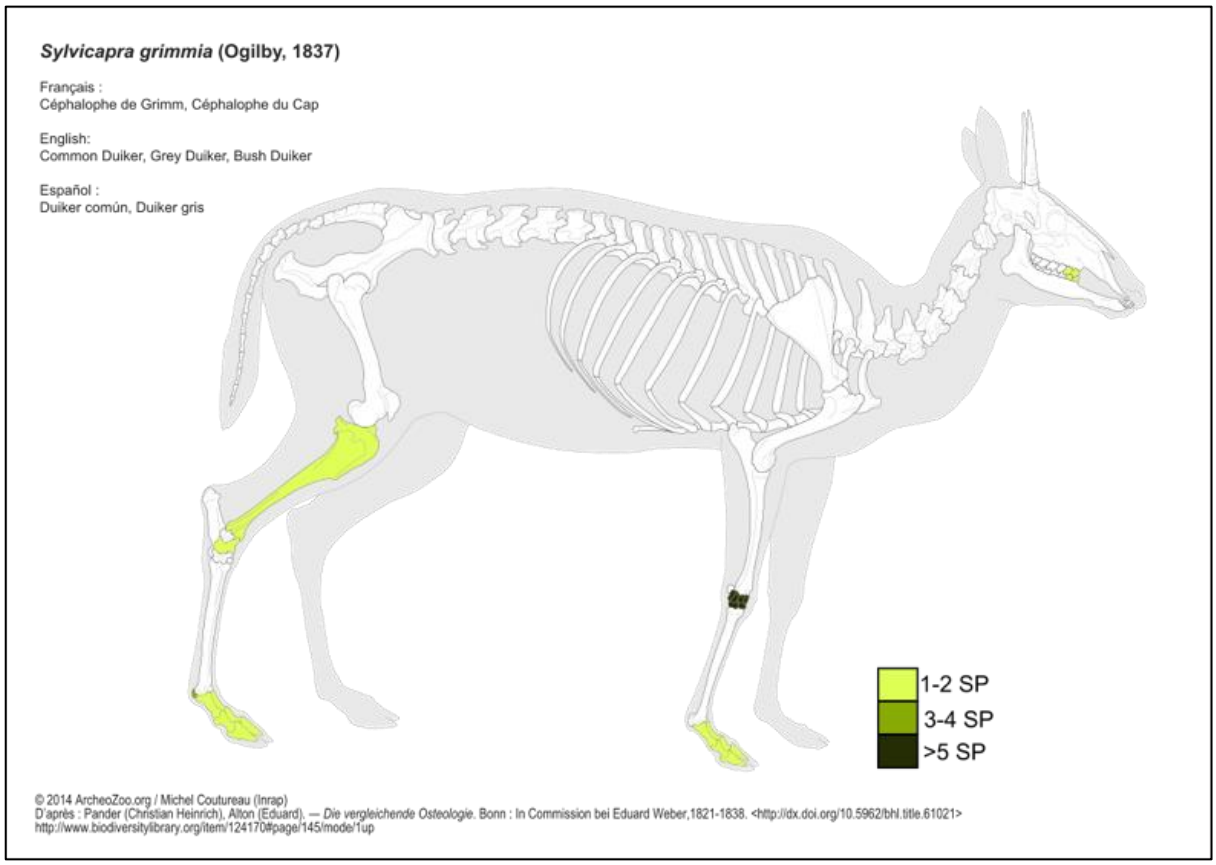


Figure 5.30: Skeletal element representation of bovid size class I remains from Rock Tank 2, spit 1

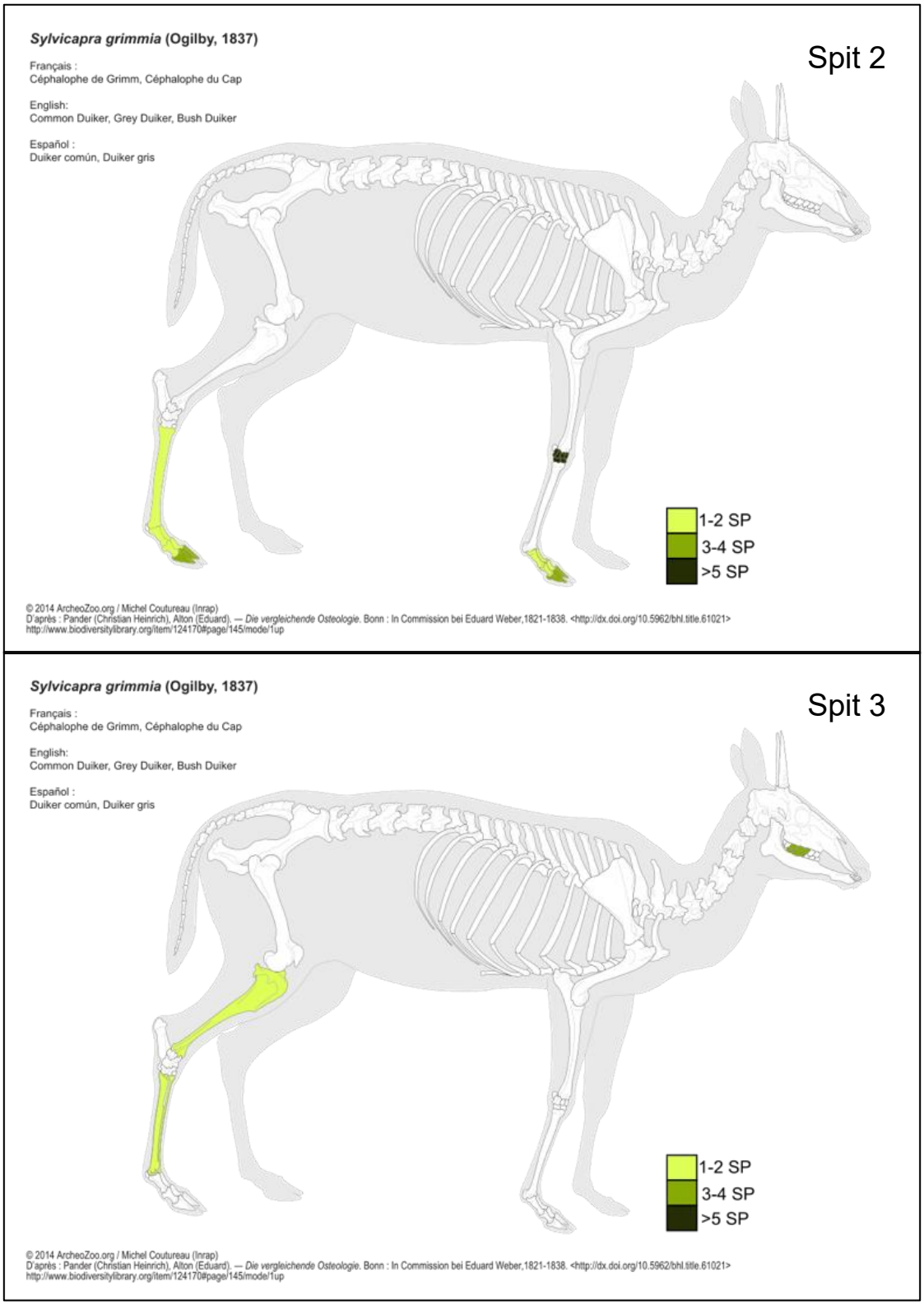


Figure 5.31: Skeletal element representation of bovid size class I remains from Rock Tank 2, Spits 2 and 3

Anthropogenic modifications occur at limb joints and along long bone shafts for bovid size class II specimens. The skeletal element representation for bovid size class III is very similar to that of bovid size class I and II from Rock Tank 2 (figures 5.35 and 5.36). The anthropogenic modifications on bovid size class III specimens are also very similar to bovid size class I and II.

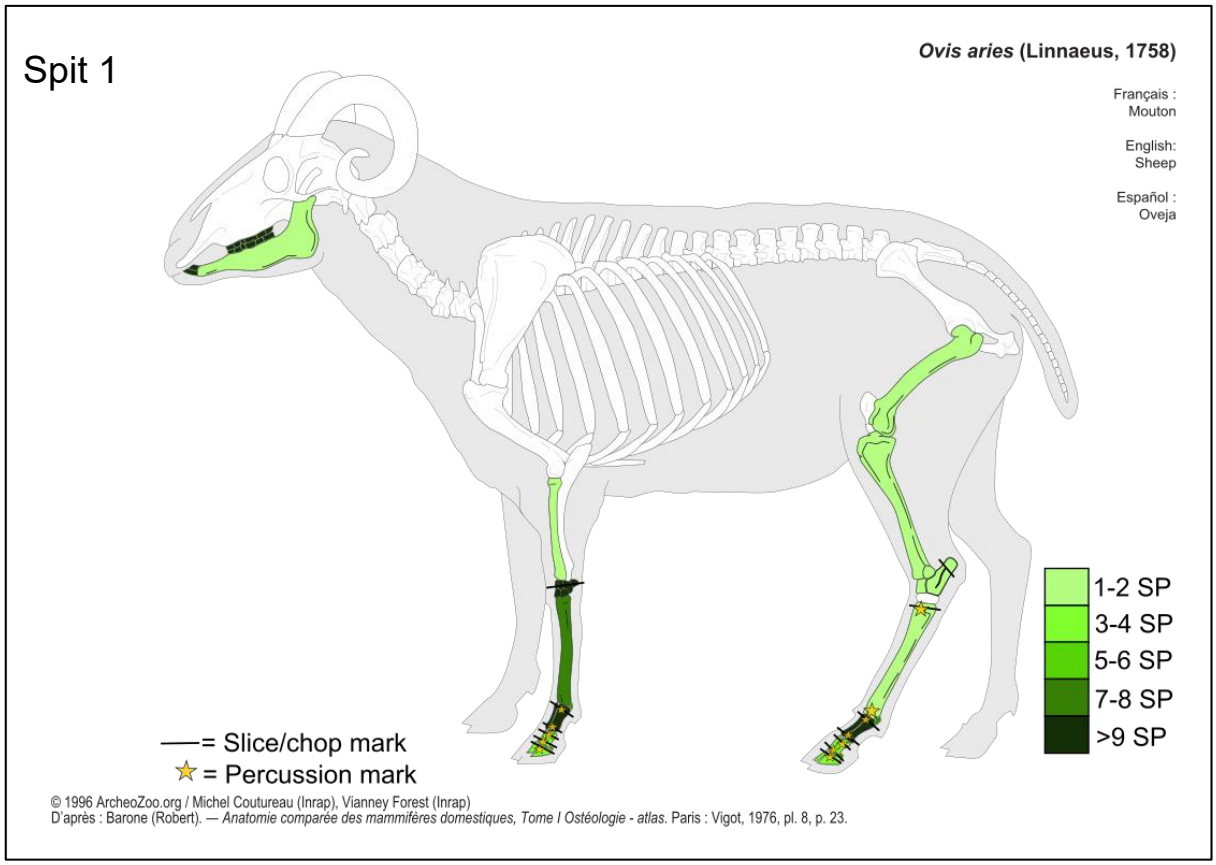


Figure 5.32: Skeletal element representation and anthropogenic modifications on bovid size class II remains from Rock Tank 2, Spit 1

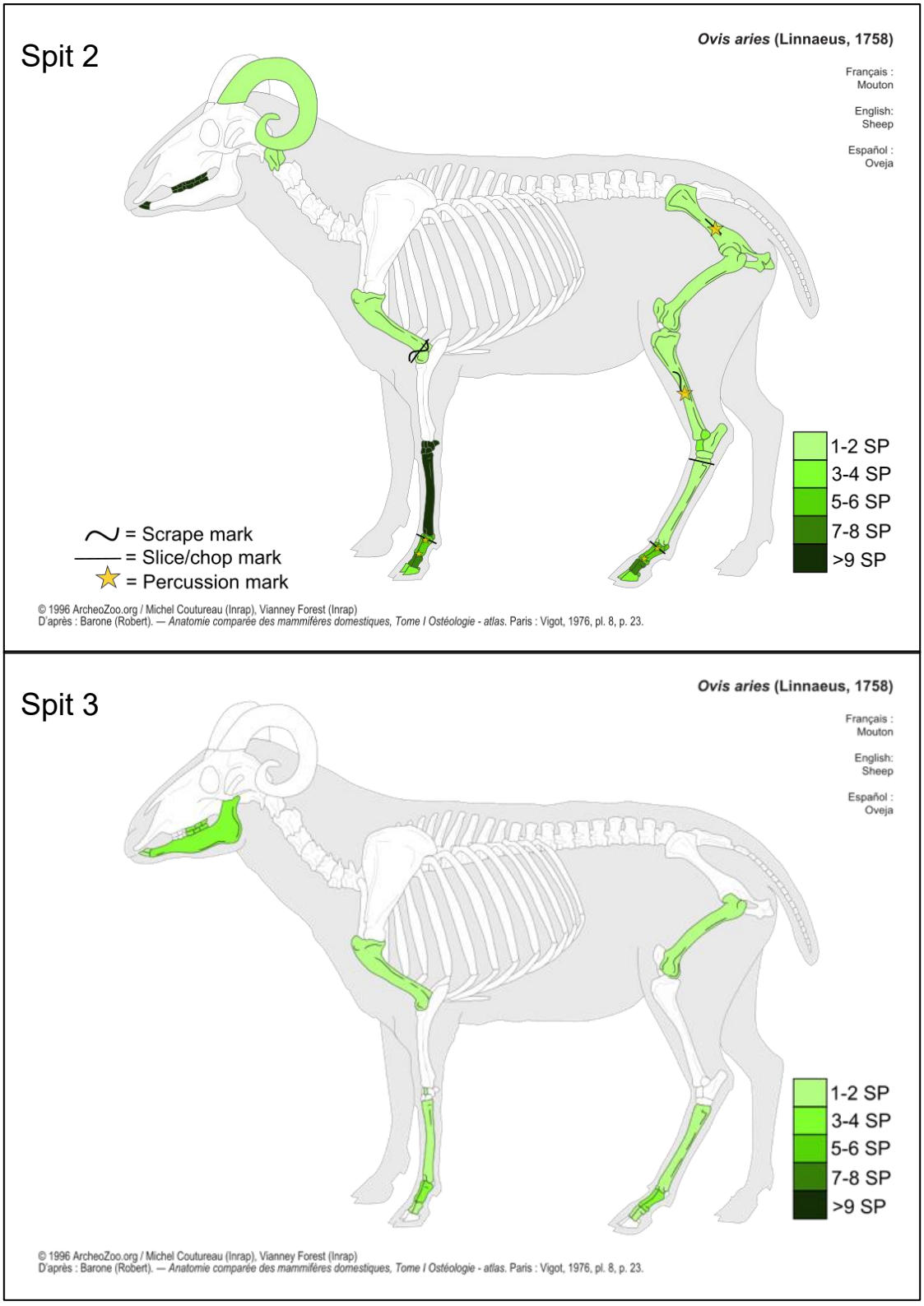


Figure 5.33: Skeletal element representation of bovid size class II remains from Rock Tank 2, Spits 2 and 3. The diagram for Spit 2 also shows anthropogenic modifications

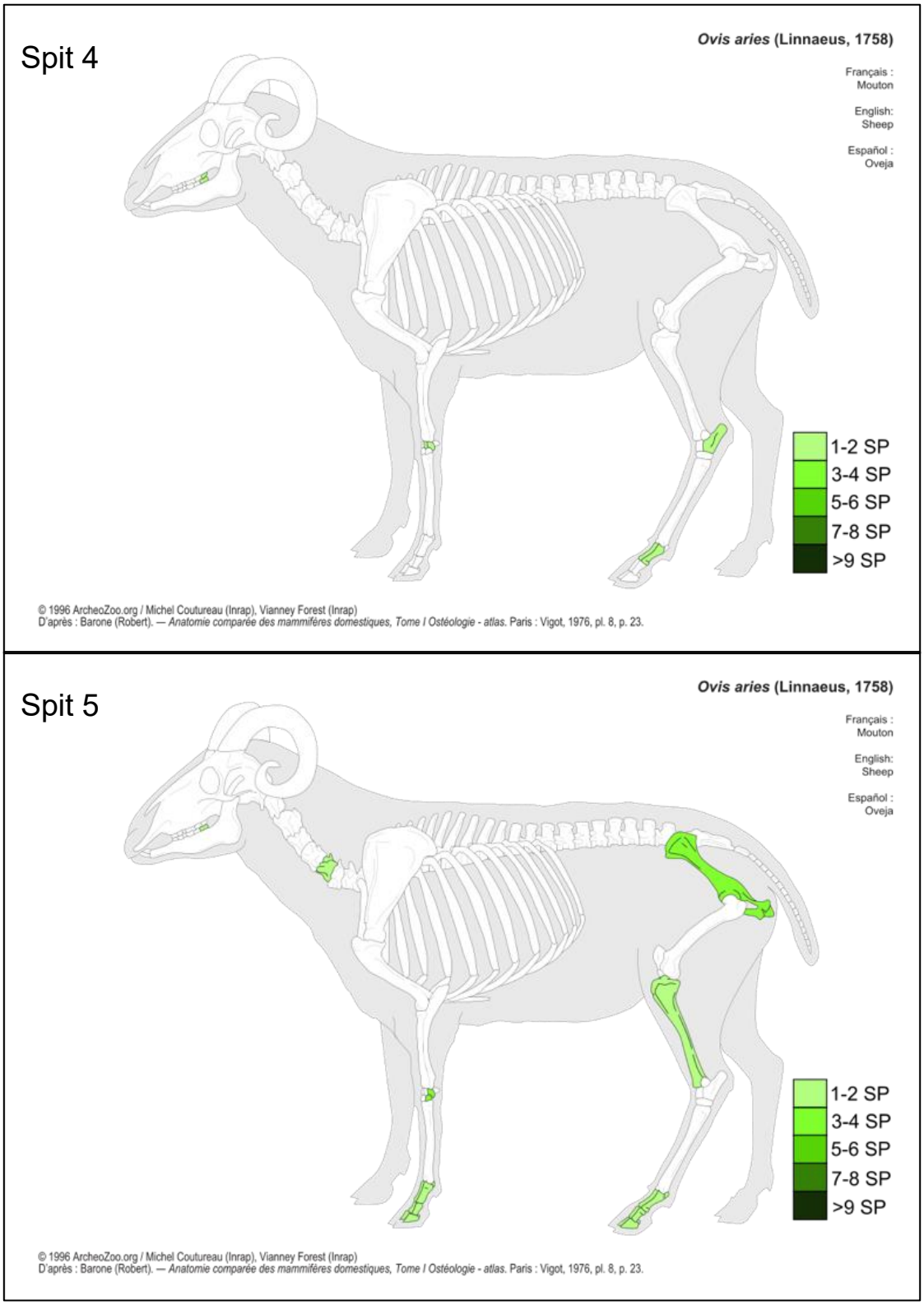


Figure 5.34: Skeletal element representation of bovid size class II remains from Rock Tank 2, Spits 4 and 5

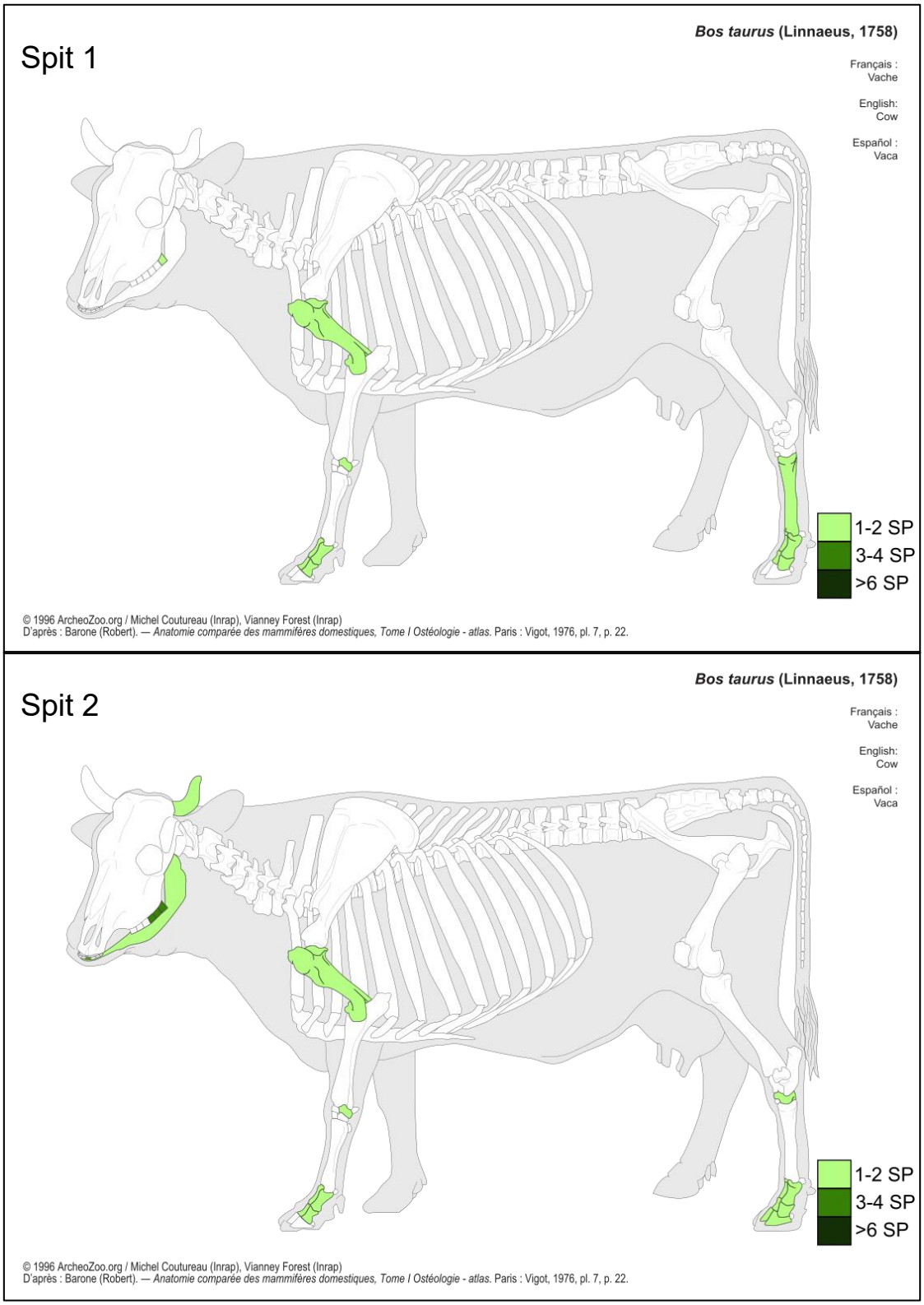


Figure 5.35: Skeletal element representation of bovid size class III remains from Rock Tank 2, Spits 1 and 2

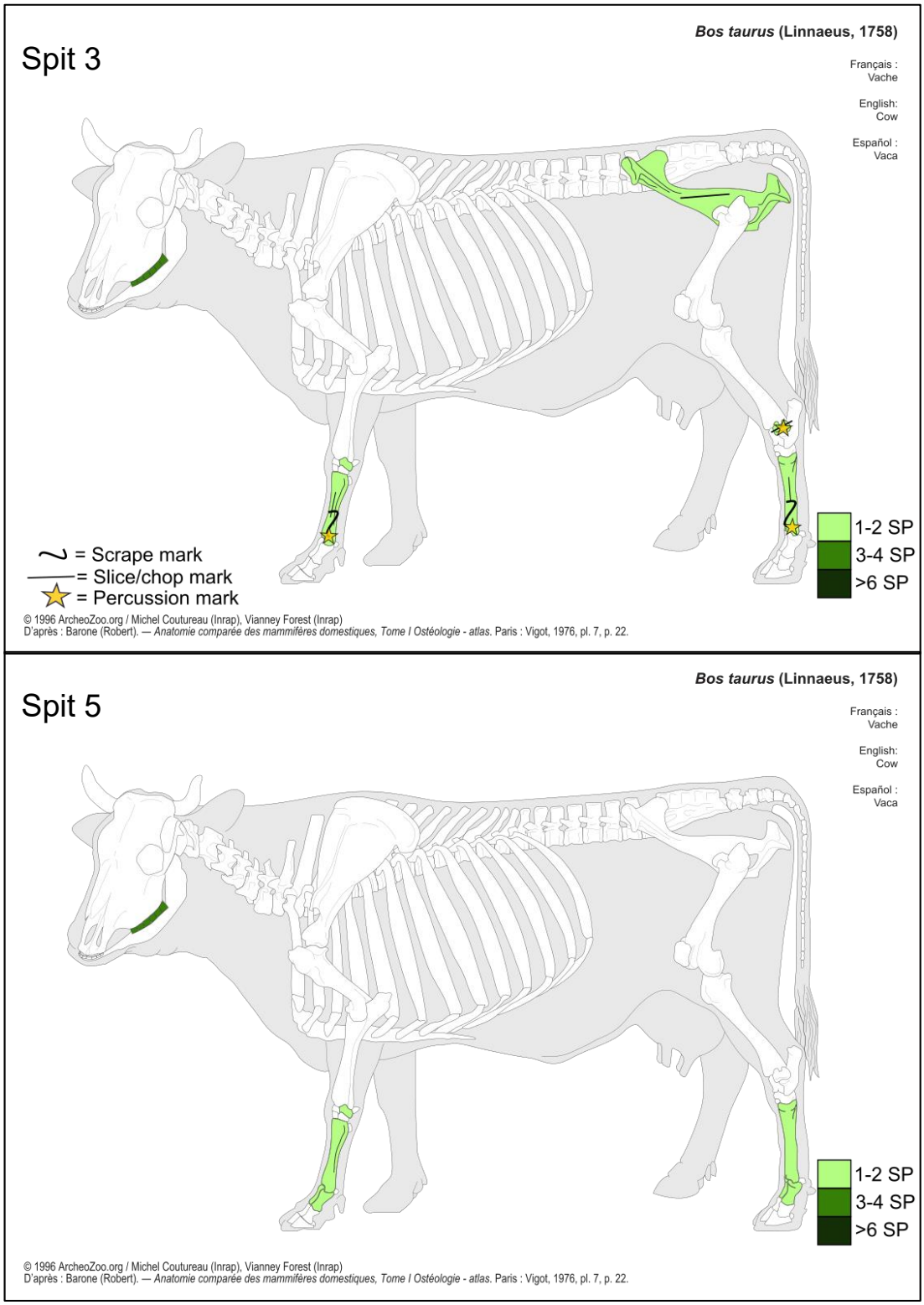


Figure 5.36: Skeletal element representation of bovid size class III remains from Rock Tank 2, Spits 3 and 5. The diagram for Spit 3 also shows anthropogenic modifications

Birds from spits 1 and 2 are represented by limb, axial and wing elements (figure 5.37 and 5.38).

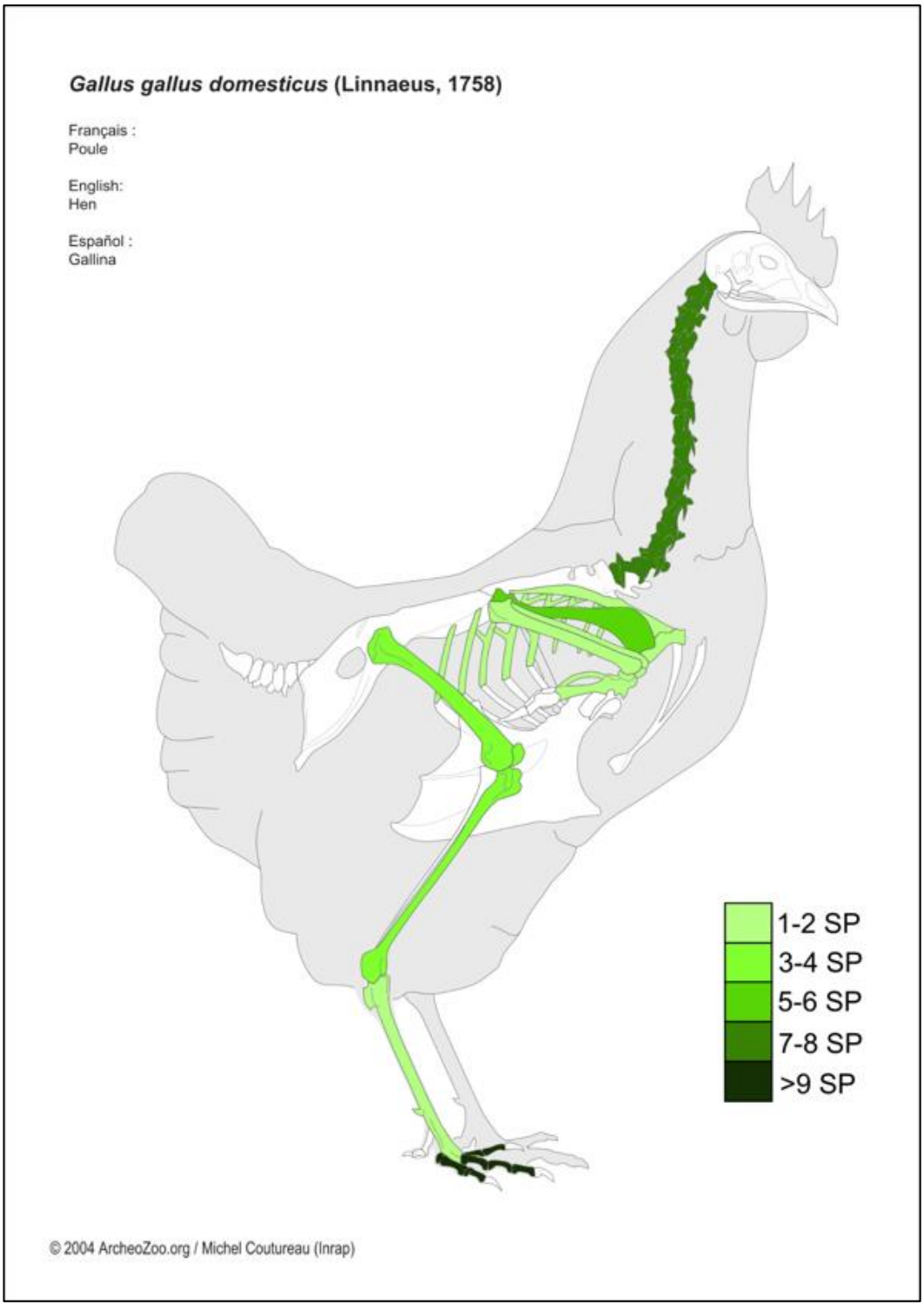


Figure 5.37: Skeletal element representation of bird remains from Rock Tank 2, spit 1

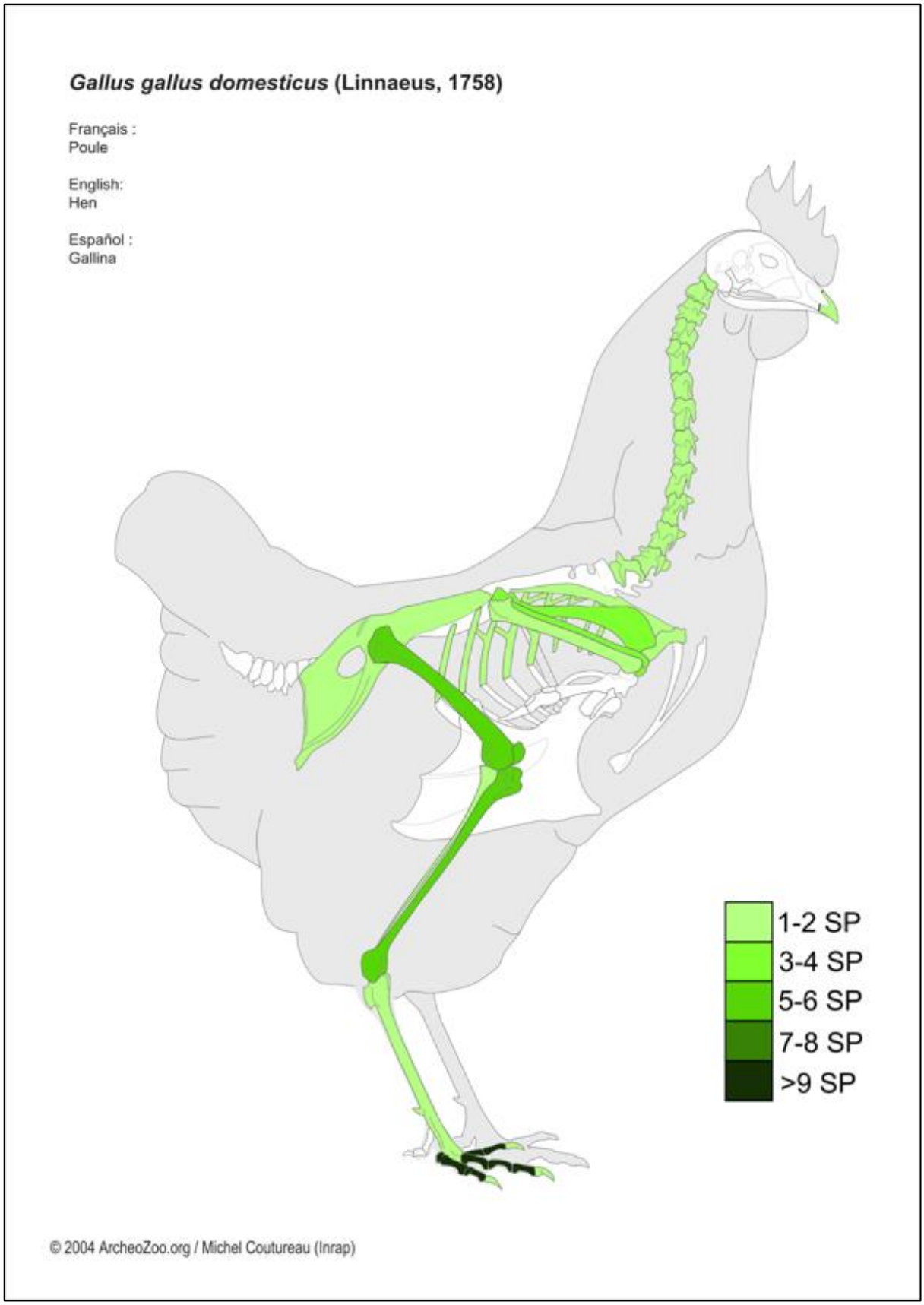


Figure 5.38: Skeletal element representation of bird remains from Rock Tank 2, spit 2

The fish specimens from Rock Tank 2 were numerous (NISP = 3568) and 3% were burnt. Spit 1 has the most fish specimens (NISP = 2318, including those burnt) (see figure 5.39 and 5.40).

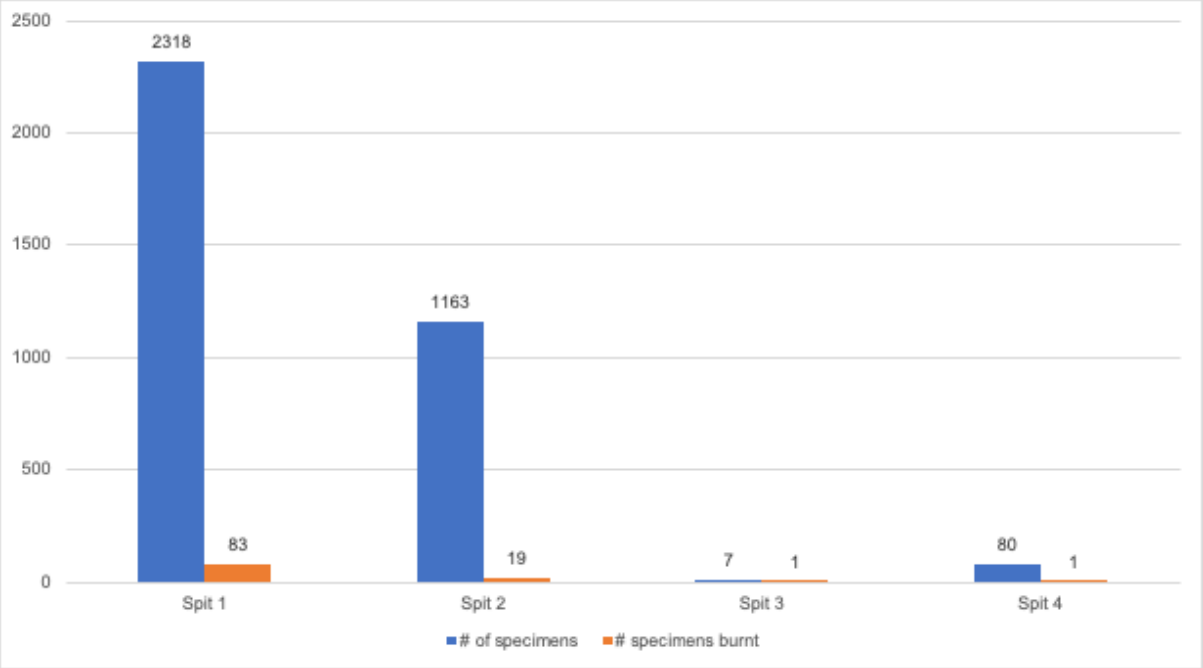


Figure 5.39: Frequency of fish remains from Rock Tank 2, per spit. Burnt fish are indicated separately, and included in the total frequency per spit

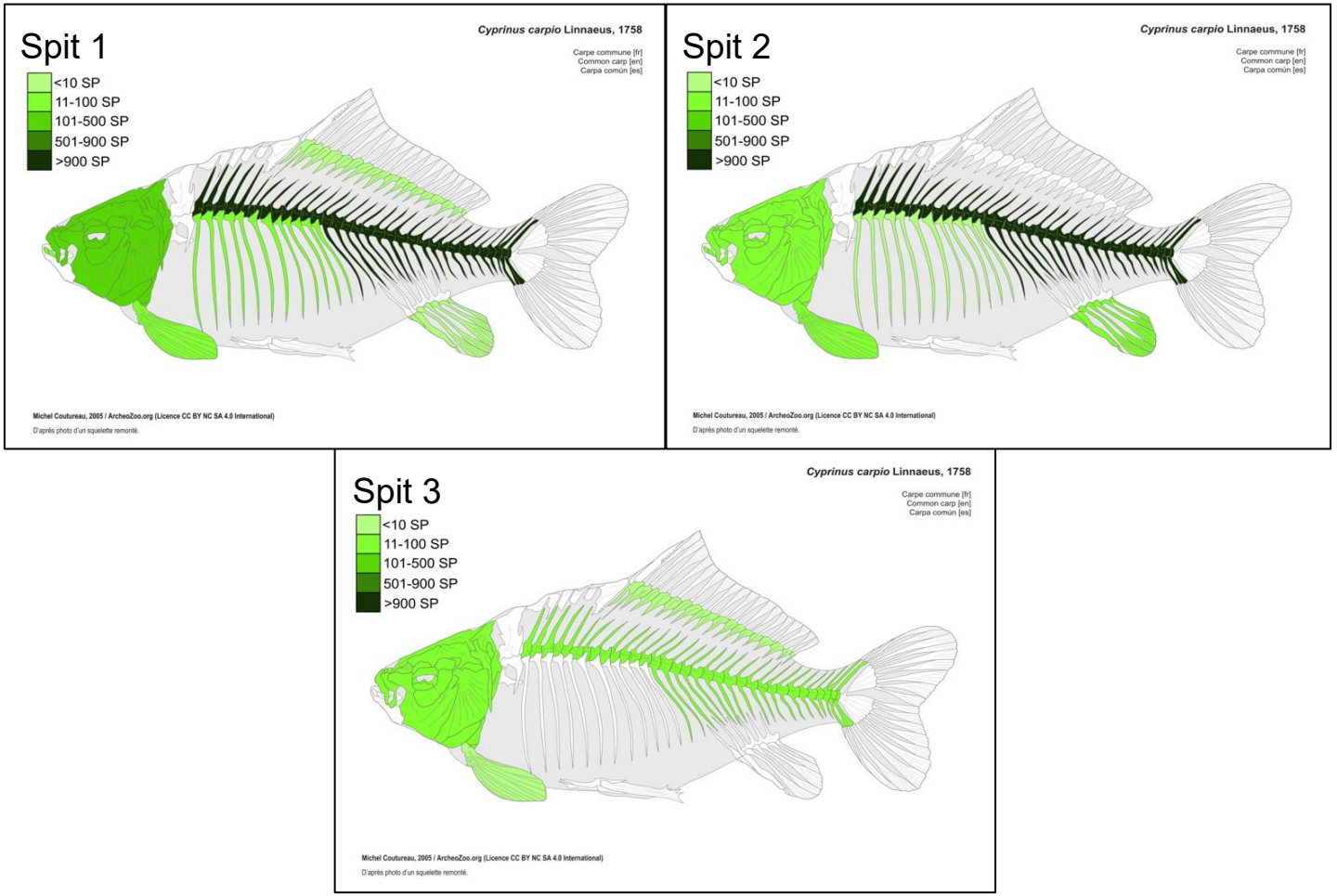


Figure 5.40: Skeletal element representation of fish remains from Rock Tank 2, Spits 1 to 3

Bone surface modifications on identified specimens from Rock Tank 2 were the most numerous in spits 1, 2 and 4. Cut marks outnumbered any other type of surface modification, except for the burnt remains in spits 1 and 4 (figure 5.41). Small mammal specimens had the most zoogenic modifications (tooth marks and acid etching).

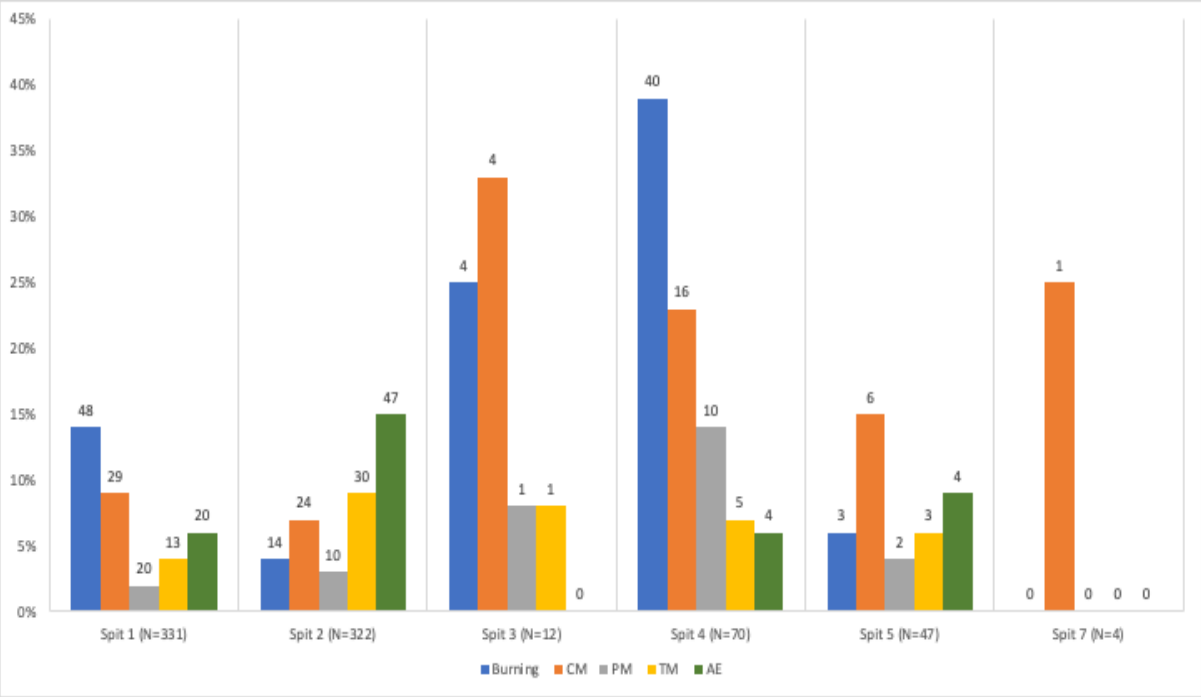


Figure 5.41: The bone surface modifications on all identified specimens from Rock Tank 2, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Rock Tank 2 were not weathered (figure 5.42). The number of weathered specimens increased from spit 5 to spit 1, with the highest number and proportion of weathered specimens in Spit 2.

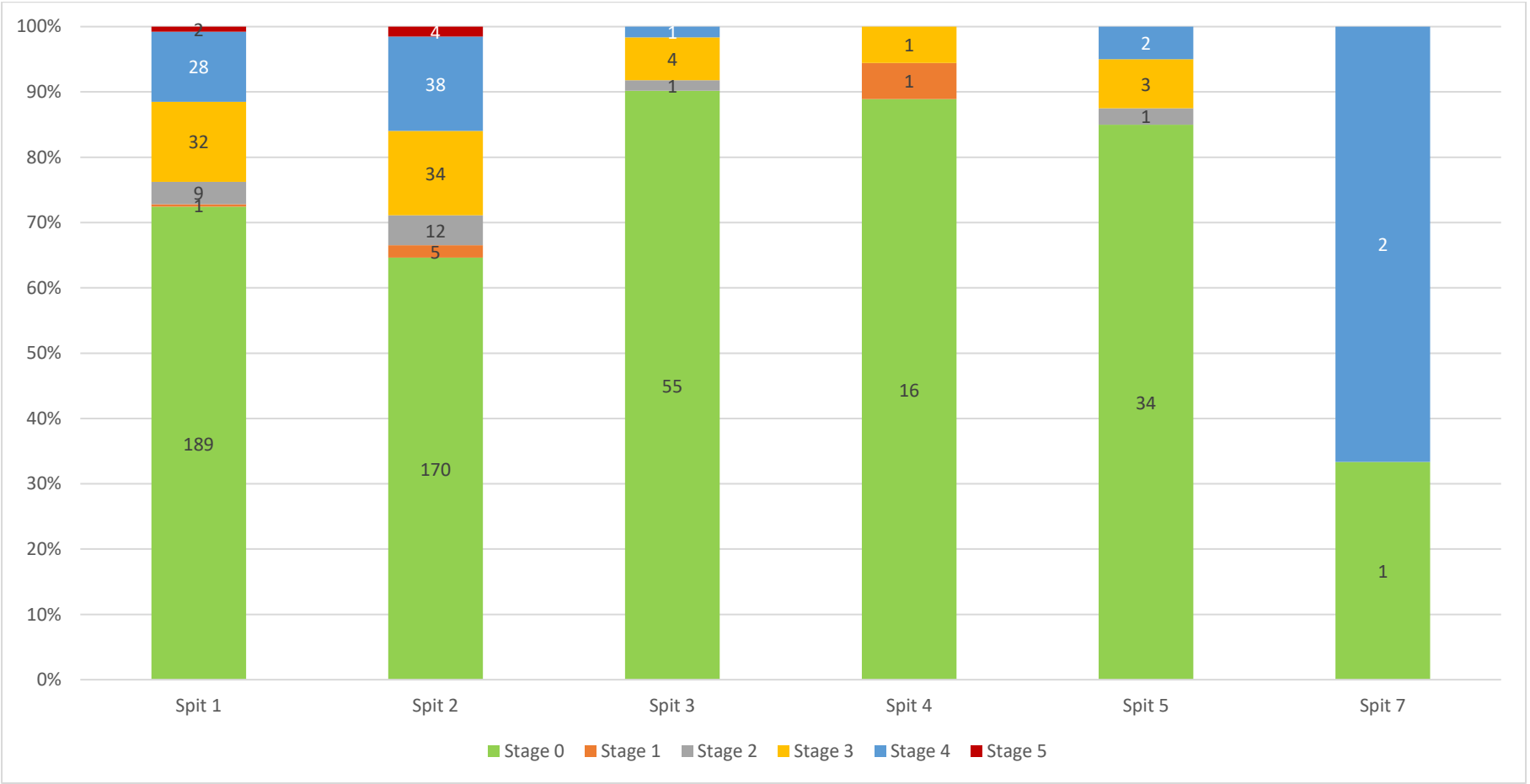


Figure 5.42: Weathering stages (Table 4.9) recorded for Rock Tank 2, per spit

A total of 102 specimens from Rock Tank 2 are trampled and far fewer specimens (in comparison to Rock Tank 1) have diagenic staining (NISP = 8). The majority of trampling marks are on specimens from Spit 2, but the proportion of trampling marks is greater in spit 5, which has a smaller sample size (figure 5.43).

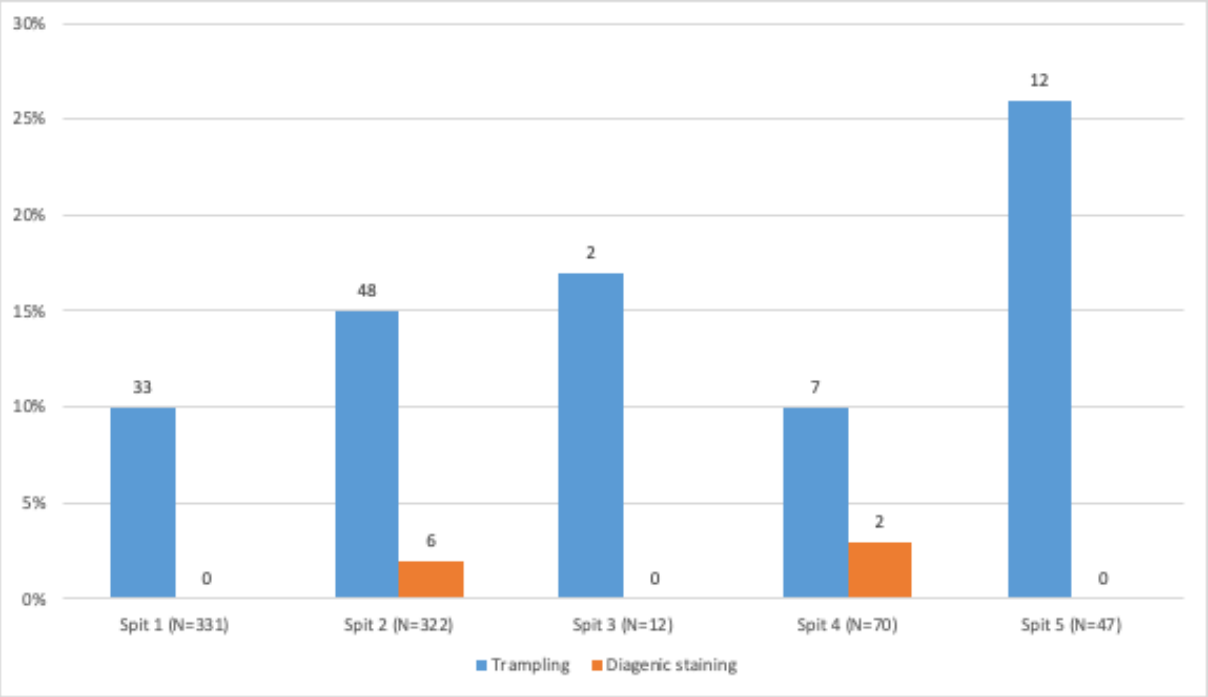


Figure 5.43: Trampling and diagenic staining recorded for Rock Tank 2, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.3.3 Central Area A

The animals in Central Area A were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 2 to spit 1 (figure 5.44). Medium mammals are the most frequently represented specimens in spits 1 and 2, whereas small mammals, including *Procavia capensis* (dassie) and *Pedetes capensis* (springhare), were the most numerous specimens from spits 3, 4 and 5 and overall had the most zoogenic modifications. *Aepyceros melampus* (impala) were the most numerous of the identified bovid size class II specimens. Only three *Ovis/Capra* (sheep/goat) specimens were identified from this area. Other important species identified were: *Panthera pardus* (leopard), Hyaenidae (hyena), *Equus quagga* (plains zebra), *Hippopotamus amphibius* (hippopotamus), *Hippotragus niger* (sable) and *Redunca arundinum* (reedbuck).

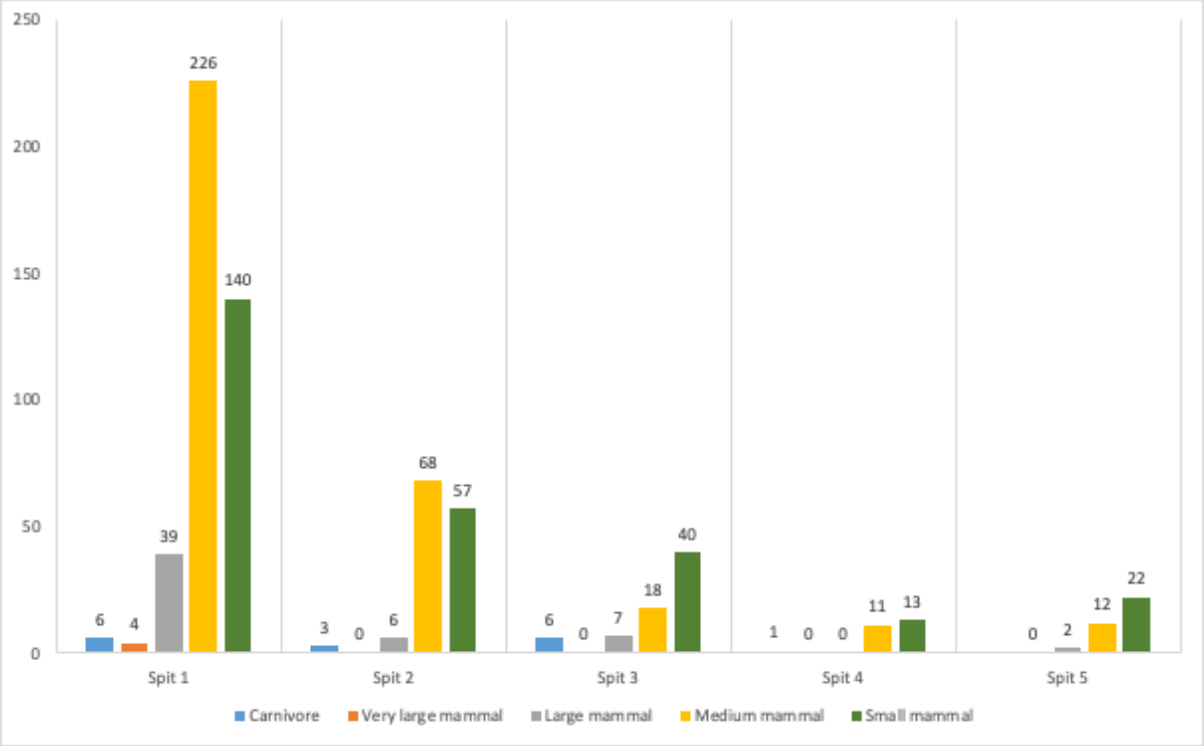


Figure 5.44: Animal distribution throughout Central Area A, per spit

Small and medium mammals from all spits were predominately represented by axial and cranial elements with more limb specimens identified than from the two rock tanks (see figure 5.45 for small mammals and figures 5.46 and 5.47 for medium mammals). The anthropogenic modifications on medium mammal specimens were predominately located on axial elements and at limb joints.

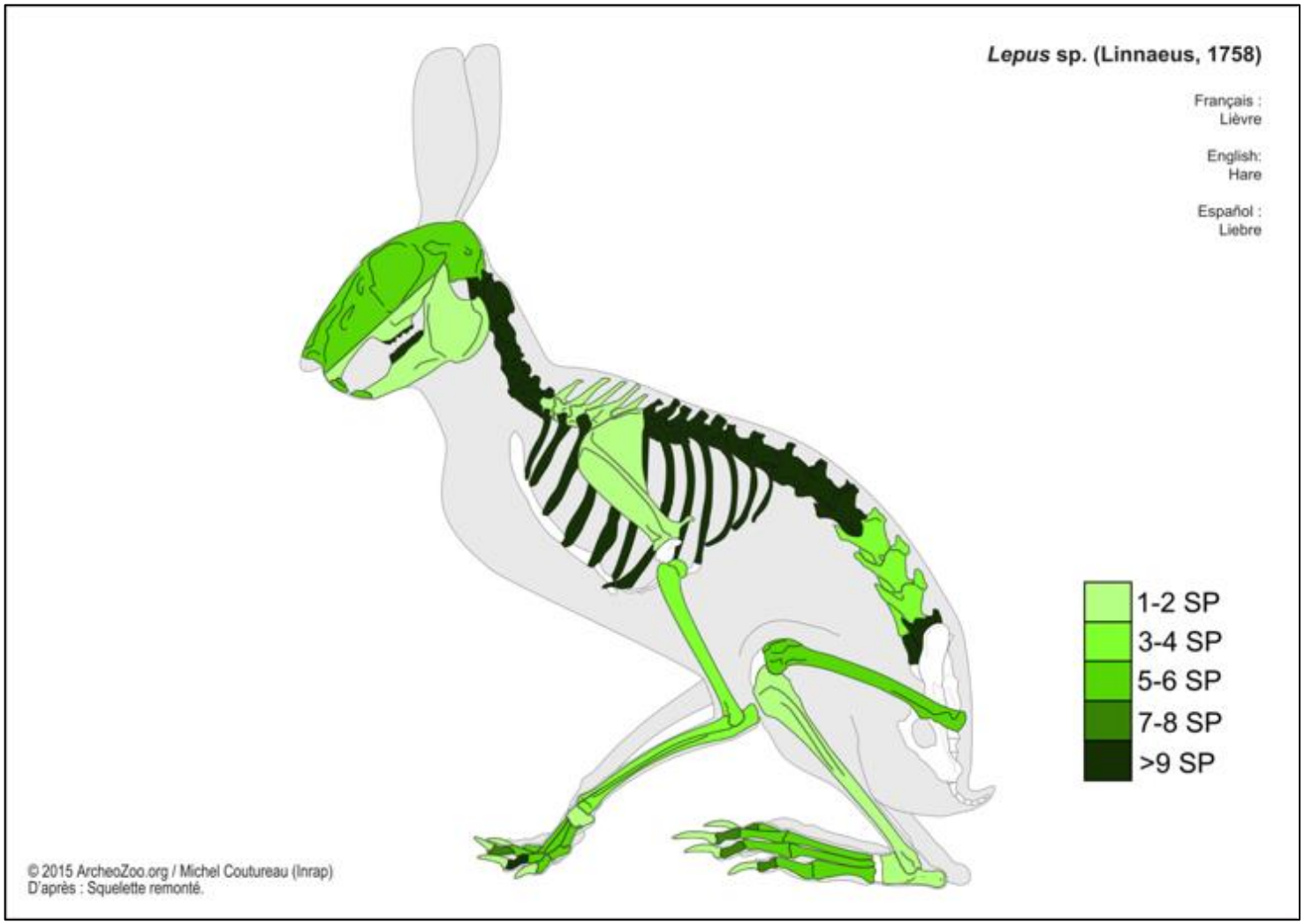


Figure 5.45: Skeletal element representation of small mammal remains from Central Area A, spit 1

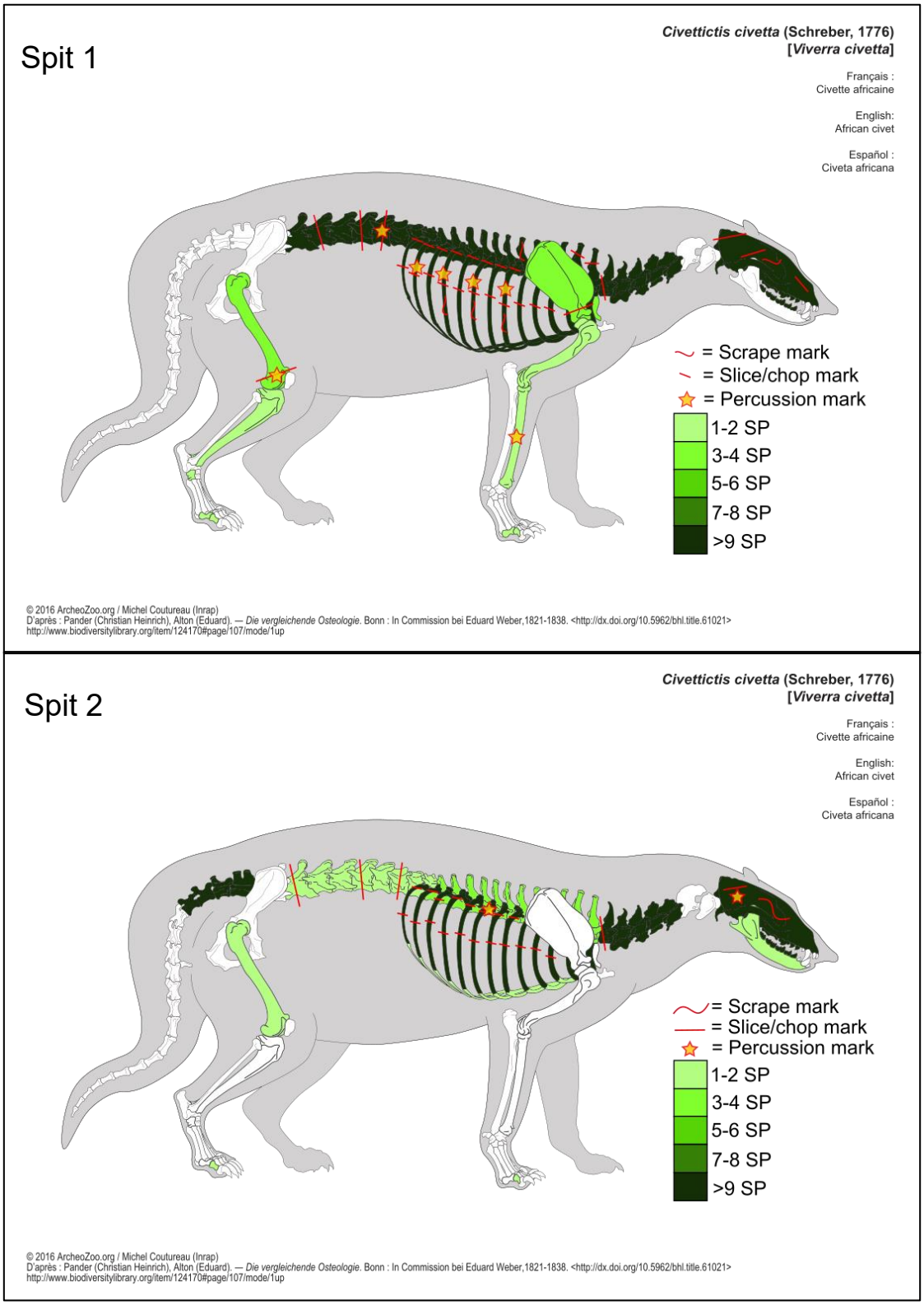


Figure 5.46: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area A, Spits 1 and 2

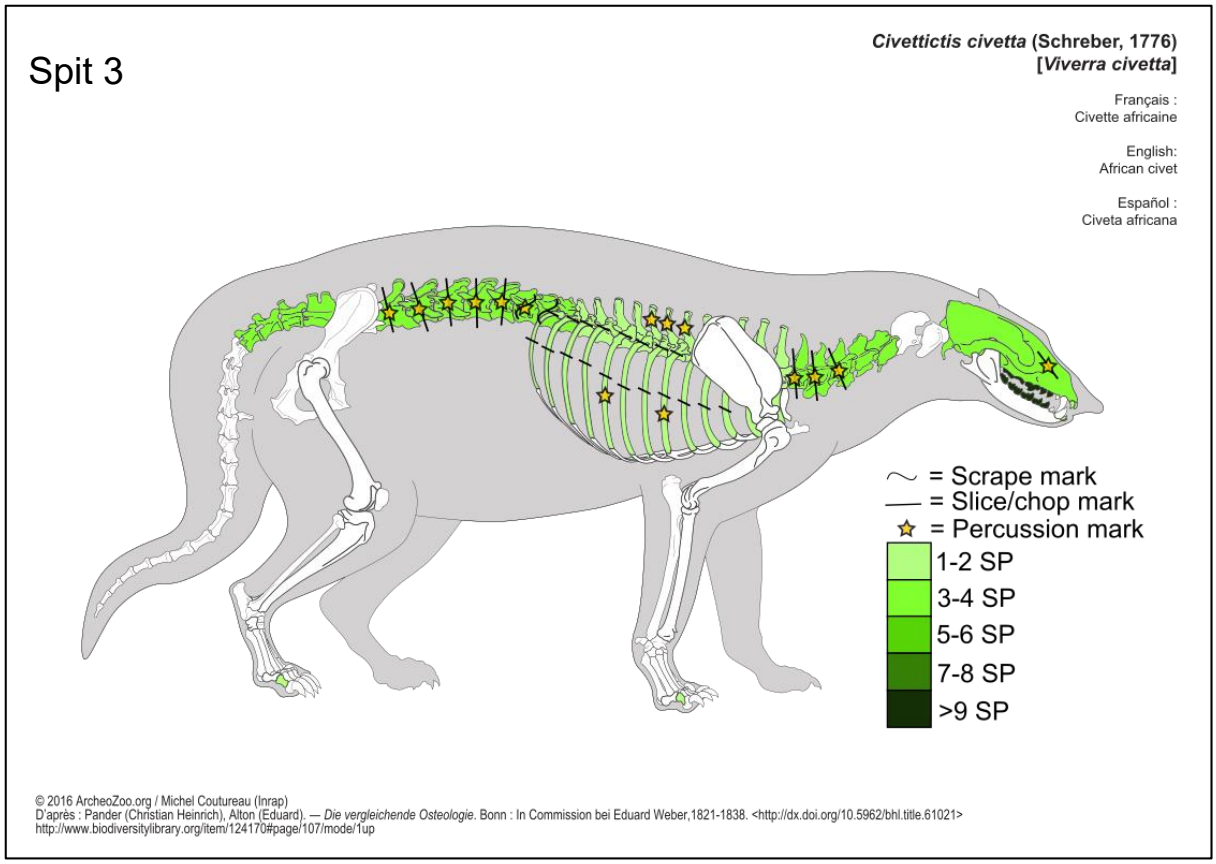
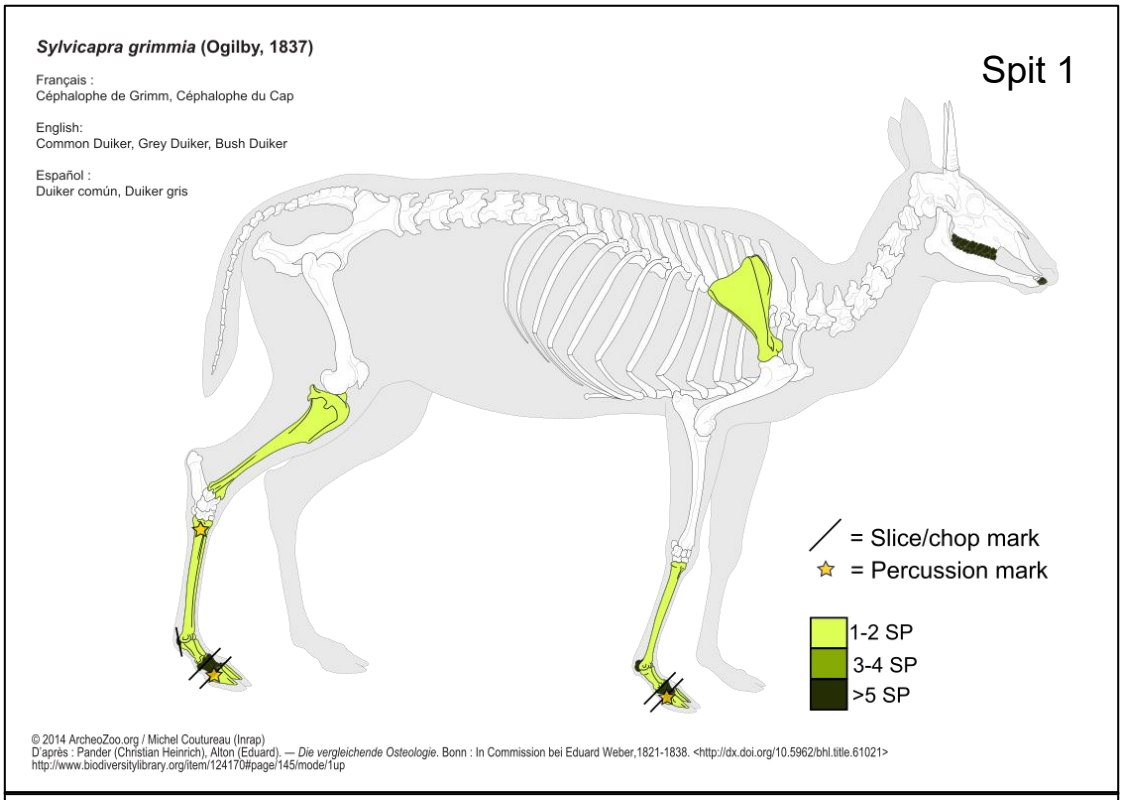


Figure 5.47: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area A, Spit 3

Bovid size class I from all spits were represented by fore- and hind-limb specimens, teeth, maxillae and mandibles (figures 5.48 to 5.50). The anthropogenic modifications occurred at limb joints. Bovid size class II from all spits were represented by fore- and hind-limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae and teeth (figures 5.51 and 5.52).



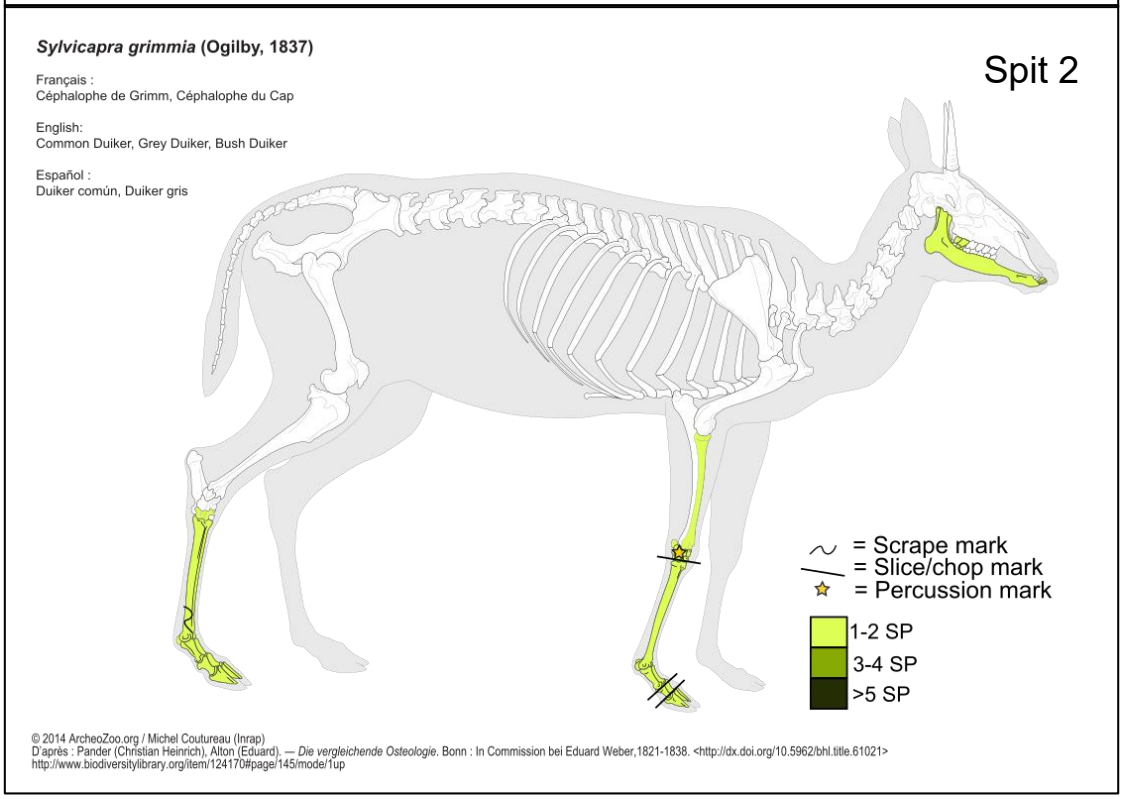


Figure 5.48: Skeletal element representation and anthropogenic modifications of bovid size class I remains from Central Area A, Spits 1 and 2

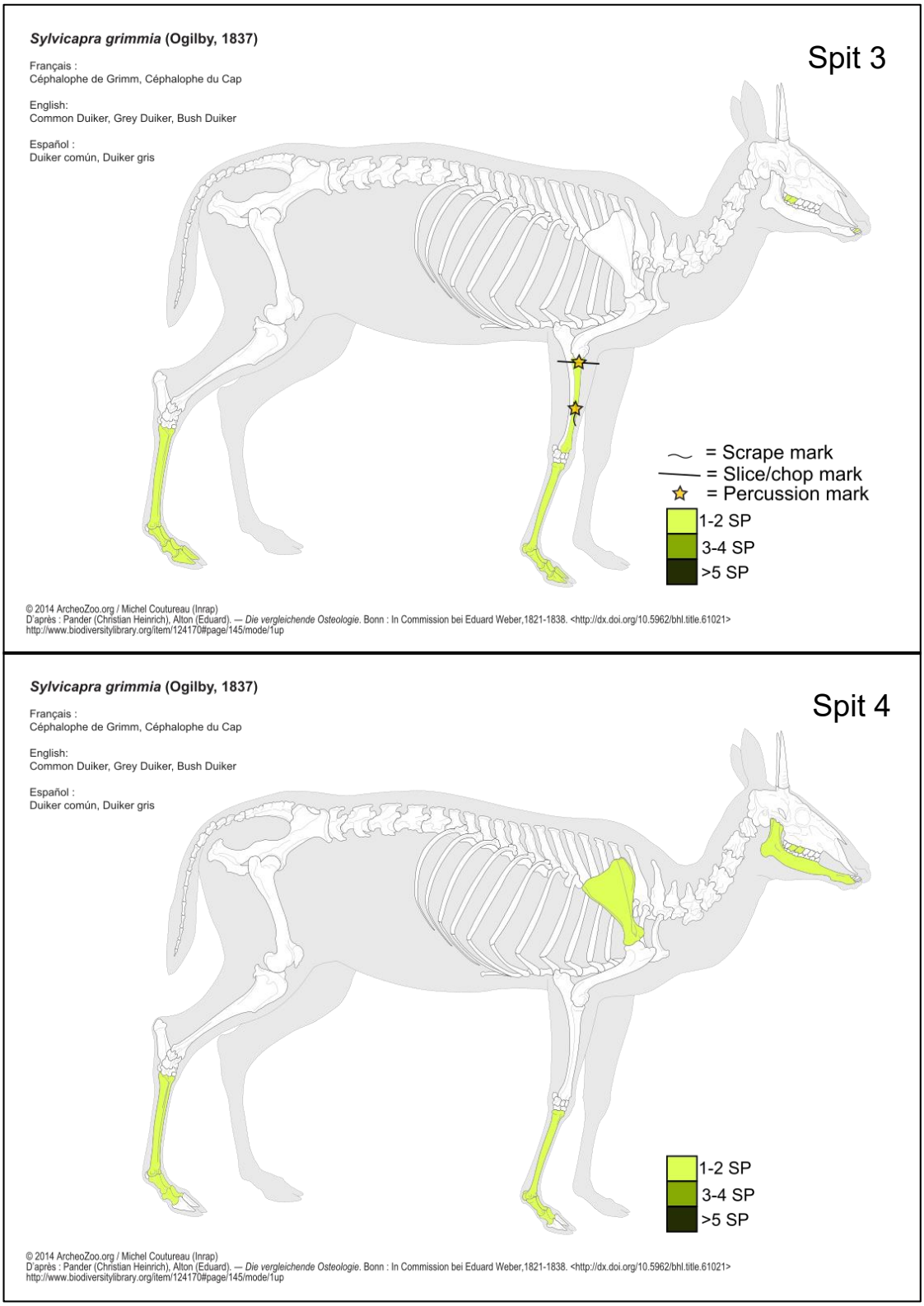


Figure 5.49: Skeletal element representation of bovid size class I remains Central Area A, Spits 3 and 4. The diagram for Spit 3 also has anthropogenic modifications

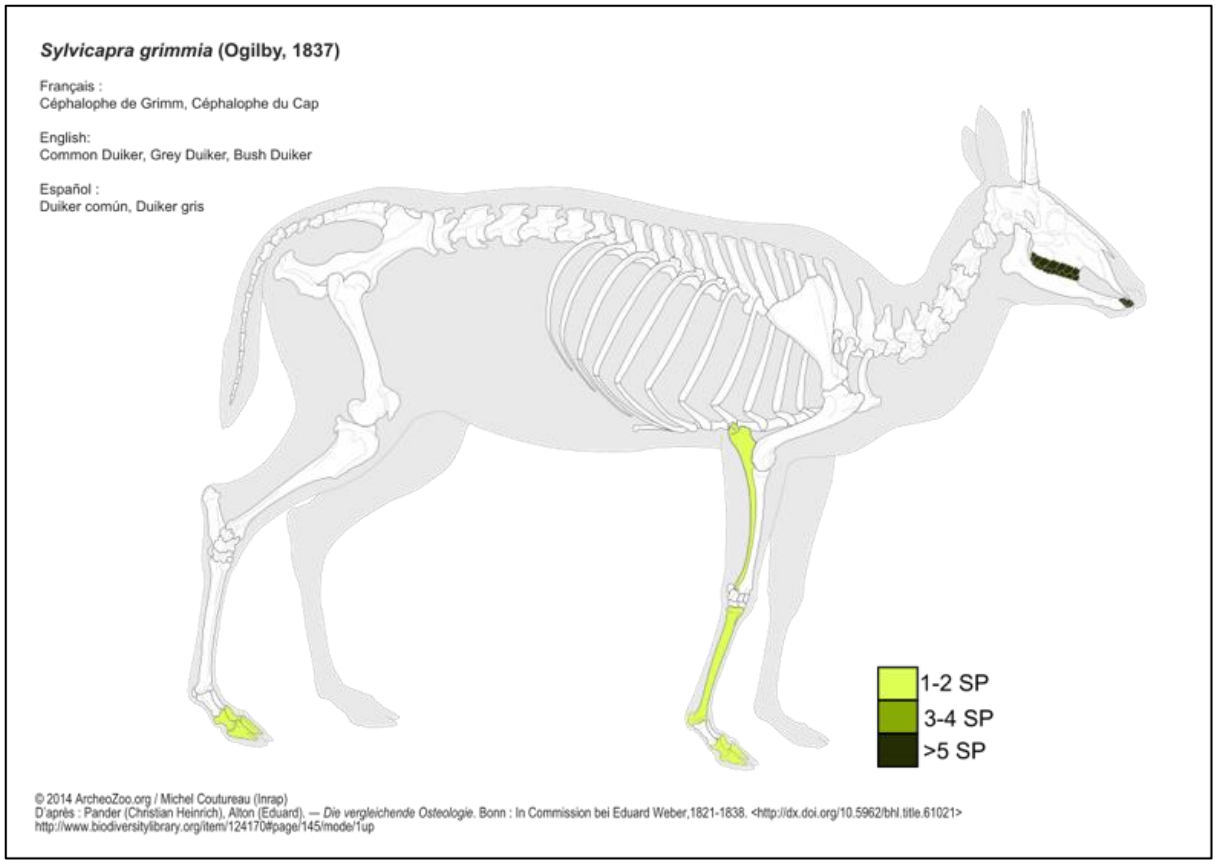


Figure 5.50: Skeletal element representation of bovid size class I remains from Central Area A, spit 5

Anthropogenic modifications on bovid size class II specimens occurred at limb joints, at the base of the cranium and along long bone shafts. The skeletal element representation for bovid size class III was very similar to that of bovid size class I and II from Central Area A (figures 5.23 to 5.24). The anthropogenic modifications on bovid size class III specimens were also very similar to bovid size class I and II.

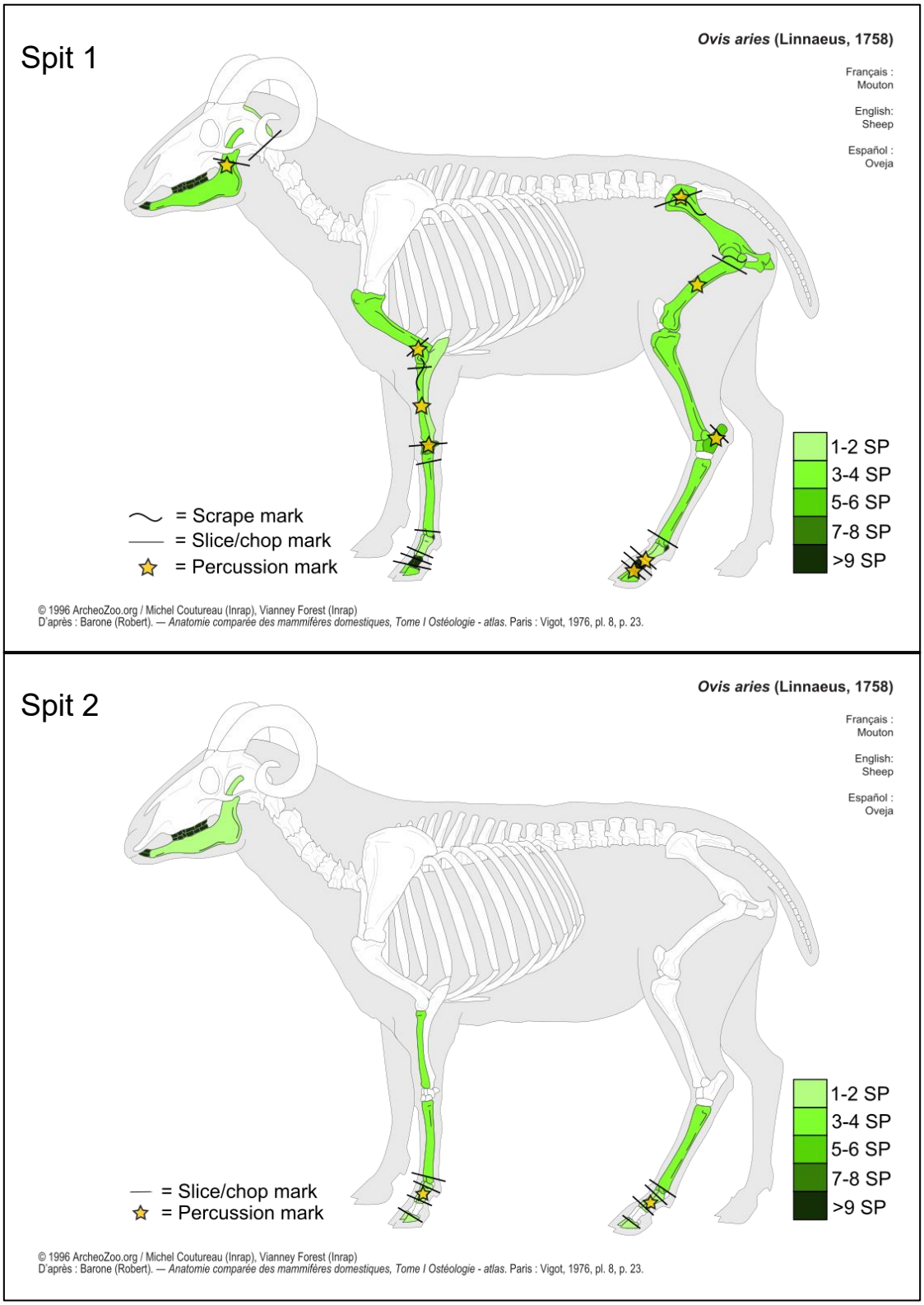


Figure 5.51: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area A, Spits 1 and 2

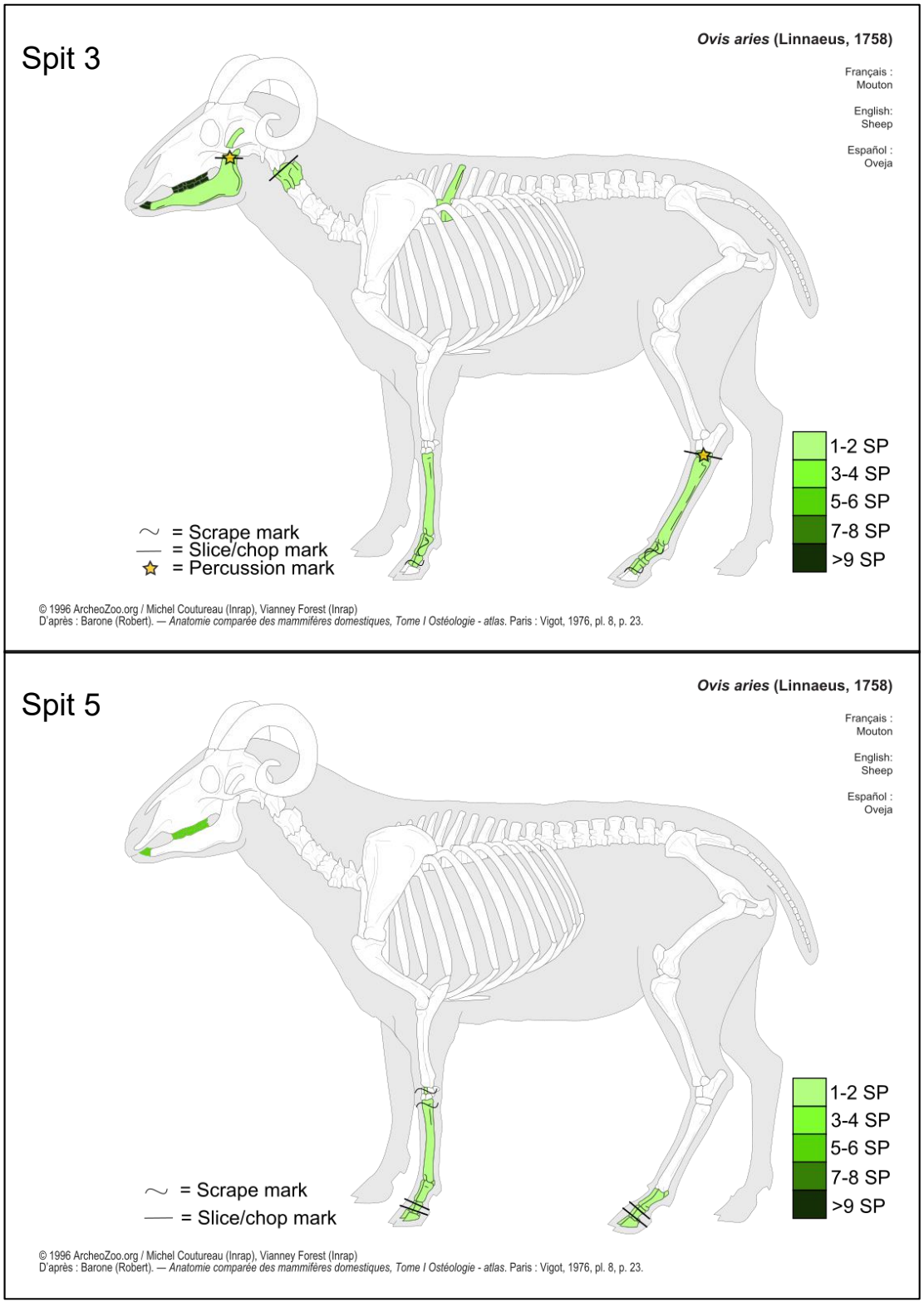


Figure 5.52: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area A, Spits 3 and 5

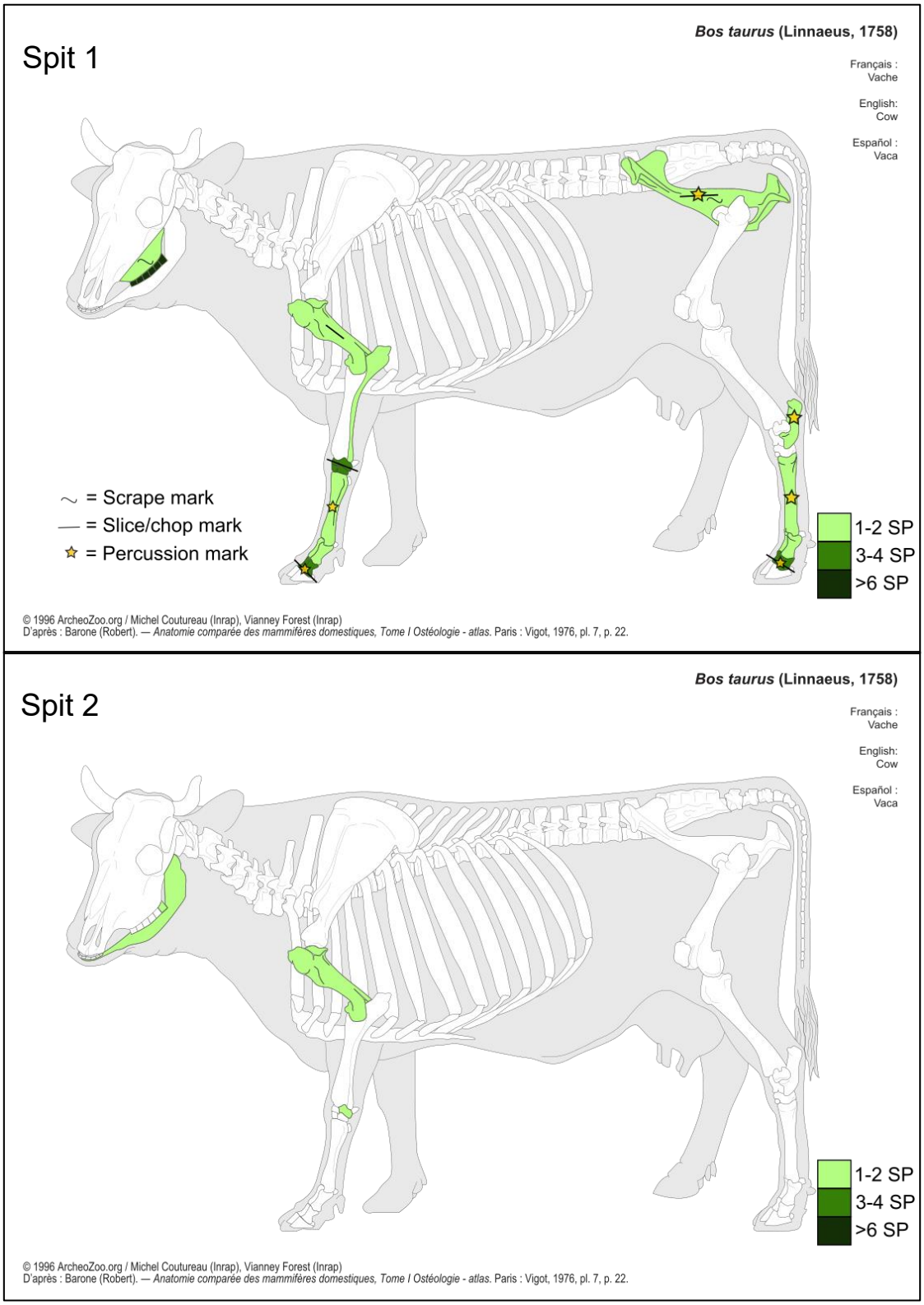


Figure 5.53: Skeletal element representation of bovid size class III remains from Central Area A, Spits 1 and 2. The diagram for Spit 1 also shows anthropogenic modifications

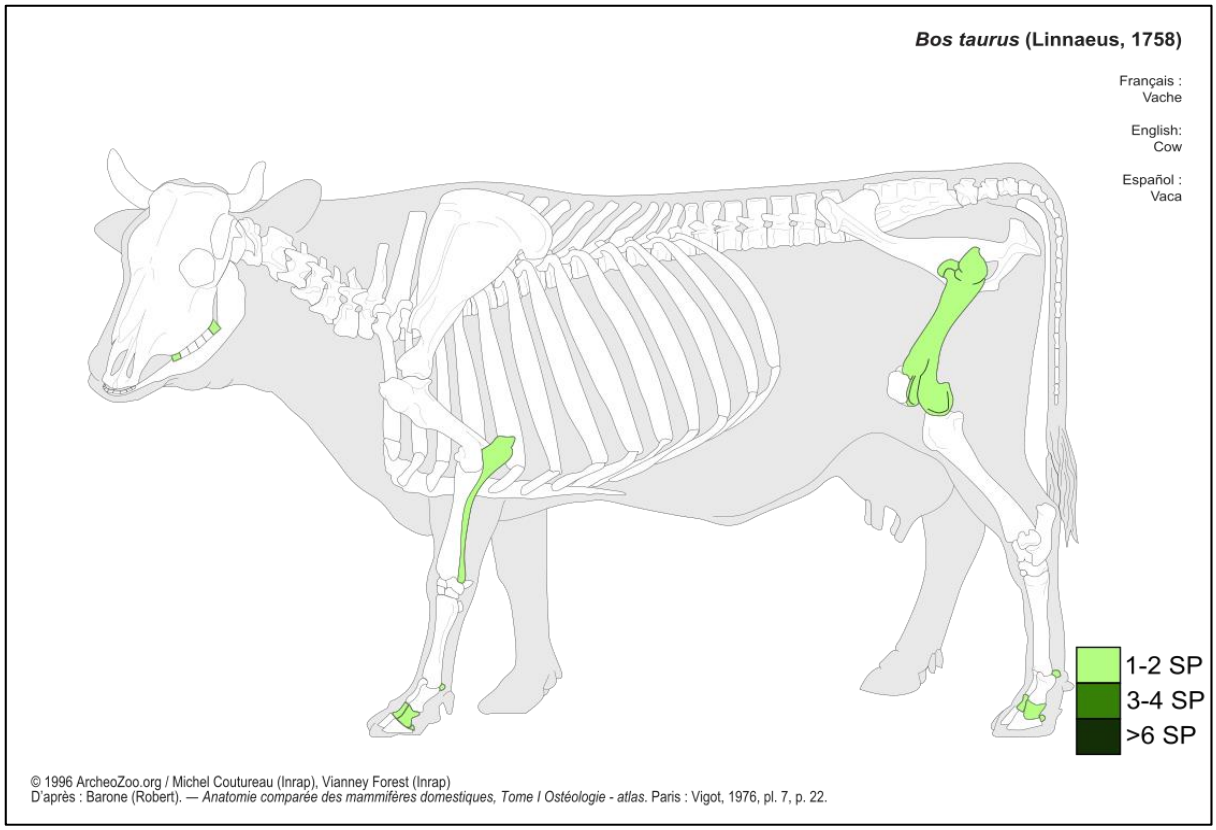


Figure 5.54: Skeletal element representation of bovid size class III remains from Central Area A, spit 3

Birds from spit 1 were represented by limb and wing elements (figure 5.55).

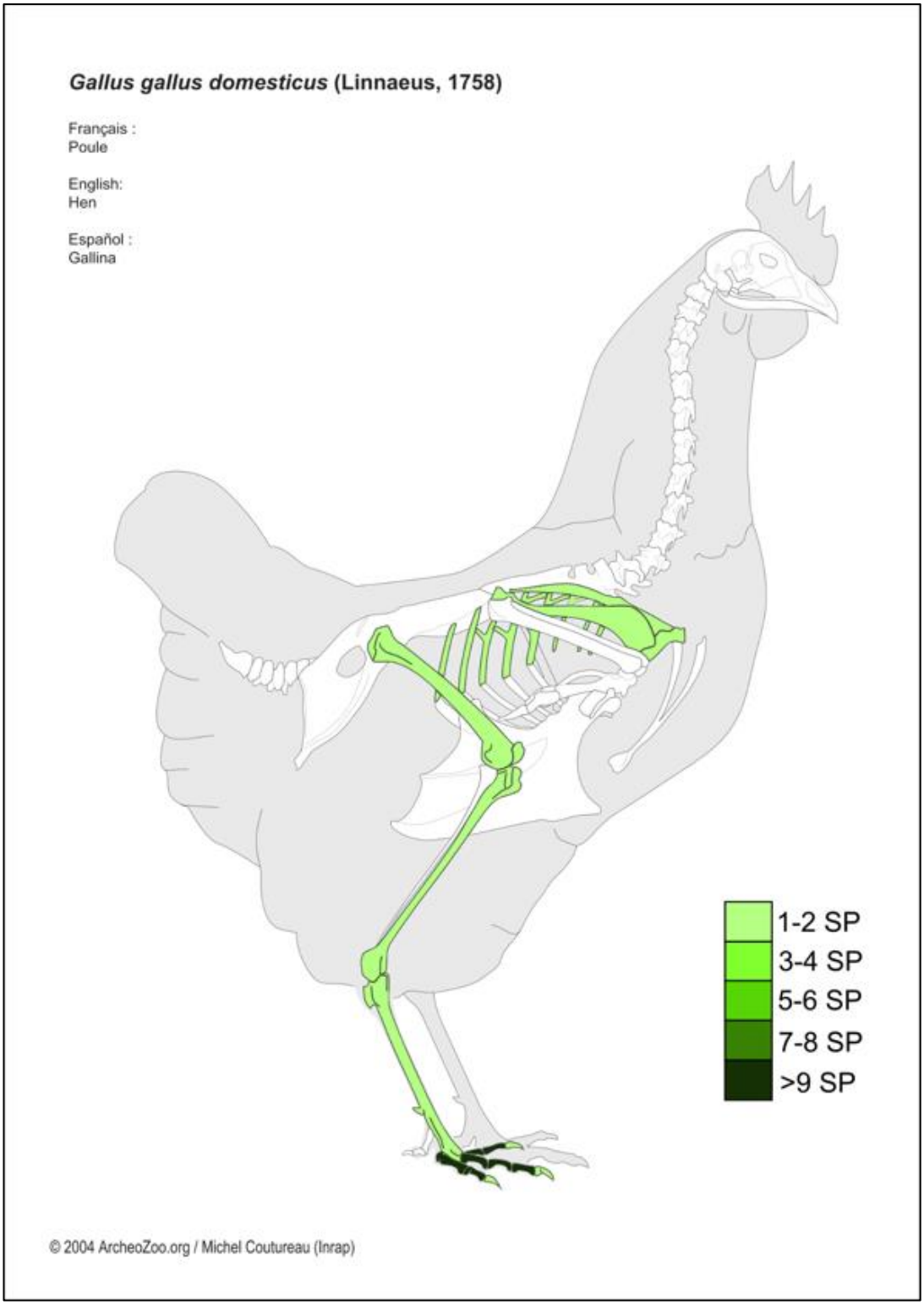


Figure 5.55: Skeletal element representation of bird remains from Central Area A, spit 1

The fish specimens from Central Area A (NISP = 789) were fewer than those from the two rock tanks, and 4% were burnt. Spit 1 had the most fish specimens (NISP = 650, including burnt bones) (figures 5.56 and 5.57).

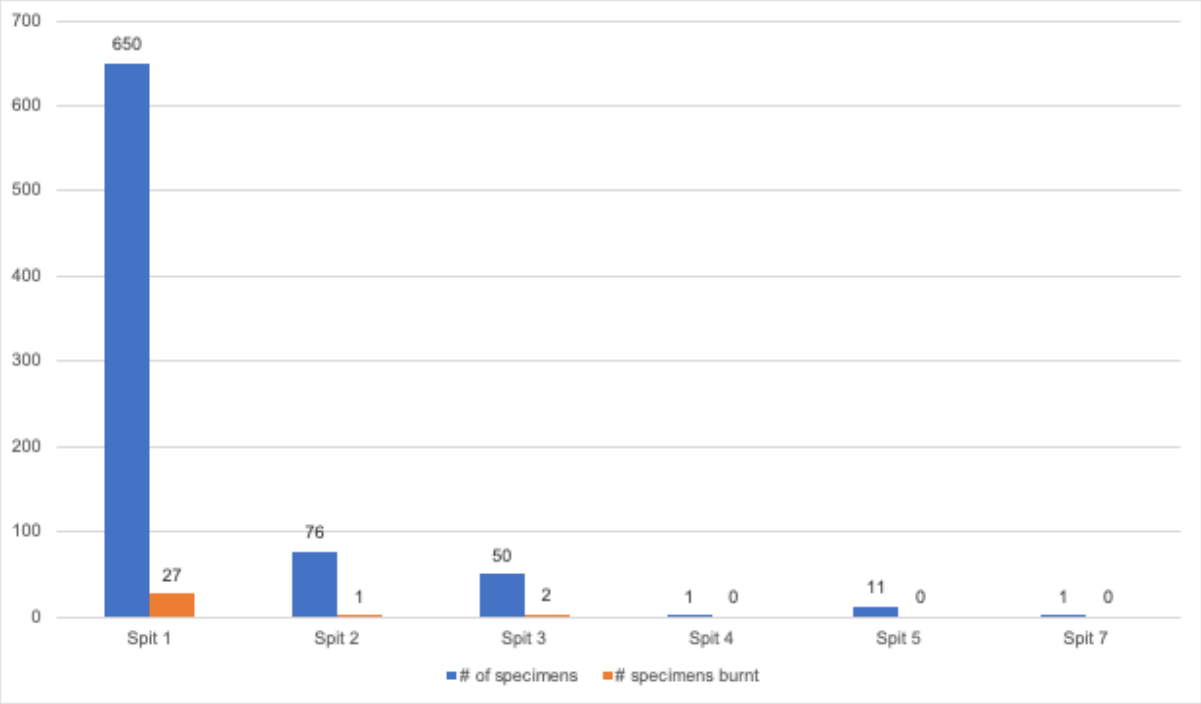


Figure 5.56: Frequency of fish remains from Central Area A, per spit. Burnt fish are indicated separately, and included in the total frequency per spit

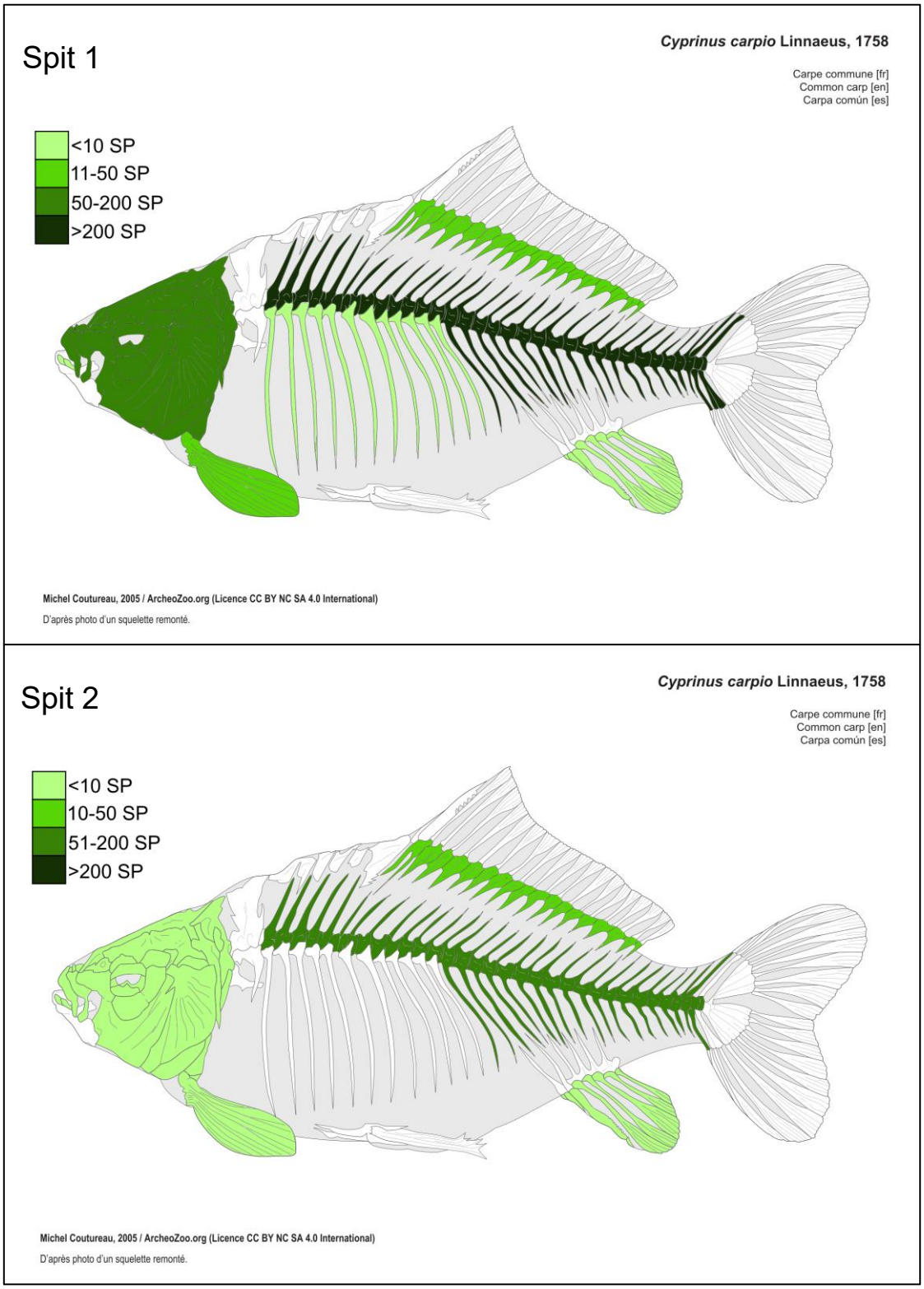


Figure 5.57: Skeletal element representation of fish remains from Central Area A, Spits 1 and 2

Bone surface modifications on identified specimens from Central Area A are proportionally the most numerous in spits 2, 3 and 4. Cut marks and tooth marks are proportionally the most numerous modifications (figure 5.58). Small mammal specimens have the most zoogenic modifications (tooth marks and acid etching).

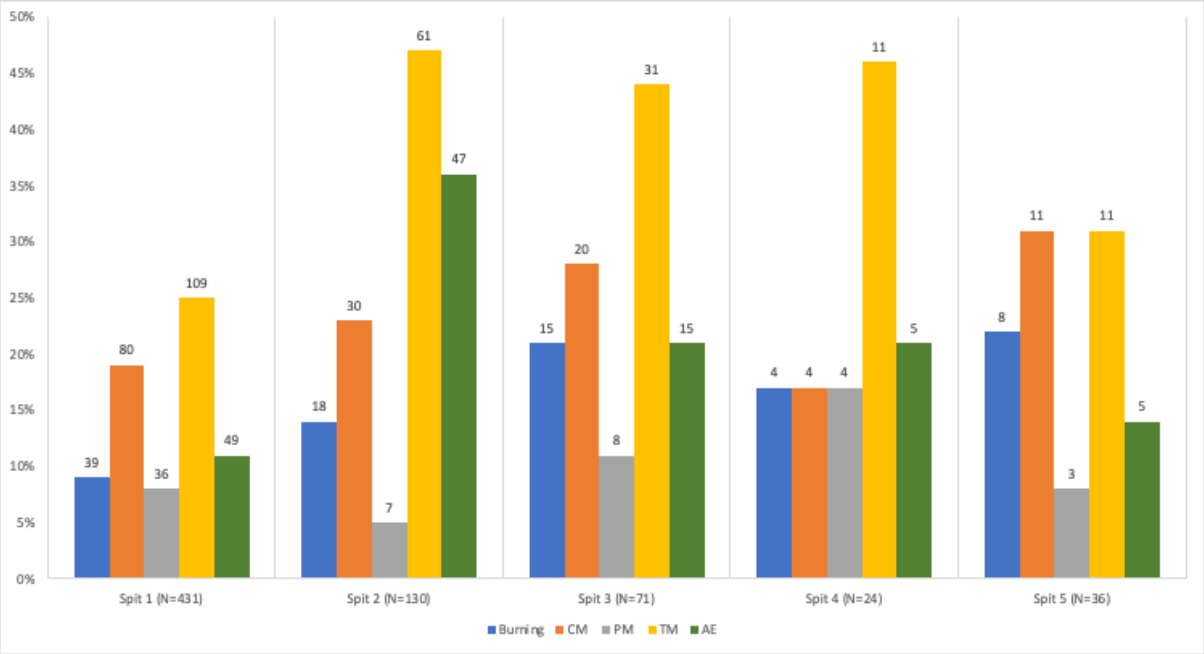


Figure 5.58: The bone surface modifications on all identified specimens from Central Area A, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks; TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Central Area A were not weathered at all (figure 5.59), however, the percentage of weathered specimens increased from spit 4 to spit 1, with the highest frequency of weathered specimens in Spit 1.

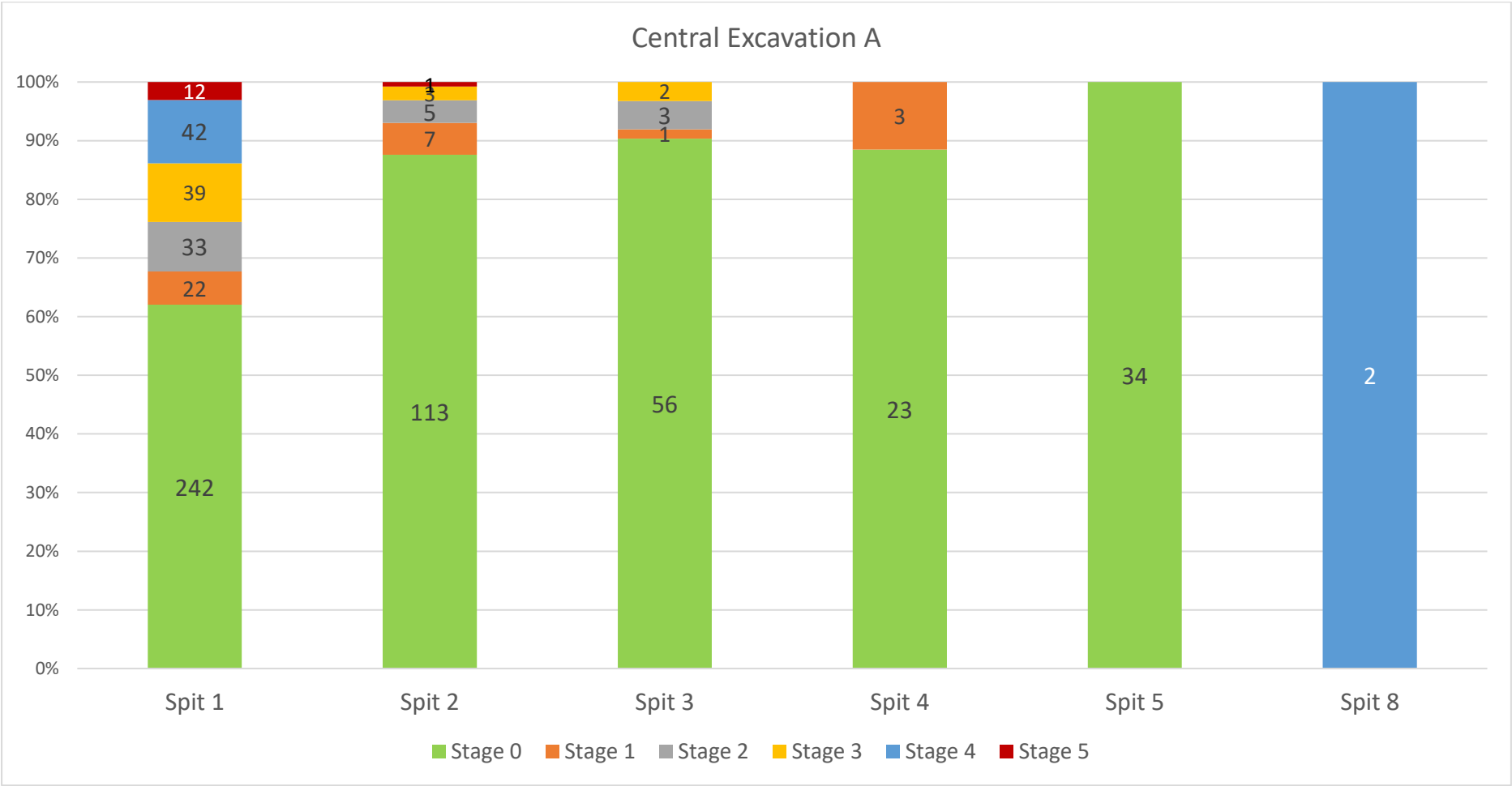


Figure 5.59: Weathering stages (Table 4.9) recorded for Central Area A, per spit

Eighty-six specimens from Central Area A were trampled and far fewer specimens had diagenic staining (NISP = 11). The majority of trampling marks were on specimens from Spit 3 (figure 5.60).

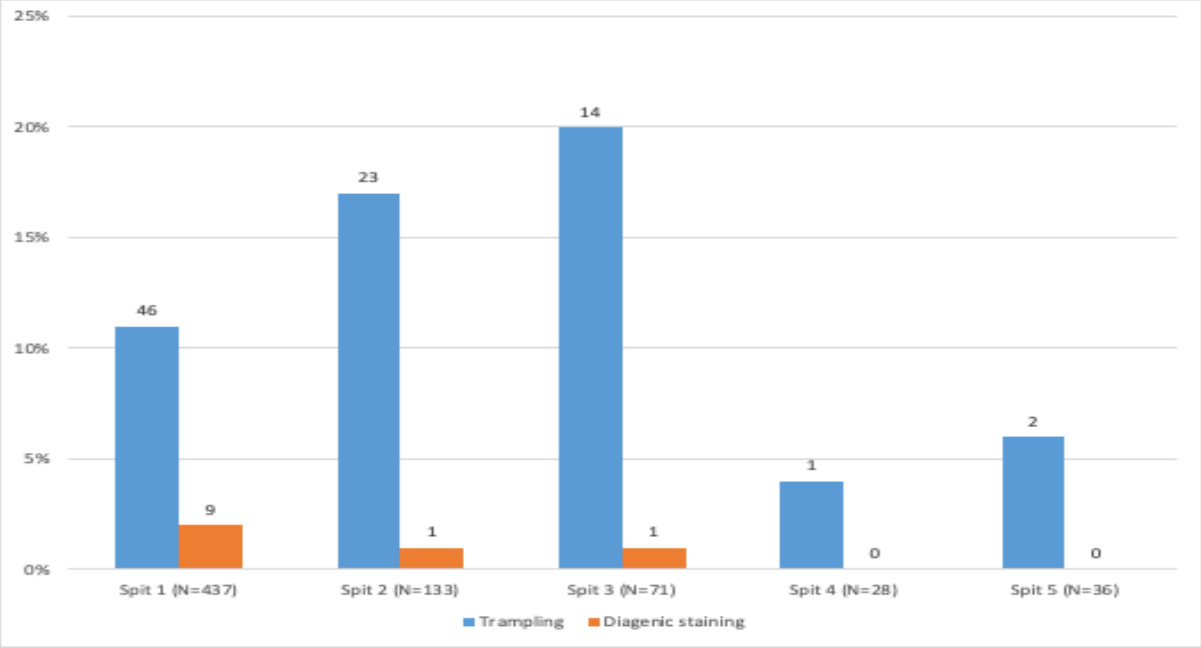


Figure 5.60: Trampling and diagenic staining recorded for Central Area A, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.3.4 Central Area B

The animals in Central Area B were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 1 to spit 2 (figure 5.61). Small mammals, including *Procavia capensis* (dassie) and *Pedetes capensis* (springhare), had the most zoogenic modifications. *Aepyceros melampus* (impala) were the most numerous of the identified bovid size class II specimens. Four *Ovis/Capra* (sheep/goat) specimens and the single *Bos* taurus (cattle) specimen were also identified. Important species identified were: *Alcelaphus buselaphus* (red hartebeest), *Tragelaphus scriptus* (bushbuck) and *Felis silvestris* (African wild cat).

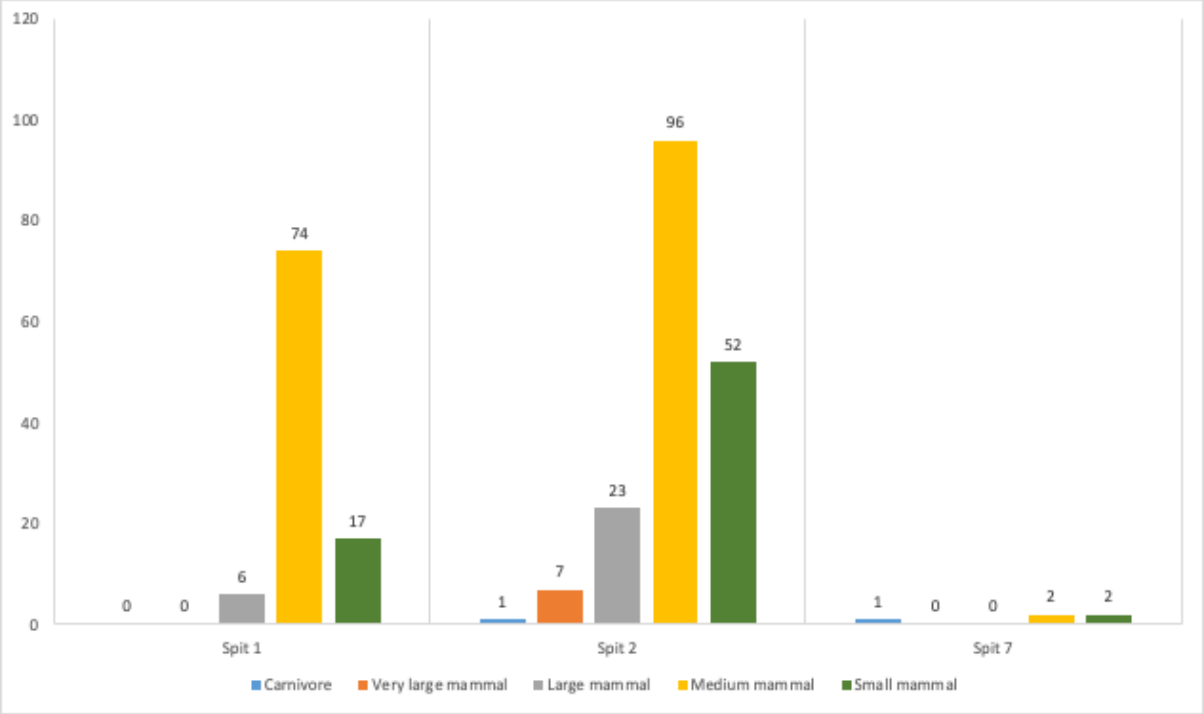


Figure 5.61: Animal distribution throughout Central Area B, per spit

Small and medium mammals from all spits were predominately represented by axial and cranial elements and very few limb specimens were present (figure 5.62). The anthropogenic modifications on medium mammal specimens were predominately located on axial elements and at limb joints.

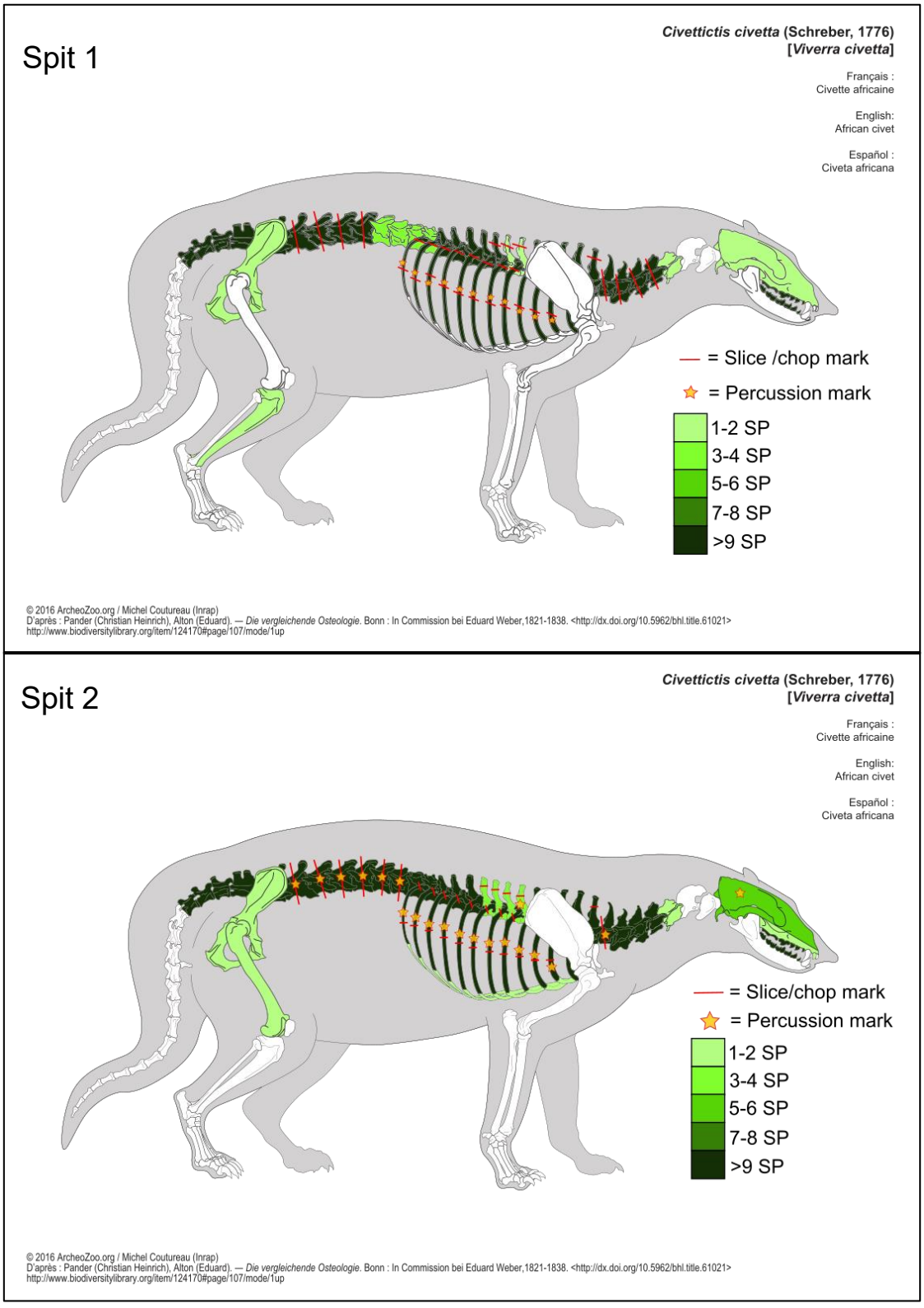


Figure 5.62: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area B, Spits 1 and 2

Bovid size class I from all spits were represented by fore- and hind-limb specimens and teeth (figure 63).

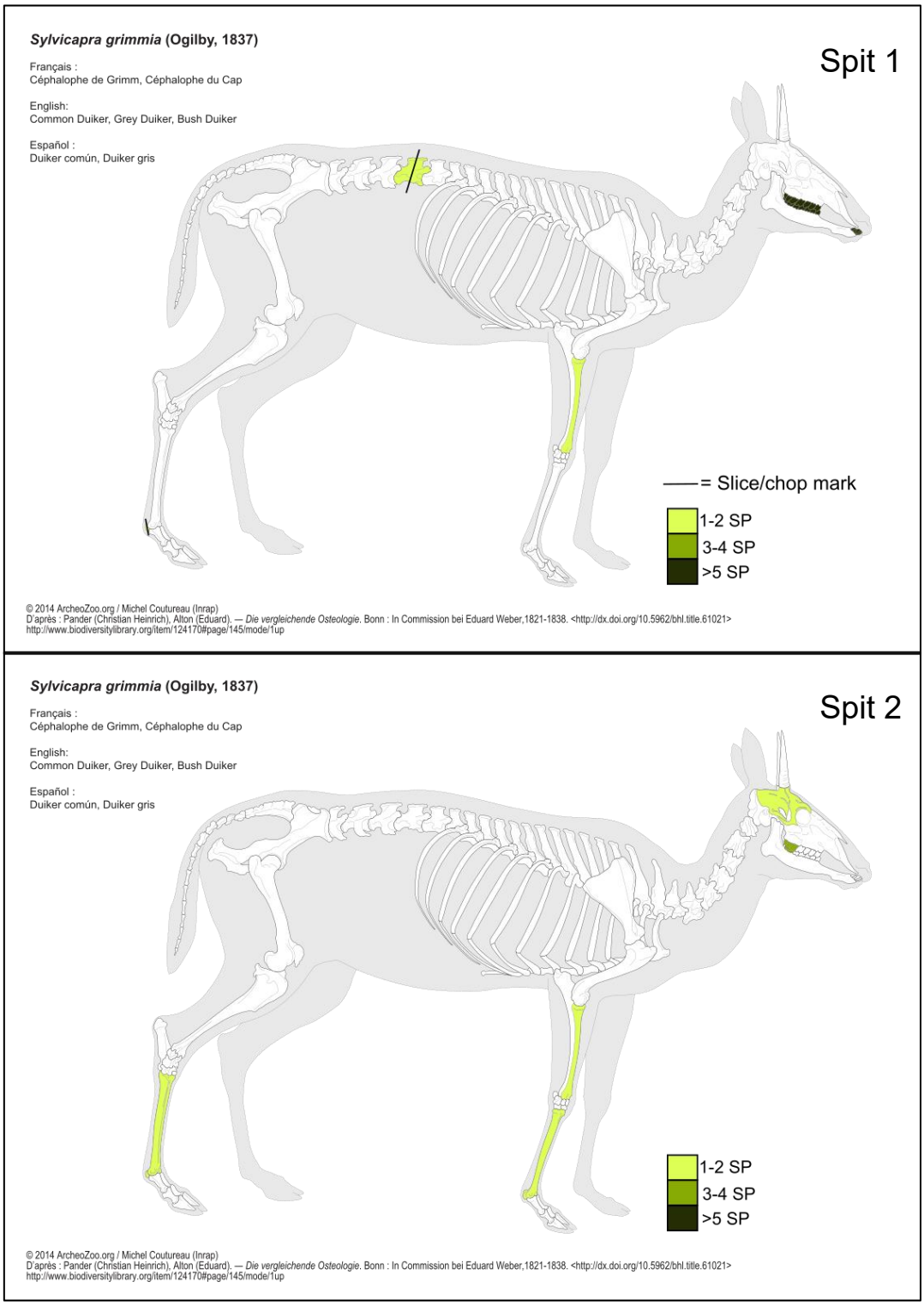


Figure 5.63: Skeletal element representation of bovid size class I remains from Central Area B, Spits 1 and 2. The diagram for Spit 1 also shows anthropogenic modifications

Bovid size class II from all spits were represented by fore- and hind-limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae and teeth (figure 5.64). Anthropogenic modifications on bovid size class II specimens occurred at limb joints and along long bone shafts.

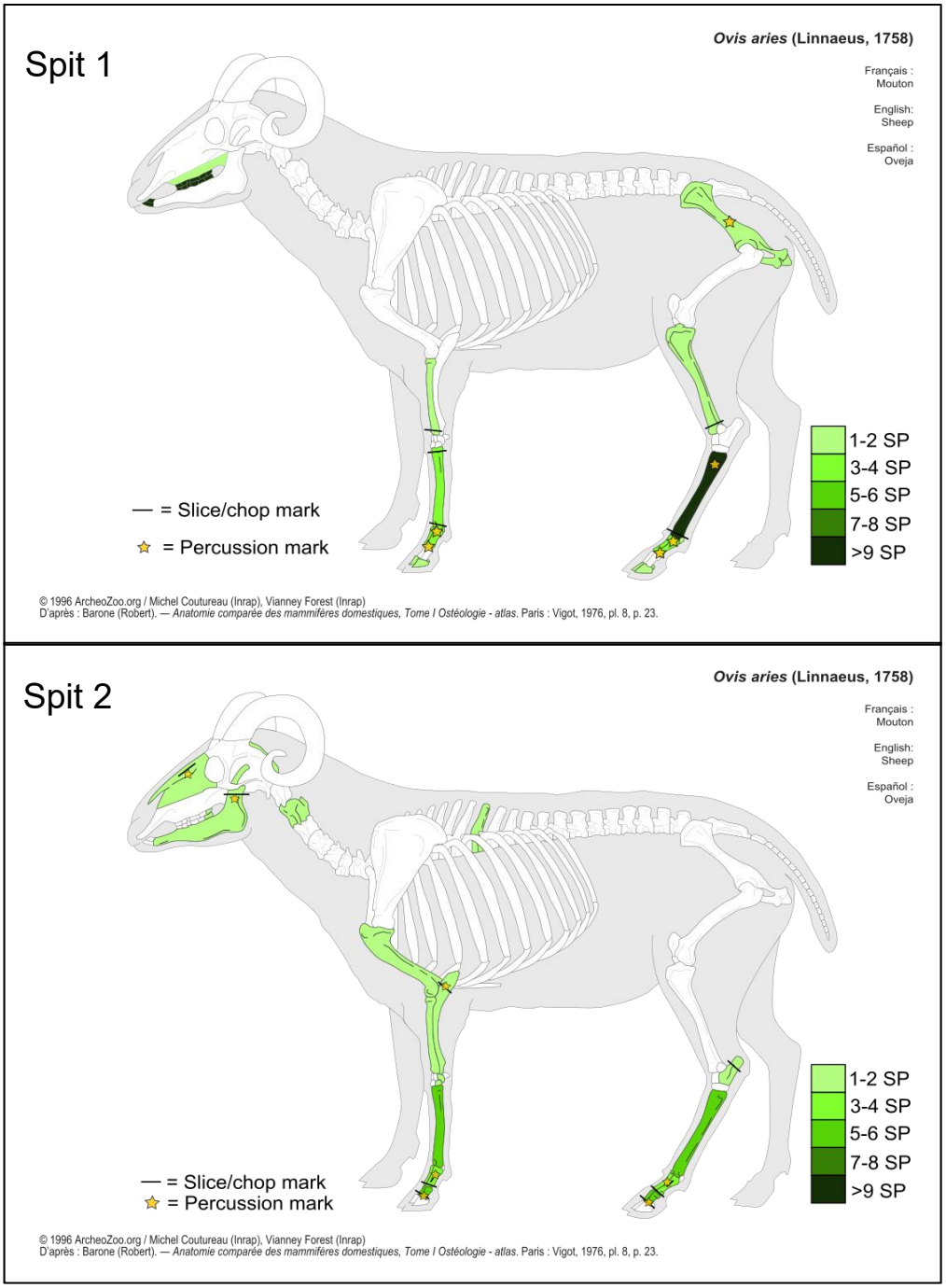


Figure 5.64: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area B, Spits 1 and 2

The skeletal element representation for bovid size class III was very similar to that of bovid size class I and II from Central Area B (figure 5.65. The anthropogenic modifications on bovid size class III specimens were also very similar to those in bovid size class I and II.

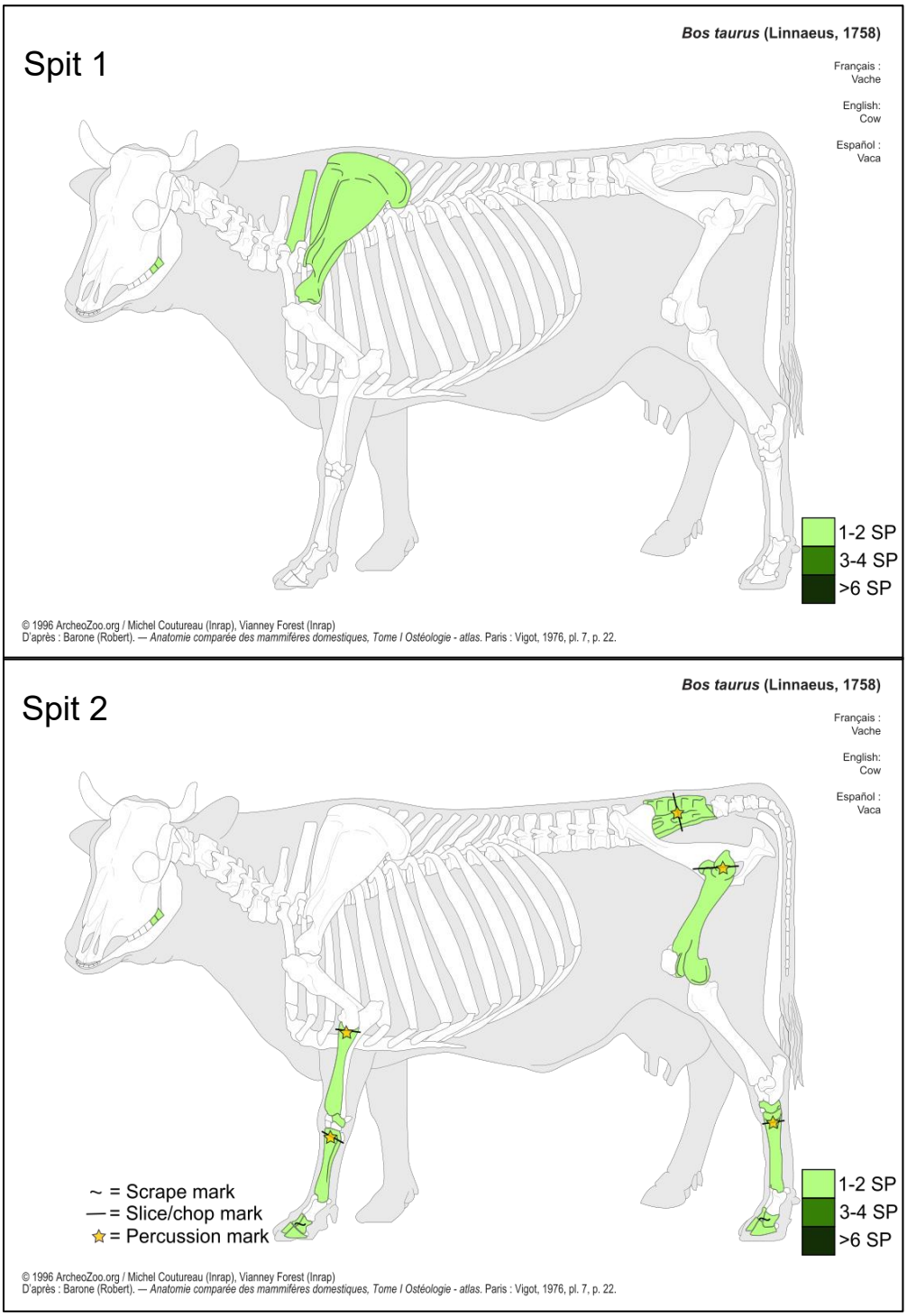


Figure 5.65: Skeletal element representation of bovid size class I remains from Central Area B, Spits 1 and 2. The diagram for Spit 2 also shows anthropogenic modifications

Birds from spit 2 were represented by limb and wing elements (see figure 5.66).

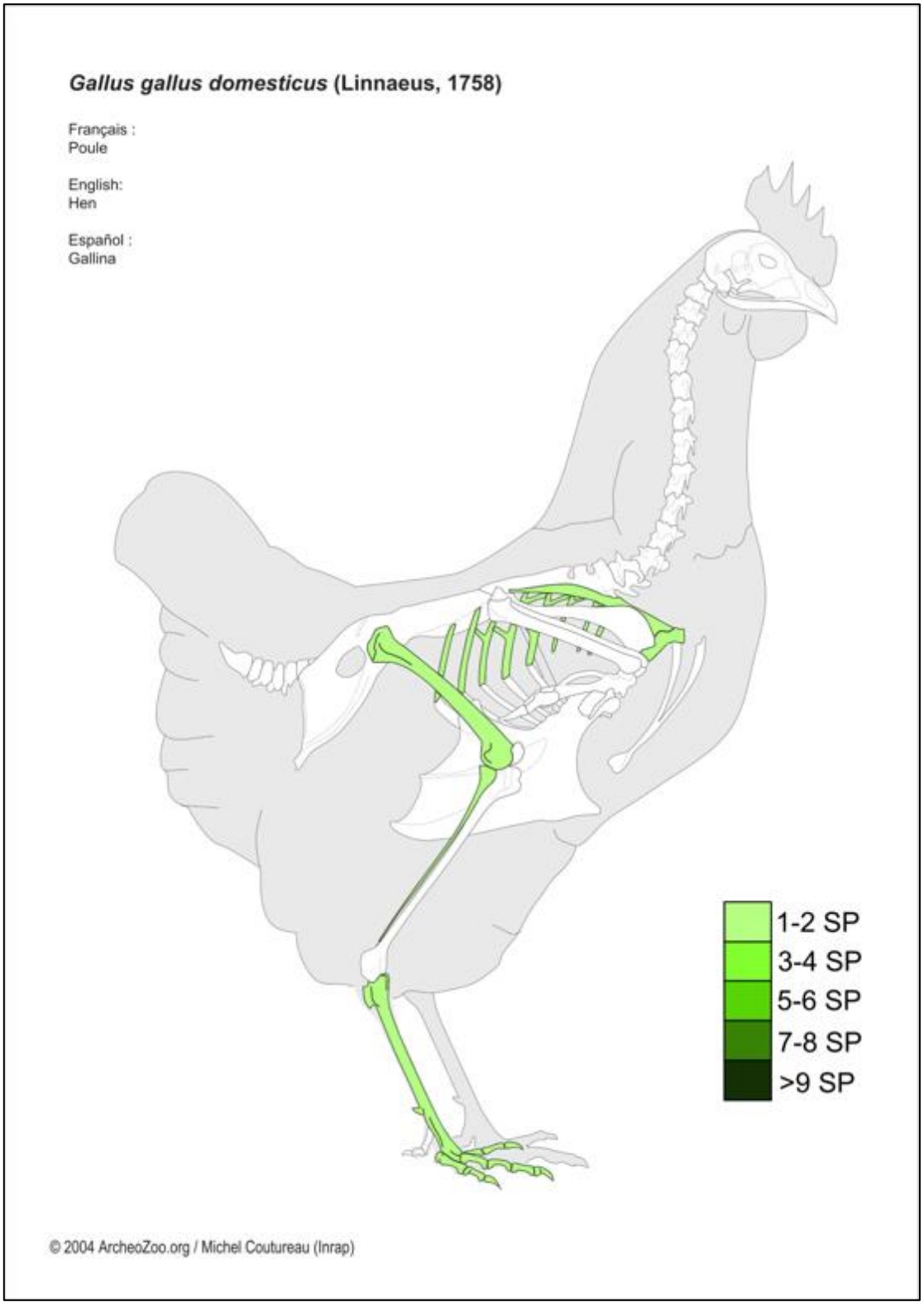


Figure 5.66: Skeletal element representation of bird remains from Central Area B, spit 2

The fish specimens from Central Area B were again fewer than those from the two rock tanks (NISP = 300) and 8% were burnt. Spit 2 has the most fish specimens (NISP = 225) (figures 5.67 and 5.68).

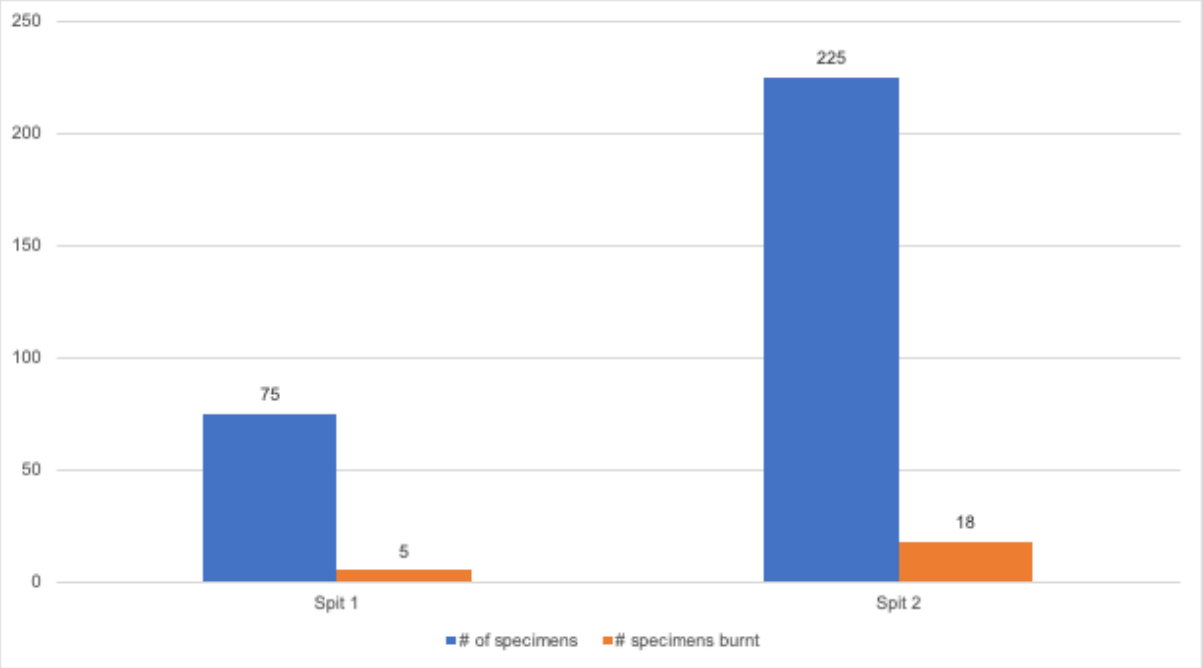


Figure 5.67: Frequency of fish from Central Area B, per spit. Burnt fish are indicated separately, and included in the total frequency per spit

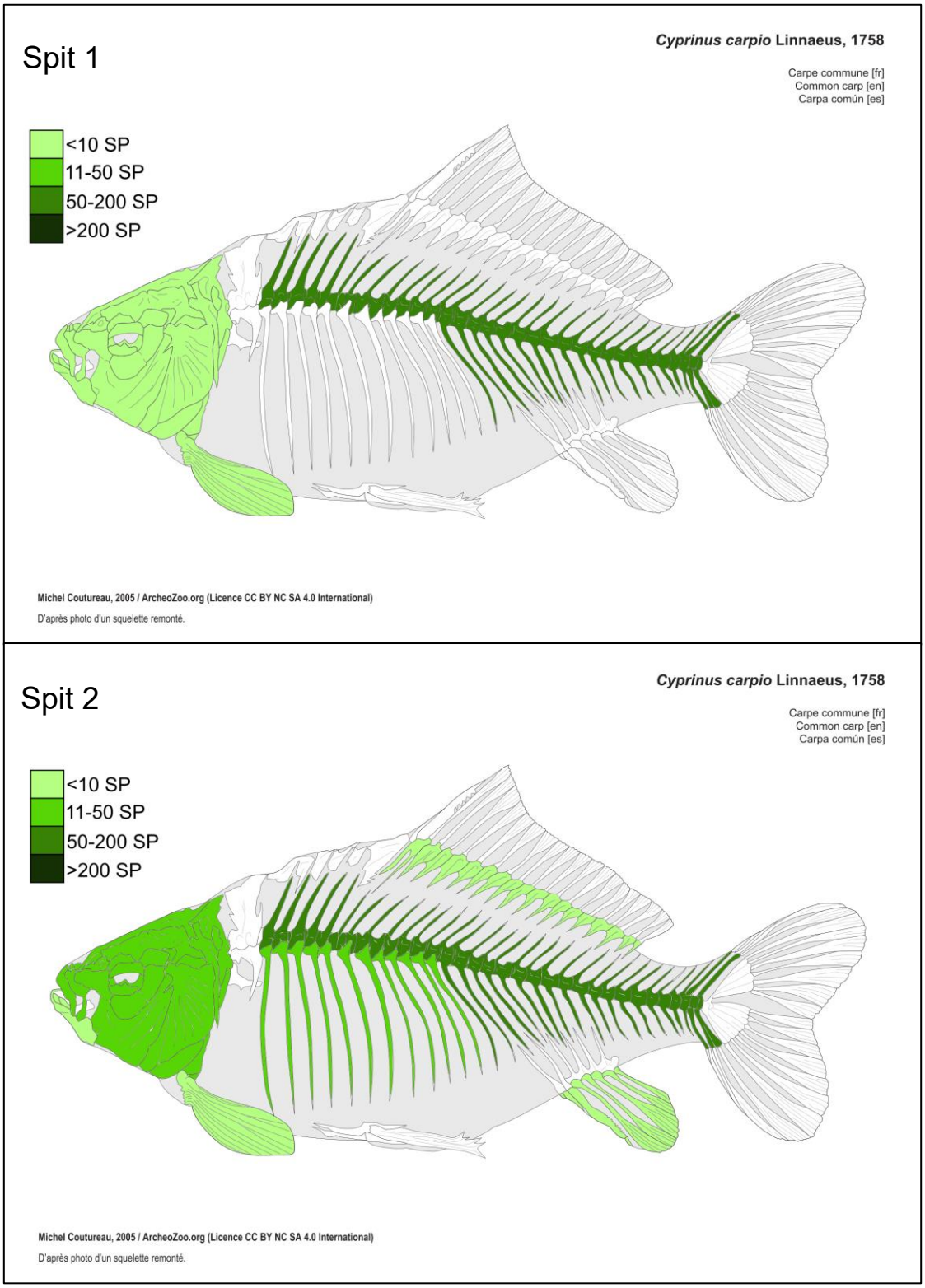


Figure 5.68: Skeletal element representation of fish remains from Central Area B, Spits 1 and 2

Specimens with bone surface modifications from Central Area B were the most numerous in spit 2. Cut marks and tooth marks were the most numerous modifications (figure 5.69) as well as burning. Small mammal specimens had the most zoogenic modifications (tooth marks and acid etching).

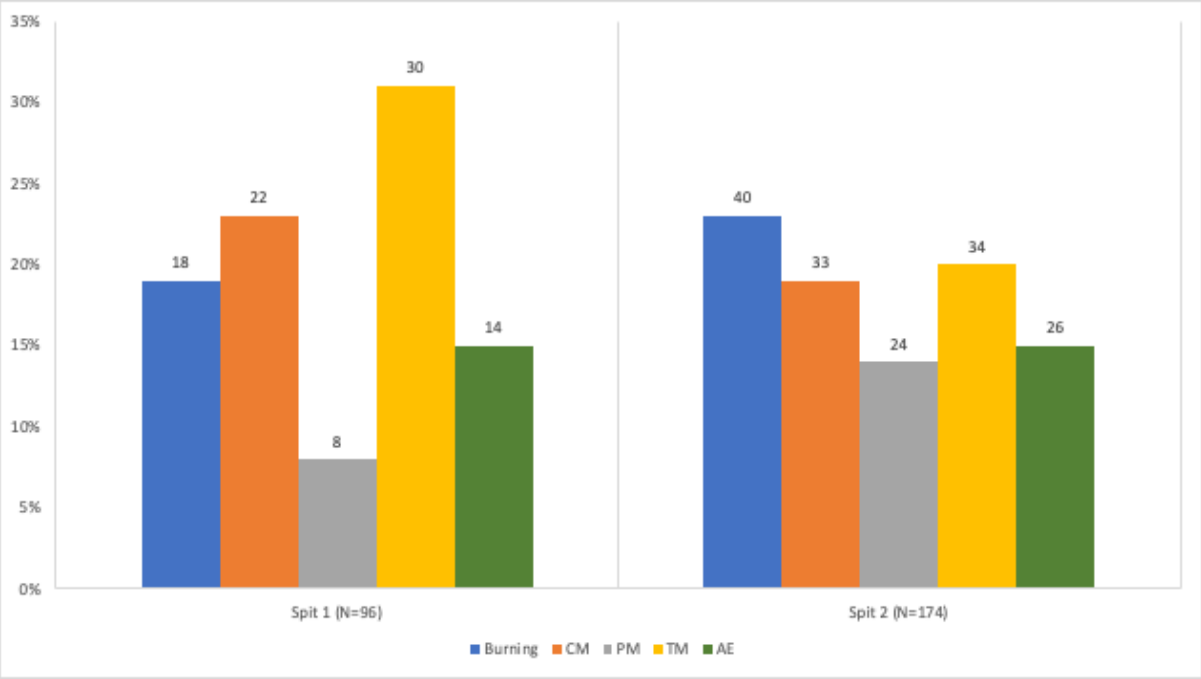


Figure 5.69: The bone surface modifications on all identified specimens from Central Area B, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Central Area B were not weathered at all (see figure 5.70). The proportion of weathered specimens in spit 1 is greater than from spits 2 and 7.

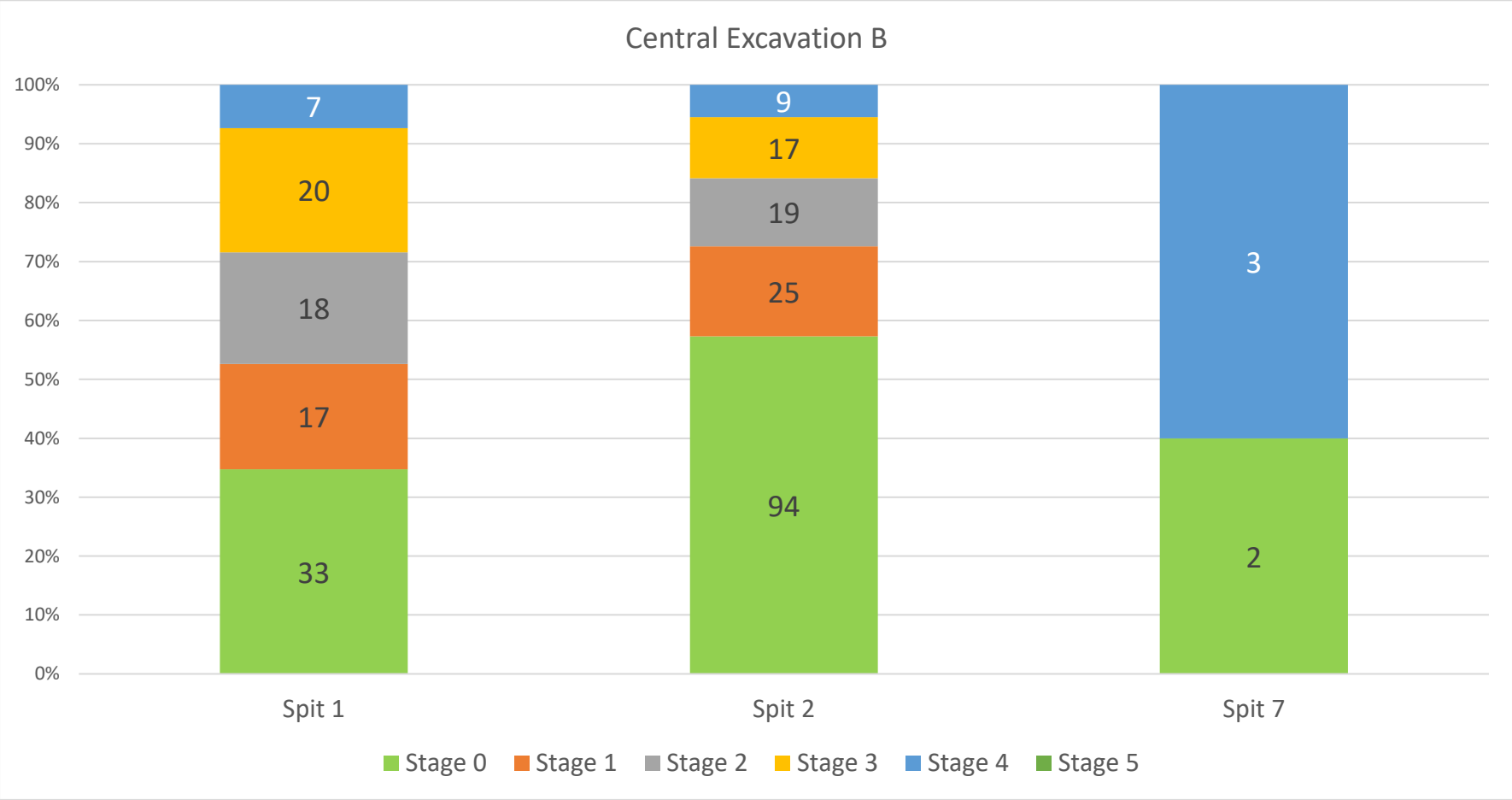


Figure 5.70: Weathering stages recorded for Central Area B, per spit

Seventy-five specimens from Central Area B were trampled and 24 specimens had diagenic staining. Proportionally more specimens from Spit 1 were trampled (see figure 5.71).

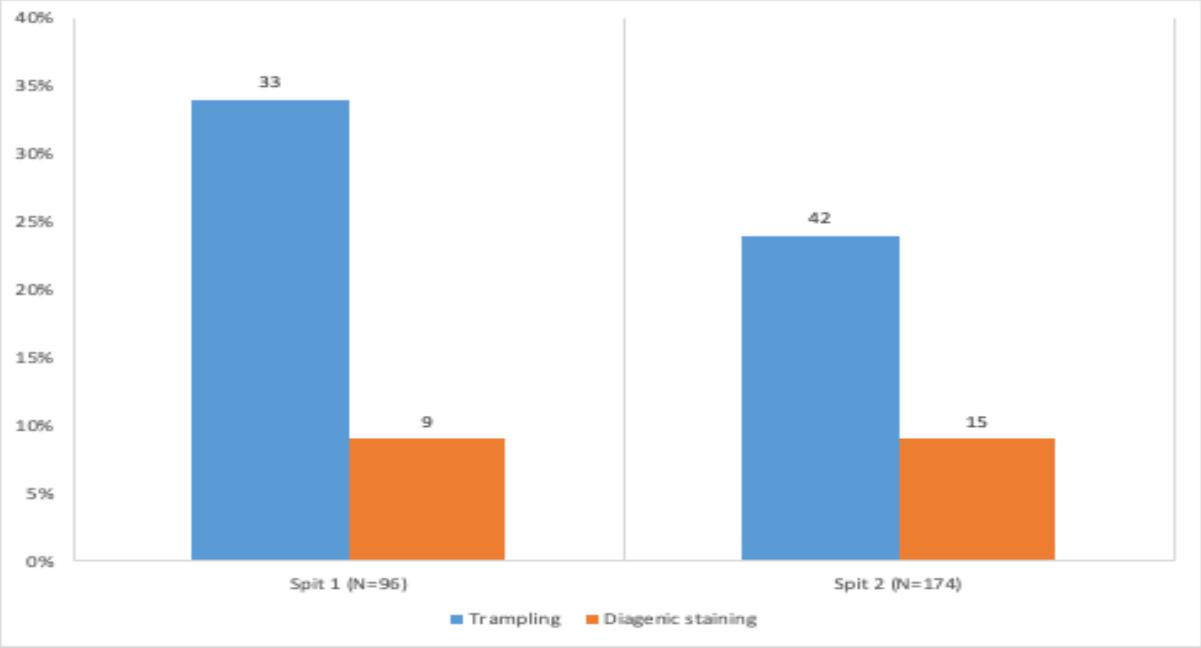


Figure 5.71: Trampling and diagenic staining recorded for Central Area B, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.3.5 Central Area C

The animals in Central Area C were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 2 to spit 3 (figure 5.72). Small mammals, including *Procavia capensis* (dassie) and *Pedetes capensis* (springhare), had the most zoogenic modifications. Medium mammals were the most numerous specimens from Central Area C. *Aepyceros melampus* (impala) were the most numerous of the identified bovid size class II specimens. There were four *Ovis/Capra* (sheep/goat) specimens and a single *Bos taurus* (cattle) specimen was also identified. Other important species identified were: *Equus quagga* (plains zebra), *Hippopotamus amphibius* (hippopotamus), *Giraffa camelopardalis* (giraffe), *Tragelaphus oryx* (eland), *Hippotragus niger* (sable), *Hippotragus equinus* (roan) and Accipitridae sp.

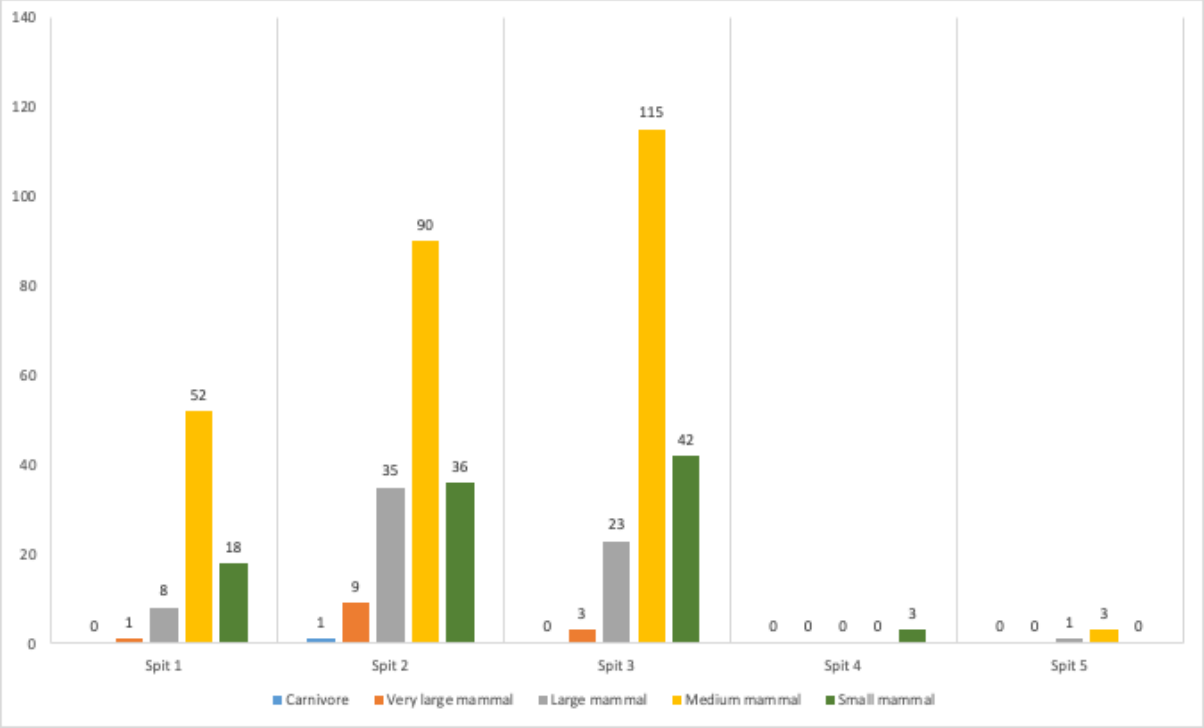


Figure 5.72: Animal distribution throughout Central Area C, per spit

Small and medium mammals from all spits were predominately represented by axial and cranial elements with very few limb specimens (see figure 5.73 for small mammals and figures 5.74 and 5.75 for medium mammals). The anthropogenic modifications on medium mammal specimens were predominately located on axial elements and at limb joints.

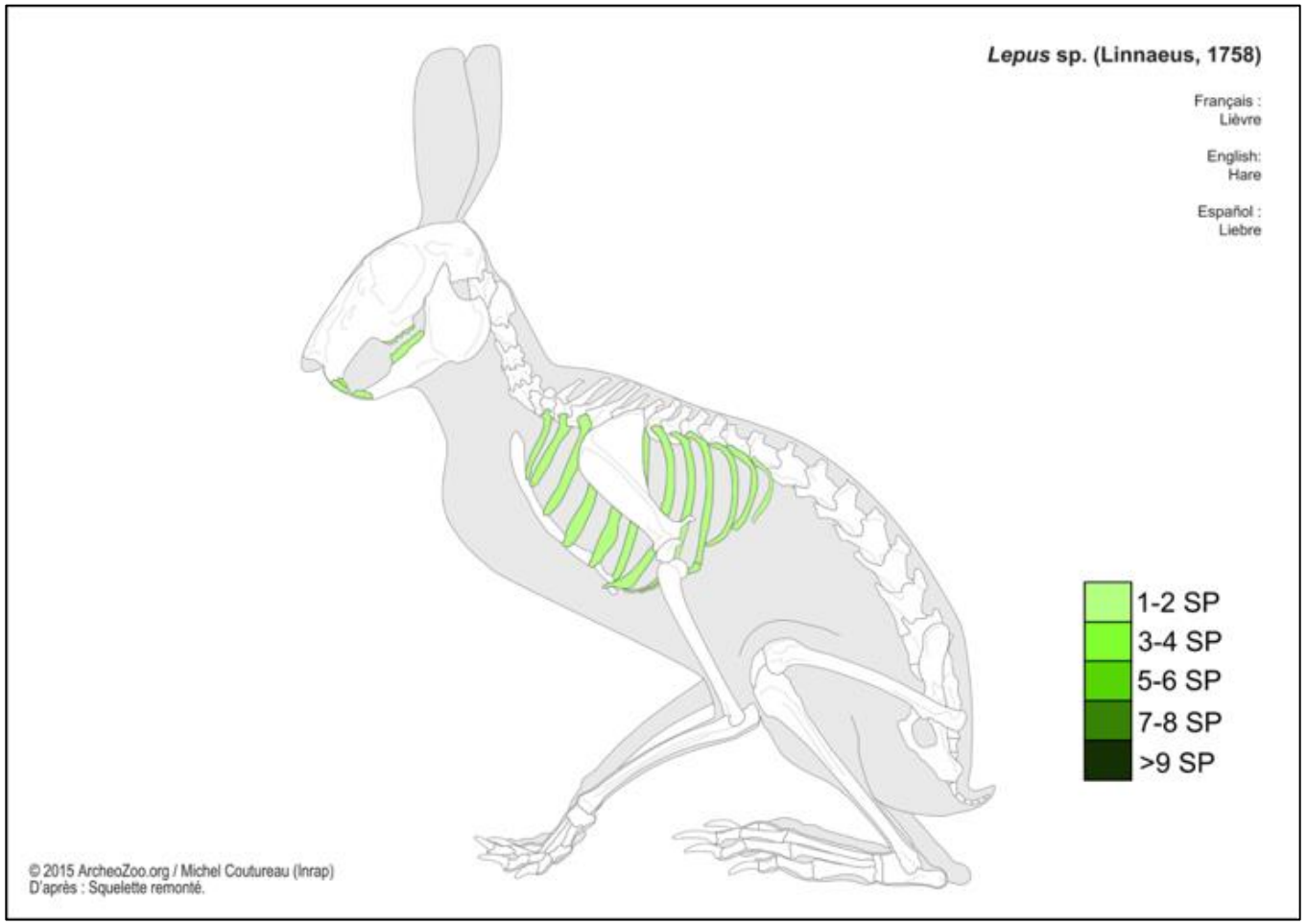


Figure 5.73: Skeletal element representation of small mammal remains from Central Area C, spit 2

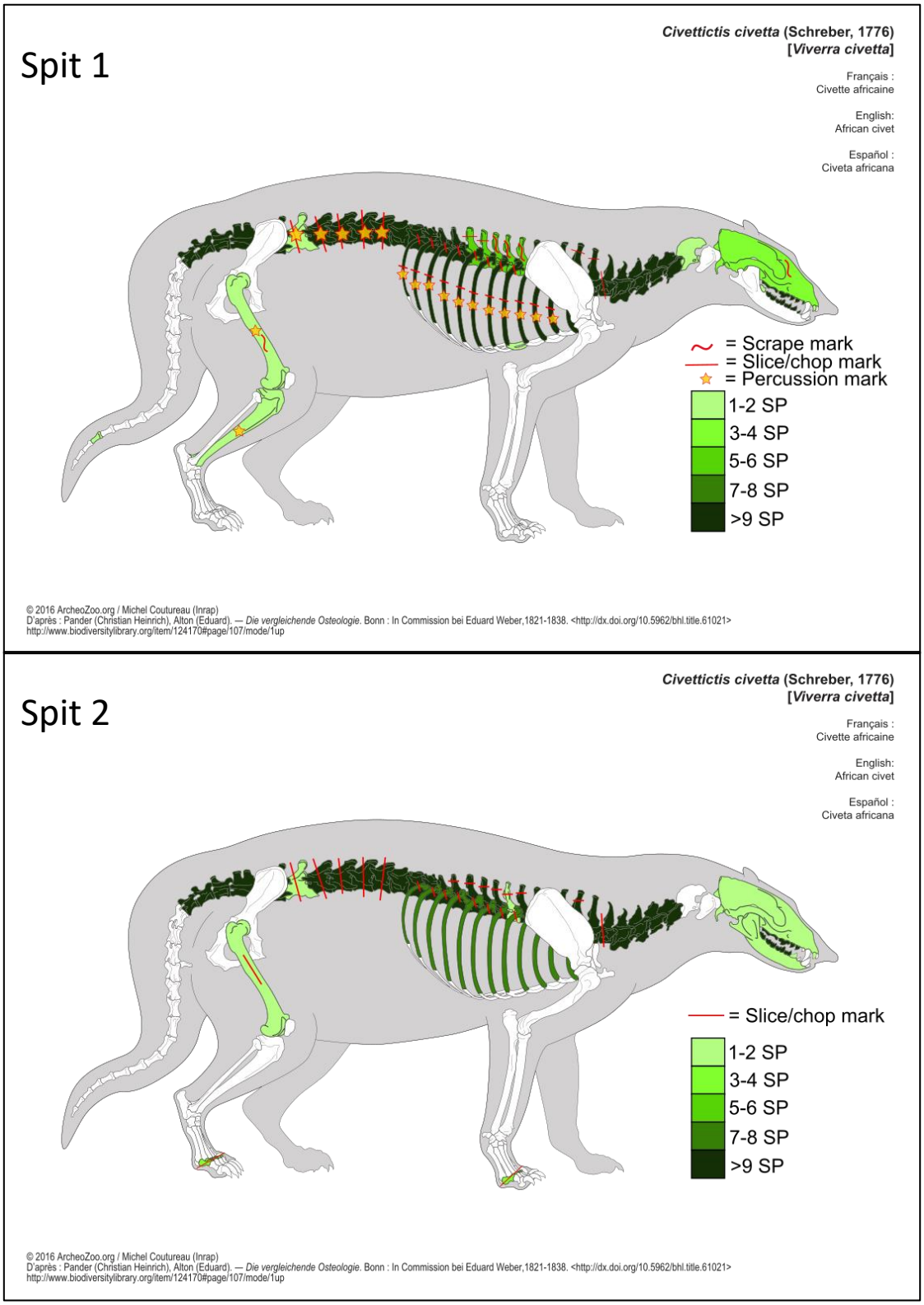


Figure 5.74: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area C, Spits 1 and 2

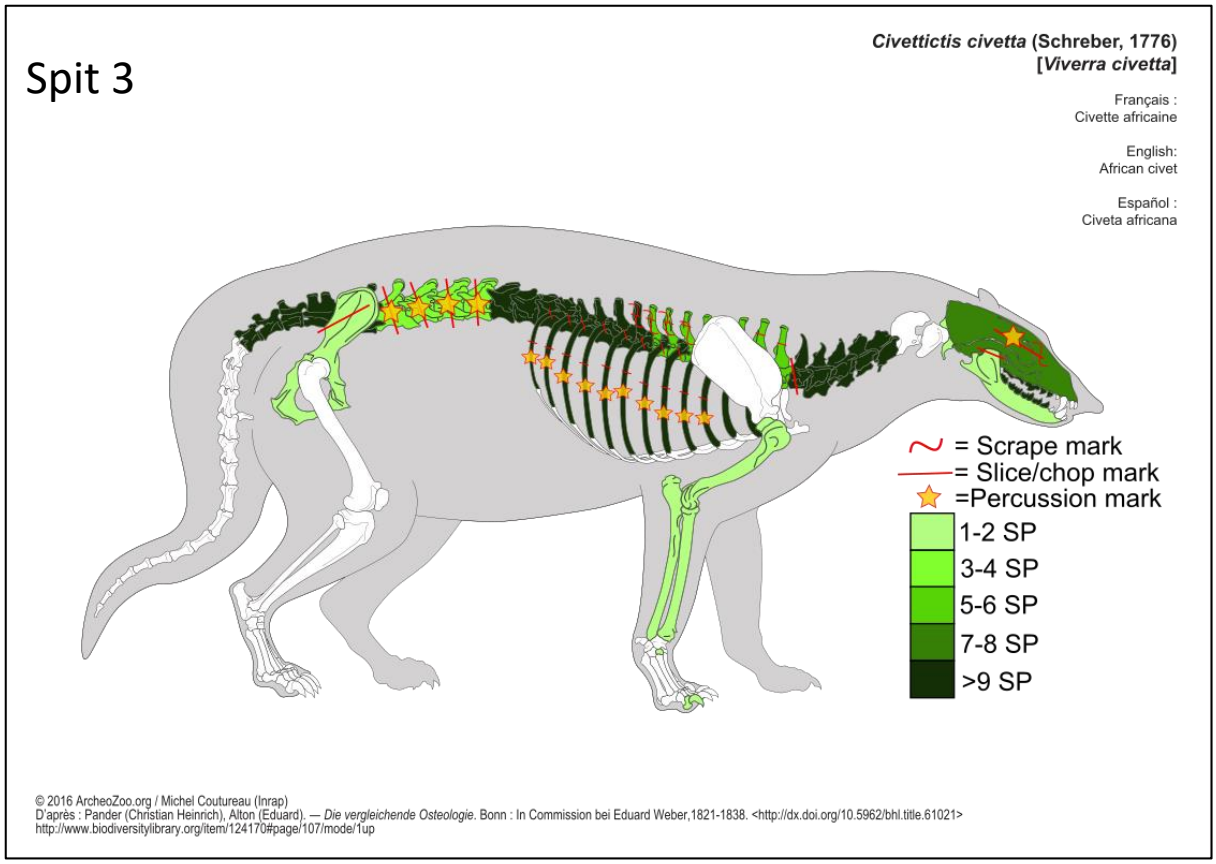


Figure 5.75: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area C, Spit 3

Bovid size class I from all spits were represented by fore- and hind-limb specimens, teeth, maxillae, and mandibles (see figures 5.76 and 5.77). The anthropogenic modifications on bovid size class I specimens occurred at limb joints.

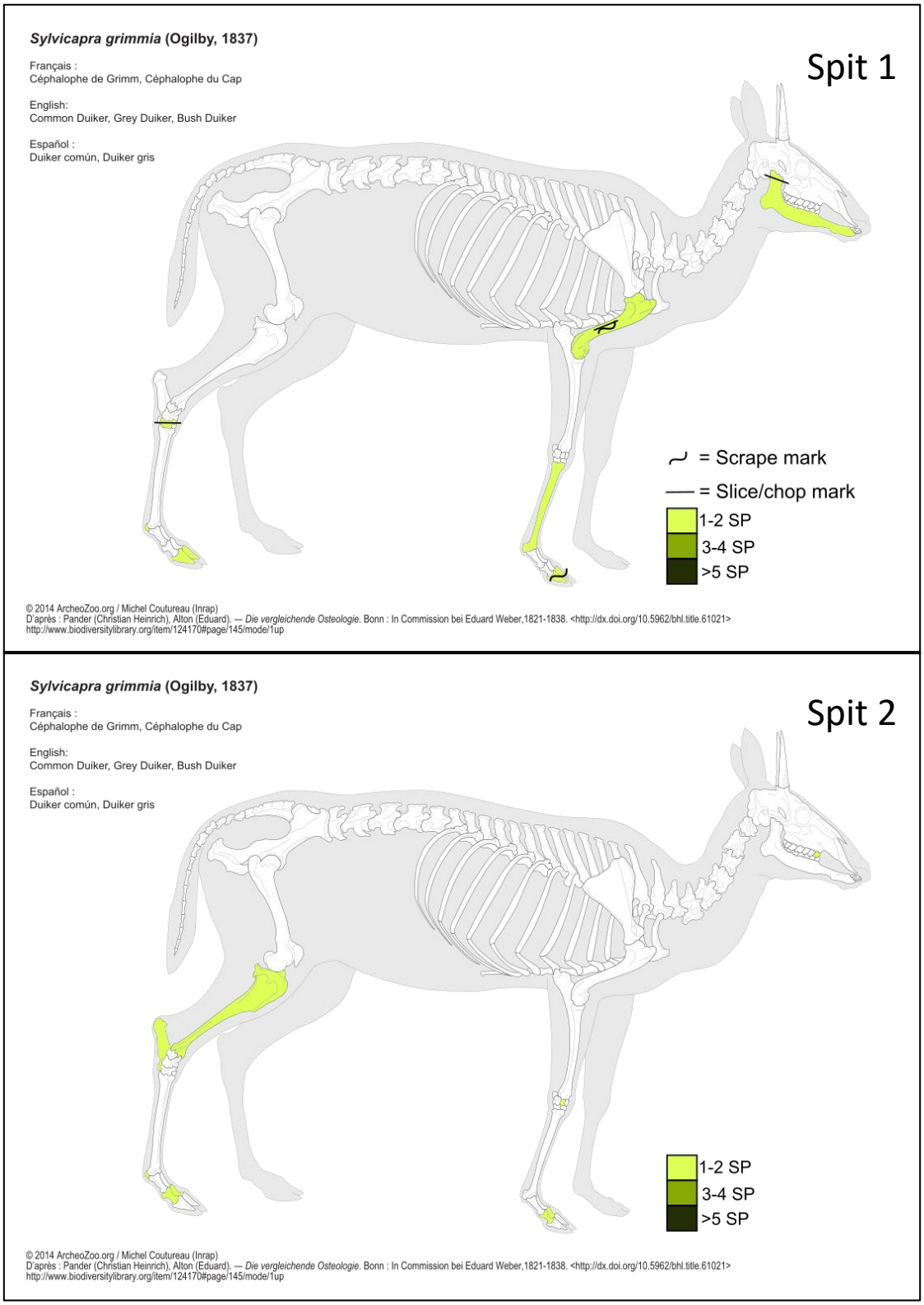


Figure 5.76: Skeletal element representation of bovid size class I remains from Central Area C, Spits 1 and 2. The diagram for Spit 1 also shows anthropogenic modifications

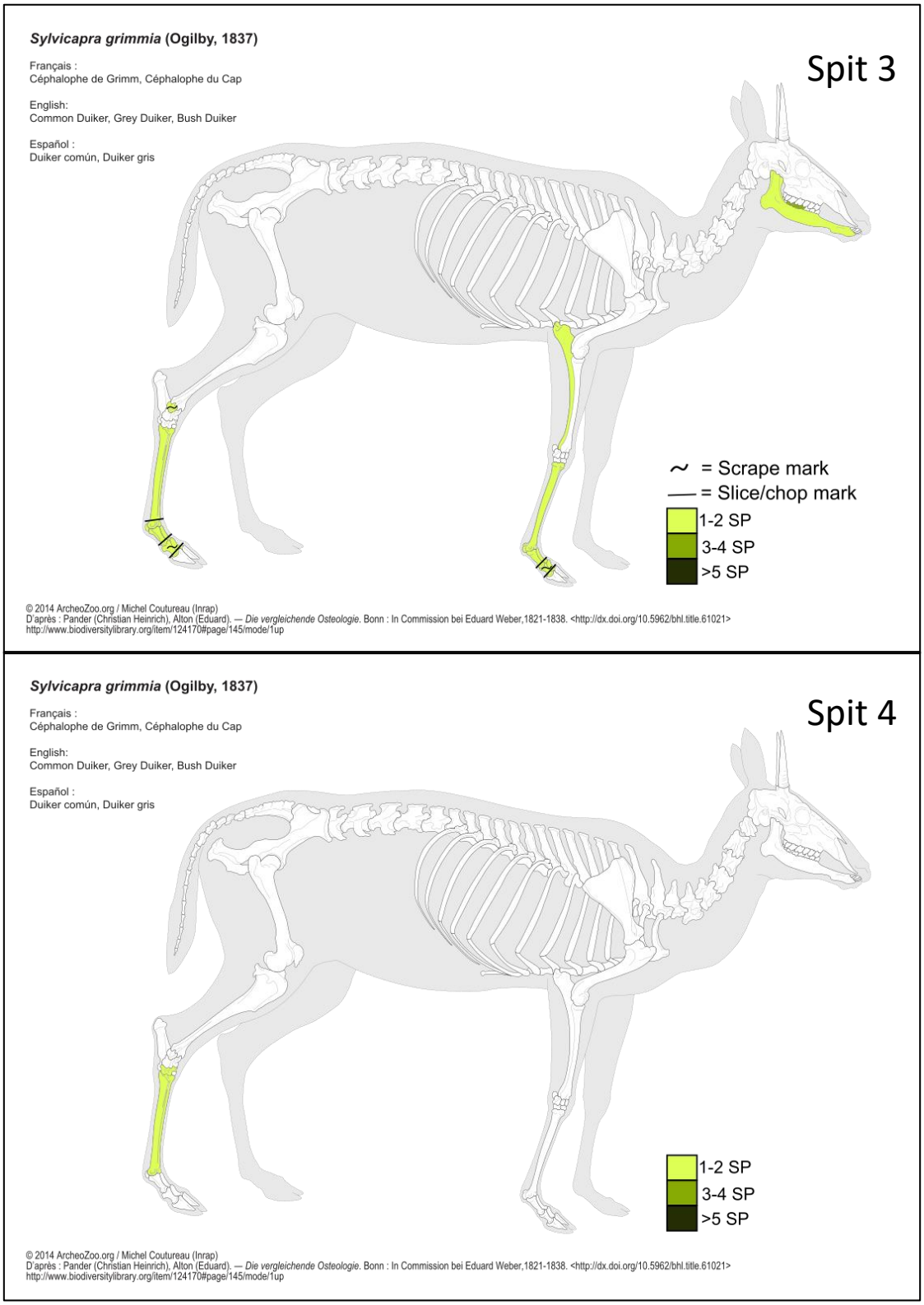


Figure 5.77: Skeletal element representation of bovid size class I remains from Central Area C, Spits 3 and 4. The diagram for Spit 3 also shows anthropogenic modifications

Bovid size class II from all spits were represented by fore- and hind-limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae, and teeth (see figures 5.78 and 5.79). Anthropogenic modifications on bovid size class II specimens occurred at limb joints and along long bone shafts.

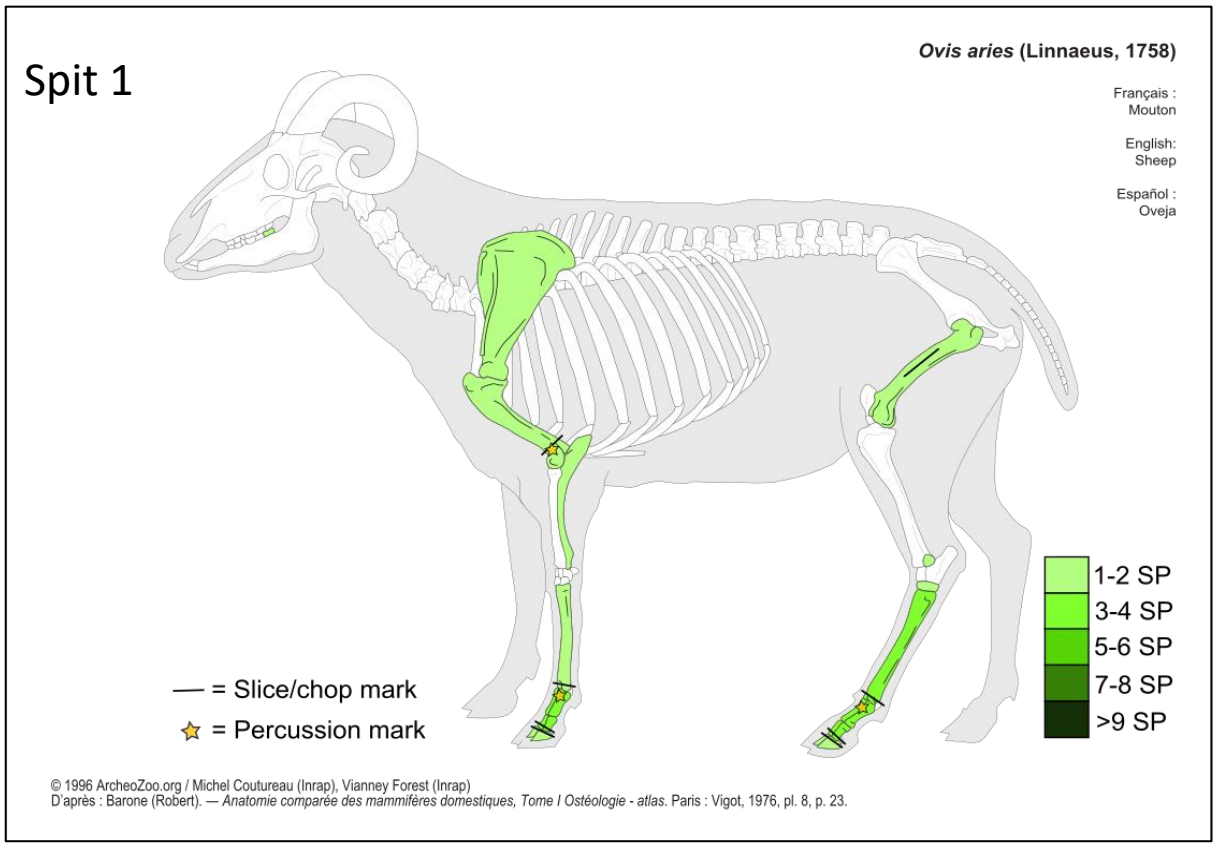


Figure 5.78: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area C, Spit 1

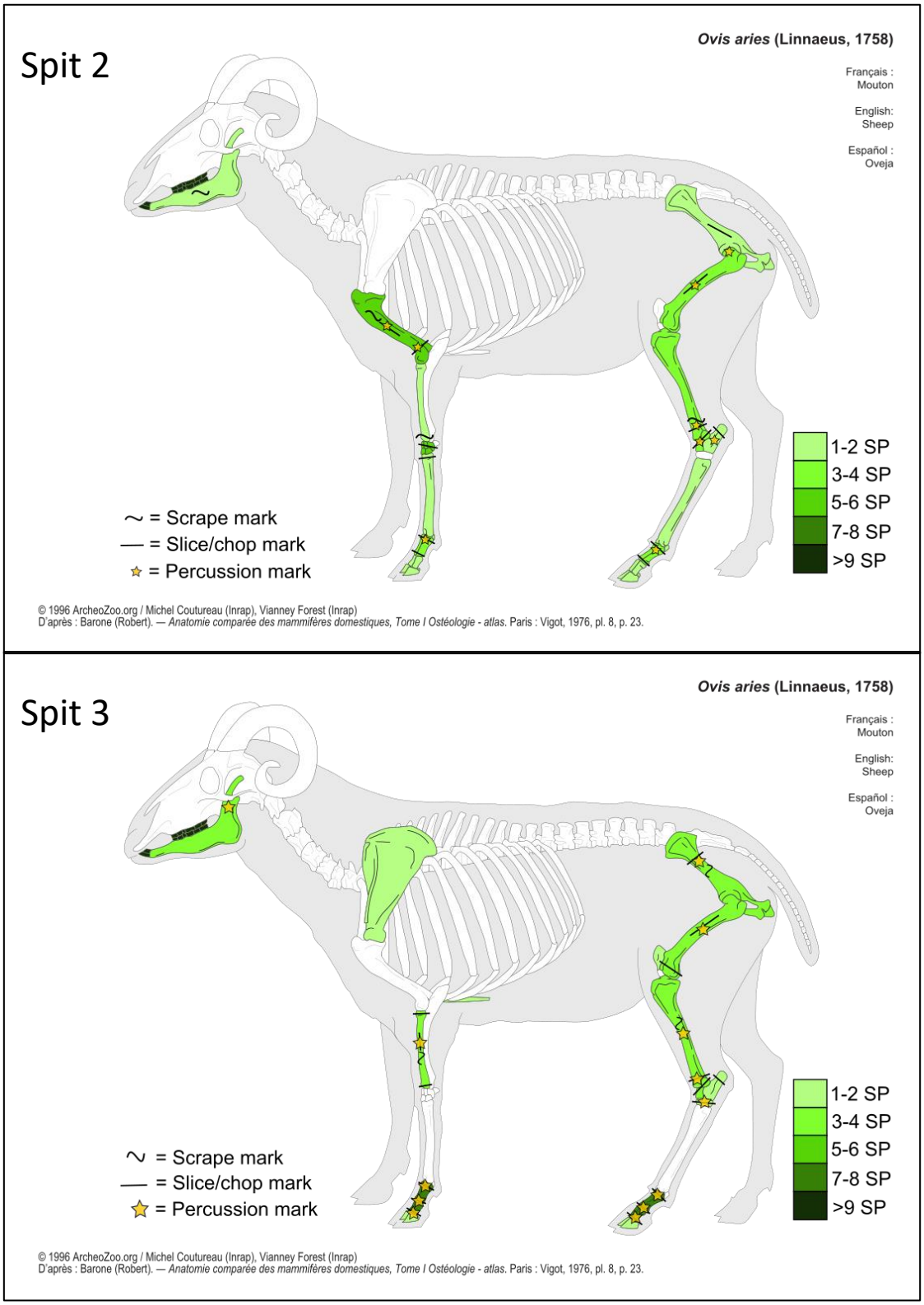


Figure 5.79: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area C, Spits 2 and 3

The skeletal element representation for bovid size class III was very similar to that of bovid size class I and II from Central Area C (see figure 5.80). The anthropogenic modifications on bovid size class III specimens were also very similar to those for bovid size class I and II.

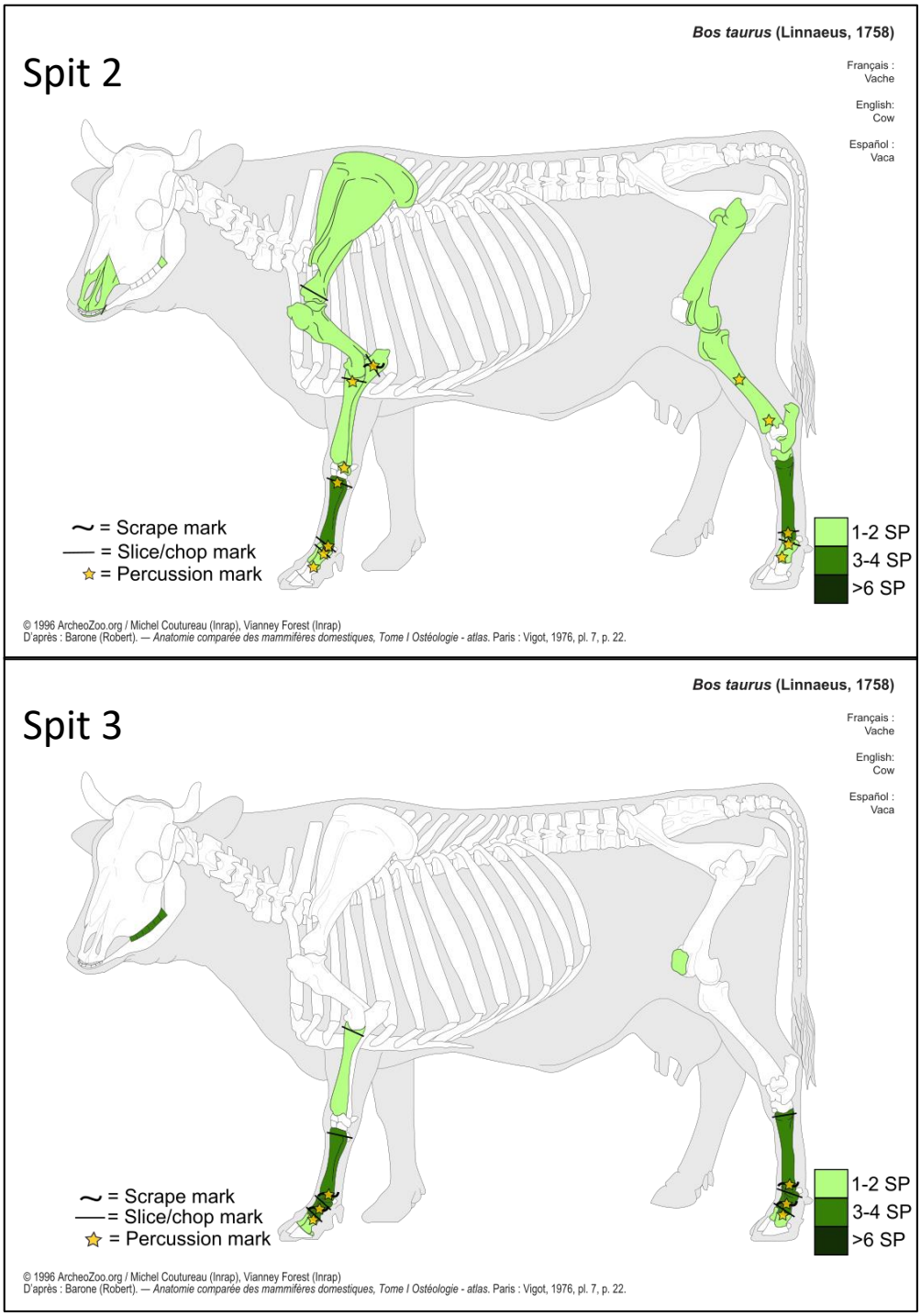


Figure 5.80: Skeletal element representation and anthropogenic modifications of bovid size class III remains from Central Area C, Spits 2 and 3

Birds from spits 2 and 3 were represented by limb and wing elements (figures 5.81 and 5.82).

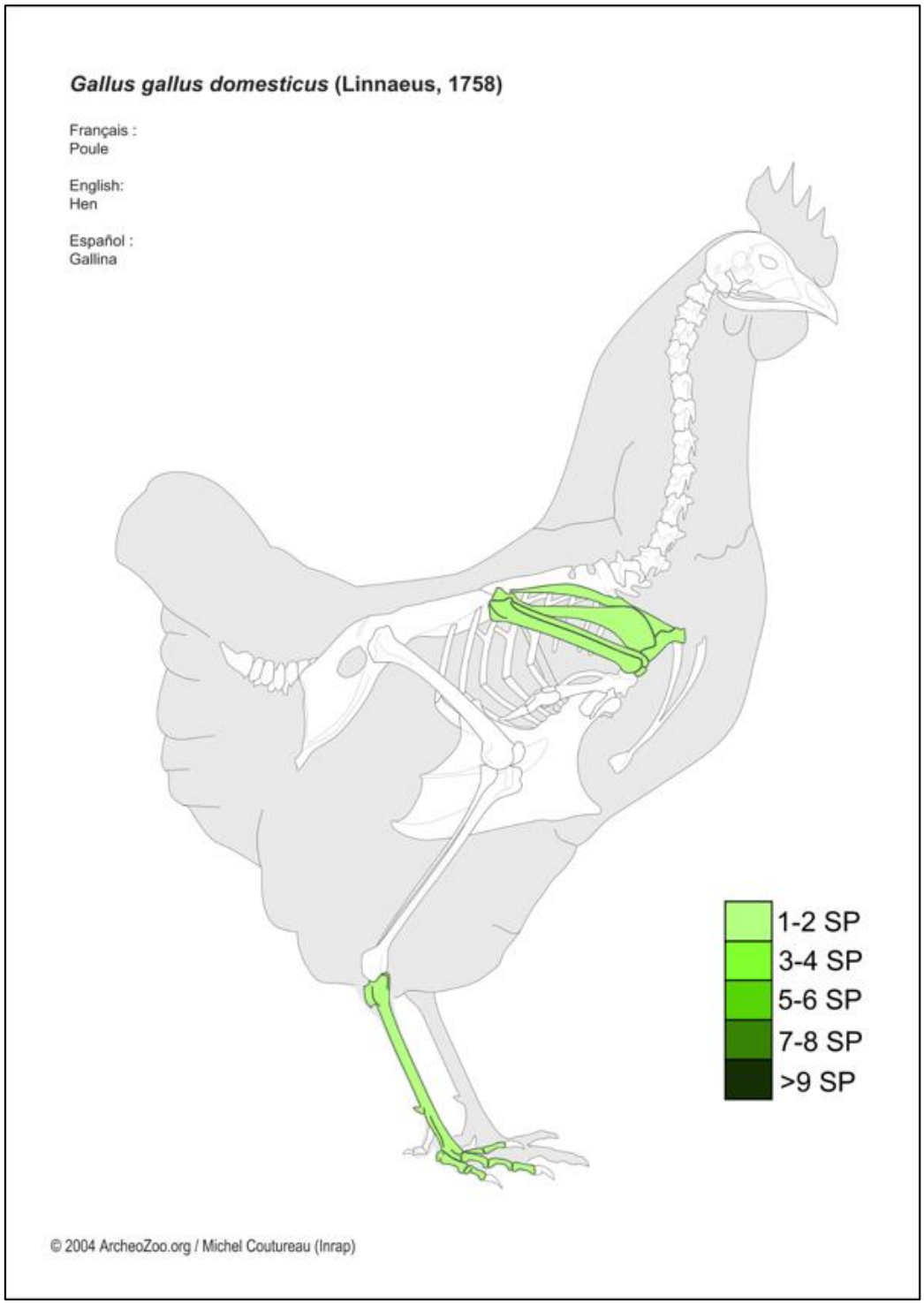


Figure 5.81: Skeletal element representation of bird remains from Central Area C, spit 2

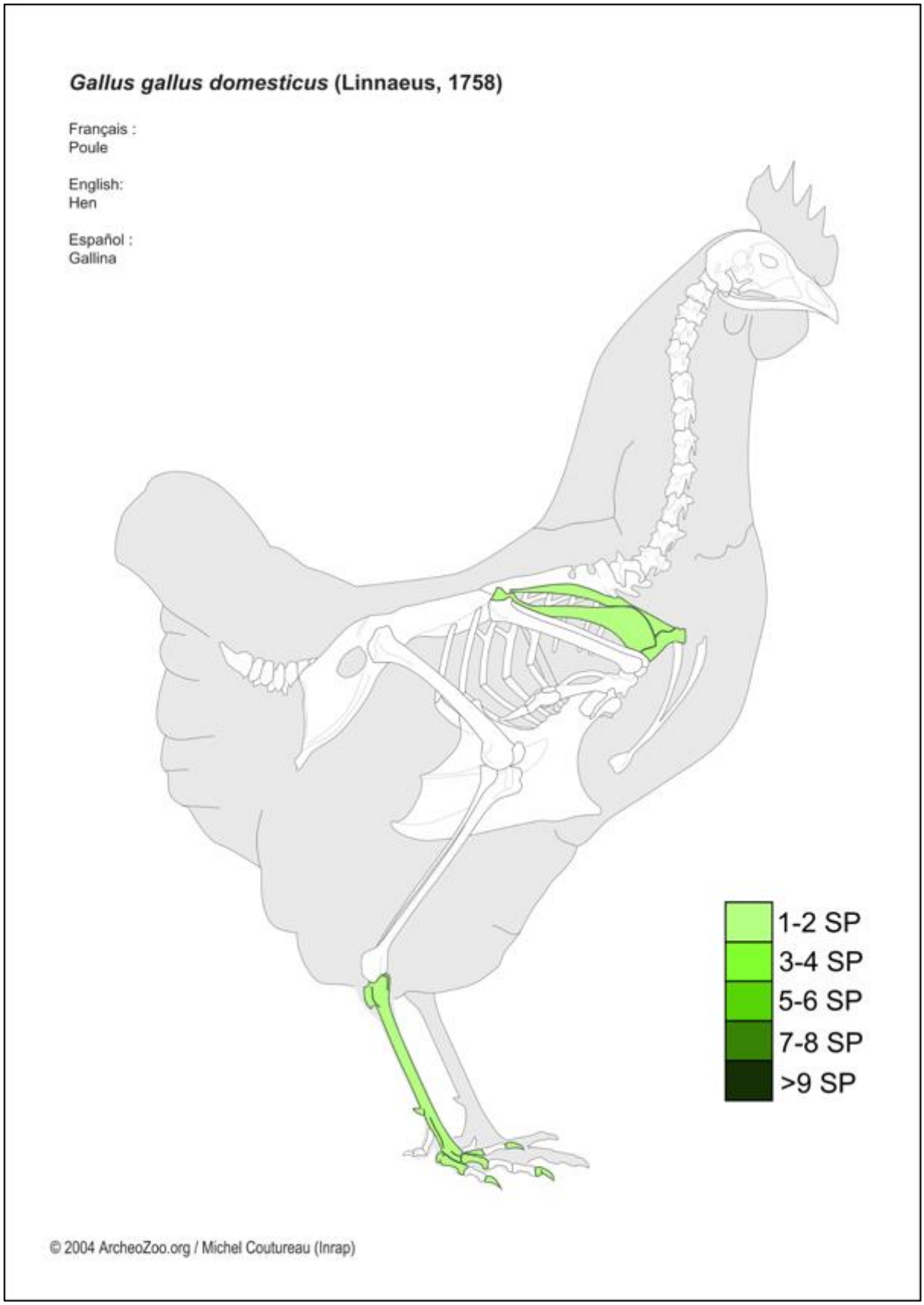


Figure 5.82: Skeletal element representation of bird remains from Central Area C, spit 3

The fish specimens from Central Area C were again fewer (NISP = 650) than from the two rock tanks and 3% were burnt. Spit 2 had the highest frequency of fish specimens (NISP = 350, including burnt bones) (see figures 5.83 to 5.85).

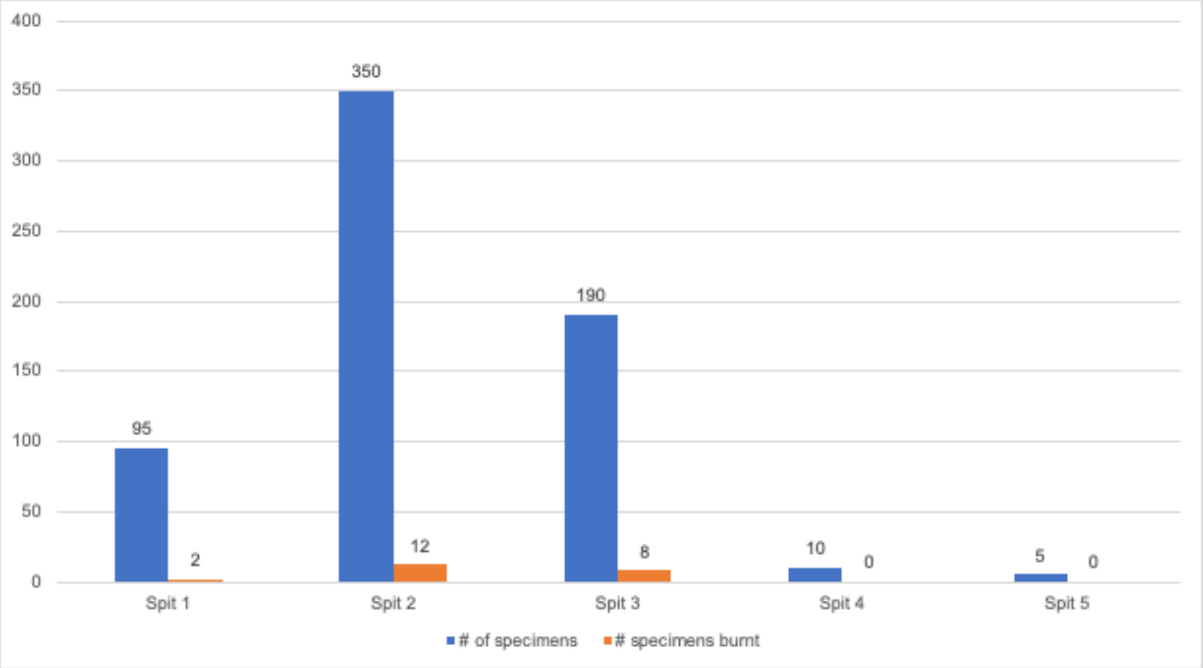


Figure 5.83: Number of fish from Central Area C, per spit. Burnt fish are indicated separately, and included in the total frequency per spit

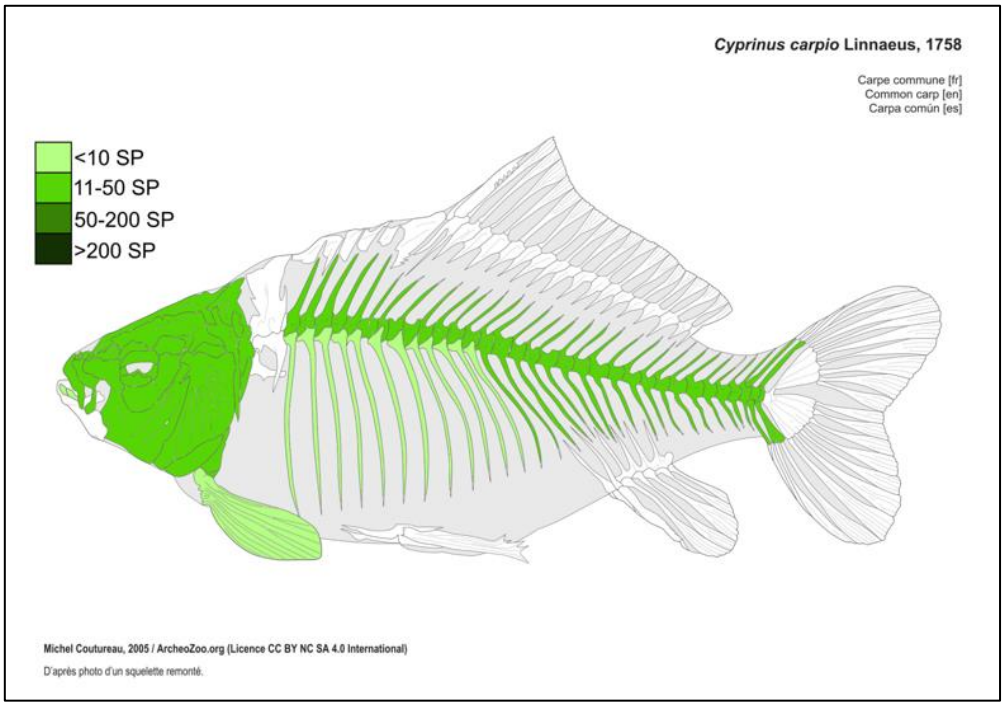


Figure 5.84: Skeletal element representation of fish remains from Central Area C, spit 1

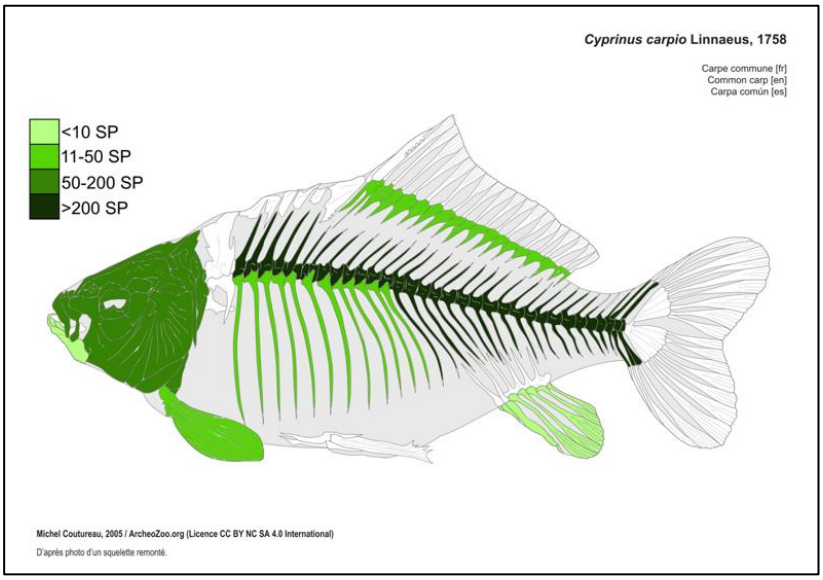


Figure 5.85: Skeletal element representation of fish remains from Central Area C, spit 2

Bone surface modifications of identified specimens from Central Area C were the most numerous in spit 2 and 3. Cut marks and tooth marks were the most numerous modifications (see figure 5.86). Small mammal specimens had the most zoogenic modifications (tooth marks and acid etching).

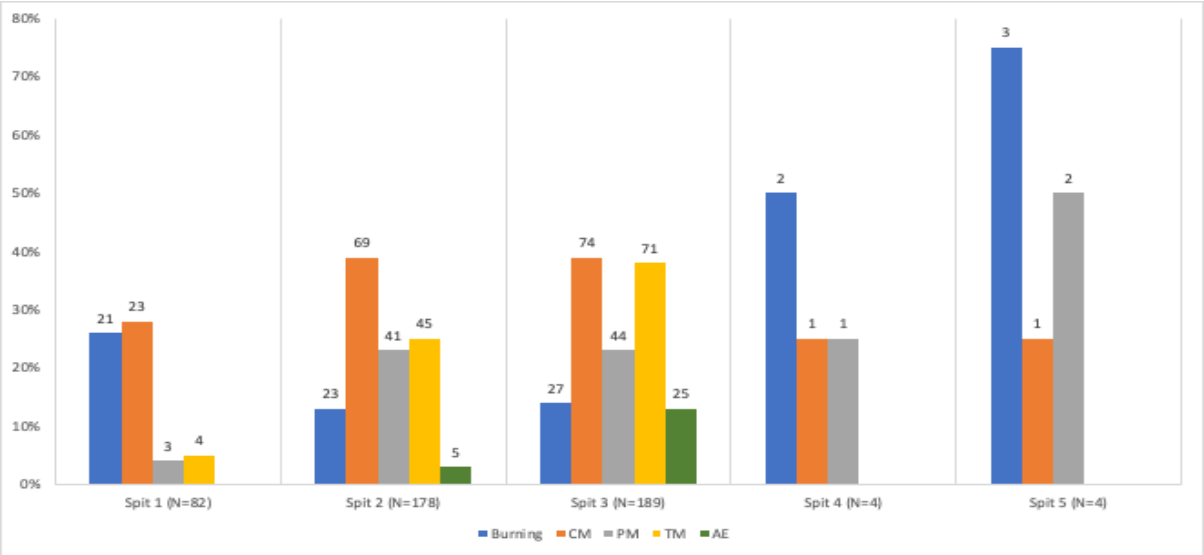


Figure 5.86: The bone surface modifications on all identified specimens from Central Area C, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Central Area C were not weathered at all (see figure 5.87). The proportion of weathered specimens increased from spit 3 to spit 1.

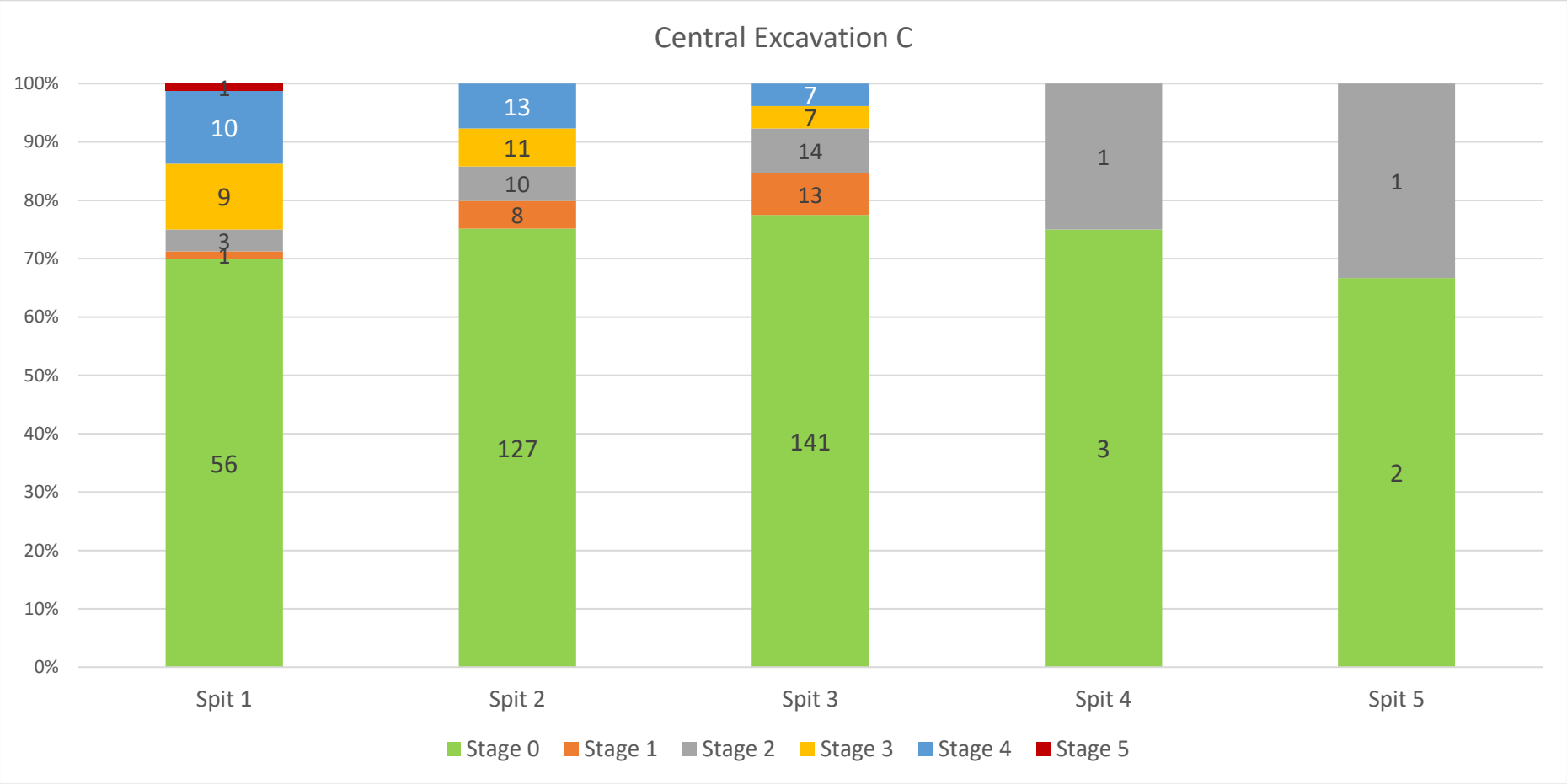


Figure 5.87: Weathering stages recorded for Central Area C, per spit

Seventy specimens from Central Area C were trampled and thirty specimens had diagenic staining. The majority of trampling marks were on specimens from Spit 3 (see figure 5.88).

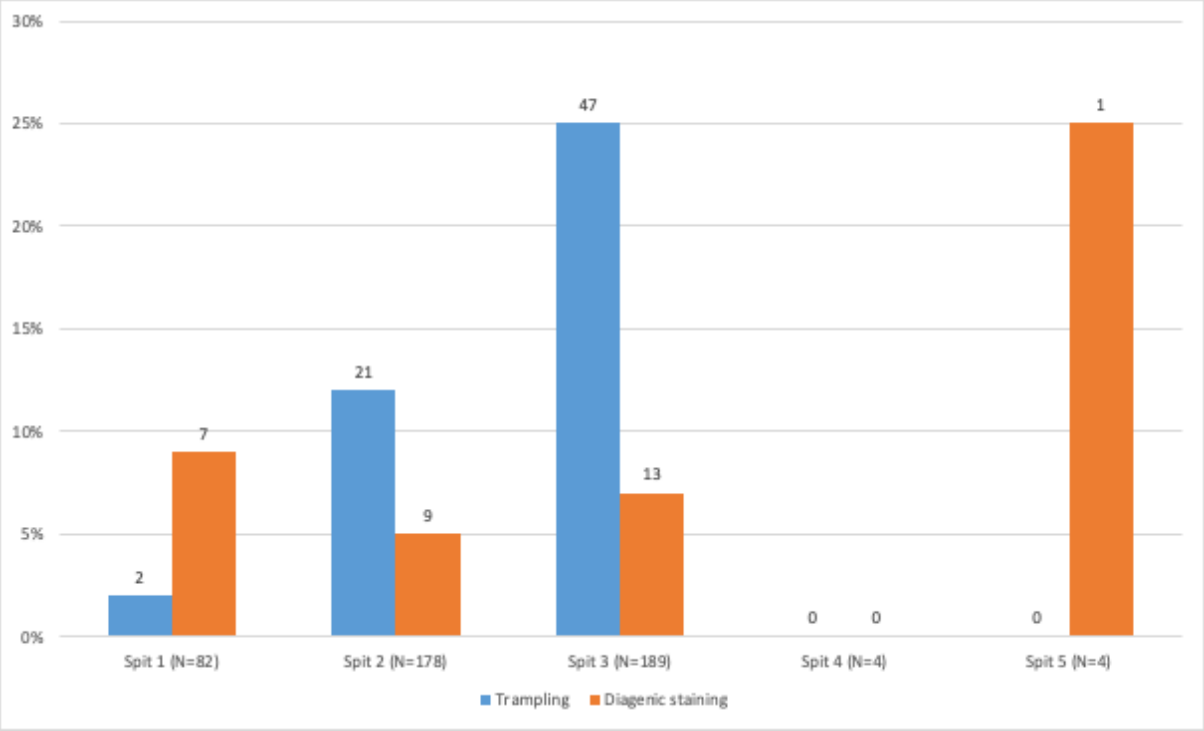


Figure 5.88: Trampling and diagenic staining recorded for Central Area C, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.3.6 Central Area D

The animals in Central Area D were distributed throughout the spits, with a steep increase in the number of identified specimens from spit 2 to spit 1 (figure 5.89). Small mammals, including *Procavia capensis* (dassie) and *Pedetes capensis* (springhare), had the most zoogenic modifications. Medium mammals were the most numerous specimens from Central Area D. *Aepyceros melampus* (impala) were the most numerous of the identified bovid size class II specimens. Three *Bos taurus* (cattle) specimens were also identified. Other important species identified were: *Equus quagga* (plains zebra), Herpestidae sp. (possible mongoose), *Hippotragus niger* (sable), *Syncerus caffer* (African buffalo), *Redunca fulvorfula* (mountain reedbuck) and *Pelea capreolus* (vaal rhebok).

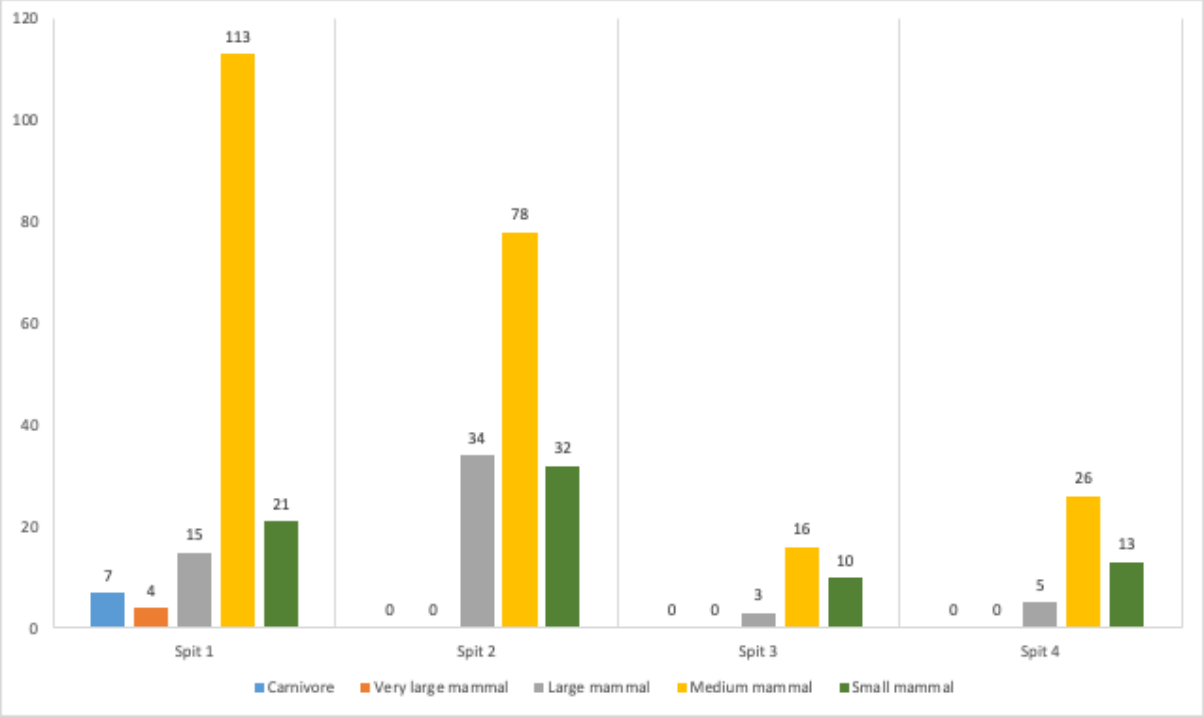


Figure 5.89: Animal distribution throughout Central Area D, per spit

Small and medium mammals from all spits were predominately represented by axial and cranial elements and very few limb specimens were present (see figure 5.90 and 5.91 for medium mammals). The anthropogenic modifications on medium mammal specimens were predominately located on axial elements and at limb joints.

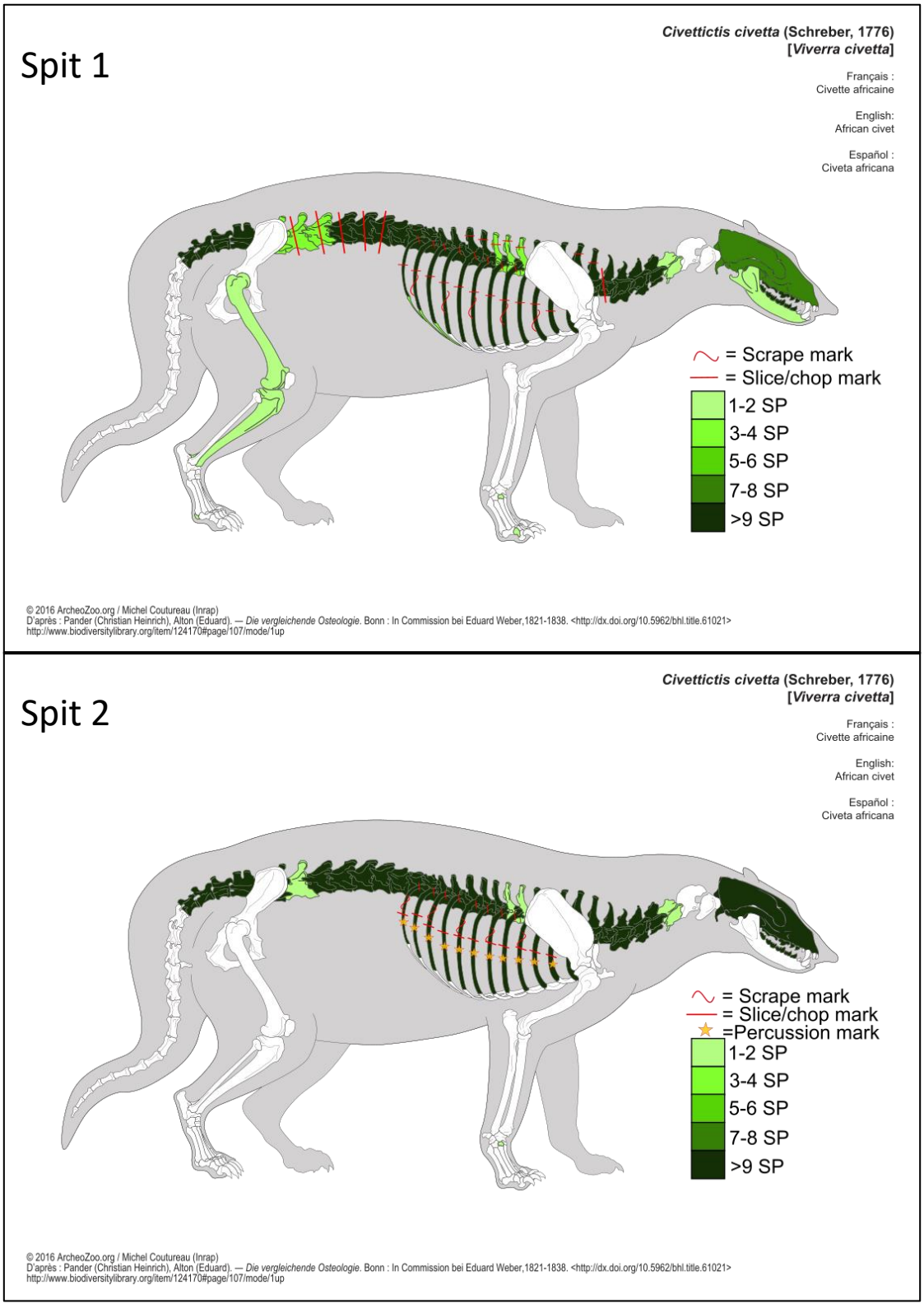


Figure 5.90: Skeletal element representation and anthropogenic modifications of medium mammal remains from Central Area D, Spits 1 and 2

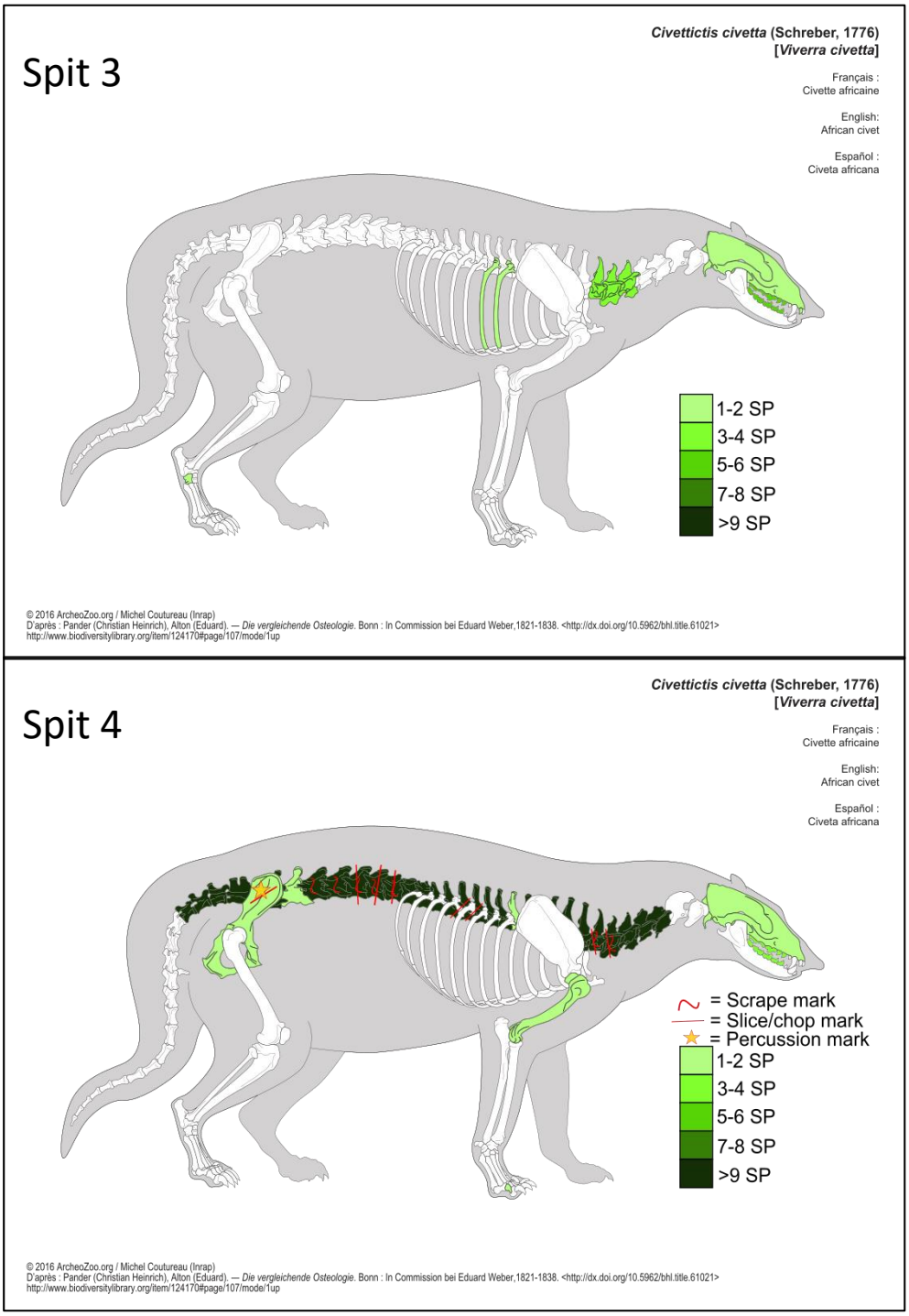


Figure 5.91: Skeletal element representation of medium mammal remains from Central Area C, Spits 3 and 4. The diagram for Spit 4 also shows anthropogenic modifications

Bovid size class I from all spits were represented by fore- and hind-limb specimens (see figure 5.92). Bovid size class II from all spits were represented by fore- and hind-limb specimens, axis vertebrae, cranial fragments, mandibles, maxillae, and teeth.

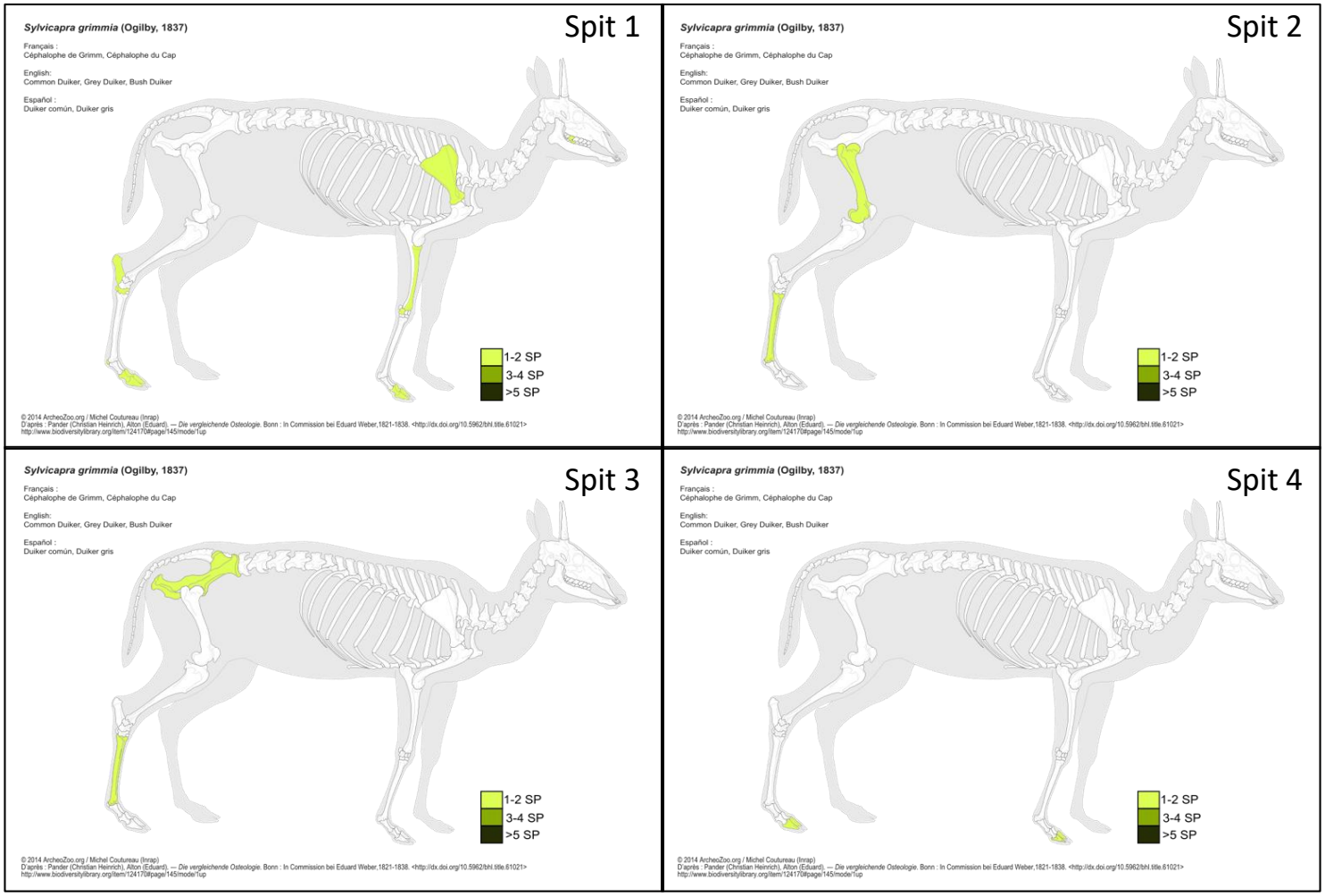


Figure 5.92: Skeletal element representation of bovid size class I remains from Central Area D, Spits 1 to 4

Anthropogenic modifications on bovid size class II specimens occurred at limb joints, at the base of the cranium and along long bone shafts (see figures 5.93 and 5.94).

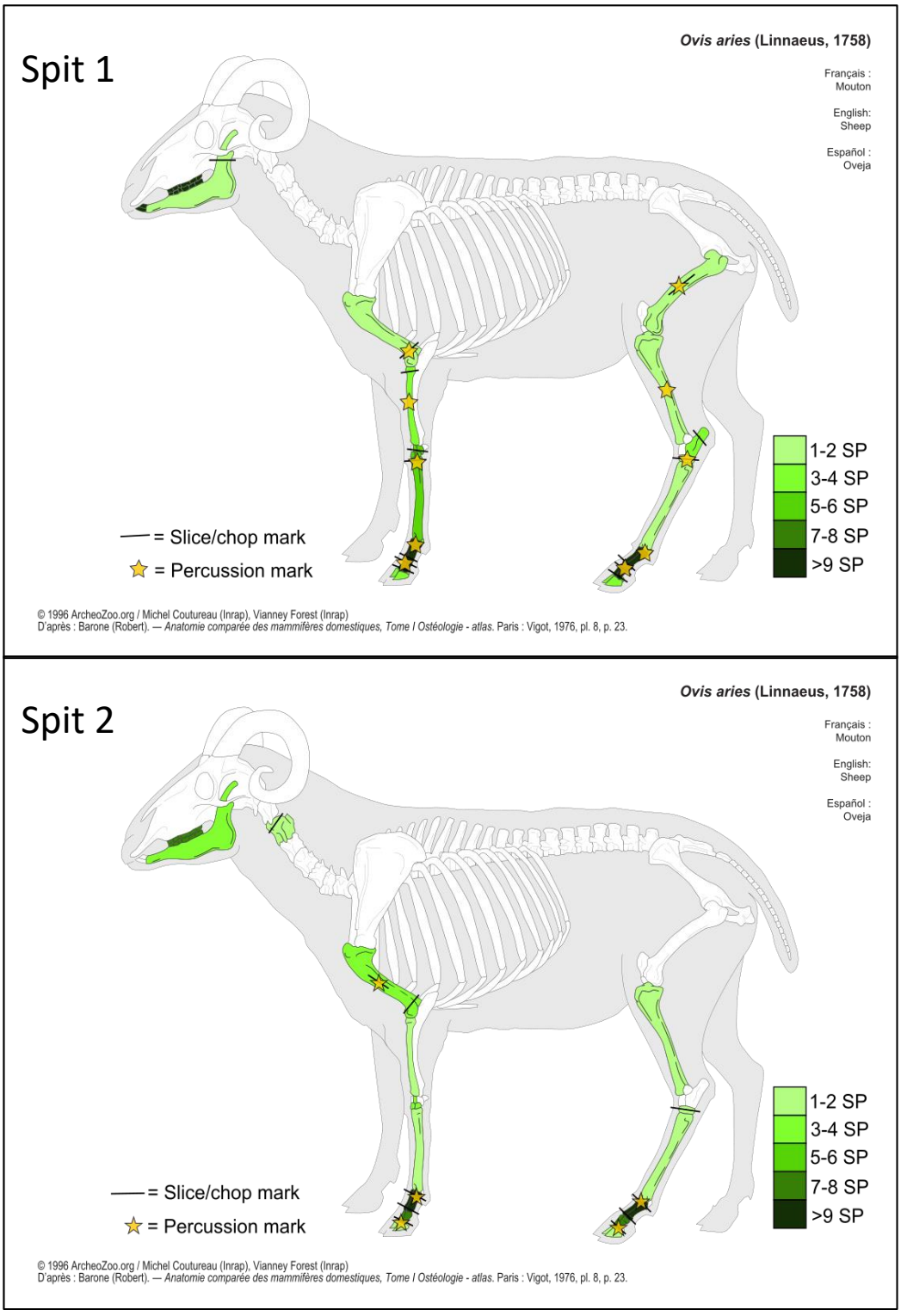


Figure 5.93: Skeletal element representation and anthropogenic modifications of bovid size class II remains from Central Area D, Spits 1 and 2

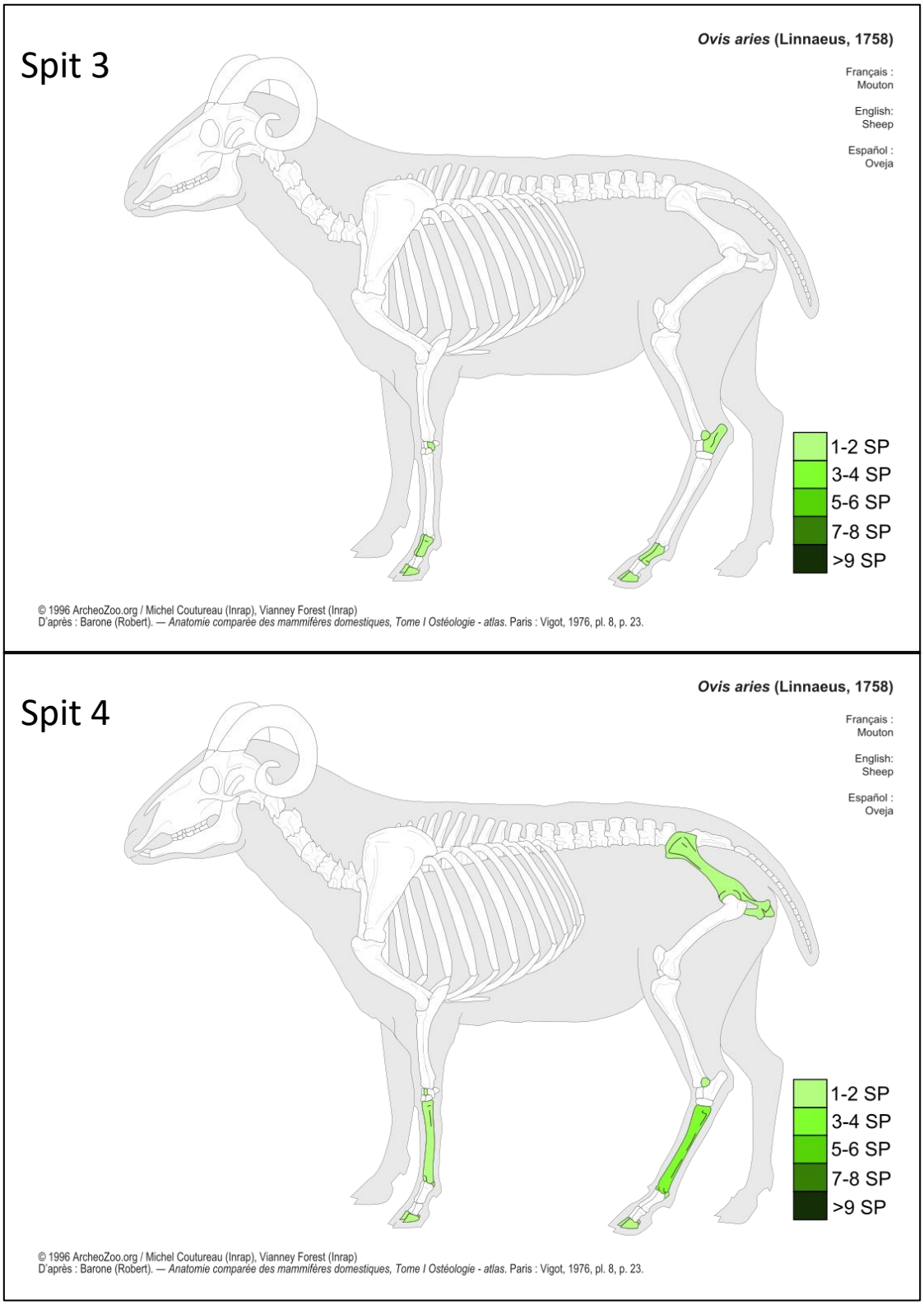


Figure 5.94: Skeletal element representation of bovid size class II remains from Central Area D, Spits 3 and 4

The skeletal element representation for bovid size class III was very similar to that of bovid size class I and II from Central Area D (see figures 5.95 to 5.96). The anthropogenic modifications on bovid size class III specimens were also very similar to those on bovid size class I and II bones.

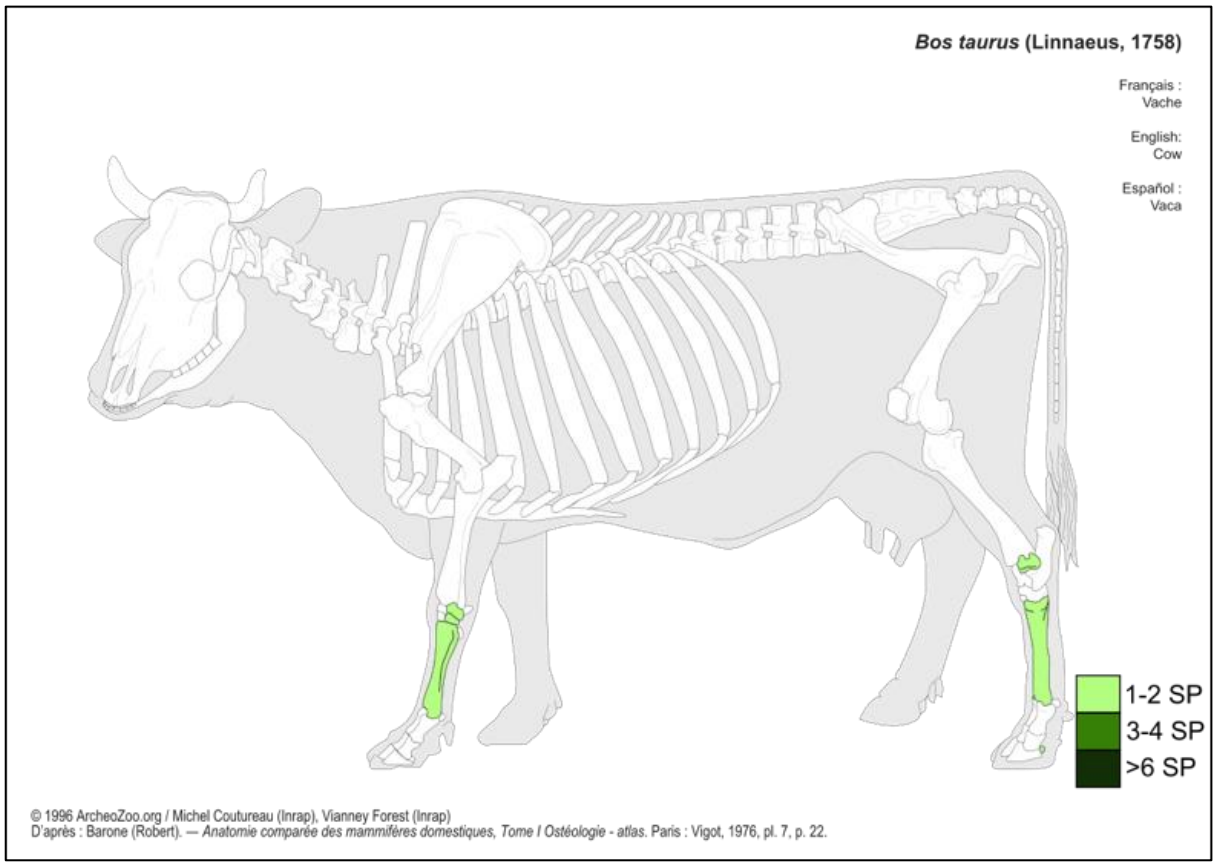


Figure 5.95: Skeletal element representation of bovid size class III remains from Central Area D, spit 1

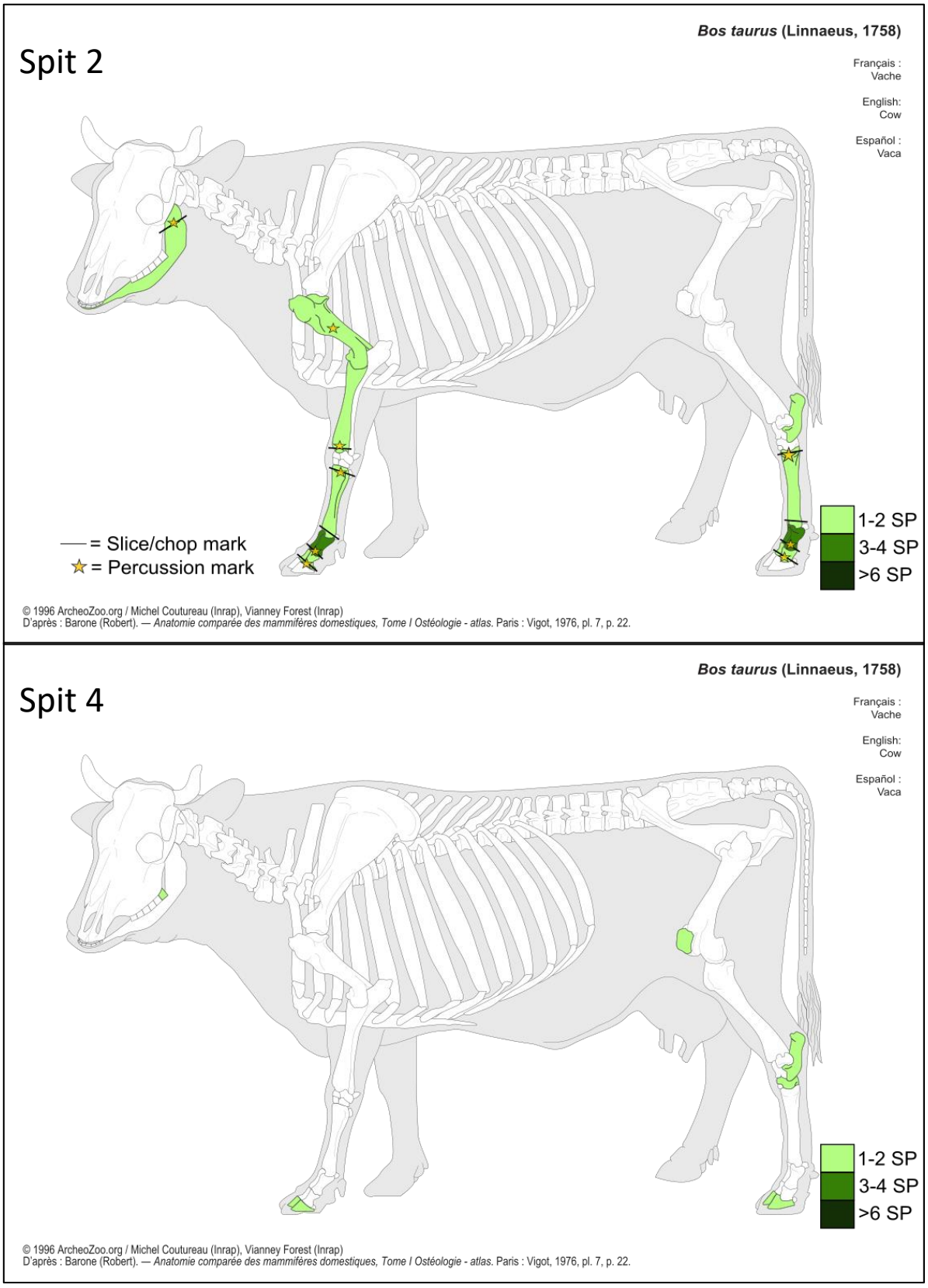


Figure 5.96: Skeletal element representation of bovid size class III remains from Central Area A, Spits 2 and 4. The diagram for Spit 2 also shows anthropogenic modifications

Birds from spit 1 were represented by limb and wing elements (figure 5.97).

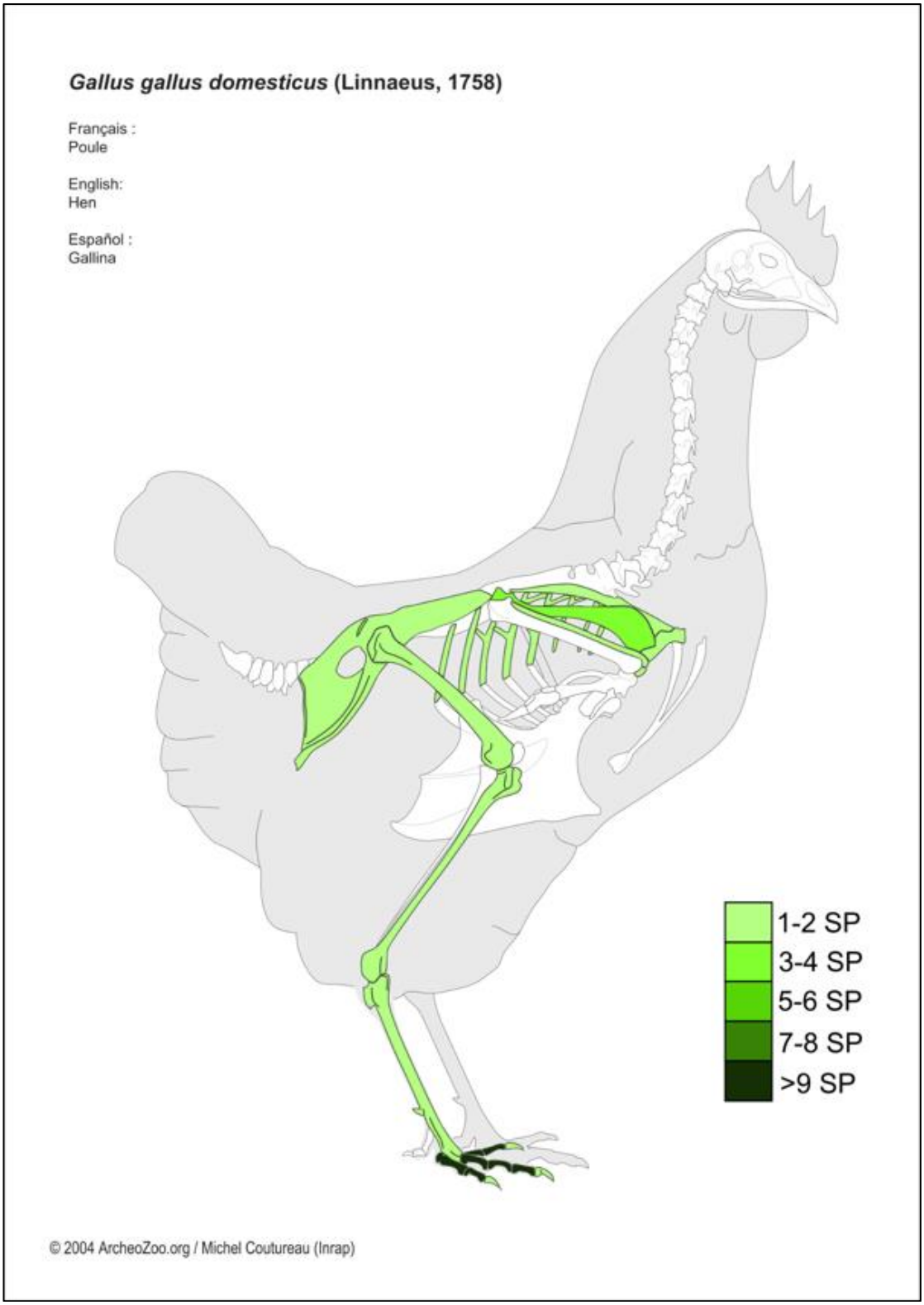


Figure 5.97: Skeletal element representation of bird remains from Central Area D, spit 1

The fish specimens (NISP = 512) from Central Area D were again fewer than those from the two rock tanks and 2% were burnt. Spit 1 in Central Area D had the most fish specimens (NISP = 416) (see figures 5.98 to 5.100)

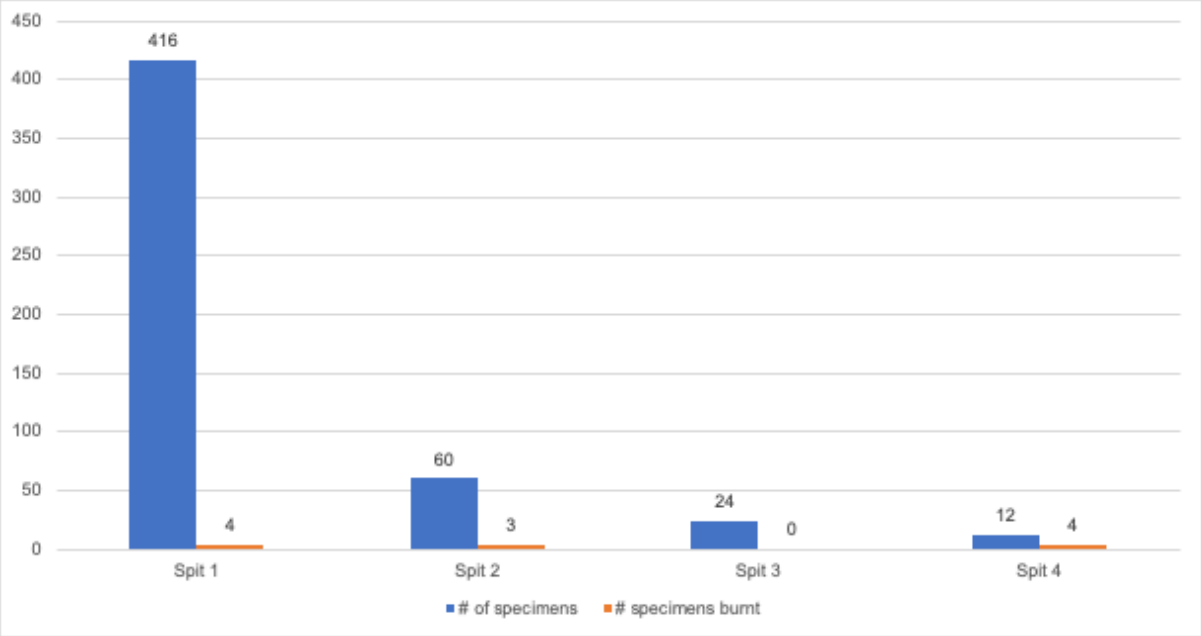


Figure 5.98: Number of fish from Central Area D, per spit

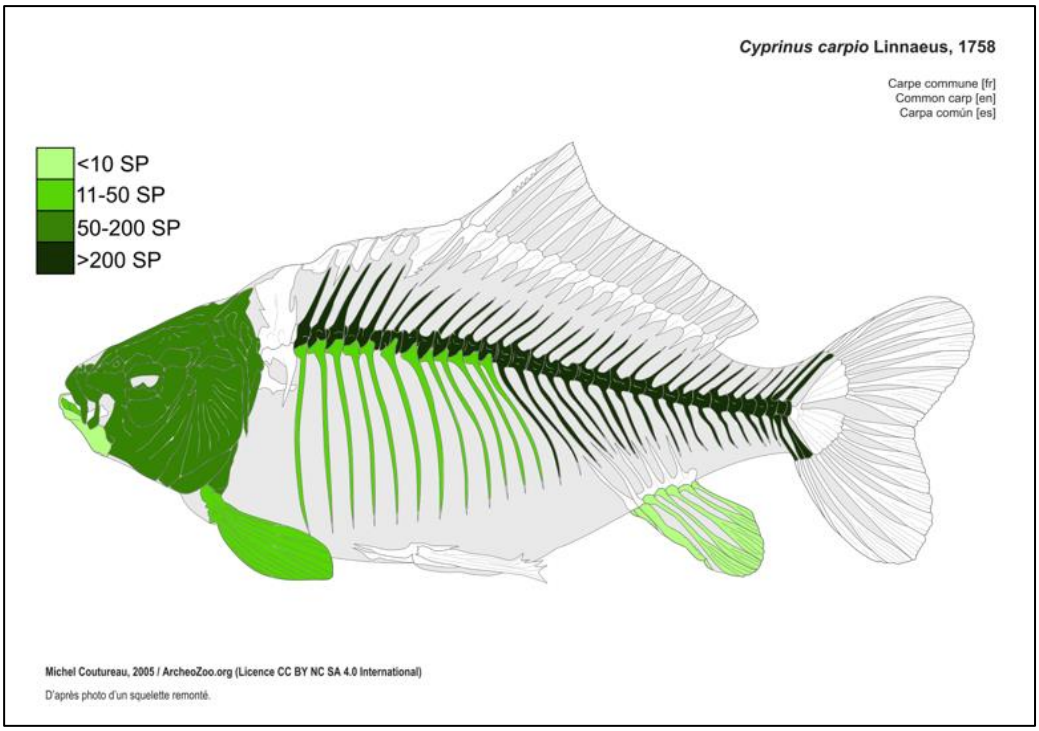


Figure 5.99: Skeletal element representation of fish remains from Central Area D, spit 1

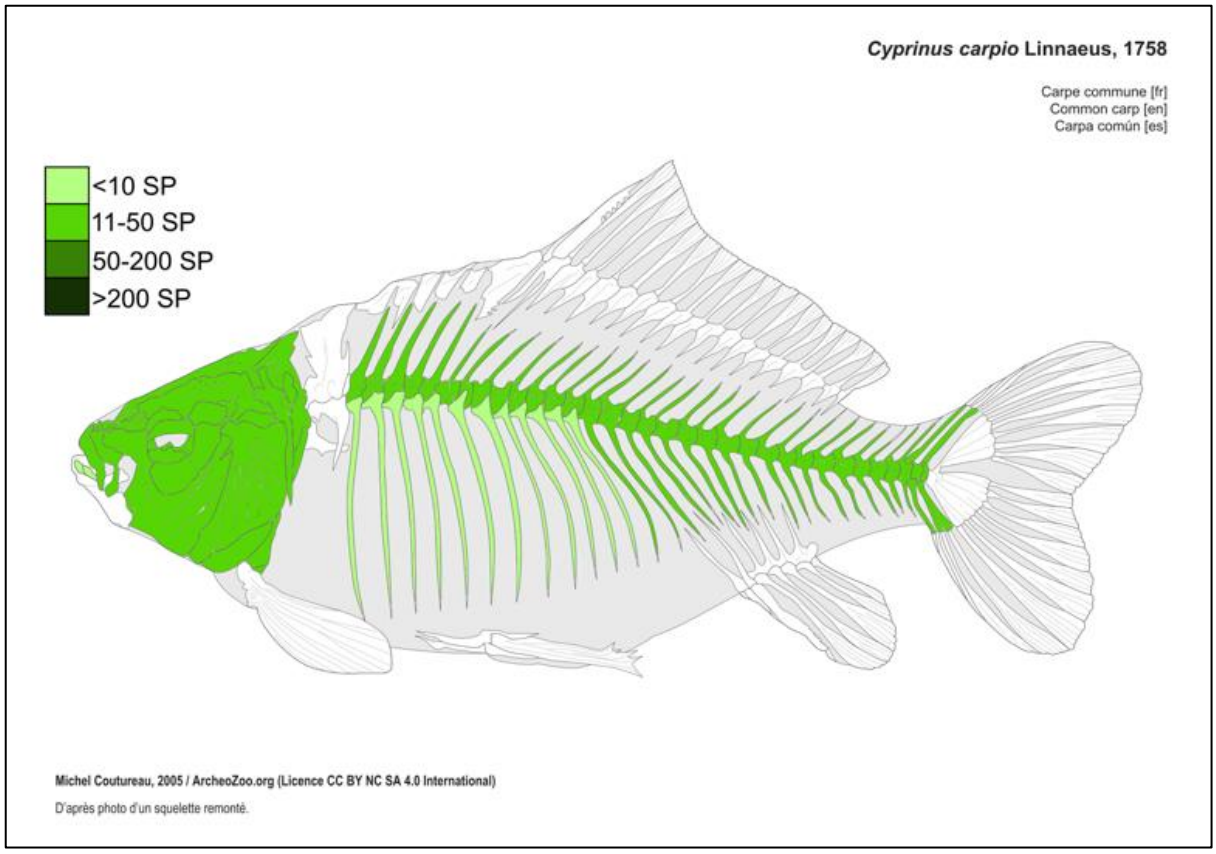


Figure 5.100: Skeletal element representation of fish remains from Central Area D, spit 2

Bone surface modifications on identified specimens from Central Area D were the most numerous in spits 1 and 2. Cut marks and tooth marks were the most numerous modifications, as was burning, in spits 2 and 4 (figure 5.101). Small mammal specimens had the most zoogenic modifications (tooth marks and acid etching).

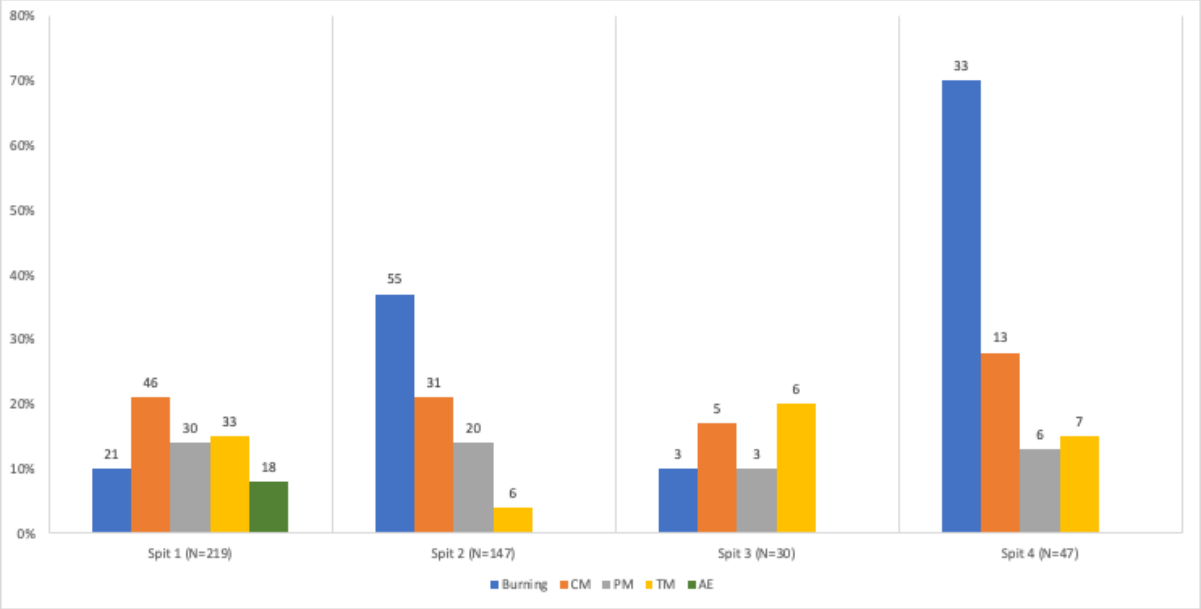


Figure 5.101: The bone surface modifications on all identified specimens from Central Area D, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

The majority of the identified specimens from Central Area D were not weathered (figure 5.102). The number of weathered specimens increased in spits 1 and 2.

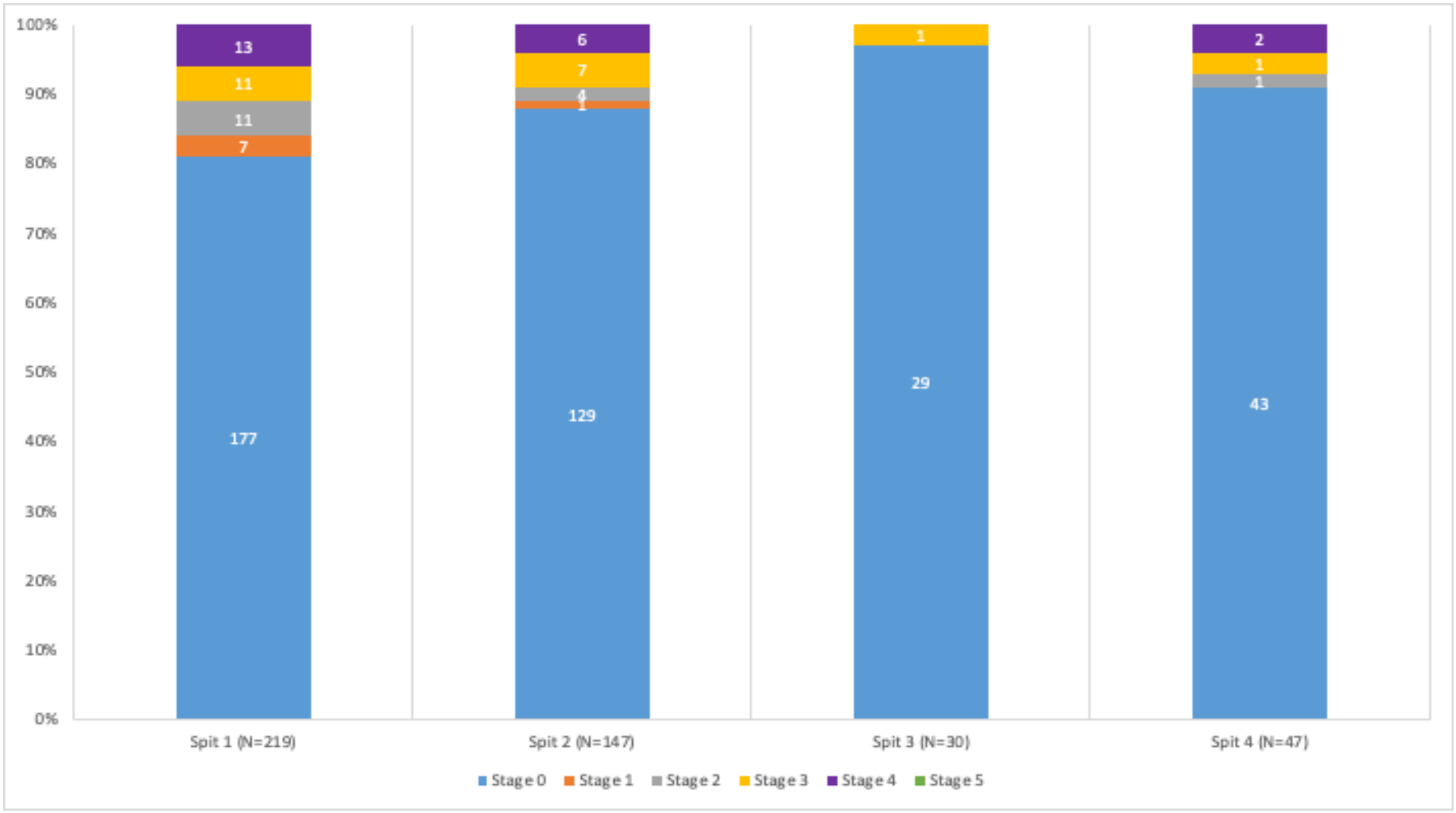


Figure 5.102: Weathering stages recorded for Central Area D, per spit

Thirty-one specimens from Central Area D were trampled and five specimens had diagenic staining. The majority of trampling marks were on specimens from Spit 1 (see figure 5.103).

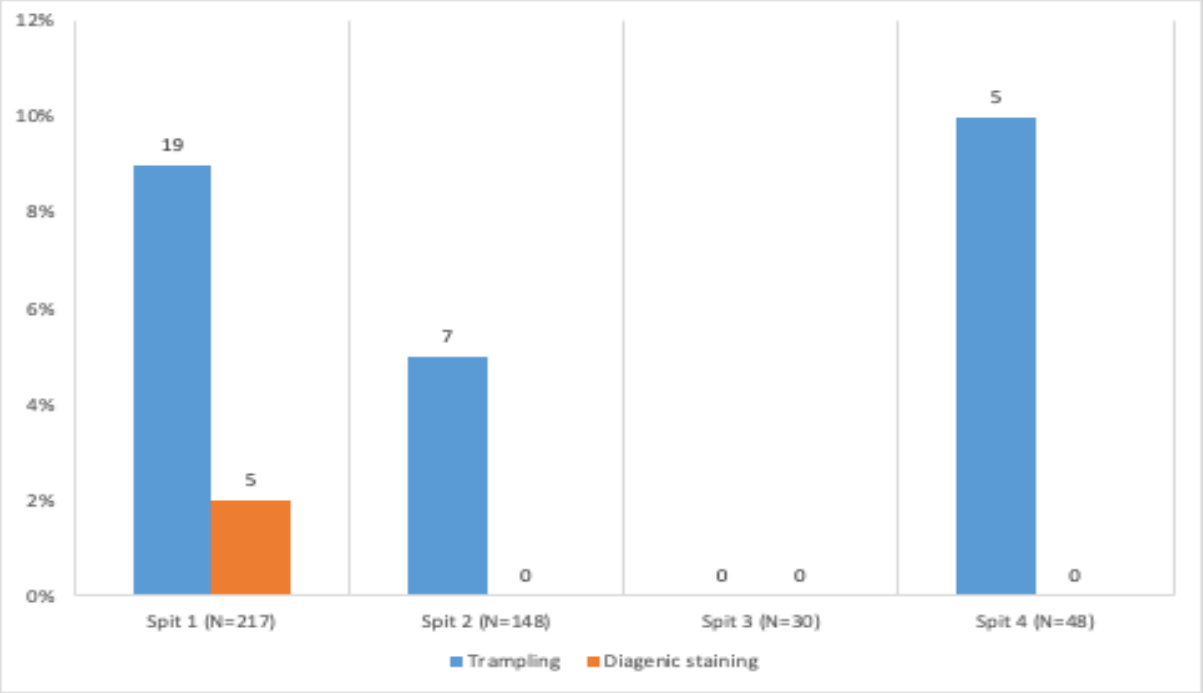


Figure 5.103: Trampling and diagenic staining recorded for Central Area D, per spit. Columns represent frequency of occurrence. Number of specimens (n) above columns

5.4 Examples of bone surface modifications identified

Anthropogenic, zoogenic and natural modifications were present in the excavated areas of Ratho Kroonkop. These included chop and slice marks (see figures 5.104 to 5.112), percussion marks (figures 5.113 to 5.115), tooth marks (figure 5.108 and 5.115 to 5.117), gastric acid etching (figure 5.118), polish and abrasion (figures 5.119 to 5.121), fresh breakage (figure 5.122), diagenetic staining (figures 5.123 and 5.124), ash encrustation (figure 5.125) and pathology (figure 5.126).

Figure 5.104: An example of chop marks

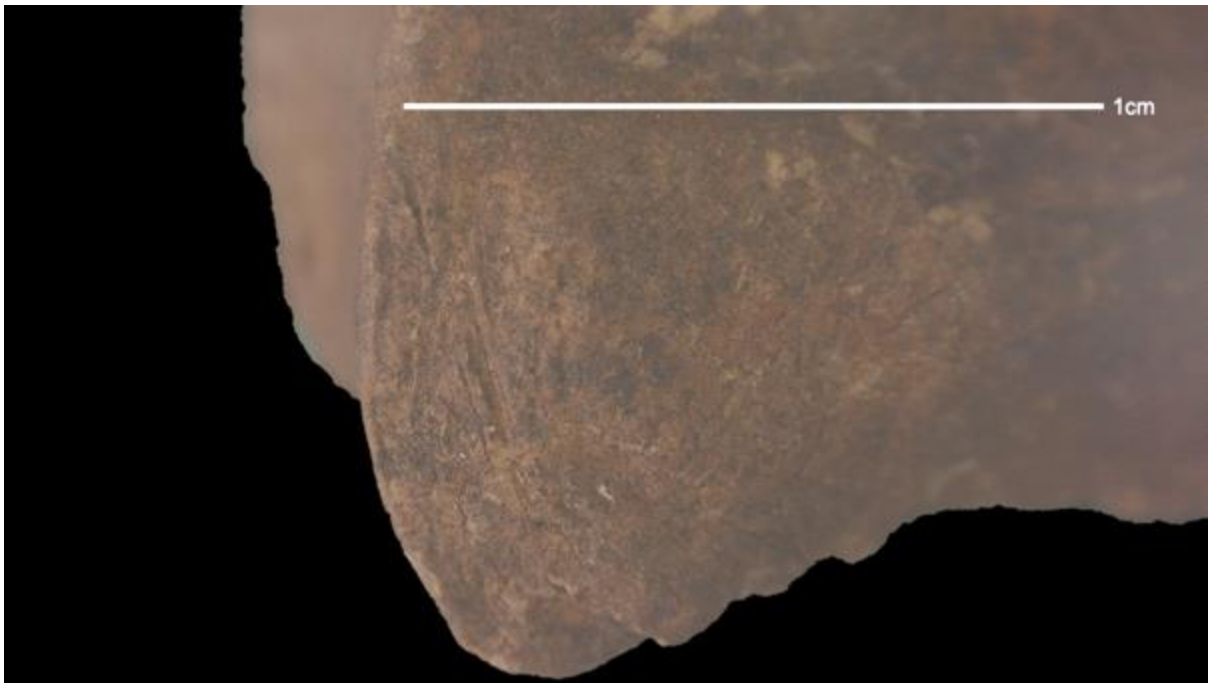


Figure 5.105: An example of slice marks

Figure 5.106: An example of slice and chop marks

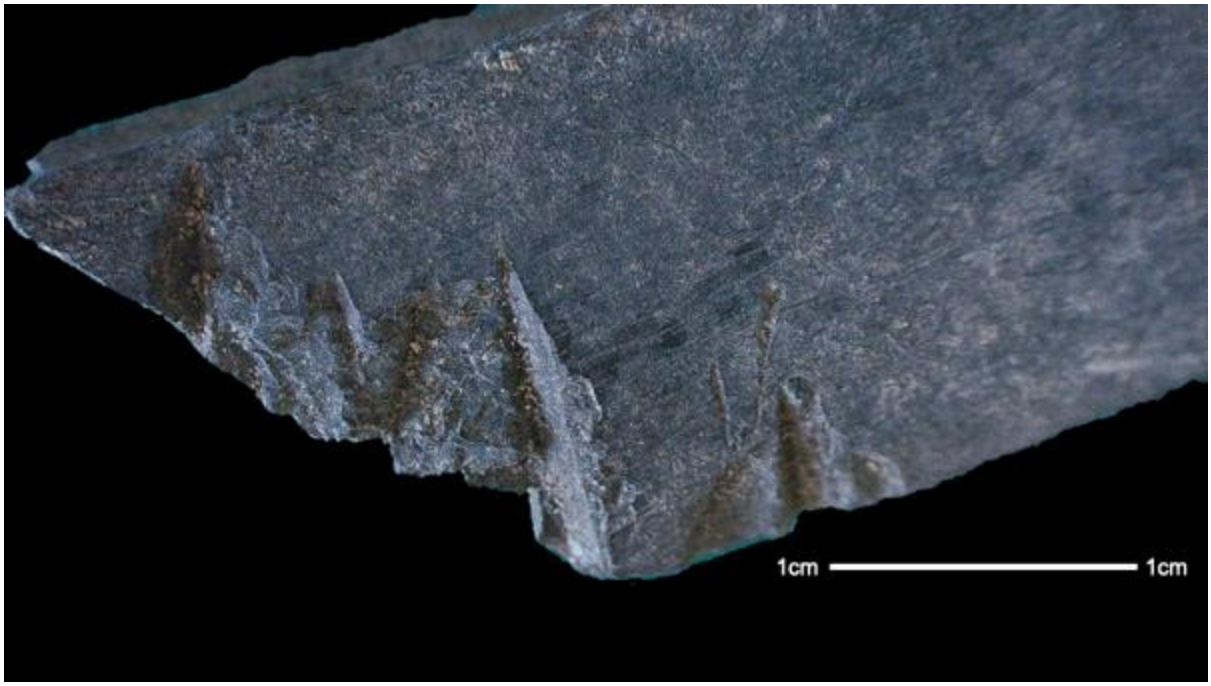


Figure 5.107: An example of a burnt black (burning stage 2, table 4.9) bone with chop marks

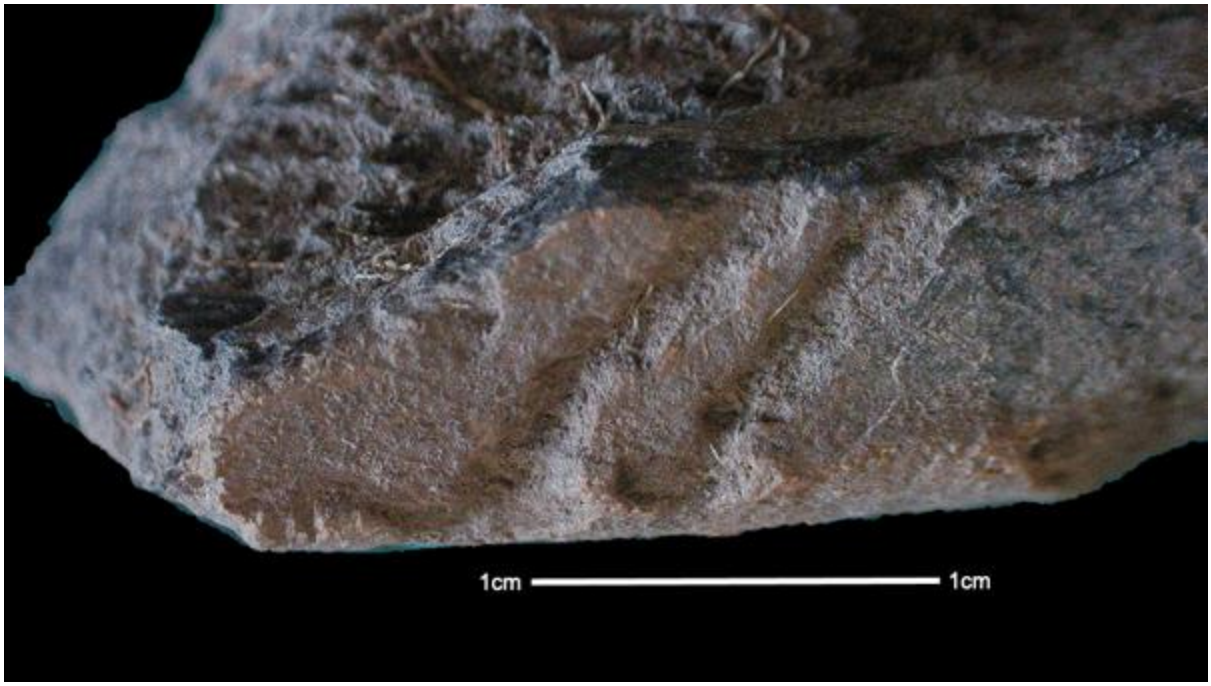


Figure 5.108: An example of bone surface modifications which could be tooth scores or slice marks (due to rounding and abrasion the sides of the modifications have become rounded)

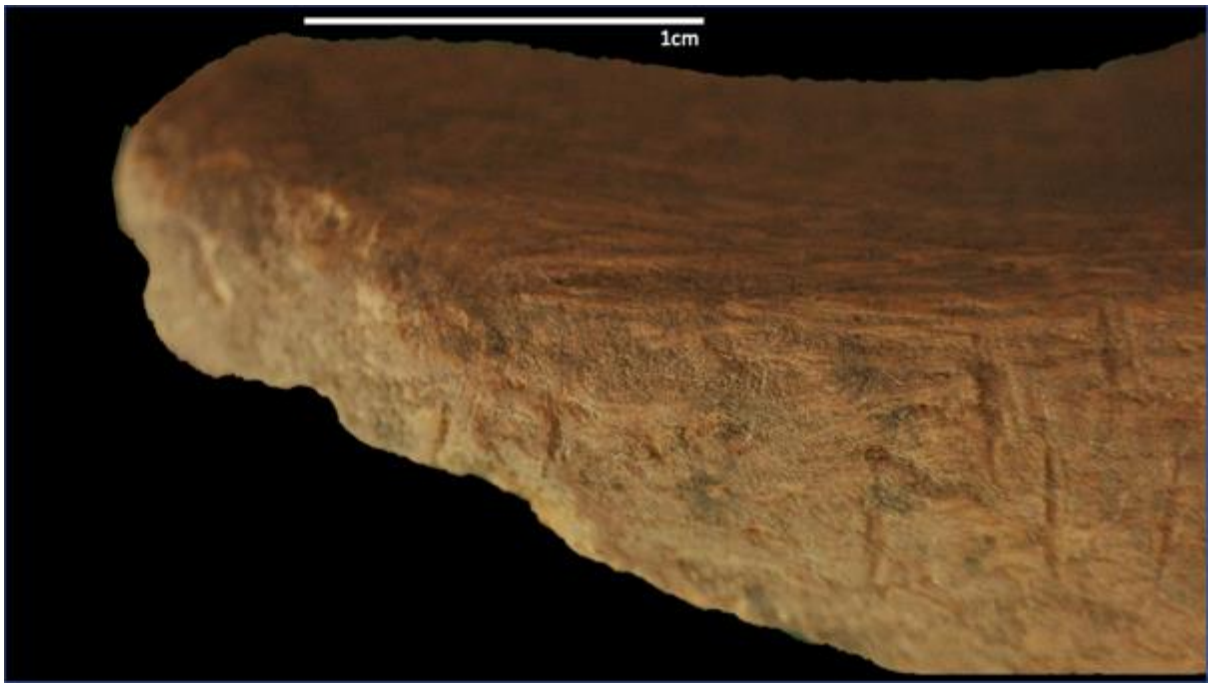


Figure 5.109: An example of a weathered and sliced bone

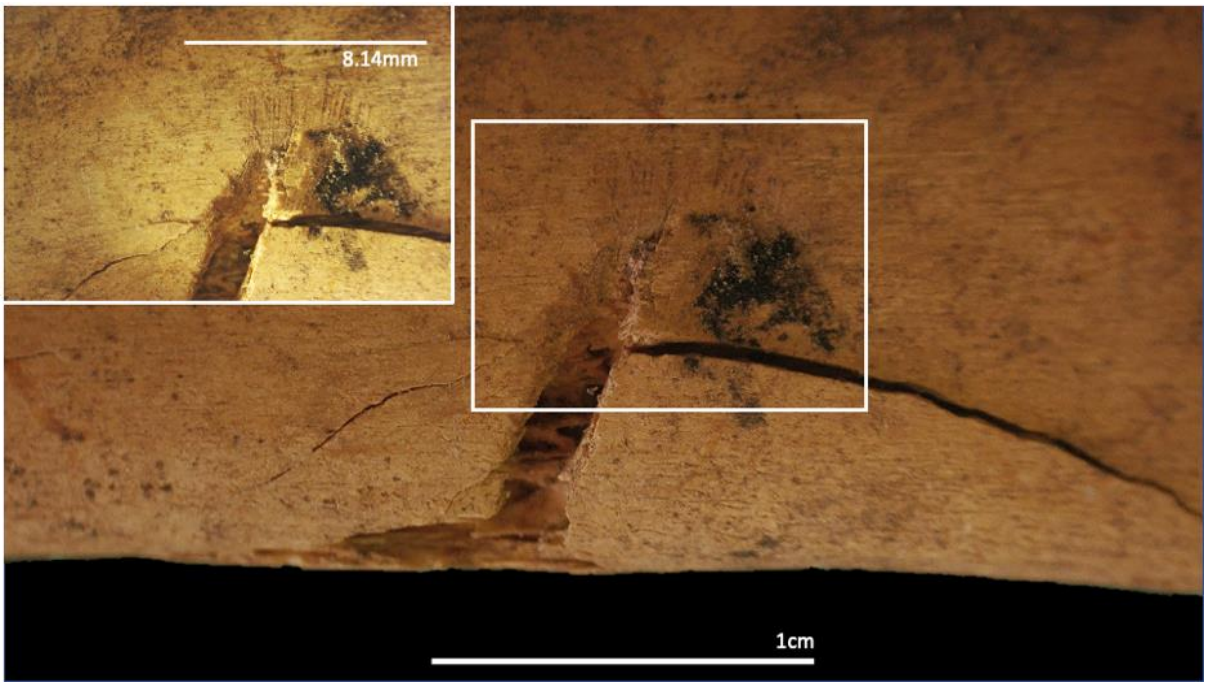


Figure 5.110: An example of a chop mark with percussion striations

Figure 5.111: An example of slice marks on a bovid size class II (non-domestic) hyoid

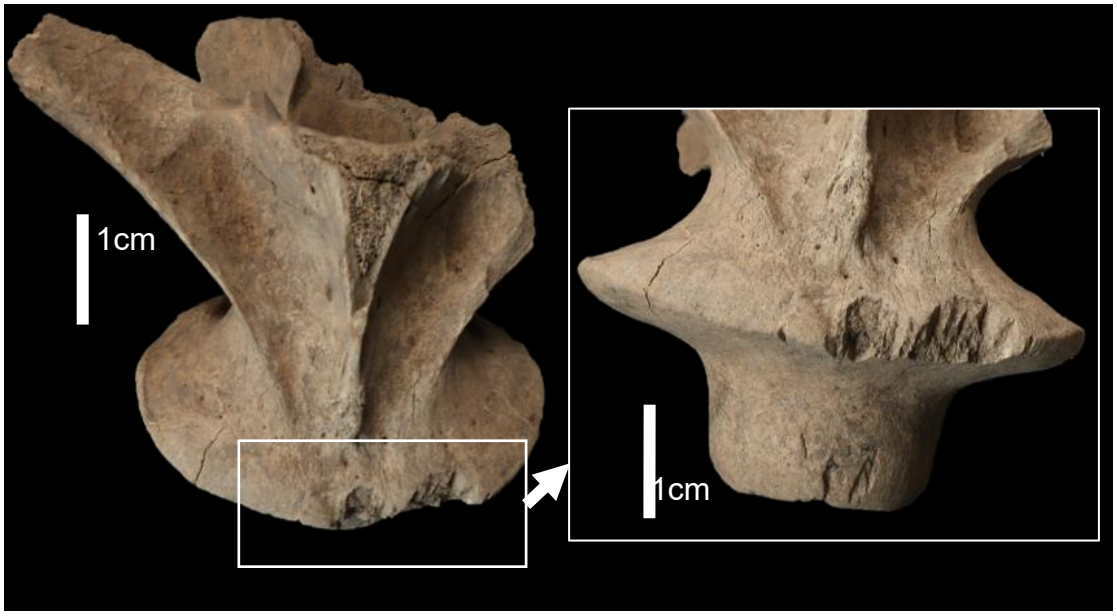


Figure 5.112: A* Syncerus caffer *axis with heavy chop marks

Figure 5.113: An example of the striations associated with a percussion mark and a bone flake removal (in box)

Figure 5.114: An example of a flake removal with ripples

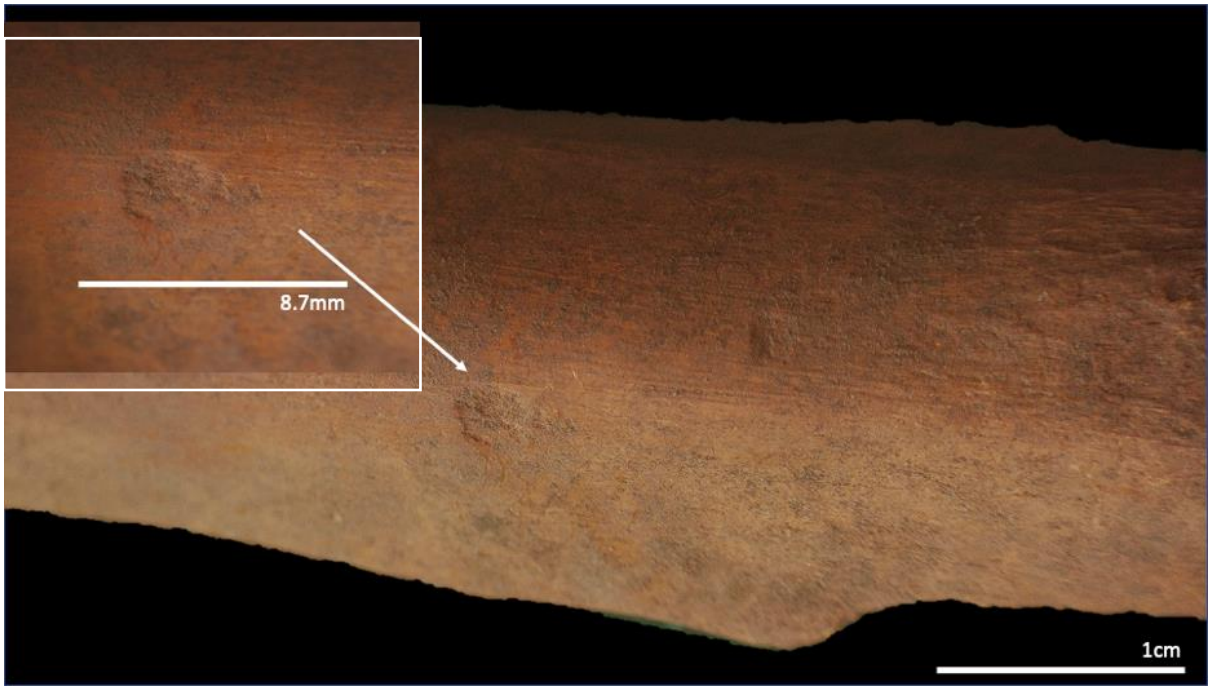


Figure 5.115: An example of a possible tooth pit or a percussion pit (magnified in the box)

Figure 5.116: An example of tooth pits

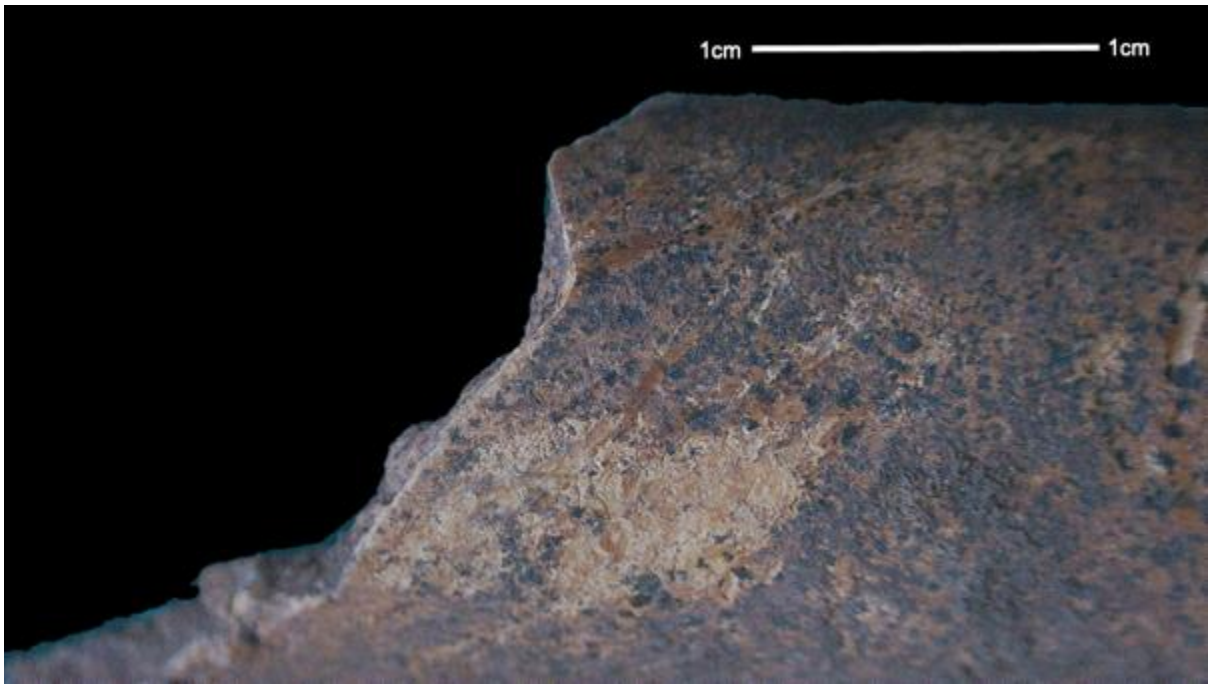


Figure 5.117: An example of tooth scores

Figure 5.118: An example of acid etching on a bovid size class I phalange

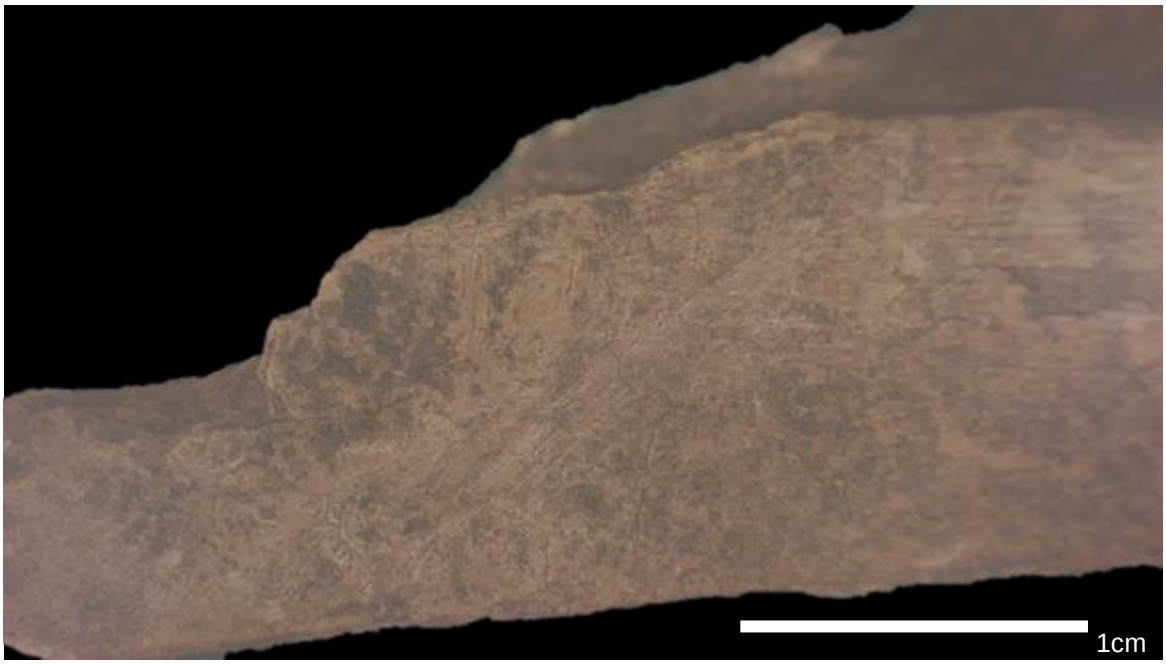


Figure 5.119: An example of abrasion

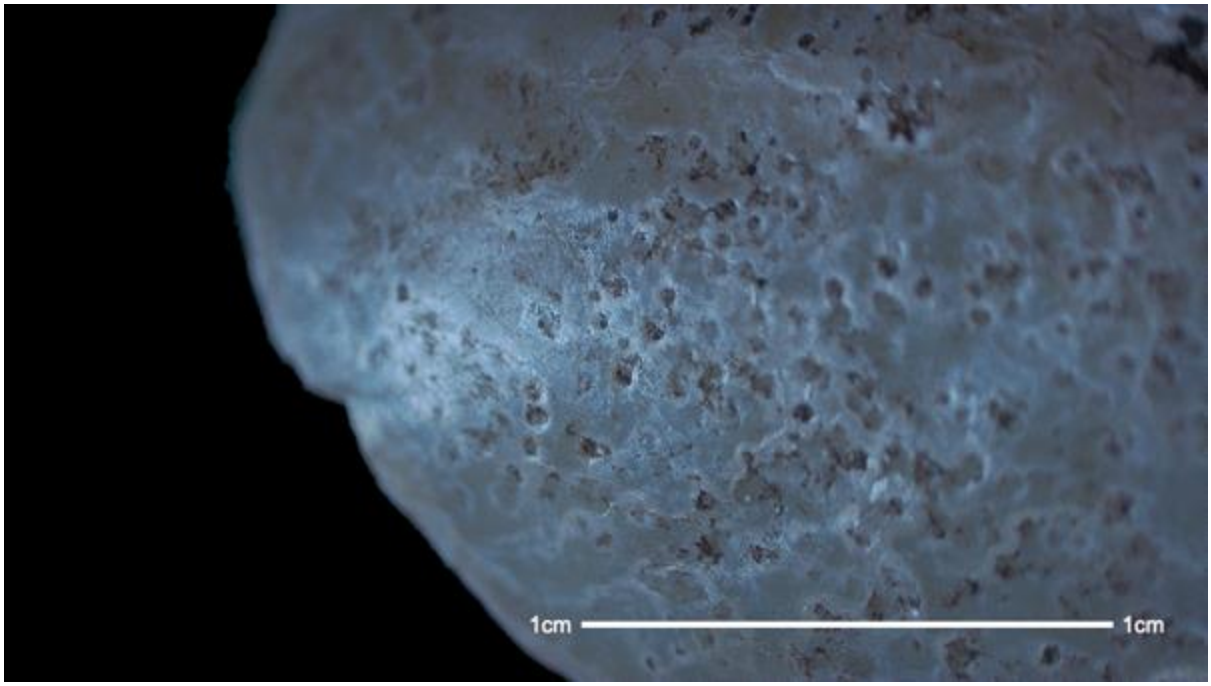


Figure 5.120: A polished freshwater mussel shell

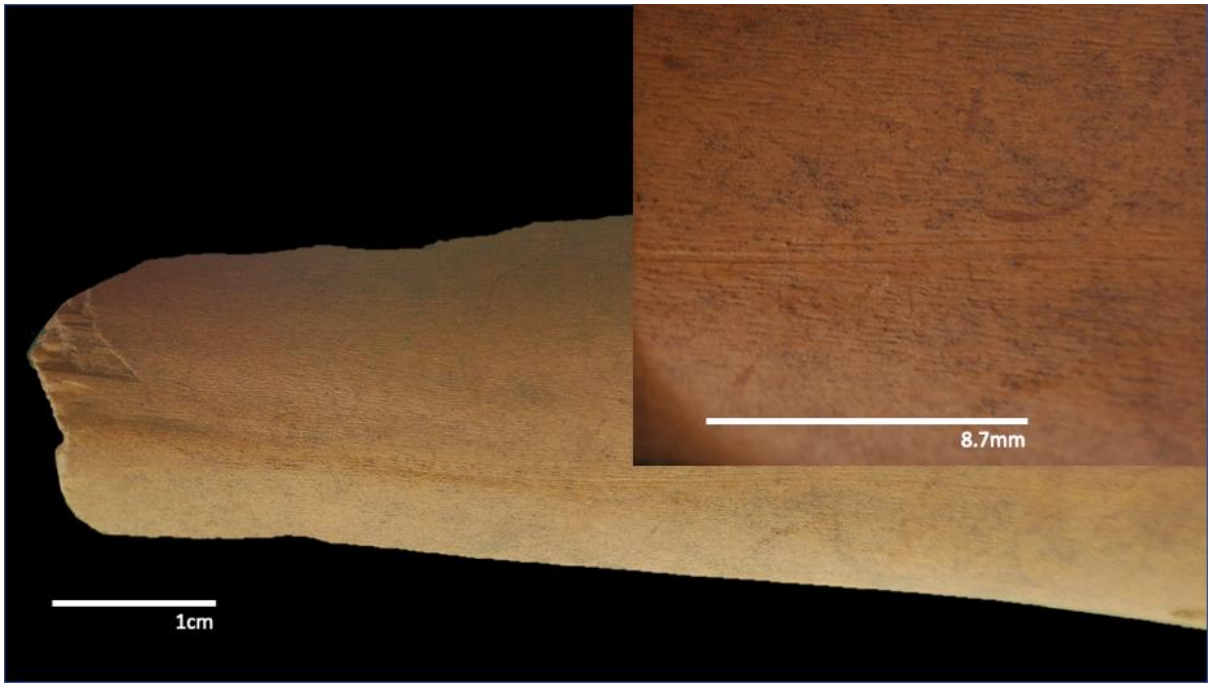


Figure 5.121: An example of polish and striations running along the shaft of a long bone (detail in box)

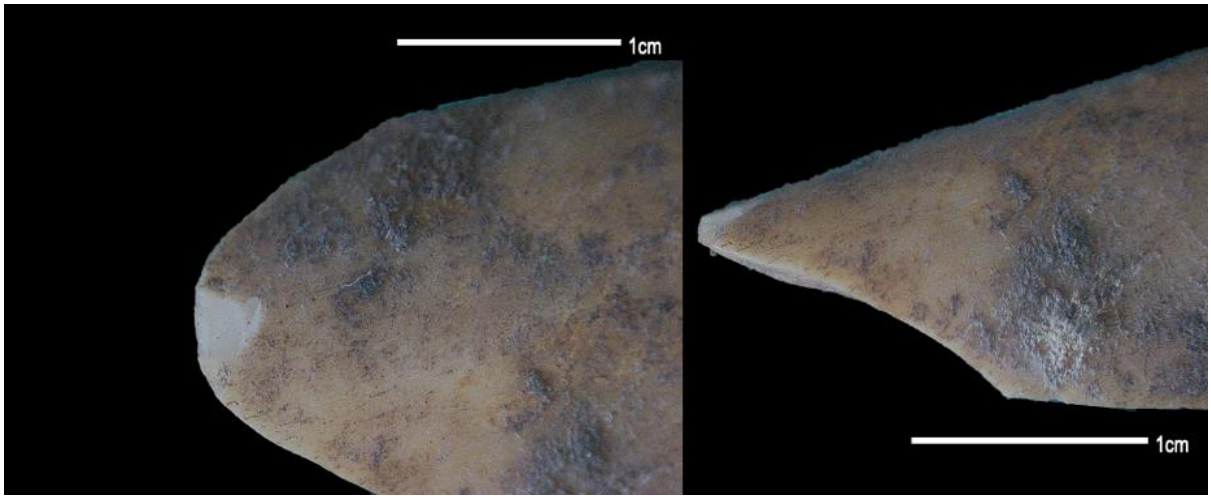


Figure 5.122: An example of fresh breakage on a bone

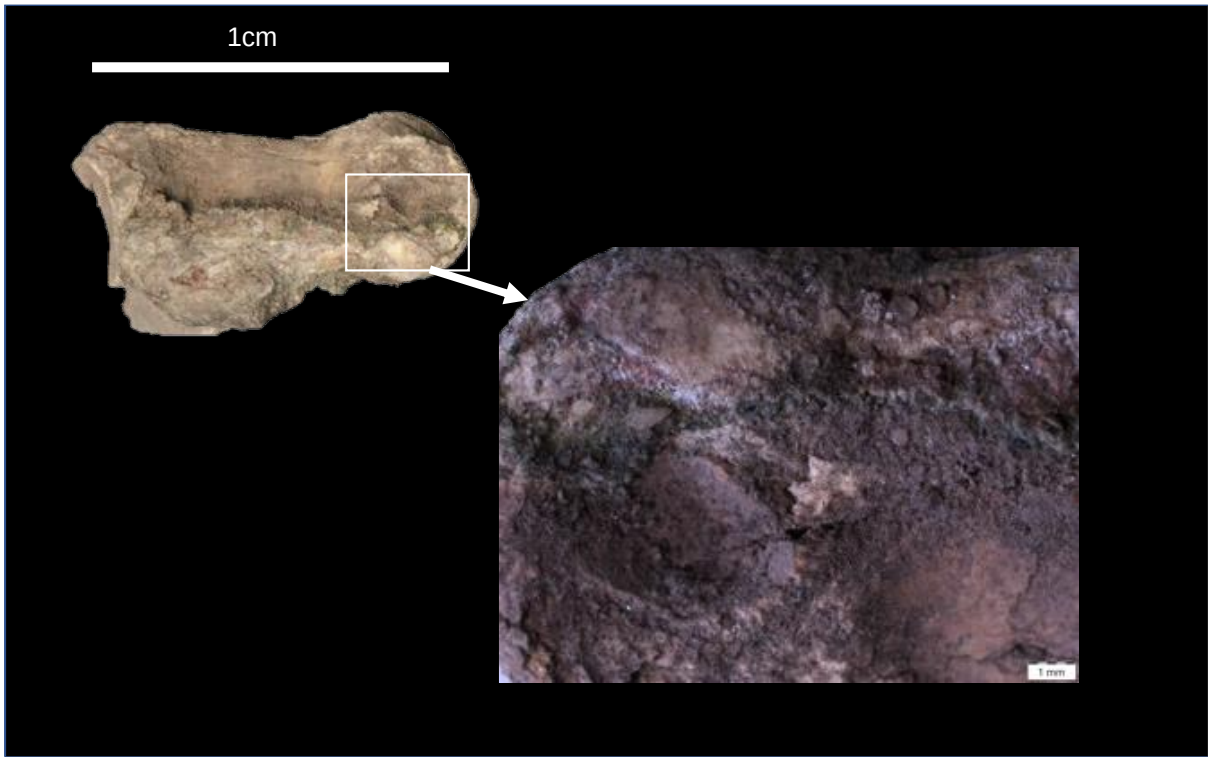


Figure 5.123: An example of diagenetic staining on a bovid size class II 2nd phalange

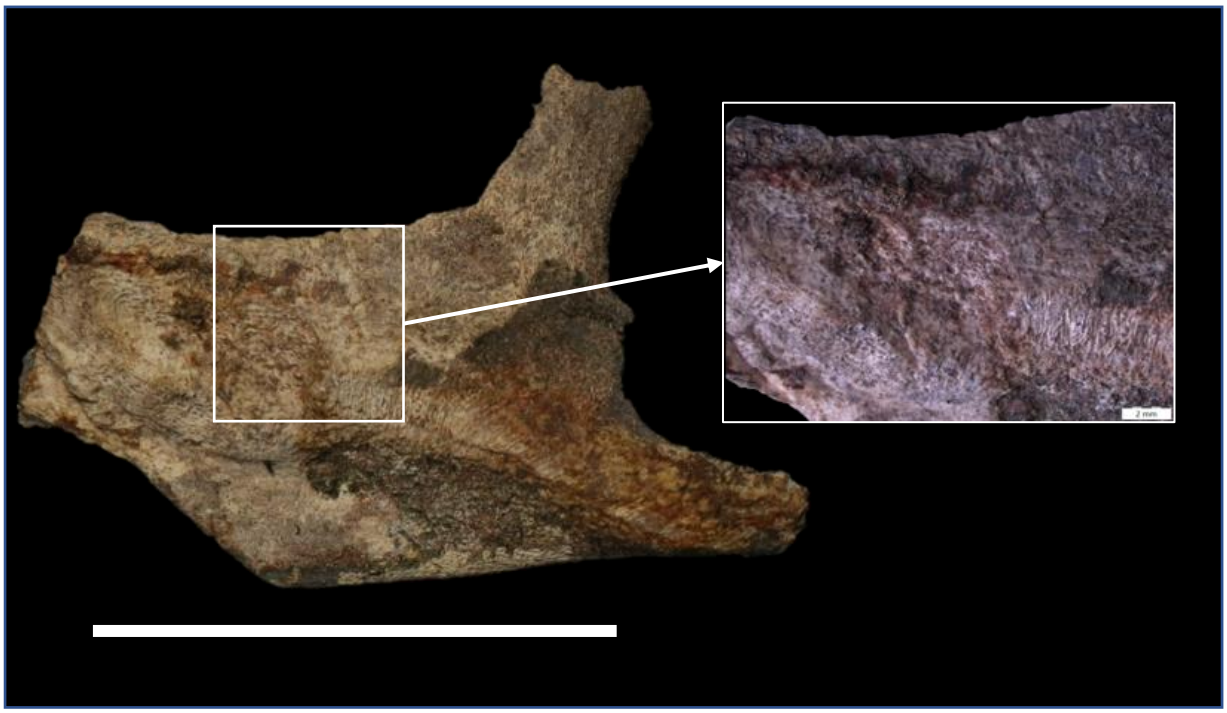


Figure 5.124: An example of diagenetic staining and gnaw marks on a partial small mammal mandible

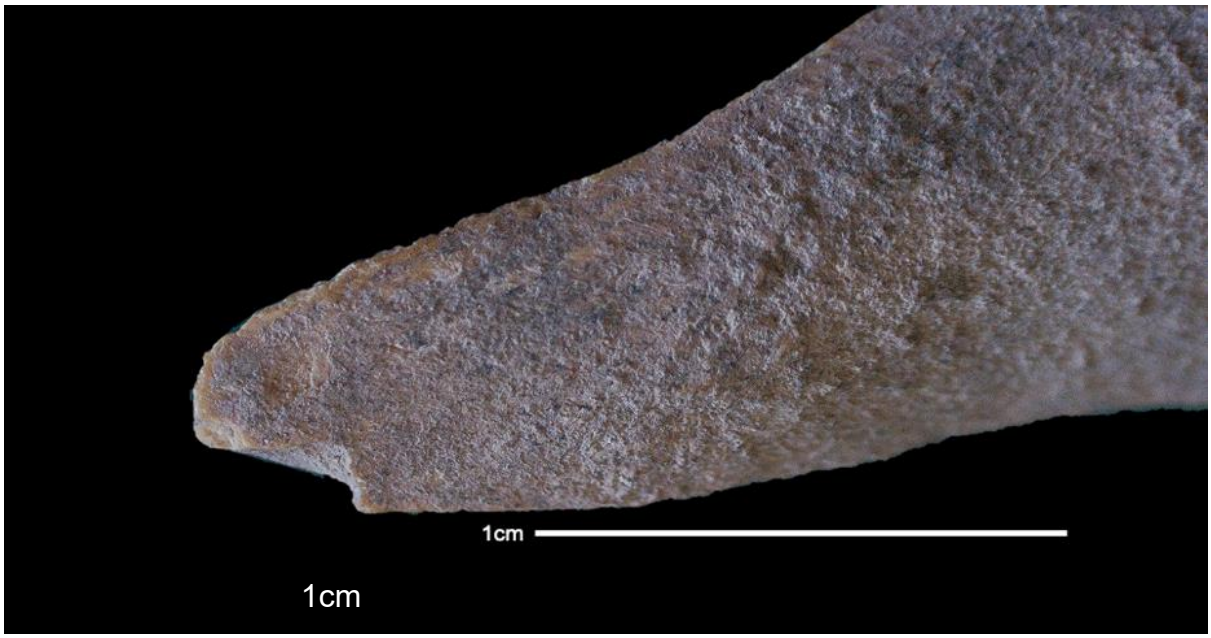


Figure 5.125: An example of ash encrustation obscuring bone surface modifications

Figure 5.126: A* Bos taurus *phalange with possible pathology from Rock Tank 1

5.5 Site-wide patterns

Identifying site-wide patterns can indicate activity areas. In this section, I present long-bone breakage patterns for Rock Tank 1, Rock Tank 2 and all the Central Areas, as well as the bone surface modifications for Rock Tank 1, Rock Tank 2 and Central Areas A, B, C and D.

Long bones are defined generally as femurs, humeri, ulnae, radii, fibulae, tibiae, and phalanges. Across Ratho Kroonkop, 30.03% of identified long-bone faunal remains had intact proximal or distal ends. Transverse (3% of total NISP) and spiral (2% of total NISP) are the most common fractures recorded, followed by irregular fractures (1% of total NISP). The highest number of intact proximal or distal ends of long bones is recorded from Rock Tank 1. Proportionally, more transverse fractures were recorded on remains from Rock Tank 2 and more spiral fractures were recorded from Rock Tank 1 (figure 5.127).

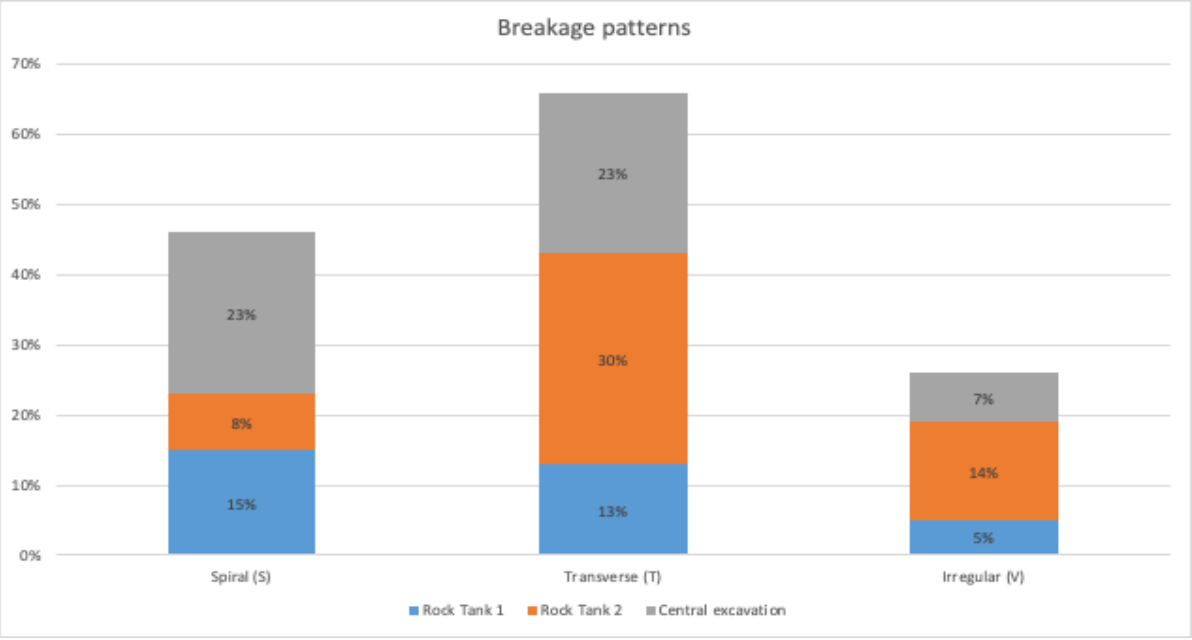


Figure 5.127: Long bone breakage patterns at Ratho Kroonkop

Across Ratho Kroonkop, cut marks and trampling marks occur most commonly. Tooth marks were most common in Central Areas A, B and C (11%, 11% and 22% of total NISP). Burning was most common in Central Areas B, C and D (11%, 14% and 16% of specimens analysed respectively). Percussion marks were most frequently recorded from Central Area C (17% of total NISP). Acid etching was infrequently

recorded (5% of total NISP) (See Appendix A.4 for a breakdown of BSMs by taxa) (figure 5.128).

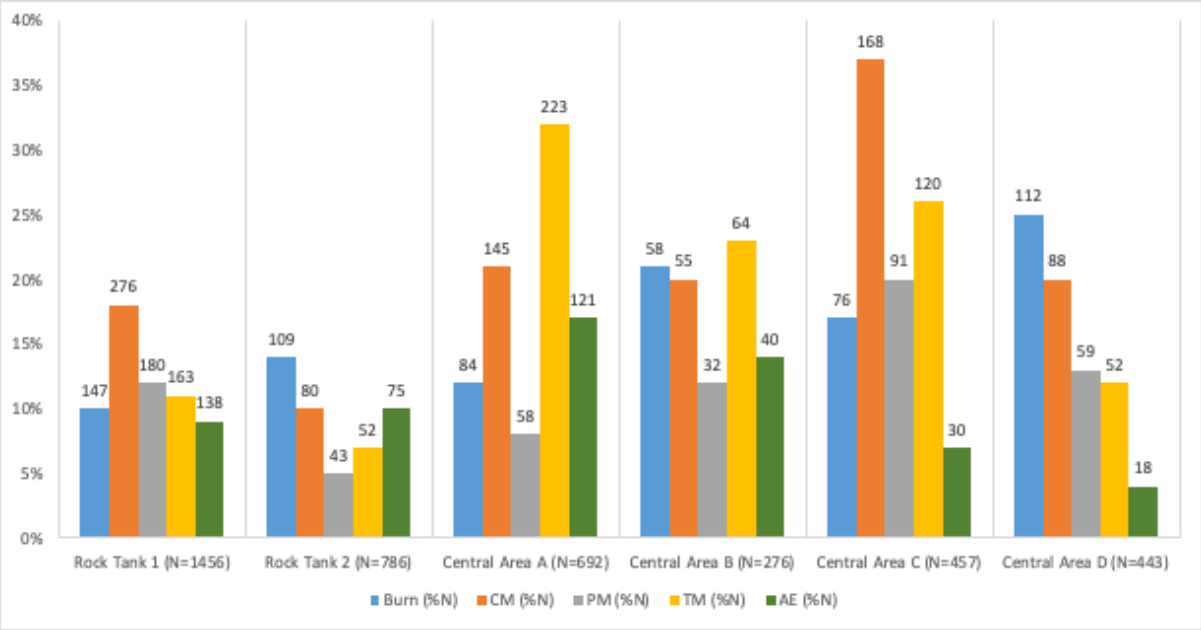


Figure 5.128: Site wide bone surface modification patterns. Columns represent frequency of occurrence. Number of specimens (n) above columns. CM = Cut marks, PM = Percussion marks, TM = Tooth marks and AE = Acid etching

5.6 Summary

This chapter presented the results from the analysis of the faunal remains from Ratho Kroonkop. I identified a wide range of species, ranging from small rodents to large carnivores and very large mammals. There were very few domestic animals remains recovered from Ratho Kroonkop. Taphonomically, anthropogenic modifications occurred predominantly at limb joints and along limb bone shafts and the majority of zoogenic modifications were located on small mammal remains. Trampling was recorded more infrequently on remains from the two rock tanks than the central areas and, overall, weathering of the bone increased in frequency closer to the surface of the archaeological deposit.

Chapter 6: Discussion

6.1 Introduction

The large faunal assemblage from Ratho Kroonkop provides a unique opportunity to explore human-animal relationships in the SLCA. I have grouped the faunal assemblage from the whole of Ratho Kroonkop into two categories based on the radiocarbon dating of the site. The first category, comprising Rock Tank 2 and Central Area A, dates to the K2 period. The second, comparing category, comprising Rock Tank 1 and Central Areas B, C and D, dates to the last 500 years.

There are differences between my study and the previous study by Brunton *et al.* (2013). First and foremost, my study analysed the entire faunal assemblage from all excavated areas of Ratho Kroonkop whereas Brunton *et al.* (2013) analysed only the faunal material from Rock Tank 2. Second, my study identified several new species, namely: cf. *Soricidae* (possible shrews), *Panthera pardus* (leopard), Hyaenidae (hyena); *Felis silvestris* (African wild cat), *Genetta* cf. *genetta* (possible small-spotted genet), Herpestidae (possible mongoose), *Phacochoerus africanus* (common warthog), *Hippopotamus amphibius* (hippopotamus), *Connochaetes taurinus* (blue wildebeest), *Alcelaphus buselaphus* (red hartebeest), *Oreotragus oreotragus* (klipspringer), *Pelea capreolus* (Vaal rhebok), *Hippotragus equinus* (roan), *Hippotragus niger* (sable), *Tragelaphus scriptus* (bushbuck), *Redunca fulvorfula* (mountain reedbuck), *Kobus ellipsiprymnus* (waterbuck) and *Pronolagus randensis* (Jameson's red rock rabbit). Many of the newly identified species were found only in Rock Tank 1 or the Central Areas and thus would not have been in the assemblage analysed by Brunton *et al.* (2013). Third, I performed a microscopic analysis of all identified specimens to determine the bone surface modifications on the faunal remains. This was not done in the study by Brunton *et al*. (2013).

I am not assigning general activity areas to Ratho Kroonkop since, according to A.R. Antonites and Kruger (2012: 3), working at TSH 32 (a site associated with Venda-speakers), this does not "adequately qualify the meaning of the site". However, an analysis of the faunal remains in terms of the relationships between people and animals, the use of animals and the discard of their remains can provide an avenue

into how particular areas of an archaeological site were used by people (A.R. Antonites & Kruger 2012).

The combination of traditional zooarchaeological methods and a microscopic taphonomic analysis allowed the development of a more complete idea of the utilisation of fauna at Ratho Kroonkop and a better understanding of people-animal relationships in the broader region. I begin this discussion with an assessment of the potential faunal accumulators of the assemblage from Ratho Kroonkop before comparing the K2 period sub-samples to faunal assemblages from hunter-gatherer sites, K2 and Transitional K2 (TK2) sites. Next, I compare the sub-samples from the last 500 year contexts to sites associated with Venda-speakers. I then discuss the faunal assemblage in the context of rain-control.

6.2 Accumulators of the faunal assemblage at Ratho Kroonkop

It is important to establish the faunal accumulators of the faunal assemblage from Ratho Kroonkop before examining the potential human agency behind the deposition of the faunal remains. If the faunal assemblage was accumulated by animals, then discussing human intentions and actions at the site is redundant.

Small mammals (including dassies, springhares, Jameson's red rock rabbits, mice and shrews), birds and fish occur across the site and throughout the spits. Many of these remains have zoogenic modifications (i.e., tooth marks and scores, and acid etching). Many of these tooth marks and scores are small (under 5mm) and the acid etching is obvious on the remains. The small, narrow tooth marks are similar to those presented by Fernández-Jalvo and Andrews (2016) for small carnivores and it is likely that these remains were gnawed by small carnivores.

The presence of juvenile and very old specimens suggests that natural deaths occurred at the site. It is also possible that some of the tooth pits on the small mammal and bird specimens were the result of raptor consumption; raptors and other birds-of-prey (e.g., fish eagles, crowned eagles and Pel's fishing owl) commonly occur in the SLCA (Sinclair *et al.* 2020). Birds-of-prey often consume small mammals, fish, and birds as part of their diet, depending on their location (see for example, Armstrong & Avery 2014; Armstrong 2016). Birds are also consumed by people and the bone

surface modifications evident at Ratho Kroonkop are similar to those described by Val *et al.* (2016) and Hockett (1991).

Some of the small mammal and bird specimens also had anthropogenic modifications, predominantly in the form of slice marks on long bones. This suggests that people sometimes supplemented their diet at Ratho Kroonkop with small mammals. Van Doornum (2008) suggested that this happened at Balerno Main Shelter and Tshisiku Shelter. Small mammal remains are also commonly found at farmer sites in the SLCA. Many of them are intrusions into the archaeological record and only some of them were consumed by people (see Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Raath 2014; A.R. Antonites *et al*. 2016a; Abatino 2021). Unfortunately, even though an in-depth taphonomic analysis was conducted, without a more nuanced understanding of the stratigraphy, it is very difficult to tease apart who (or what) accumulated the small mammals on Ratho Kroonkop. At face value, it seems more likely that the small mammals were accumulated by predators such as leopards or birds of prey; the cut marks on certain small mammal remains, however, suggest at least some accumulation by human agents.

The bovid size class I remains from across Ratho Kroonkop were possibly snared by people, brought to the site, and dismembered for consumption. Bovid size class I remains are common at many archaeological sites in the SLCA, including hunter-gatherer (see e.g., Van Doornum 2008) and farmer sites (see e.g., Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Fatherley 2009; Badenhorst *et al.* 2011, 2016; Raath 2014; A.R. Antonites *et al*. 2016a; Abatino 2021). At these sites, it is also likely that they were snared to supplement the diet (see e.g., Van Doornum 2007, 2008; Hutten 2005; Badenhorst *et al*. 2016). It is probable that the small mammal, bird, and fish remains were introduced into the archaeological record at Ratho Kroonkop by a variety of accumulators, including people and animals (see e.g., Badenhorst *et al*. 2016).

The medium and large mammal remains (including bovid size class II and III and zebra) from Ratho Kroonkop present a different scenario. Cut, chop and percussion marks are found on almost every skeletal element, particularly at limb joints, on axial

elements, the ascending ramus of the mandibles and on the foot bones. Additionally, percussion marks are predominantly located at the proximal and distal ends of long bones as well as towards the centre of long bones. These anthropogenic modifications should be interpreted together rather than separately and can be used to make inferences about cultural practices and methods of skeletal processing (Binford 1981, 1984a, 1991; Lyman 1995, 2005). In the case of Ratho Kroonkop, it was likely that the skeletons were dismembered and skinned, and that the bones were further processed for marrow. The anthropogenic modifications on medium and large mammal remains correlate with anthropogenic modifications found at farmer sites in the SLCA where disarticulation of the carcass occurs at the joints, accessing marrow occurs on long bone shafts and skinning activities are visible on the foot bones and the mandibles (e.g., Plug 2000; Hutten 2005; Abatino 2021, see also Grody 2016).

The medium and large mammal remains from Ratho Kroonkop were, however, not only modified by people; animals also had access to these remains, as evidenced by the tooth marks and scores and infrequent acid etching. These zoogenic modifications occur where carnivores commonly chew on bones (at the epiphyses and sometimes along long bone shafts). The tooth pits and scores on medium and large mammal remains from Ratho Kroonkop were similar to those produced by larger carnivores such as hyena, and wild and domestic dogs (Haynes 1980a, b; Binford *et al.* 1988; Marean & Spencer 1991; Marean *et al.* 1992; Blumenschine 1995; Fisher 1995; de Ruiter & Berger 2000; Domínquez-Rodrigo & Piqueras 2003; Pickering *et al*. 2004; Domínguez-Rodrigo & Barba 2006; Young *et al*. 2015). It is possible that domestic dogs were the main zoogenic modifier of these remains considering their presence in and around the SLCA since the first millennium AD, and evidence for them scavenging human discard at farmer sites (see e.g., Denbow 1984; Voigt 1983; Plug 1996, 2000; Plug & Badenhorst 2006). It is likely that the medium and large mammals present at Ratho Kroonkop were hunted, either as a group activity or alone, brought back to the site and dismembered for consumption and use, and that medium-sized carnivores accessed the faunal remains after human discard.

The remains of very large mammals, including giraffe, buffalo, rhinoceros, and hippopotamus present yet another accumulation scenario. The skeletal elements of these very large mammals at Ratho Kroonkop suggest that the distal limb elements

were deliberately selected from carcasses. The evidence for this is the cut and chop marks at the epiphyses of phalanges and metapodia, as well as anthropogenic marks on carpals and tarsals. These very large mammal elements also have zoogenic modifications (specifically large tooth marks, over 5mm wide), which are similar to those identified by Pickering *et al.* (2004), Marean *et al.* (1992) and de Ruiter and Berger (2000) as being made by large carnivores, such as leopards.

The combination of the location of the anthropogenic modifications and the presence of the zoogenic modifications indicates that it is possible that these remains were opportunistic finds from carcasses. Remains from very large mammals are uncommon in southern African archaeological contexts (A.R. Antonites & Kruger 2012) but do occur in faunal assemblages in the SLCA (e.g., Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Raath 2014; A.R. Antonites *et al*. 2016a; Abatino 2021).

6.3 The faunal assemblage from Ratho Kroonkop compared to others in Limpopo Province

Ratho Kroonkop, a geographical outlier on the Mapungubwe landscape, presents an interesting case study for the variability of archaeological sites within this landscape. The dating of the site suggests two distinct phases of utilisation. The first phase covers the K2 and K2/Mapungubwe transition (TK2) and the second phase took place during the last 500 years. The overall faunal patterns of the site do not necessarily differentiate between these two periods and the different areas at Ratho Kroonkop. The general trend at Ratho Kroonkop is that there were mixed accumulators of the faunal remains, namely, carnivores and/or birds of prey, and people. The following section contextualises the Ratho Kroonkop assemblage in order to explain the rationale behind my choice of assemblages for comparison with the Ratho Kroonkop assemblage and my use of relevant ethnographic material.

6.3.1 Contextualising Ratho Kroonkop

I compare the Ratho Kroonkop faunal assemblage to northern-most South African hunter-gatherer and farmer sites, and read the assemblage against both hunter-gatherer and farmer ethnographies.

For Rock Tank 1 and Central Areas B, C and D, I utilised hunter-gatherer and Venda ethnographies to contemplate the faunal remains, because, due to the radiocarbon dates for these parts of the site, they were the most likely users of the site during the last 500 years. For the hunter-gatherer component, my approach is informed by the historical and archaeological evidence for the presence of hunter-gatherers or hybrid hunter-gatherer-farming communities, such as the Kattea, between the Waterberg mountains and the southern banks of the Limpopo River (Van der Ryst 2003; Schoeman 2020; see figure 3.2). These, however, were not isolated peoples. Khami pot sherds were recovered from hunter-gatherer contexts in the nearby Ratho Boulder Shelter (Schoeman pers comm. 2022), which points to interaction between Khami farmers and the hunter-gatherers, or a hybrid community. This interaction is not surprising since there are level 3 (petty chief) Khami/Venda stonewalled residential sites on the farm Ratho (on the northernmost ridge overlooking the Limpopo River) and on the adjacent farm, Breslau. In addition, there are initiation-related structures near the level 3 site on the farm Ratho (Huffman & Hanisch 1987).

In spite of the Venda/Khami presence in the area, there is no substantive evidence for Venda or Khami settlement on Ratho Kroonkop. This should not come as a surprise since the site is too small and difficult to access to effectively function as a royal site, and Venda commoners generally did not live on hilltops, because these were associated with higher status individuals and ritual use (see Huffman & Hanisch 1987).

For the earlier period at Ratho Kroonkop (i.e., ca. AD 900 to 1230), there is more evidence for farmer and hunter-gatherer occupation of the area immediately surrounding the site. For example, the rock art at Ratho Boulder Shelter (RBS) and a Zhizo/Leokwe period site on the lower western slope of Ratho Kroonkop (Schoeman pers comm. 2022). The earlier rock art at RBS resembles central San rock art recorded throughout the SLCA (Eastwood & Blundell 1999) and this, with the farmer occupation on the lower slopes of Ratho Kroonkop lends support to the theory of the site being initially used by hunter-gatherers, either for mundane purposes or rain-control, and then being appropriated by farmers for their rain-control ceremonies (e.g., Schoeman 2006a, 2009).

6.3.2 Is the faunal assemblage from Ratho Kroonkop similar to faunal assemblages at other sites in northern Limpopo Province?

Unfortunately, the faunal remains from other possible rain-control sites in Zimbabwe, Botswana and northern South Africa have not yet been reported. This means that it is currently not possible to compare the faunal assemblage from Ratho Kroonkop to other possible rain-control sites elsewhere in the SLCA to form a more complete picture of the use of animals in these rituals. Here, I compare the Ratho Kroonkop assemblage with those from SLCA hunter-gatherer and farmer sites, as well as contemporaneous farmer sites in the Soutpansberg that marks the southern edge of the SLCA.

Rock Tank 2 and Central Area A

These areas of Ratho Kroonkop date to the K2 and TK2 periods in the SLCA (ca. AD 1040 – 1240). In this section, I compare the species and bone surface modifications of the faunal assemblages in these areas to those from K2 and the T2K faunal assemblages from the archaeological sites of K2, and the faunal assemblages from Phase 3 at Mapungubwe.

The general trend from Rock Tank 2 and Central Area A is that the majority of the faunal material originates from the uppermost layers. The taxa identified from these areas are diverse, consisting mainly of wild animals with only five specimens identified to *Ovis/Capra* and none identified as *Bos taurus*. All of the domestic taxa remains are mandibles, maxillae, or tooth fragments, with the exception of one distal metapodial. This is in stark contrast with the faunal assemblages from K2 and Phase 3 at Mapungubwe where these assemblages are dominated by domestic taxa with wild taxa representing very few of the total identified specimens (e.g., Voigt & Plug 1981; Plug & Voigt 1985; Plug 2000; Hutten 2005; Manyanga 2006; Badenhorst *et al.* 2011; Raath 2014; Badenhorst *et al.* 2016; Abatino 2021). Of particular relevance are the skeletal elements of domestic taxa represented at these sites; these species are represented by almost every skeletal element (e.g., Hutten 2005; Abatino 2021).

The butchery patterns evident at Rock Tank 2 and in Central Area A, which indicate disarticulation at limb joints, some skinning activities, marrow extraction and utilisation

of the whole carcass as well as access to the remains by carnivores, are very similar to those evident at K2 and Phase 3 at Mapungubwe (e.g., Fatherley 2009; Abatino 2021).

It is difficult to compare the faunal assemblages from these areas with the faunal assemblages from hunter-gatherer sites in the SLCA because there is limited data available from those sites. The fauna from Rock Tank 2 and Central Area A is dominated by wild taxa and the majority of these are larger than hares and dassies. The faunal assemblages from Balerno Main Shelter and Tshisiku Shelter are dominated by smaller mammals, with a low frequency of larger mammals present (Van Doornum 2007, 2008). Comparing the faunal material from Rock Tank 2 and Central Area A to hunter-gatherer sites is also difficult because there are very few faunal remains from below the gravel floors and establishing the accumulators of this material is impossible.

Rock Tank 1 and Central Areas B, C and D

In this section, I compare the faunal assemblages from these areas to faunal assemblages from sites associated with Venda-speakers in the Soutpansberg because Rock Tank 1 and Central Areas B, C and D date to the last 500 years and Venda speakers are one of the communities that might have lived in the area around Ratho Kroonkop during this time. The multiple bone clusters in Rock Tank 1 indicate that this rock tank was used multiple times during the last 500 years.

From these areas on Ratho Kroonkop, the taxa diversity is as diverse as the earlier areas at Ratho Kroonkop (i.e., Rock Tank 2 and Central Area A). The faunal assemblages are also dominated by wild taxa with very few domestic taxa present. The *Ovis/Capra* specimens are exclusively cranial (mandibles and maxillae) and teeth and *Bos taurus* specimens are represented by a phalange, carpal, hyoid and a tooth.

The faunal assemblages from the contemporaneous Venda sites in the Soutpansberg are often diverse. However, the general trend at these sites (including those, such as Dzata and Tshitheme with status differentiation) is that the assemblages are generally dominated by domestic taxa (sheep, goats, and cattle) with some wild taxa

represented in much lower frequencies (e.g., de Wet-Bronner 1994a, b; 1995a, b; A.R. Antonites & Kruger 2012).

Importantly, at TSH 32 (a site associated with Venda-speakers in the Ha-Tshirunudu Mountains dating to between AD1860 and 1913), birds, tortoise carapace pieces, fish remains, and freshwater mussel fragments were recovered from across the site, indicating that even when domesticates were available for consumption, other species were also exploited. A.R. Antonites and Kruger (2012) suggest that the wide variety of taxa identified from the midden at TSH 32 is indicative of opportunistic hunting and snaring (particularly of zebra, impala, and klipspringer, among others). They argue that the presence of much large game animals suggests more organised hunting, as well as the selection of parts of carcasses for consumption away from where the animal was killed. Large carnivore and primate remains at sites associated with Venda-speakers have been suggested as indicators of court or elite female activities and possibly also ritual activities (de Wet-Bronner 1995a, b; A.R. Antonites & Kruger 2012).

The Bone Surface Modifications (BSMs) on the faunal assemblages from Rock Tank 1 and Central Areas B, C and D are also similar to those from Venda sites that have evidence for the utilisation of whole carcasses, marrow access, skinning activities and dismemberment at limb joints, as well as access to the remains by carnivores (e.g., de Wet-Bronner 1994a, b; 1995a, b; A.R. Antonites & Kruger 2012).

The comparisons of taxa (represented above) indicate that the faunal assemblage from Ratho Kroonkop is different from other sites within the SLCA and the Soutpansberg. The human activities, however, left similar taphonomic signatures at these sites. It is thus necessary to consider other options from which interpretations of the assemblage can be made, such as feasting and ritual.

6.3.3 Is Ratho Kroonkop a feasting site?

Archaeologically, the faunal signature of feasting includes the presence of whole elements (in particular whole metapodials) (Magoma *et al.* 2018), high concentrations of bone in a specific area or stratigraphic unit, the presence of articulated limbs, the presence of animals which would be difficult to hunt and the intense exploitation of a particular species (Hayden 2001: 40-41). Importantly, feasting is a public event

attended by many people (Stayt 1968; Badenhorst 2008; Fleisher 2010; Magoma *et al.* 2018).

Looking at skeletal element representation alone, the faunal assemblage from Ratho Kroonkop as a whole, the several bone clusters (particularly those in the rock tanks), the presence of large and very large mammals (i.e., eland, giraffe, hippopotami, and rhinoceros) and the high frequency of impala (*Aepyceros melampus*) specimens would all suggest that Ratho Kroonkop is a feasting site. However, the low frequency of domesticates (especially cattle), which historically have played a large role in feasts held among farmer groups in southern Africa (e.g., Stayt 1968; Badenhorst 2008; Magoma *et al.* 2018), as well as the comparatively small area available at Ratho Kroonkop for hosting large numbers of people, detracts from this hypothesis. A final hypothesis for the faunal assemblage at Ratho Kroonkop is that it accumulated as a result of ritual.

6.3.4 Animals as more than animals at Ratho Kroonkop

At Ratho Kroonkop, the dating of the site indicates two periods of use, both of which involved the deposition of faunal remains into rock tanks. The faunal remains from the different areas at Ratho Kroonkop indicate that activities associated with consumption, skinning and marrow extraction occurred throughout the site during both episodes of use. The hypothesis that the faunal remains at Ratho Kroonkop were accumulated as a result of ritual can be tested using ethnography, taphonomy and the species representation at the site.

During both periods of use, people deliberately chose particular skeletal elements from animals that were considered significant by hunter-gatherers and farmers, e.g., kudu, eland, rhinoceros, hippopotamus and giraffe phalanges and carpals. Hunter-gatherers in South Africa, commonly depicted eland, kudu, rhinoceros, and giraffe in rock art, particularly in the broader SLCA landscape (e.g., Eastwood & Cnoops 1999; Eastwood & Blundell 1999; Eastwood 2006) and Eastwood and Blundell (1999) suggest that depictions of these large mammals can be interpreted as representing particularly spiritually important animals in hunter-gatherer cosmology.

There is continuity in considering these large mammals as spiritually potent and important, which is demonstrated through rock art, both engraved and painted, and the re-use of important hunter-gatherer sites by herders and farmers (e.g., Ouzman 1995; Hall & Smith 2000). According to ethnographic records of hunter-gatherers and farmers in South Africa, these large and very large mammals were considered dangerous and especially difficult to hunt (e.g., Stayt 1968; Mönning 1978). They were hunted either using pits (e.g., Stayt 1968; Hall 1984) or as a group activity (e.g., Stayt 1968; Van Warmelo 1953; Hammond-Tooke 1974a, b). At Schroda, very large mammals, in particular, were represented using clay figurines, which may have been used in initiation ceremonies for boys to prove their bravery (e.g., Van Schalkwyk 2002). Eland, kudu, rhinoceros and giraffe are still present as spiritually significant animals in farmer cosmology (e.g., Hall & Smith 2000; Boeyens & Van der Ryst 2014).

The identification of predominantly maxillae, mandibles, and teeth of *Ovis/Capra* (some with deliberate polish) suggests that these elements held significance. Sheep were considered particularly important spiritually among historical farmer and herder groups and were painted in places that were considered spiritually potent by both groups (e.g., Salt Pan Shelter [Hall & Smith 2000]). Sheep were also sacrificed at important events because they are quiet while being killed and are also considered as a replacement for human sacrifice (de Heusch 1985). Cattle (*Bos taurus*) are also represented at Ratho Kroonkop by several elements and are considered important by historical farmer groups. Cattle are often slaughtered during important events (e.g., Shaw 1974; Van der Vliet 1974; Magoma *et al.* 2018).

The animals used at Ratho Kroonkop are more than animals because of the agency they were embodied with by the people who used the site. This secondary agency (Insoll 2011a; J. Morris 2012) can be viewed archaeologically through the taxa represented, where the faunal remains were deposited and by analysing the bone surface modifications. These modifications allow archaeologists to understand the ‘life history’ of the faunal remains (following Kopytoff 1986).

The spatial patterns, which have emerged from this faunal analysis indicate that ritual and mundane activities occurred in the central areas and that some of the associated material was then deposited into the rock tanks. It is, however, difficult to explicitly

separate which faunal remains were mundane, and which were ritual because mundane objects (including animals) can be transformed into ritualised objects through association with ritual practices (Groleau 2009). The large increase in the frequency of fish remains, some of which were burnt, also indicates that the rock tanks were important areas into which particular species should be deposited. It is likely that animals brought to Ratho Kroonkop were thought of as more than animals; they were used as more than food at this site. The faunal assemblage from Ratho Kroonkop is different from faunal assemblages at other sites in the SLCA and the taxa and skeletal elements represented suggest that the faunal assemblage was accumulated because of ritual activity. One such activity is rain-control.

6.4 The 'rain's things' at Ratho Kroonkop

Several of the species identified at Ratho Kroonkop are ecologically associated with water or with wet places. Of the Bovidae these species include *Syncerus caffer* (African buffalo), *Tragelaphus strepsiceros* (Greater kudu), *Tragelaphus scriptus* (Bushbuck), *Connochaetes taurinus* (Blue wildebeest), *Alcelaphus buselaphus* (Red hartebeest), *Hippotragus equinus* (Roan), *Hippotragus niger* (Sable), *Redunca arundinum* (Southern reedbuck), *Redunca fulvorfula* (Mountain reedbuck), *Kobus ellipsiprimnus* (Waterbuck) and *Aepyceros melampus* (impala) (Skinner & Chimimba 2005). *Giraffa camelopardalis* (Giraffe), *Hippopotamus amphibius* (Hippopotamus), *Potamochoerus larvatus* (Bushpig), *Equus quagga* (Plains zebra) and *Rhinocerotidae* sp. (Rhinoceros) all are also ecologically associated with water (Skinner & Chimimba 2005). As mentioned, the presence of the above taxa has been recorded at several sites in the SLCA and the Soutpansberg, however, in much lower frequencies than at Ratho Kroonkop. The surrounding context of the faunal remains enables interpretation of these faunal remains as resulting from rain-control practices.

Ratho Kroonkop is a place where cosmologies are manifested and maintained, and it provides an interesting look into people-animal relationships specifically related to rain and rain-making. Wilmsen (2014: 399) contends that "materials, revered natural objects as well as artefacts, become invested with meaning through social interaction and are capable of accumulating histories that embody the essence of social life" and, given that faunal remains in the archaeological record form part of these materials to

which Wilmsen (2014) refers, they are one avenue that archaeologists can use to access and understand people-animal interactions and relationships.

The physical aspect of Ratho Kroonkop, a hill of sandstone rising above a valley, is also an indicator that it was a site of rain-control in the SLCA. For ethnographically documented hunter-gatherers and farmers, hills and places that held water were considered particularly spiritually important places where the ancestors dwell and they are able to control rain (e.g., Schapera 1971; Berglund 1976; Bleek 1933b; Ouzman 1996; Lewis-Williams & Pearce 2004; Wilmsen 2014).

Important for my study and the interpretation of the faunal remains from Ratho Kroonkop, it is also a long-held belief that farmers moving into an area respected and acknowledged hunter-gatherer authority over particular aspects such as rain-control as hunter-gatherers were considered the 'first people' (e.g., Aukema 1989; Hammond-Tooke 1974b; Schoeman 2006, a, b, 2009; Wilmsen 2014). Wet places are also crucial places for rain-control and rain medicine (e.g., Bleek 1933; Berglund 1976; Murimbika 2006). The rock tanks on Ratho Kroonkop would have been places where rain water would have gathered and would thus have been considered as 'wet places'. Wet places were important for rain-control and rain medicine because the medicine had to be kept 'cool' in order for rain to fall (e.g., Schapera 1971; Berglund 1976; Schoeman 2006a, b, 2009; Murimbika 2006). Schoeman (2006a, b) argues that rain-control in the SLCA was evidence of the interaction between hunter-gatherers and farmers, expressed in the integration of hunter-gatherer vocabulary around rain-control (such as the production of cupules) into farmer vocabulary around rain-control (expressed through farmer use of hills and wet places to make rain).

Although Rock Tank 2 and Central Area A date to the K2 and TK2 periods, the archaeological evidence of many years of interaction between hunter-gatherers and farmers in the SLCA (e.g., Forssman 2011, 2016, 2017, 2020) allows for the use of hunter-gatherer ethnography regarding rain-control for interpretations of the faunal assemblage from these areas. The presence of some domestic species also means that analogies can be drawn from historical farmer ethnographies that address rain-control.

The species represented in Rock Tank 2 and their skeletal elements provide an avenue for exploring rain-control during the K2 and TK2 periods at Ratho Kroonkop. Large mammals, such as zebra, and very large mammals, such as a rhinoceros, are represented by their distal limb elements (i.e., phalanges, carpals/tarsals and distal metapodia). Rhinoceros are also depicted in rock art in the Soutpansberg and at several sites in the SLCA (e.g., Ouzman 1996), including in Ratho Boulder Shelter just below the crown of Ratho Kroonkop (see figure 2.5). A hybrid hunter-gatherer-farmer group, such as the Kattea, are the likely authors of this particular painting of a rhinoceros (also see Schoeman 2020).

The anthropogenic modification on large and very large mammal remains can also be used as potential evidence for rain-control at Ratho Kroonkop. The percussion and cut marks on rib fragments link with /Han≠kasso's statement to Bleek and Lloyd that the "rain's medicine men seize and break the rain's ribs…" (Bleek 1933 a: 387), which Ouzman (1996) contends is represented in the engraved rock art at Thaba Sione.

Boeyens and Van der Ryst (2014) argue that the presence of rhinoceros foot bones (i.e., phalanges, carpals and tarsals) at rain-control sites can potentially be explained by the belief among farming communities that rhinoceros charge and stamp out campfires (which would lead to 'cooling', an important aspect in farmer rain-making). At Ratho Kroonkop, however, I argue that the presence of rhinoceros foot bones associated with the foot bones of other very large mammals (such as giraffe) might also be linked to the ideas that informed the making of cupules, which are dotted across the site. These cupules are created through a hammering process, which could have been used as a metaphor for animals running, which is associated with rain by hunter-gatherers (Schoeman 2006). An example of this is the creation of a new medicine song inspired by the hooves of giraffes running before a storm and the beat of the rain, according to a woman named Beh (Eastwood & Cnoops 1999: 109).). A further example can be found in what Han≠kasso said to Bleek and Lloyd: "the rain is addressed in the following manner by the old men: first they speak to the dead men who are with the rain. 'O gallopers, O gallopers, do you not know me?…" (Bleek 1933a: 304).

Smaller animals, such as fish, are also important in hunter-gatherer ontologies because they are associated with the rain and are the “water’s things” (Bleek 1956: 484). The large increase in fish remains, including some that are burnt, may thus indicate that fish were still involved with rain-control during the K2 and TK2 period.

Small animals, such as hyraxes and guinea fowl, were also added to rain-medicine by Tswana and Pedi people when general rain-control rituals had failed (Feddema 1966; Murimbika 2006). These animals were present throughout the Ratho Kroonkop excavations and had been modified by people and animals. Birds are particularly important in Tswana beliefs around rain-control and origin myths (Schapera 1971; Wilmsen 2014) and form part of the rain-medicine. Most important birds in Tswana beliefs (the fish eagle and the bateleur eagle) around rain-control, however, are much larger than those identified at Ratho Kroonkop. The bateleur eagle and fish eagle, in particular, were thought of as intermediaries between chiefs, rain-controllers and the ancestors who controlled the rain (Schapera 1971; Wilmsen 2014).

There is continuity in thinking of animals and rain-control. The Korana, a hybrid hunter-gatherer farmer group, sacrificed one head of cattle when rain was needed. From this animal, a rib from each side and the clavicular portions were roasted over a fire. The Korana also burnt the bones and fat because it was the smell of the fat that had to rise into the sky for rain to fall (Engelbrecht 1936). For many historically documented farming groups, sacrifice of a domestic animal (preferably a black sheep) was also common in rain-control rituals (e.g., Hammond-Tooke 1974a, b; de Heusch 1985; Murimbika 2006). Interestingly, there are very few *Ovis/Capra* specimens from Rock Tank 2 and Central Area A and no cattle remains from this earlier period at Ratho Kroonkop. From the later period (in Rock Tank 1 and Central Areas B, C and D), the *Ovis/Capra* specimens are represented only by maxillae, mandibles and teeth and cattle are represented by a phalange, carpal and hyoid. This selectiveness could be due to the animals being slaughtered at the rain-makers home and only particular body parts being brought to Ratho Kroonkop for more specific rain-control ceremonies; this theory, however, needs to be explored further.

The burning recorded across Ratho Kroonkop also potentially indicates that rain-control ceremonies occurred at the site. It was common among historically

documented farmer groups that the bones and fat of animals, as well as wet plant material was burnt to create black smoke to call the rain (e.g., Eiselen 1928; Schapera 1930, 1971; Stayt 1968; Berglund 1976; Mönning 1978; Murimbika 2006; also, Schoeman 2006, for the practice in archaeological contexts in the SLCA). The use and sacrifice of animals and ritual cooking and burning of the meat and bones for rain-control was also prevalent among ethnographically documented farmer groups (e.g., de Heusch 1985; Murimbika 2006; Schoeman 2009) and Schoeman (2009) suggests that this aspect of rain-control predates contact with hunter-gatherers and was part of early farmer rain-control vocabulary.

The continued dominance of wild taxa at Ratho Kroonkop and multiple deposition episodes is significant because, according to Murimbika (2006), the Venda held only one rain-control ceremony annually and these ceremonies involved the slaughter of a goat, whose bones were buried in a wet place with other rain-medicines. Among other historically documented farming groups, wild animals, such as a klipspringer, were sought only if the usual rain-control ceremonies did not produce rain (Schapera 1971).

The wild animals represented at Ratho Kroonkop, in the rock tanks and the central areas, include several species associated with water, such as waterbuck, rhinoceros and hippopotamus, which may suggest that, at Ratho Kroonkop specifically, these animals were considered more potent than domestic taxa for rain-control. This may have been due to the idea that places that were spiritually significant for hunter-gatherers were more potent than other spaces (for e.g., Salt Pan Shelter [Hall & Smith 2000]). This idea may have filtered into more recent rain-control ceremonies by Venda and historical people using the site, possibly evident in the faunal remains, especially those from the rock tanks.

The context surrounding the faunal assemblages from Ratho Kroonkop also suggest that rain-control ceremonies occurred at the site. Most significant are the rock tanks with deposit; for hunter-gatherers and some farmer groups, rain-control occurred atop hills close to their living spaces and the rain medicine was deposited into ‘wet places’ where water collected (e.g., Eiselen 1928; Schapera 1930, 1971; Stayt 1968; Berglund 1976; Mönning 1978). The cupules at Ratho Kroonkop also potentially provide a link to rain-control. Cupules were used by Venda people to make and thank God for the

arrival of rain (Stayt 1968) and are present at other rain-control sites in the SLCA, which, according to Schoeman and Murimbika (2006-7), indicates that the cupules (potentially first made by hunter-gatherers at these sites) were incorporated into Venda thinking about rain. Schoeman (2009) suggests that the deliberate disposal of refuse from rain-control rituals into the rock tanks (indicated by the clusters of material culture which included bone) was a geographically and temporally restricted practice in the SLCA. The faunal remains from Ratho Kroonkop support this suggestion.

It is important to acknowledge that although there are several lines of evidence of rain-control at Ratho Kroonkop, other rituals, as well as more mundane activities, may have also occurred at the site. This is evidenced by the presence of commonly consumed species and the taphonomic markers of 'ordinary' processing of carcasses, as well as skinning activities. Ultimately, Ratho Kroonkop is a multi-use site at which animals were more than food and were used in ways different to those at other contemporary sites in the SLCA and the Soutpansberg. The faunal assemblage from Ratho Kroonkop is both mundane and ritual and provides further evidence that identification of this distinction in faunal remains is difficult, if not impossible, without further context (e.g., Bell 2007; Groleau 2009).

Chapter 7: Conclusions and recommendations

7.1 Introduction

By analysing the faunal remains from an identified rain-control site, this study broadens the scope of faunal studies in the SLCA, which have tended to focus on faunal data gathered from farmer settlements. My study also highlights the potential of zooarchaeological analysis for furthering our understanding of rain-control sites, and the nature of ritual performance at these sites.

At the core of these ritual acts is the relationship between people and animals. These relationships between people and animals have been entangled with the study of ritual since its inception (e.g., Tylor 1970). Ritual also received significant attention in 20th century archaeology (e.g., Feddema 1966; Aukema 1989; Bell 1992; Wilson 1992; Hall & Smith 2000; Hill 2000; Gazin-Schwartz 2001; Kyriakidis 2007; Huffman 2012; Brunton *et al.* 2013; Kinahan 2018). In southern Africa, ritual comes in many forms, ranging from the healing rituals of hunter-gatherer groups (e.g., Lewis-Williams 2003; Lewis-Williams & Pearce 2004) to initiation rituals common among farmer groups (e.g., Hammond-Tooke 1974b; Van der Vliet 1974). In the SLCA, the archaeological signatures of several rituals are evident in the large numbers of figurines from Schroda (Hanisch 2002; Hanisch & Maumela 2002; Van Schalkwyk 2002; Schoeman 2017), the numerous rock art sites (both painted and engraved) (Eastwood & Cnoops 1999; Eastwood & Blundell 1999; Eastwood 2003, 2006), and the rain-control hilltop sites (Schoeman 2006a, b, 2009; Brunton *et al.* 2013). My study analysed the faunal remains from one of these rain-control hilltop sites, Ratho Kroonkop.

The data gathered during the course of my PhD research contribute significantly to the body of knowledge from the SLCA, specifically further informing rain-control ritual performance in the area. In addition to the above, by analysing the faunal remains from identified rain-control sites, this study broadens the view of faunal studies from farmer sites, which tend to focus on faunal data gathered from farmer settlements rather than ritual sites, for example.

7.2 Conclusions

The taxonomic analysis expanded the previously reported taxa list from Ratho Kroonkop (Brunton *et al.* 2013) and the microscopic taphonomic analysis provided more details about the processing of animals at the site. These two streams of evidence, combined with the excavation data and the relevant hunter-gatherer and farmer ethnographies, provided the appropriate framework within which the faunal data could be interpreted.

While it is difficult to reach definite conclusions regarding the use of the site, I suggest some probable interpretations: first, that Ratho Kroonkop is archaeologically different from 'ordinary' hunter-gatherer and farmer sites in several ways. These include that the taxa represented at Ratho Kroonkop is more varied than hunter-gatherer and farmer sites in the SLCA, that the site has not been used continuously, but rather sporadically, probably as the need arose, and that the intentional use of the rock tanks suggests a consideration for spatial differentiation of activities at Ratho Kroonkop.

Second, the taphonomic analysis suggests that the rock tanks were likely used for ritual deposit, either for offerings or following ritual activities in other areas of Ratho Kroonkop, and that the central area, away from the two rock tanks was probably used as a temporary living space, where mundane and ritual activities took place.

Third, and finally, interaction between hunter-gatherer and farmer groups is evident at Ratho Kroonkop from the faunal remains because of the taxa represented (giraffe, rhinoceros, hippopotamus, carnivores and caprines), as well as the parallels in hunter-gatherer and farmer rituals in the production of cupules (for making sound) and the mankala board next to one of the rock tanks. It is not possible to conclusively determine which group utilised Ratho Kroonkop, but there are four possibilities: one, hunter-gatherer ritual specialists used the site and were also employed by incoming farmer groups until they were no longer needed; two, hunter-gatherer ritual specialists used the site before it was appropriated by farmer ritual specialists: three, farmer ritual specialists used the site for rituals that incorporated ritual concepts from hunter-gatherer groups; or four, Kattea utilised the site for their ritual purposes.

7.3 Recommendations for further research

While this study was comprehensive, some recommendations for future research can be made:

1. Similar studies of other potential rain-control sites could provide the means to identify possible taxonomic and/or taphonomic patterns common to these sites, and to determine whether spatial or temporal variations occurred;

2. A precise, descriptive study of the location, direction and depth of cut and chop marks on the faunal remains;

3. A SEM (Scanning Electron Microscope) analysis of the cut and chop marks to determine what kind of tool was used (e.g., stone vs metal) to aid with understanding disarticulation methods used by the people who utilised Ratho Kroonkop;

4. A bone-density analysis of the elements, which I suggest were deliberately selected by humans, to test my hypothesis;

5. A formal analysis of the rodents present in Ratho Kroonkop faunal assemblage to help to determine more accurately how wet or dry the environment was during the periods when Ratho Kroonkop was used;

6. An investigation into the fish and rodent taxa identified and their provenance could provide more context regarding anthropogenic or zoogenic faunal accumulators.

7.4 Final thoughts

The faunal assemblage from Ratho Kroonkop is varied and the taxonomic and taphonomic analyses highlight several intriguing avenues of thought. Clearly, there were animals that were integral to daily life and ritual activities at Ratho Kroonkop in several ways. Although the taxonomic analysis was important for establishing the taxa present at Ratho Kroonkop, it also provided details regarding the use of those taxa at the site, thus providing a more comprehensive base from which interpretations could

be made. My study of the faunal remains from Ratho Kroonkop has demonstrated that animals at the site transcended the mundane/ritual boundary and formed an integral part of thinking about, and performing, rain-control in the SLCA.

The use of Ratho Kroonkop during the K2 and TK2 period and within the last 500 years indicates that rain-control ceremonies continued to take place away from the centre of leadership, contra to the assertion by Huffman (2007a: 385) that this was not the case after the development of sacred leadership and the centralisation of rain-control by the king (as at Mapungubwe). The occurrence of rain-control away from centres of leadership is also evident in the various ethnographies, which state that when the usual rain-control rituals did not work, rain-controllers went to sacred hills or mountains (Eiselen 1928; Schapera 1930, 1971, 1984; Stayt 1968; Hammond-Tooke 1974b; Berglund 1976; Mönning 1978; Murimbika 2006). The evidence presented in this thesis, together with the ethnographic evidence and material culture, supports the case for continued rain-control in farming communities in the SLCA south of the Limpopo River that incorporated borrowed aspects of hunter-gatherer thinking about animals and their supernatural potency.

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Appendix A

A.1 Aging of specimens according to fusion of epiphyses

Taxa	Total (N)	Neonate		Unfused		Just fused		Fused	
		n	%N	n	%N	n	%N	n	%N
Procavia capensis	137			18	20.45%	3	3.41%	67	76.14%
Pronolagus randensis	2							2	100.00%
Pedetes capensis	28			1	3.03%	2	6.06%	30	90.91%
Lagomorph gen. et sp. indet.	18					1	7.14%	13	92.86%
Aethomys cf. *chrysophilis*	3							1	100.00%
Steatomys cf. *pratensis*	1							1	100.00%
Insectivore cf.	14			1	25.00%			3	75.00%
Rodent Small	1789			174	20.54%	5	0.59%	668	78.87%
Rodent Medium	46			9	24.32%	4	10.81%	24	64.86%
Panthera pardus	2							2	100.00%
Hyaenidae sp.	1							2	100.00%
Felis silvestris	1							1	100.00%
Genetta cf. *genetta*	1			1	50.00%			1	50.00%
Herpesdidae gen. et sp. indet.	2							4	100.00%
Carnivore small	32							18	100.00%
Carnivore medium	14			2	20.00%			8	80.00%
Diceros bicornis/Ceratotherium simum	14			2	7.69%			24	92.31%

Taxa	Total (N)	Neonate		Unfused		Just fused		Fused	
		n	%N	n	%N	n	%N	n	%N
Equus quagga	24			1	3.45%			28	96.55%
Potamochoerus larvatus	2							4	100.00%
Hippopotamus amphibius	3							5	100.00%
Giraffa cameloparadalis	3							4	100.00%
Syncerus caffer	6			1	14.29%	1	14.29%	5	71.43%
Tragelaphus strepsiceros	1							2	100.00%
Tragelaphus scriptus	4							3	100.00%
Tragelaphus oryx	4							7	100.00%
Tragelaphus gen. et sp. indet.	4							4	100.00%
cf. Tragelaphus	4							8	100.00%
Connochaetes taurinus	1							2	100.00%
Alcelaphus buselaphus	1							2	100.00%
Hippotragus equinus	1							1	100.00%
Hippotragus niger	3							5	100.00%
Sylvicapra grimmia	9			1	8.33%			11	91.67%
Redunca arundinum	11			5	26.32%	3	15.79%	11	57.89%
Redunca fulvorufula	3			1	25.00%	1	25.00%	2	50.00%
Redunca sp.	33	2	6.1%	2	4.88%			37	90.24%
cf. Redunca	4			1	25.00%			3	75.00%
Kobus ellipsiprymnus	1							2	100.00%
Pelea capreolus	2							3	100.00%

Taxa	Total (N)	Neonate		Unfused		Just fused		Fused	
		n	%N	n	%N	n	%N	n	%N
Raphicerus campestris	26	2	7.7%					33	94.29%
Aepyceros melampus	95	8	8.4%	4	2.86%	3	2.14%	125	89.29%
Oreotragus oreotragus	16			1	10.00%	1	10.00%	8	80.00%
Bos taurus	7					2	16.67%	10	83.33%
Ovis aries	1							1	100.00%
Ovis/Capra	32							4	100.00%
Bov I	272	13	4.8%	10	4.31%	2	0.86%	207	89.22%
Bov I/II	6	4	50.00 %					4	50.00%
Bov II (Non-Domestic)	9							7	100.00%
Bov II	965	9	1.35%	59	8.82%	14	2.09%	587	87.74%
Bov II/III	1							1	100.00%
Bov III (Non-Domestic)	2							3	100.00%
Bov III	242	6	4.38%	14	10.22%	6	4.38%	111	81.02%
Bov III/IV	7			2	20.00%	1	10.00%	7	70.00%
Bov IV	12	2	13.33 %	1	6.67%			12	80.00%
Mammal Small	1956	8	0.79%	281	27.77%	20	1.98%	703	69.47%
Mammal Medium	4017	4	0.57%	199	28.51%	22	3.15%	473	67.77%
Mammal Large	302			33	23.57%	5	3.57%	102	72.86%
Mammal Very Large	52			7	26.92%			19	73.08%
Numida gen. et sp. indet.	14							17	100.00%
Francolinus gen. et sp. indet.	6							8	100.00%
Bird Small	54			3	5.17%			55	94.83%

Taxa	Total (N)	Neonate		Unfused		Just fused		Fused	
		n	%N	n	%N	n	%N	n	%N
Bird Small/Medium	298			20	6.94%	4	1.39%	264	91.67%
Bird Medium	154			9	5.66%	3	1.89%	147	92.45%
Bird Med/Large	1							2	100.00%
Bird Large	1							1	100.00%
Stigmochelys pardalis	28					2	15.38%	11	84.62%
Chelonia sp.	353			2	2.20%	3	3.30%	86	94.51%
Varanus gen. et sp. indet.	7							1	100.00%
Lizard Small	46							7	100.00%
Reptile Small	153			14	11.29%	4	3.23%	106	85.48%
Reptile Medium	210			50	22.73%	1	0.45%	169	76.82%
Clarias sp.	596							171	100.00%
Fish Small	8103							1095	100.00%
Fish Medium	3090							794	100.00%
Fish Large	401							210	100.00%
Total	23764	58	0.24%	929	3.91%	113	0.46%	6581	27.69%

A.2 Indeterminate mammal skeletal part representation based on numbers of identified specimens (NISP)

Element	Small mammal		Medium mammal		Large mammal		Very large mammal	
	NISP	nNISP	NISP	nNISP	NISP	nNISP	NISP	nNISP
Cranial	124	62	287	143.5	24	12	2	1
Mandibles	13	6.5	9	4.5	4	2	□	□
Maxillae	13	6.5	5	2.5	1	0.5	□	□
Teeth	151	□	2780	□	45	□	15	□
Hyoid	1	1	□	□	□	□	□	□
Head	302	31,5	3081	50.17	74	4.83	17	1
Vertebral	380	15.2	486	19.44	104	4.16	5	0.2
Ribs	908	32.43	299	10.68	65	2.32	9	0.32
Axial	1288	23.82	785	15.06	169	3.24	14	0.26
Scapulae	17	8.5	5	2.5	1	0.5	□	□
Humeri	7	3.5	9	4.5	6	3	1	0.5
Ulnae	29	14.5	5	2.5	1	0.5	□	□
Radii	10	5	9	4.5	□	□	□	□
Forelimbs	63	7.9	28	3.5	8	1.33	1	0.5
Innominate	9	1.5	12	2	15	2.5	2	0.33
Femurs	37	18.5	26	13	4	2	2	1
Tibiae	7	3.5	7	3.5	4	2	1	0.5
Hind limb	53	7.83	45	6.17	23	2.17	5	0.61
Metapodia	33	□	□	□	1	□	1	□
Metacarpals	1	0.5	□	□	□	□	□	□
Metatarsals	4	2	□	□	□	□	□	□
Carpals	79	9.88	17	2.13	7	0.88	5	0.63
Tarsals	2	0.25	10	1.25	1	0.13	□	□
Astragali	□	□	□	□	□	□	1	0.5
Calcaneus	12	6	□	□	□	□	□	□
Distal limbs	131	1.6	27	1.69	9	0.5	7	0.57
Sesamoids	6	0.25	8	0.04	□	□	□	
Phalanges	106	4.42	21	1.75	9	0.38	7	0.29
Extremities	112	2.34	29	0.9	9	0.38	7	0.29

A.3 Bovid skeletal part representation (Numbers of identified specimens)

Element	Bov I		Bov II		Bov III		Bov IV	
	NISP	nNISP	NISP	nNISP	NISP	nNISP	NISP	nNISP
Horn Cores			1	0.5				
Cranial	1	0.5	15	7.5	2	1		
Mandibles	8	4	31	15.5	5	2.5		
Maxillae	2	1	3	1.5	3	1.5		
Teeth	93		367		103		2	
Hyoids	2	2	8	8	2	2		
Head	106	1.9	425	6.6	115	1.75	2	
Scapulae	3	1.5	6	3	3	1.5		
Humeri	4	2	29	14.5	11	5.5	1	0.5
Ulnae	4	2	11	5.5	4	2	1	0.5
Radii	6	3	25	12.5	6	3	1	0.5
Forelimbs	17	2.1	71	8.9	24	3	3	0.5
Innominate	1	0.17	17	2.83	4	0.67	1	0.5
Femurs	2	1	27	13.5	9	4.5	1	0.5
Tibiae	7	3.5	41	20.5	9	4.5	1	0.5
Patellae	1	0.5	3	1.5	2	1		
Hind limbs	11	1.3	88	9.58	24	2.7	3	0.5
Metapodia	20	5	91	18.2	14	3.5	2	0.5
Metacarpals	4	2	23	11.5	8	4	1	0.5
Metatarsals	1	0.5	7	3.5	3	1.5		
Carpals	24	3	69	8.63	15	1.5	3	0.38
Tarsals	6	0.75	23	2.88	6	0.6	1	0.13
Astragali	6	3	12	6	2	1	1	0.5
Calcaneus	4	2	19	9.5	8	4		
Distal Limbs	65	2.3	244	8.6	56	2.3	8	0.4
Phalanges	61	2.54	229	9.54	40	1.67	5	0.21
Sesamoids	64	2.67	76	3.17	8	0.33	1	0.04
Extremities	125	2.61	305	6.36	48	1	6	0.13

A.4 Bone surface modifications on taxa

Taxa	Anthropogenic modifications					Zoogenic modifications			Natural modifications		
	Burnt	Cut marks	Percussion marks	Worked edge	Polish	Tooth marks	Gnaw marks	Acid etching	Root etching	Weathering	Manganese staining
Procavia capensis	25	8	5		13	14	1	5	5	15	9
Pronolagus randensis							1			1	1
Pedetes capensis	2	3			4	4	1	1	1	2	3
Lagomorph gen. et sp. indet.	2	1			2						1
Insectivore cf.						1					
Rodent Small	73	2			50	23	1	30		25	12
Rodent Medium	8				1	5		2		2	1
Rodent Large	1										
Panthera pardus		1								1	
Hyaenidae gen. et sp. indet.						1		1			
Genetta cf. *genetta*		1	1	0	1	0	0	0	0	0	1
Herpesdidae gen. et sp. indet.		0	0	0	1	0	0	0	0	0	0
Carnivore small	1	0	0	0	3	0	0	0	0	0	0
Carnivore medium	3	2	0	0	0	1	1	1	0	0	0
Diceros bicornis/Ceratotherium simum	3	6	4	0	3	4	0	0	0	4	0
Equus quagga	3	11	9	2	6	2	1	0	0	2	2
Potamochoerus larvatus		2			1						

Taxa	Anthropogenic modifications					Zoogenic modifications			Natural modifications		
	Burnt	Cut marks	Percussion marks	Worked edge	Polish	Tooth marks	Gnaw marks	Acid etching	Root etching	Weathering	Manganese staining
Hippopotamus amphibius		2			1	3				2	
Giraffa cameloparadalis	1	1	0	0	0	2	0	0	0	2	0
Syncerus caffer	1	4	2		2	1					1
Tragelaphus strepsiceros										1	
Tragelaphus scriptus	1		1								
Tragelaphus oryx		4	4		3				1		
Tragelaphus gen. et sp. indet.		3	2		1						1
cf. Tragelaphus		3	1	0	3	0	0	0	0	1	0
Connochaetes taurinus	1										
Hippotragus equinus		1				1				1	
Hippotragus niger	1	2	1	1	1	2			1		1
Sylvicapra grimmia	2	1	2			3		3	1	1	1
Redunca arundinum	2	4			2					1	2
Redunca fulvorufula								1		1	
Redunca sp.	6	15	6	1	6	3		2	2	7	1
cf. Redunca		1	0	0	0	0	0	0	0	2	
Kobus ellipsiprymnus		1	1		1						
Raphicerus campestris	6	2			5	1		1	1	2	4
Aepyceros melampus	17	33	27	3	29	13	0	3	11	28	11

Taxa	Anthropogenic modifications					Zoogenic modifications			Natural modifications		
	Burnt	Cut marks	Percussion marks	Worked edge	Polish	Tooth marks	Gnaw marks	Acid etching	Root etching	Weathering	Manganese staining
Oreotragus oreotragus	1	4			2	3		1		1	3
Bos taurus	2	3	2	1	0	0	0	0	0	3	0
Ovis aries		1									
Ovis/Capra		1	3		1	3			1	2	
Bov I	33	28	17	6	37	25	2	30	7	36	13
Bov I/II		1	0	3	0	3	0	3	0	0	0
Bov II	126	185	120	47	112	80	2	22	34	140	53
Bov II (Non-Domestic)		2	4	2	1	1	0	0	0	1	0
Bov II/III										1	
Bov III (Non-Domestic)	2	1	1	0	0	0	0	0	0	0	0
Bov III	27	57	48	12	30						
Bov III/IV		2	3	0	1	1	1	0	2	4	1
Bov IV	4	6	6	1	3	4	0	0	1	7	
Mammal Small	180	66	18	0	121	151	21	141	17	120	47
Mammal Medium	257	202	85	13	141	189	11	43	58	88	55
Mammal Large	37	86	50	7	32	43	6	2	15	62	12
Mammal Very Large	4	12	5	3	4	6			1	11	
Struthio camelus	3		1	2	2					2	
Accipitridae sp.			1								
Numida gen. et sp. indet.		3			3	5		4		4	2

Taxa	Anthropogenic modifications					Zoogenic modifications			Natural modifications		
	Burnt	Cut marks	Percussion marks	Worked edge	Polish	Tooth marks	Gnaw marks	Acid etching	Root etching	Weathering	Manganese staining
Francolinus gen. et sp. indet.		1								1	
Bird Small	2	0	1	2	0	4	0	10	1	1	1
Bird Small/Medium	20	3	1	15	0	19	0	39	1	5	20
Bird Medium	4	6	5	11	0	25	0	33	0	12	3
Bird Med/Large						1					1
Bird Large					1						
Stigmochelys pardalis	5	3	1		1	4		3			1
Chelonia sp.	55	14	5	0	10	12	0	6	1	25	1
Varanus sp.									1		
Reptile Small	7				4	2				2	3
Reptile Medium	31	6	2		14	22		3		2	3
Clarias sp.	26	1			1		1				
Fish Small	103										
Fish Medium	48										
Fish Large	3										
Total	1139	808	445	132	660	687	50	390	163	631	271
%	21.19%	15.03%	8.28%	2.46%	12.28%	12.78%	0.93%	7.25%	3.03%	11.74%	5.04%