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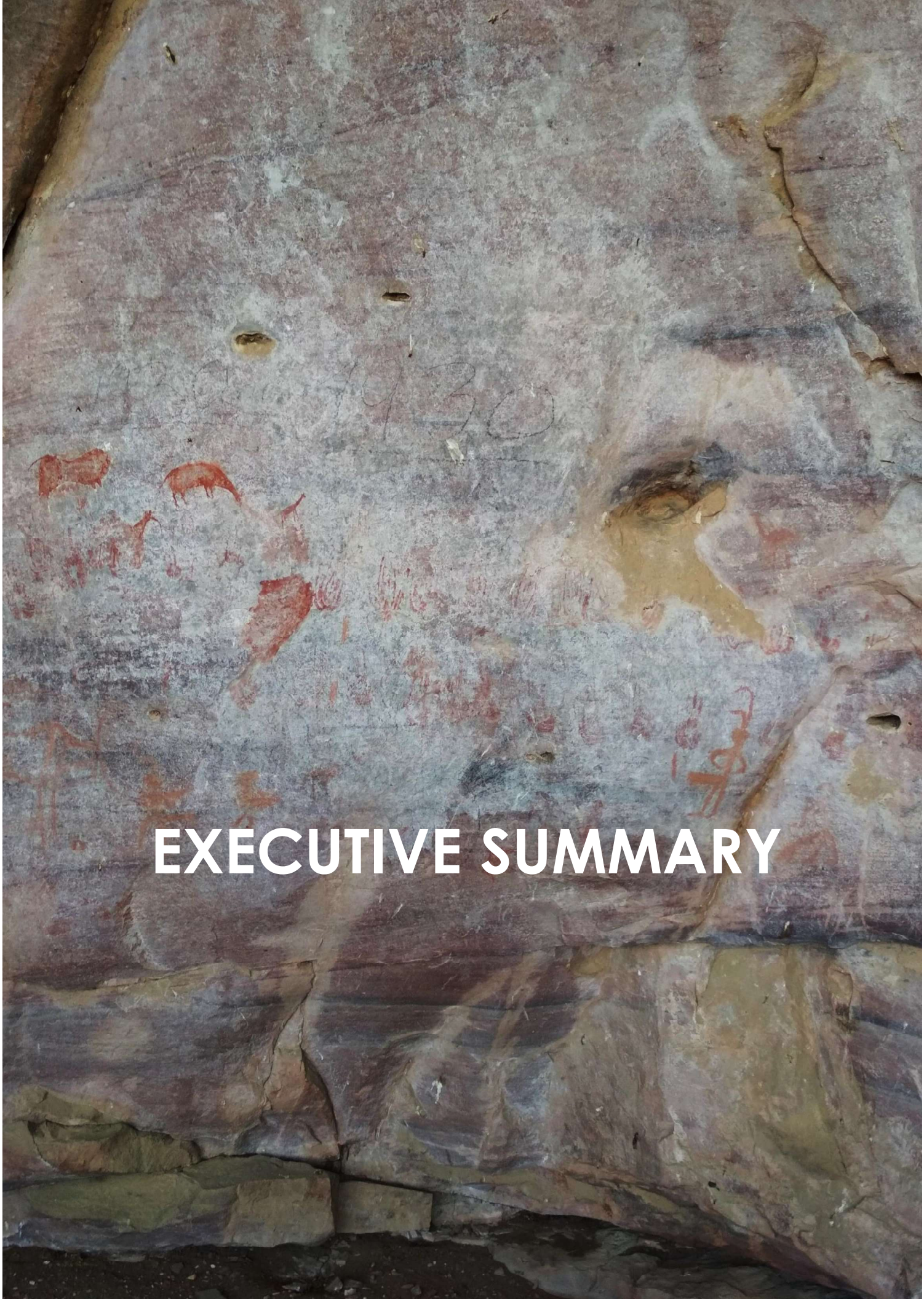
LIST OF ABBREVIATIONS & ACRONYMS

ACMP	Archaeological Conservation Management Plan
Amafa	Amafa and Research Institute
AMH	Anatomically Modern Humans
CD:NGI	The Chief Directorate: National Geo-spatial Information
CFB	Cape Fold Belt
CFR	Cape Floral Region
DFFE	Department of Forestry, Fisheries and the Environment
DRS	Diepkloof Rock Shelter
DSAC	Department of Sport, Arts and Culture
ESA	Earlier Stone Age
ESR	Electron Spin Resonance
HEADS	Human Evolution: Adaptations, Dispersals and Social Developments
HP	Howiesons Poort
HWC	Heritage Western Cape
ICMP	Integrated Conservation Management Plan
IDP	Integrated Development Plan
IMP	Integrated Management Plan
LG	Last Glacial
LSA	Later Stone Age
MEC	Member of the Executive Council
MELI	Monitoring, Evaluation, Learning and Intervention
MIS	Marine Isotope Stage
MSA	Middle Stone Age
NEMA	National Environmental Management Act, No. 107 of 1998
NEM:PAA	National Environmental Management: Protected Areas Act, No. 57 of 2003
NHRA	National Heritage Resources Act, No. 25 of 1999
OEMP	Operational Environmental Management Plan

OES	Ostrich Eggshell
OSL	Optically Stimulated Luminescence
OUV	Outstanding Universal Value
PHRA	Provincial Heritage Resources Authority
PPSC	Pinnacle Point Site Complex
RSA	Republic of South Africa
SACP4	South African Coast Paleoclimate, Paleoenvironment, Paleoecology, Paleoanthropology Project
SAHRA	South African Heritage Resources Agency
SAHRIS	South African Heritage Resources Information System
SB	Still Bay
SCP	Southern Coastal Plain
SDF	Spatial Development Framework
SMP	Site Management Plan
TL	Thermoluminescence
UNESCO	United Nations Educational and Scientific Organization
USA	United States of America
WCP	Western Coastal Plain



EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

State Party

The Republic of South Africa.

State, province or region

The three sites included in the proposed composite World Heritage Property are located in two district municipalities in the Western Cape Province and in one district municipality in KwaZulu-Natal[1].

No.	Name	Province	District	Local Municipality
01	Diepkloof Rock Shelter	Western Cape	West Coast	Cederberg
02	Pinnacle Point Site Complex	Western Cape	Garden Route	Mossel Bay
03	Sibhudu Cave	KwaZulu-Natal	iLembe	KwaDukuza

Name of Property

The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa.

Geographical coordinates to the nearest second

No.	Name	Coordinates
01	Diepkloof Rock Shelter	32° 23' 11" S, 18° 27' 9" E
02	Pinnacle Point Site Complex	34° 12′ 27″ S, 22° 05′ 22″ E
03	Sibhudu Cave	29° 31′ 26″ S, 31° 05′ 10″ E

Textual description of the boundaries of the nominated Property:

01 **Diepkloof Rock Shelter** is on Portion 3 of the Farm Groote Drift 5, Piketberg in the Cederberg Local Municipality in the Western Cape Province on a ridge about 550 m from the edge of the Verlorenvlei wetland. The area is protected as a

[1] The Tentative List for this nomination was submitted in 2015 with six sites. However, three of them, namely Blombos Cave, Border Cave and Klasies River are not part of the current nomination.

Provincial Heritage Site and lies above the 100 m contour line, which runs along the bottom of the hill.

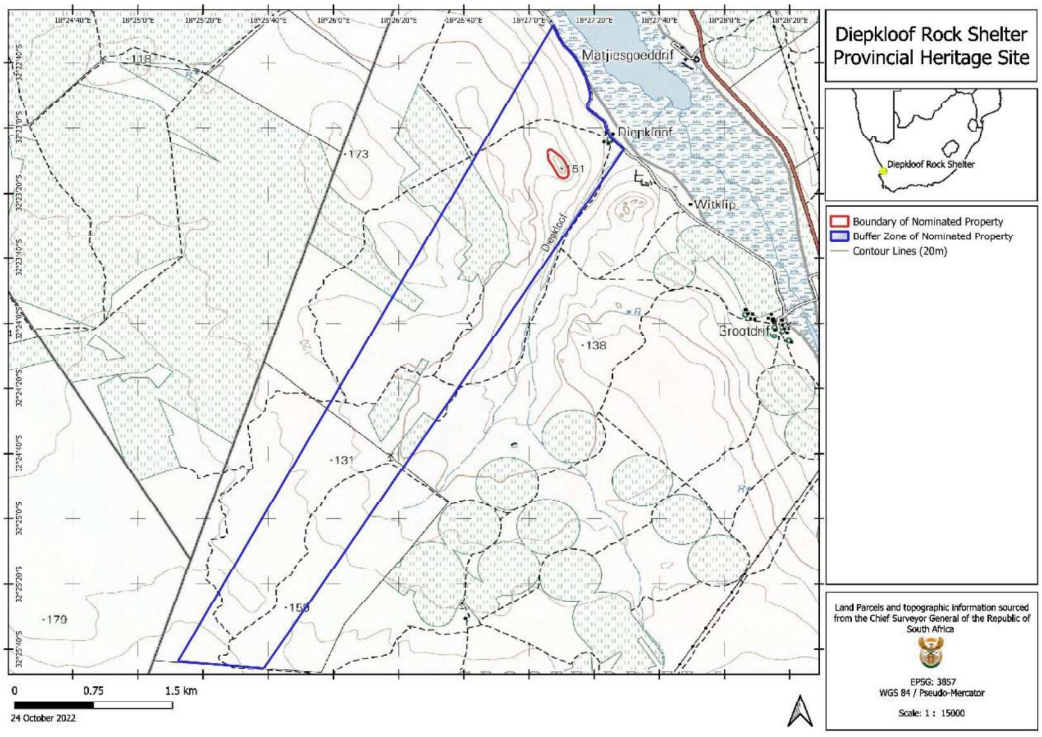
02 **The Pinnacle Point Site Complex** is situated on the Pinnacle Point Estate, in Mossel Bay Local Municipality in the Western Cape Province. The southern border of the site is the coastline. The site is situated along the southern and western edge of Erf 15391 (a portion of Erf 2001), Boplaas, Mossel Bay. The area protected as a Provincial Heritage Site includes the area above the Provincial boundaries until the southern border of the Pinnacle Point Estate. The World Heritage Site includes the area between the Cape St Blaize Trail and the provincial boundaries at the coastline with an extension beyond the Cape St Blaize Trail as per Map 3. Additionally, the entire extent of the site complex below the cliff is included in the proposed property.

03 **Sibhudu Cave** is situated on Portion Sibhudu of the Farm Sinembe no. 16902-fu, in the KwaDukuza Local Municipality, in KwaZulu-Natal. The cave itself is located in a steep, forested cliff that overlooks the uThongathi River in an area that is now a sugar cane plantation. The shelter was formed by erosional downcutting of the uThongathi River, which now lies 7–10 m below the shelter. The site is protected as a National Heritage Site.

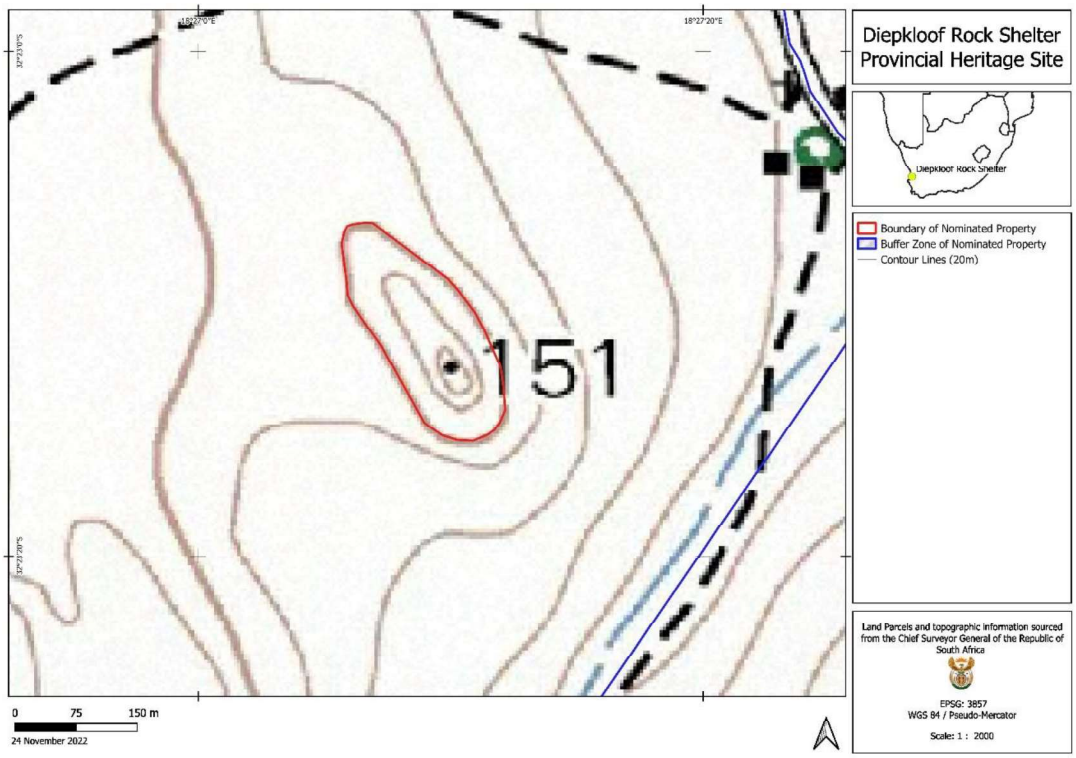
A4 or A3-size maps of the nominated Property showing boundaries and Buffer zone (if present)

Considering the space constraints for the Executive Summary, the maps are presented as the reduced version of the A4 maps in Section 1.e. The hard copy maps are presented in Annexure 1 as per the requirements in the Operational Guidelines.

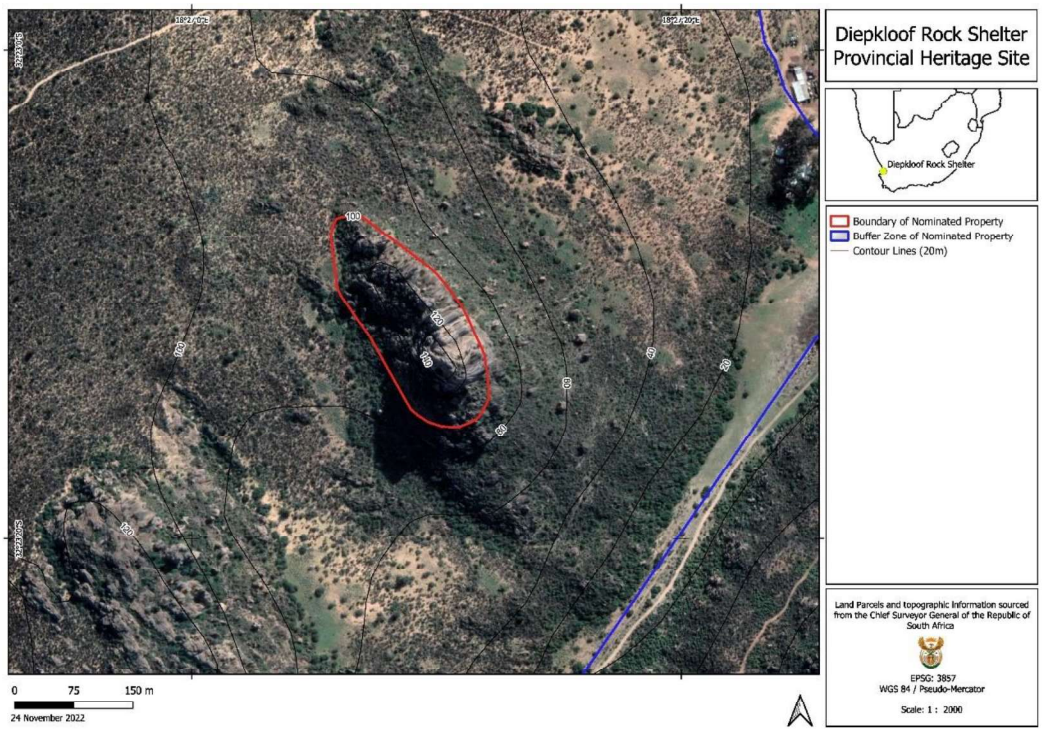
Map 1. Locations of the Nominated Properties across South Africa. Scale 1:50 0000



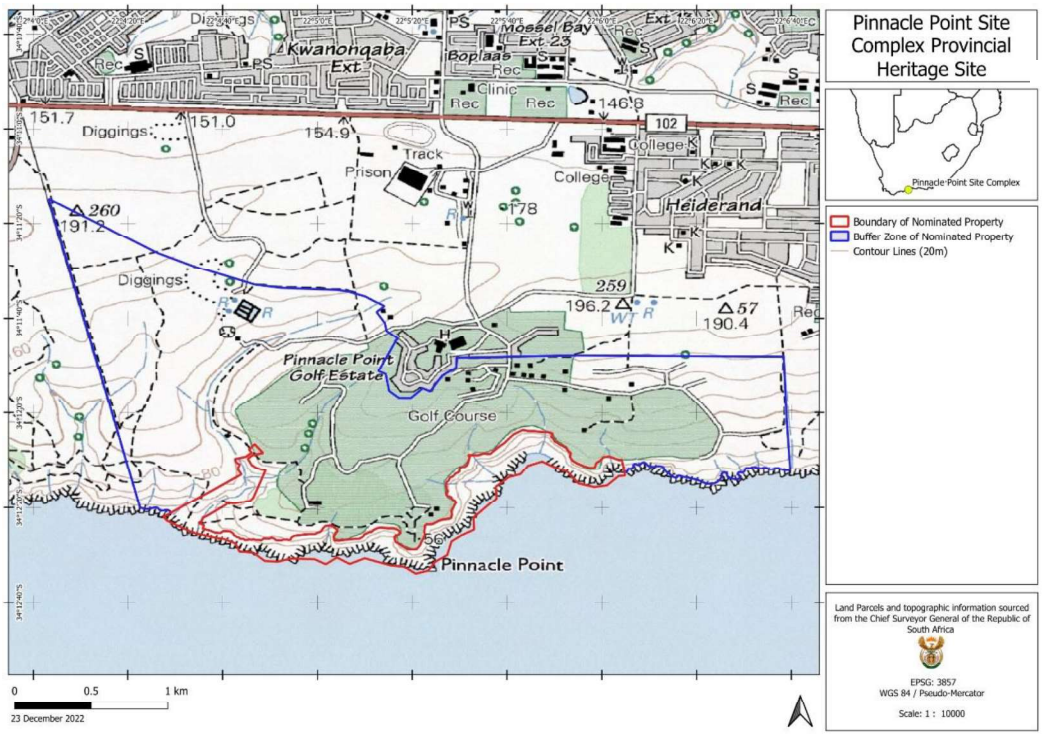
Map 2. Diepkloof Rock Shelter Property and Buffer zone. Scale1: 15 000.



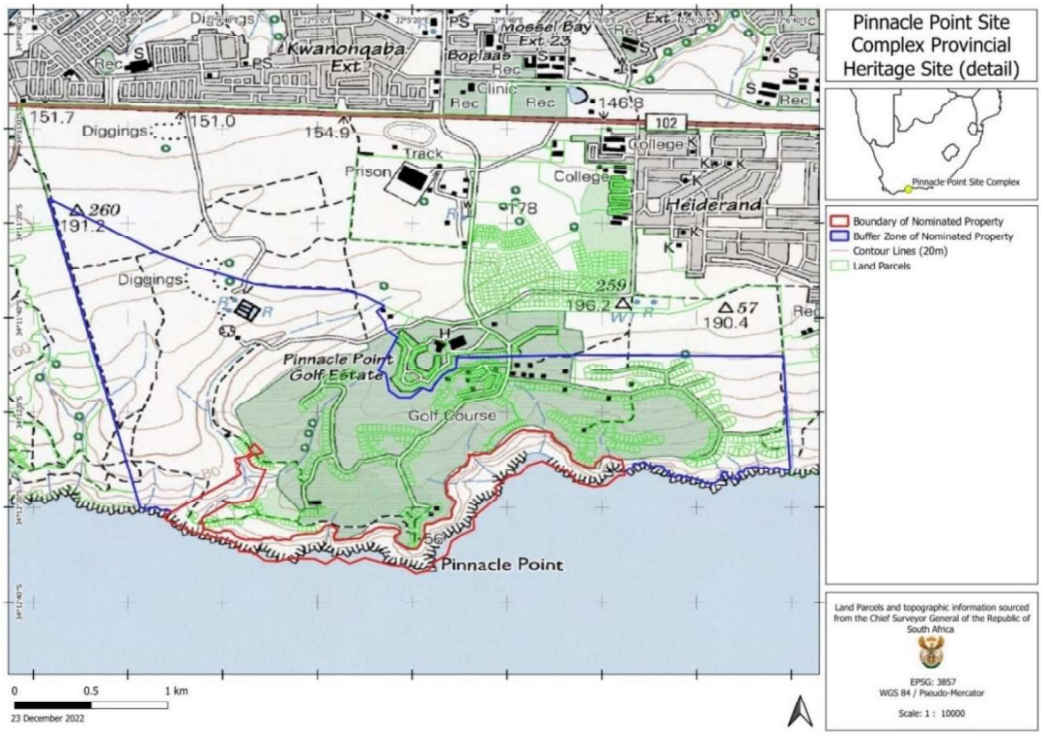
Map 3. Close up of Map 2. Diepkloof Rock Shelter Property. Scale 1: 2 000.



Map 4. Satellite close up of Map 2. Diepkloof Rock Shelter. Scale 1: 2 000.

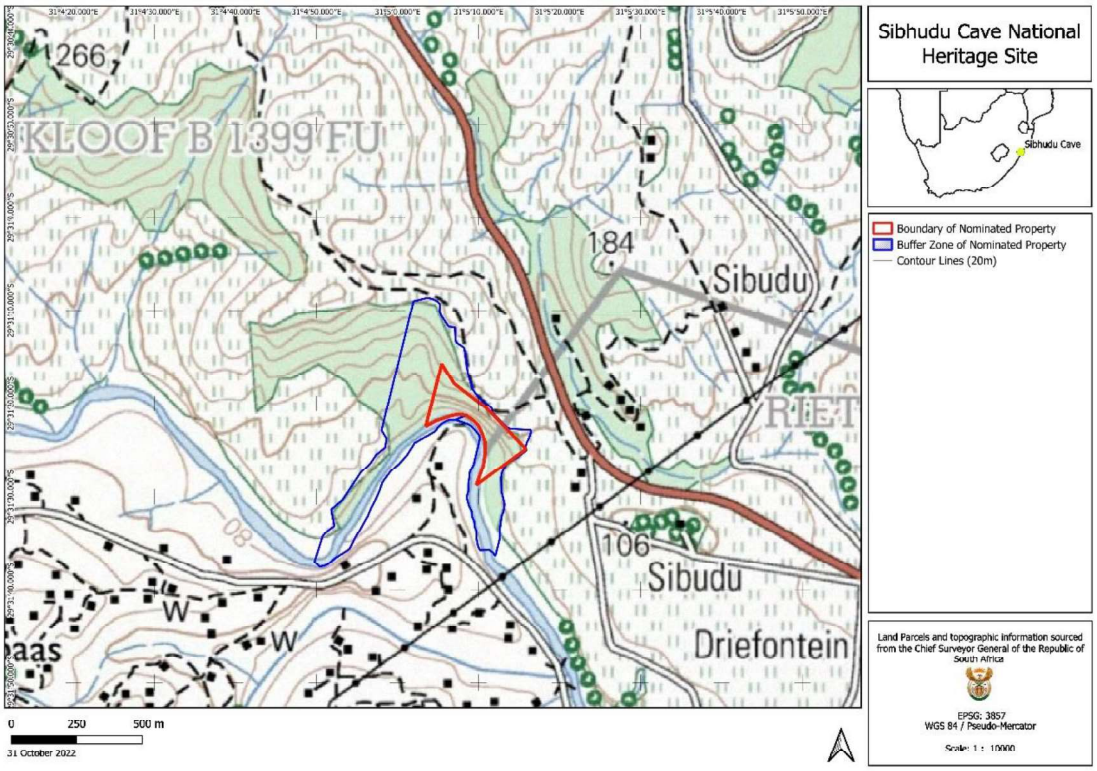


Map 5. Pinnacle Point Site Complex Property and Buffer zone. Scale: 1:10 000

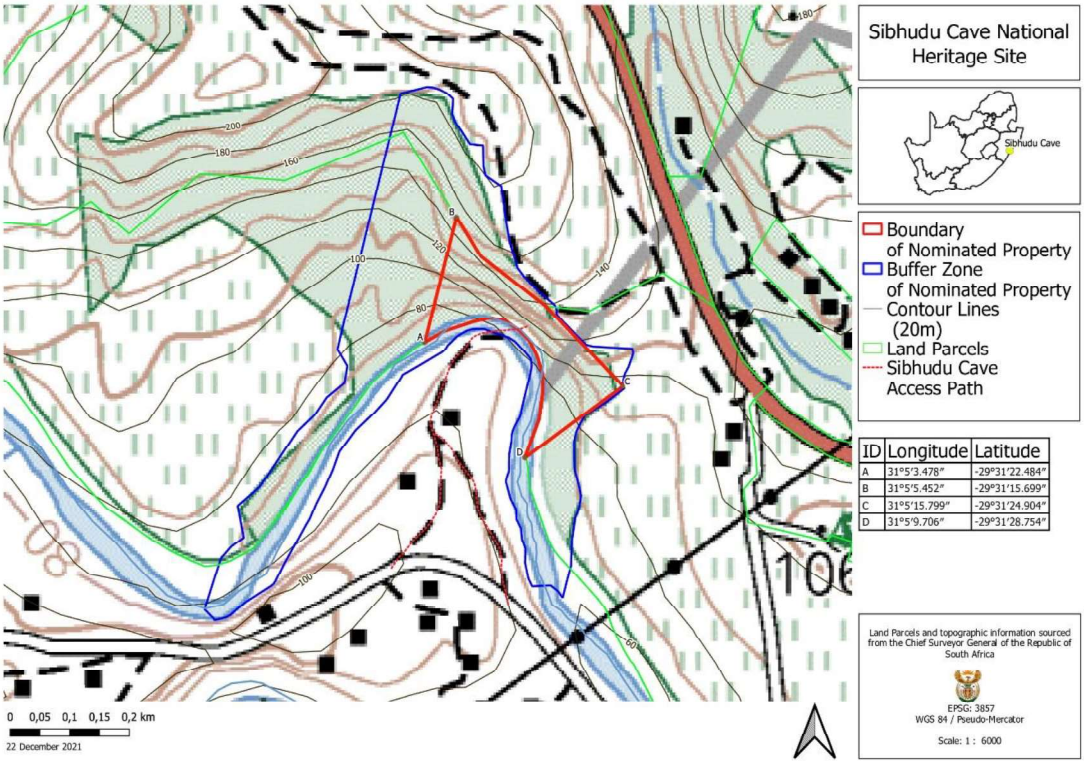


Map 6. Pinnacle Point Site Complex Property and Buffer zone with land parcels indicated. Scale: 1:10 000.

Map 7. Satellite close up of Maps 5 and 6. Pinnacle Point Site Complex Property. Scale 1: 6 000



Map 8. Sibhudu Cave Property and Buffer zone. Scale 1: 10 000.



Map 9. Sibhudu Cave Property and Buffer zone. Scale 1: 6 000.

Criteria under which the three components are nominated:

The sites are proposed for inscription under the following criteria:

Criterion (iii): Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.

Criterion (iv): Be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

Criterion (v): Be an outstanding example of a traditional human settlement, land-use or sea-use which is representative of a culture, or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.

Cultural Landscape

The property is not nominated as a cultural landscape.

Statement of Outstanding Universal Value

Draft Statement of Outstanding Universal Value

a) Brief synthesis:

Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave are three archaeological cave sites in South Africa. Two of them, Sibhudu cave and Diepkloof Rock Shelter, are located within 15km from the current shoreline, while Pinnacle Point Site Complex is located directly on the coast. These sites provide the best-preserved record worldwide of the development of modern human behaviour dating back over 162 000 years ago.

As a group, they are vital to our understanding of the origin of behaviourally modern humans, the climatic transitions that they survived, and their cognitive abilities and cultures.

b) Justification for criteria (iii, iv and v)

Criterion (iii): These sites provide an exceptional example of the early cultural tradition of modern humans, when *Homo sapiens* became behaviourally modern. The archaeological layers of these sites provide exceptional evidence and insight into the behavioural and palaeoenvironmental remains of the Middle Stone Age. They contain early evidence of symbolic thought and advanced technologies in the form of extensive ochre processing; engraved patterns on ochre and bone; estuarine shellfish beads used for body decoration; decorated ostrich eggshell; lithic technologies used for advanced projectile weapons; heat treatment and microliths; and the capture and use of fur of dangerous nocturnal felines.

Criterion (iv): These sites furthermore preserve exceptionally well-stratified and well-dated sedimentary records of ancient human life dating from about 162 000 to 38 000 years ago. They bear evidence of the development of complex cognition through the deliberate heat treatment of stone for toolmaking, prepared-core stone blades and backed tools; polished bone points; engraved bone tools, and some of the earliest recorded evidence of art in the form of incised patterns on ochre and ostrich eggshell.

Criterion (v): Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave offer some of the earliest and best-preserved evidence in the world for the consistent exploitation of coastal resources during the Middle and Late Pleistocene. The consumption of nutrients included in this food may have contributed to the healthy development of the *Homo sapiens* brains and the expansion of its advanced cognitive abilities during the MSA.

As current sea levels rise due to climate change, much of the ancient record of human coastal resource use has been obliterated or is in grave danger. As such, the excellent preservation of these sites is pivotal in the preservation of outstanding evidence for palaeoclimates and palaeoenvironment.

c) Statement of integrity

Each of these sites contain long sequences of human occupation. Diepkloof Rock Shelter and Sibhudu Cave have remained remarkably intact, while Pinnacle Point Site Complex was only identified during the impact assessment process for a high-end real estate development. The implementation of the recommendations included in the impact assessment for this estate development has ensured that the site is preserved and not negatively impacted by further development.

Archaeological excavations have been conducted following the highest international standards and methods available. All findings have been carefully curated and catalogued in national collections, and their significance and interpretation have been reported in many highly significant papers published in international journals. Ongoing research at these sites continues to demonstrate the reliability and quality of the existing information. Additionally, many more scientific discoveries will undoubtedly be made from these sites, as new material is analysed or new methods and questions are applied to previously excavated finds.

The designated property defined in this serial nomination conserves the sense of place and experience of these sites within their current landscape.

d) Statement of authenticity

Archaeological discoveries at the three sites have revealed authentic evidence of an original cultural phase in our evolution as humans. All three sites have been excavated by different international multidisciplinary teams of experts, leaders in their field of speciality. These specialists are also linked to some of the most prestigious universities worldwide.

Favourable depositional processes have led to the steady accumulation of archaeologically significant deposits with little or no loss of them due to natural erosion. Fortunately, human activity and development in the immediate vicinity of these sites has been restricted, thus largely minimising or even avoiding damage of these significant archives of key steps within our evolution as a species. The cultural sediments in PP13B and PP5-6 of the Pinnacle Point Site Complex are well protected, as these sites are situated well above the high-water mark of the ocean. At Diepkloof Rock Shelter,

the site is located on a small hill about 15 km from the current shoreline. Similarly, Sibhudu Cave is well protected from floods.

e) Requirements for protection and management

All three sites are formally protected under the national heritage legislation and 'no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such a site' (s. 27(18)).

The sites are also subject to a comprehensive management framework of laws, regulations and planning instruments relating to heritage, conservation and environmental protection, which are detailed in the integrated management plans developed for each site. Besides a Management Authority and a Joint Management Committee rooted in the provincial and national structures, each site has a Management Committee based in the local context and relies on local authorities and the involvement of relevant local stakeholders.

Name and contact information of official local institution/agency

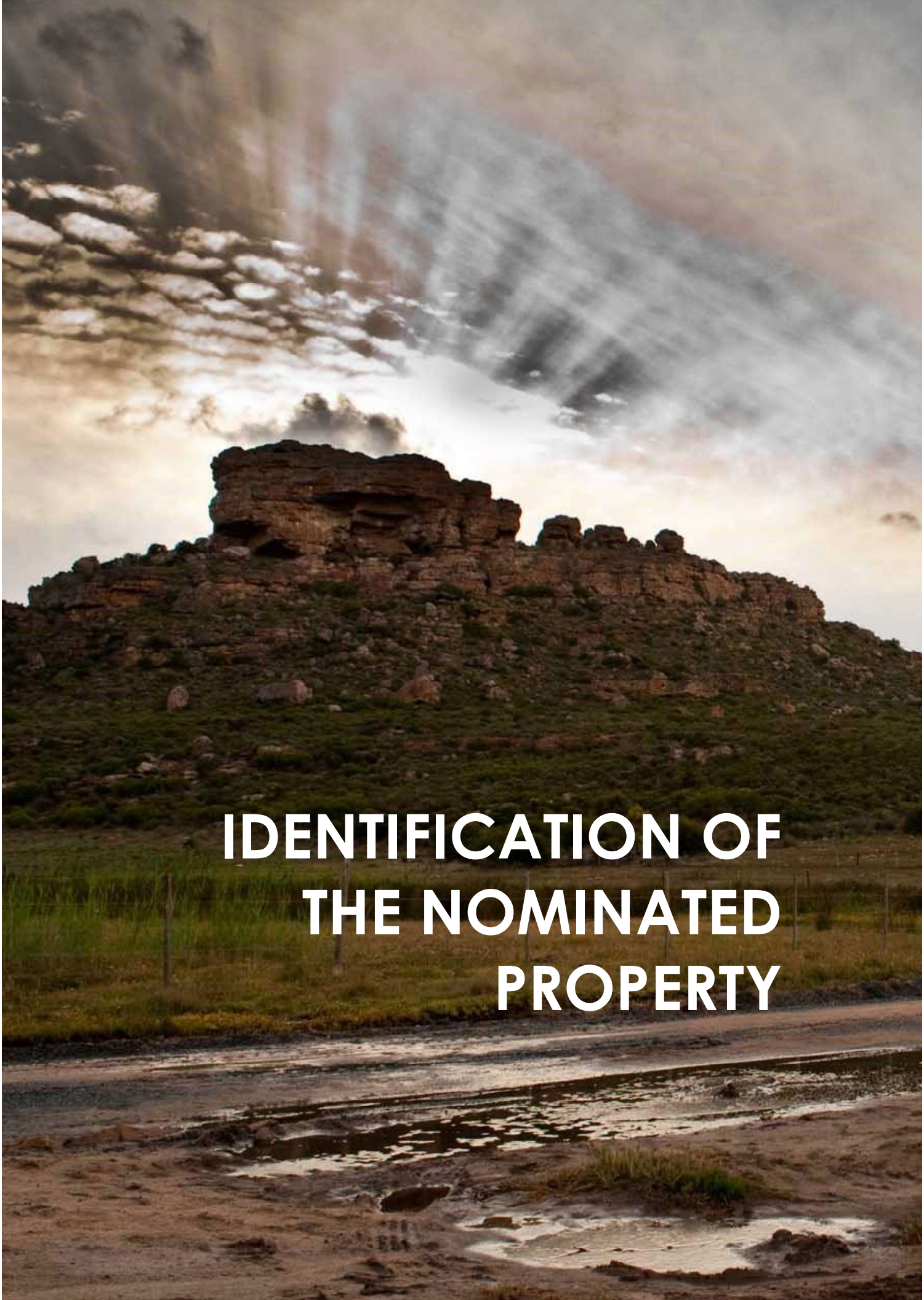
Organisation: Department of Forestry, Fisheries and the Environment (DFFE)

Address: Private Bag X447, Pretoria, 0001

Tel: +27 12 399 9535

E-mail: Ms Thumeka Ntloko: tntloko@dffe.gov.za

Web address: https://www.environment.gov.za



IDENTIFICATION OF THE NOMINATED PROPERTY

1. IDENTIFICATION OF THE NOMINATED PROPERTY

1.a Country

The Republic of South Africa.

1.b State, Province or Region

The sites included in this nomination are located in two district municipalities of the Western Cape Province and one of KwaZulu-Natal (Table 1).

Table 1. Location of sites by province and district.

No.	Name	Province	District	Local Municipality
001	Diepkloof Rock Shelter	Western Cape	West Coast	Cederberg
002	Pinnacle Point Site Complex	Western Cape	Garden Route	Mossel Bay
003	Sibhudu[2]	KwaZulu-Natal	iLembe	KwaDukuza

1.c Name of nominated property

The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa.

1.d Geographical coordinates to the nearest second

Table 2. Geographical coordinates of nominated properties.

No.	Name of component part	District	Coordinates of central Point	Area of Nominated component of the Property (ha)	Area of the Buffer zone (ha)	Map no.
001	Diepkloof Rock Shelter	West Coast	32° 23' 11.92" S 18° 27' 9.49" E	2.1	531	2 - 4

[2] After consultation with the Qwabe Traditional Council and Zulu linguists, it was decided to use the spelling 'Sibhudu' in this nomination dossier rather than the most commonly used 'Sibudu'. The inclusion of the 'h' reflects the original correct isiZulu spelling.

No.	Name of component part	District	Coordinates of central Point	Area of Nominated component of the Property (ha)	Area of the Buffer zone (ha)	Map no.
002	Pinnacle Point Site Complex	Garden Route	34° 12' 27" S, 22° 05' 22" E	51	416	5 – 7
003	Sibhudu Cave	iLembe	29° 31' 19" S 31° 05' 08" E	4.3	18.5	8-9

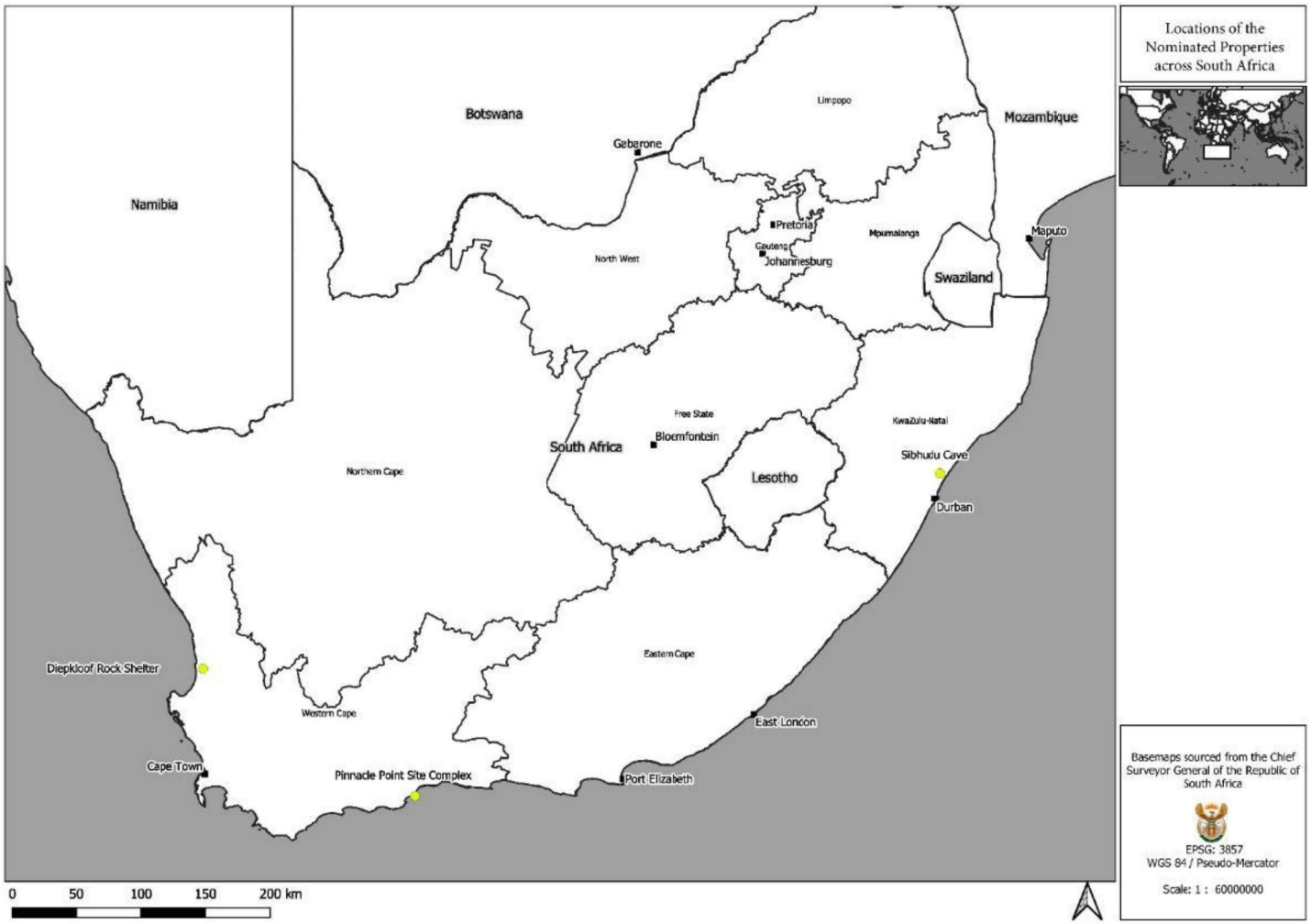
1.e Maps showing the boundaries of the nominated property and buffer zone

South Africa divides its land parcels into two types: urban and rural. Urban land parcels are often referred to as an 'erf' or 'erven' (plural). These land parcels are defined by a number and in relation to a particular local municipality. Rural land is defined as a parent farm and portions thereof, defined in relation to a magisterial district.

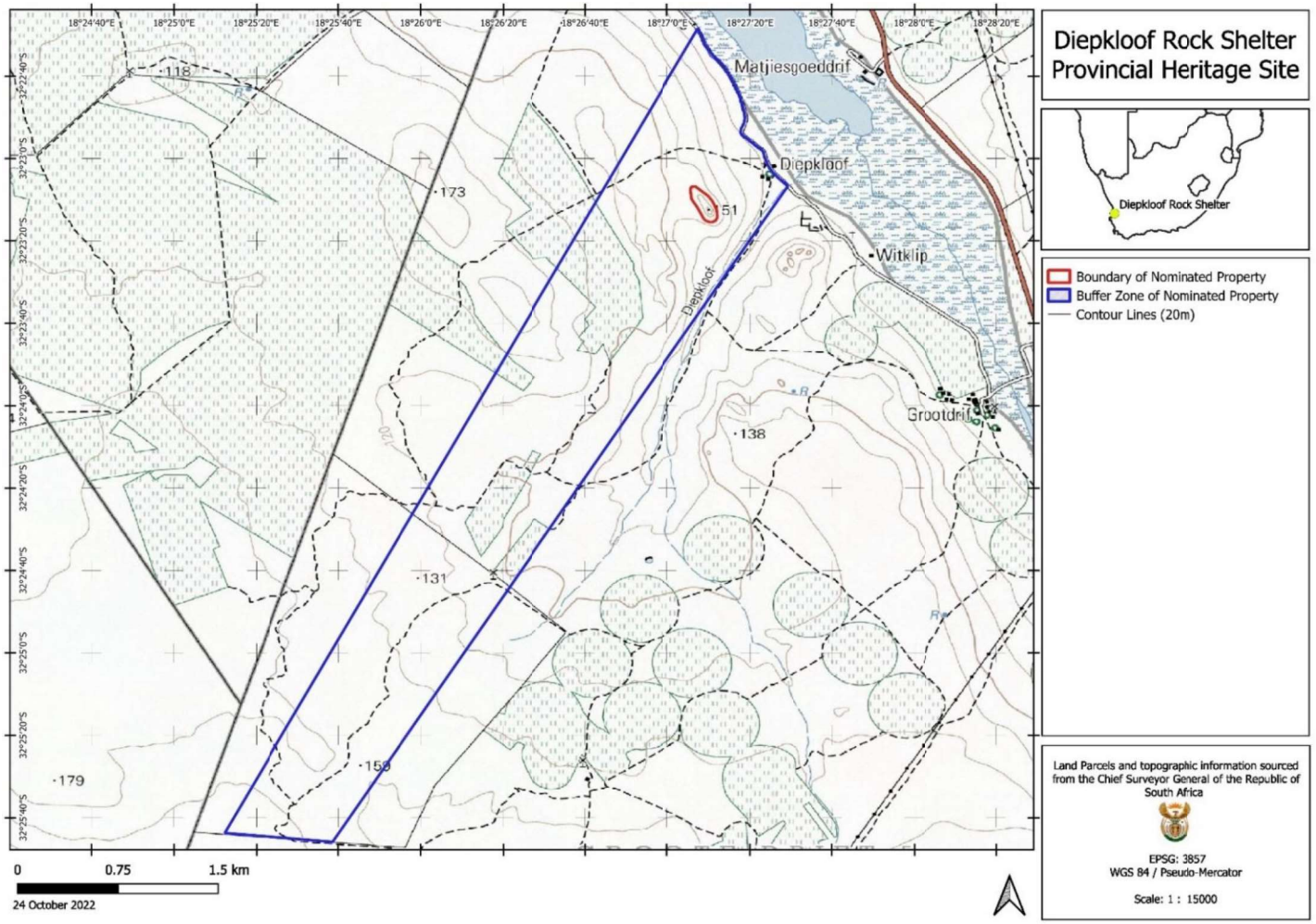
The imagery used in the Nomination Dossier has been sourced from the Chief Directorate: National Geo-spatial Information (CD:NGI) — the national repository for aerial photographs of the country — and from numerous other available sources, including ESRI, Google and Digital Globe. These have been indicated where relevant. The clearest imagery has been selected in each case.

In addition to the above mapping sources, the CD:NGI also provides 1:50 000 topographical maps and 1:10 000 orthophoto maps. The sites have been marked on both formats (included as Annexure 1). It should be noted that none of these maps include cadastral information. This issue has been addressed by overlaying the cadastral information from the Surveyor-General over the imagery from the CD:NGI. In this way, the sites can be displayed on one map at a scale that shows adequate detail of their essential attributes.

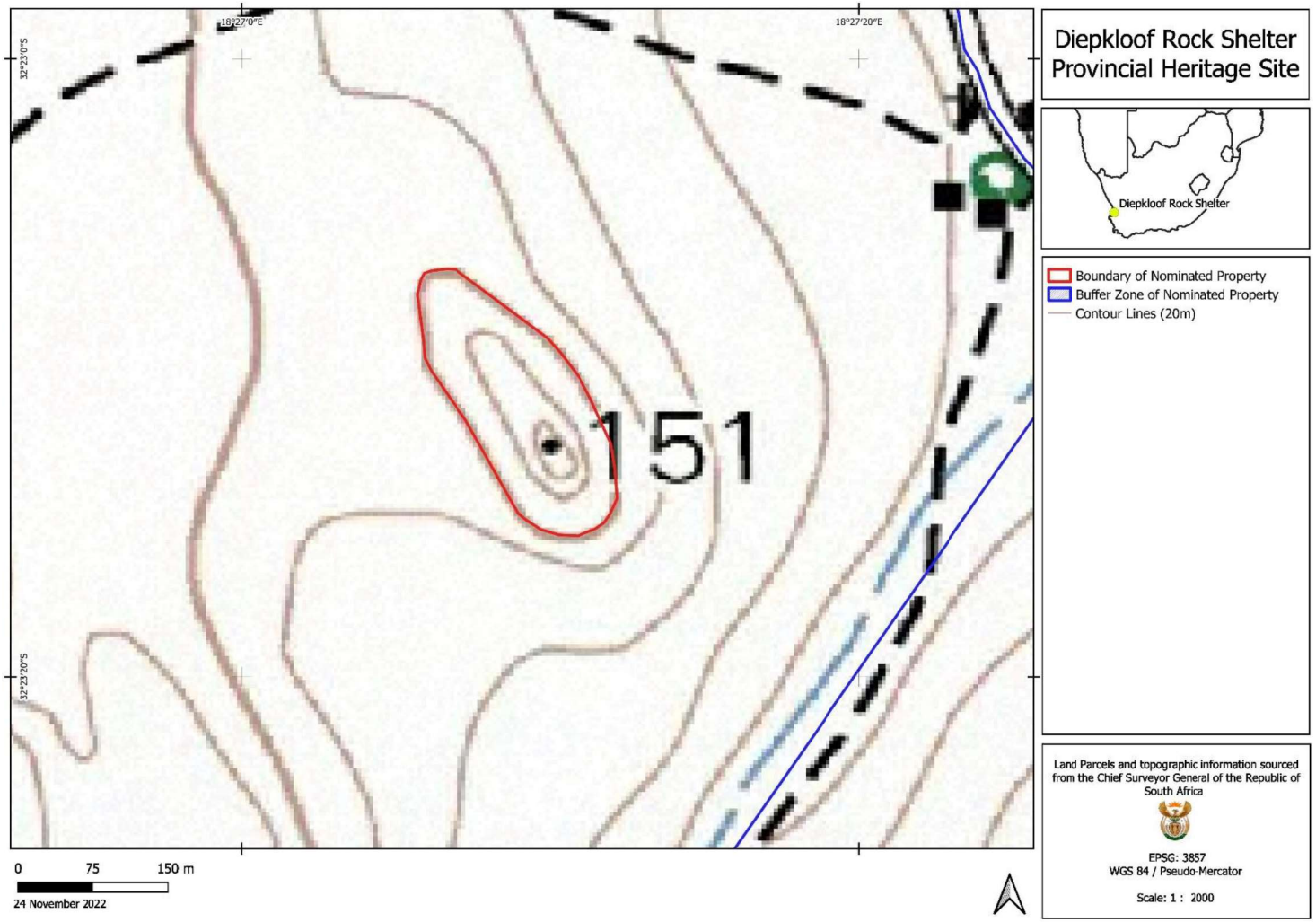
First an overview map (Map 1) is presented, showing the localities of the sites that make up the proposed World Heritage Property across South Africa. Maps 2 to 8 are the site maps showing coordinates and the necessary Operational Guidelines requirements.



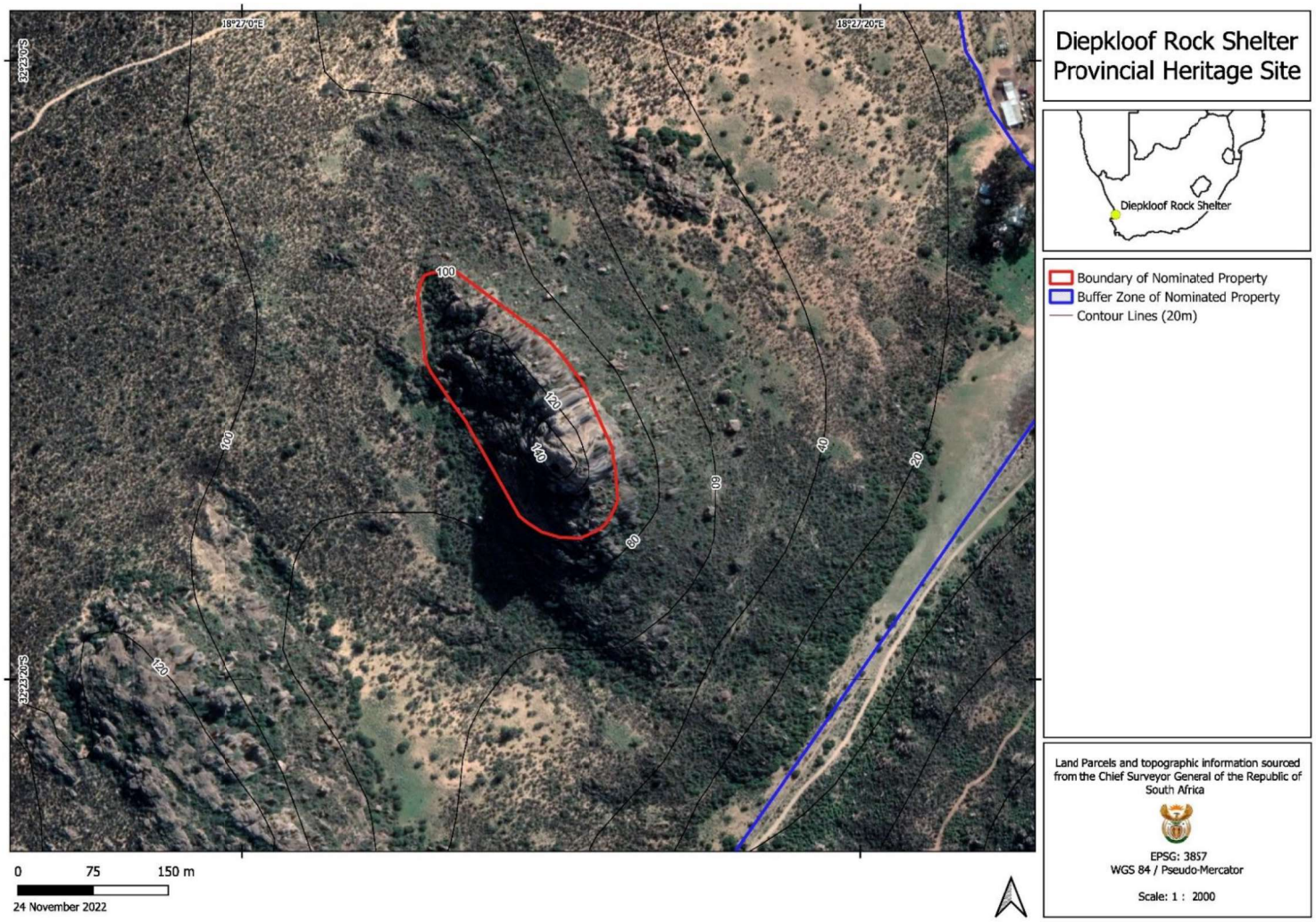
Map 1. Locations of the three nominated properties along the coastal areas of South Africa. Scale 1:60 000 000



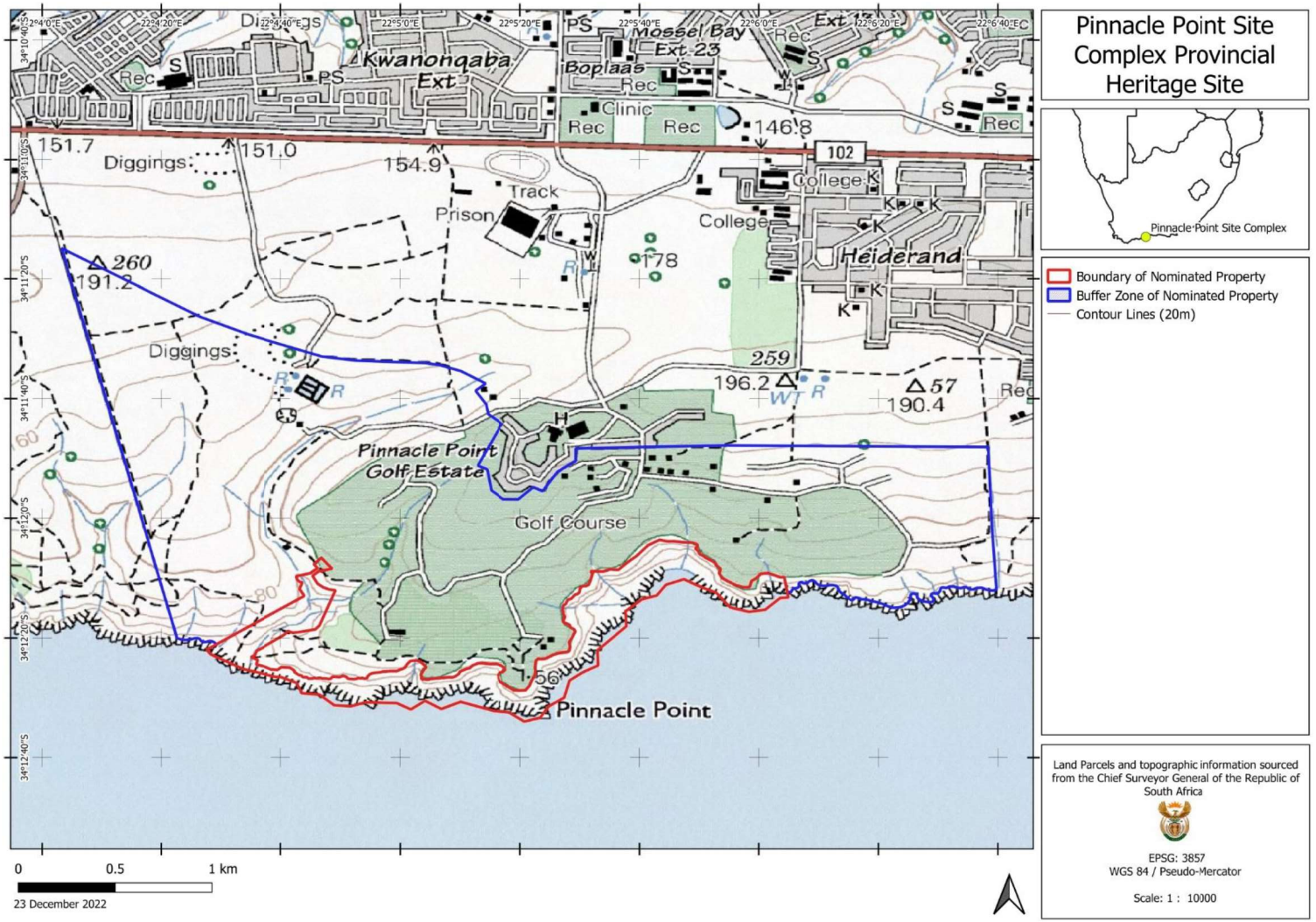
Map 2. Diepkloof Rock Shelter Property and Buffer zone. Scale 1: 15 000.



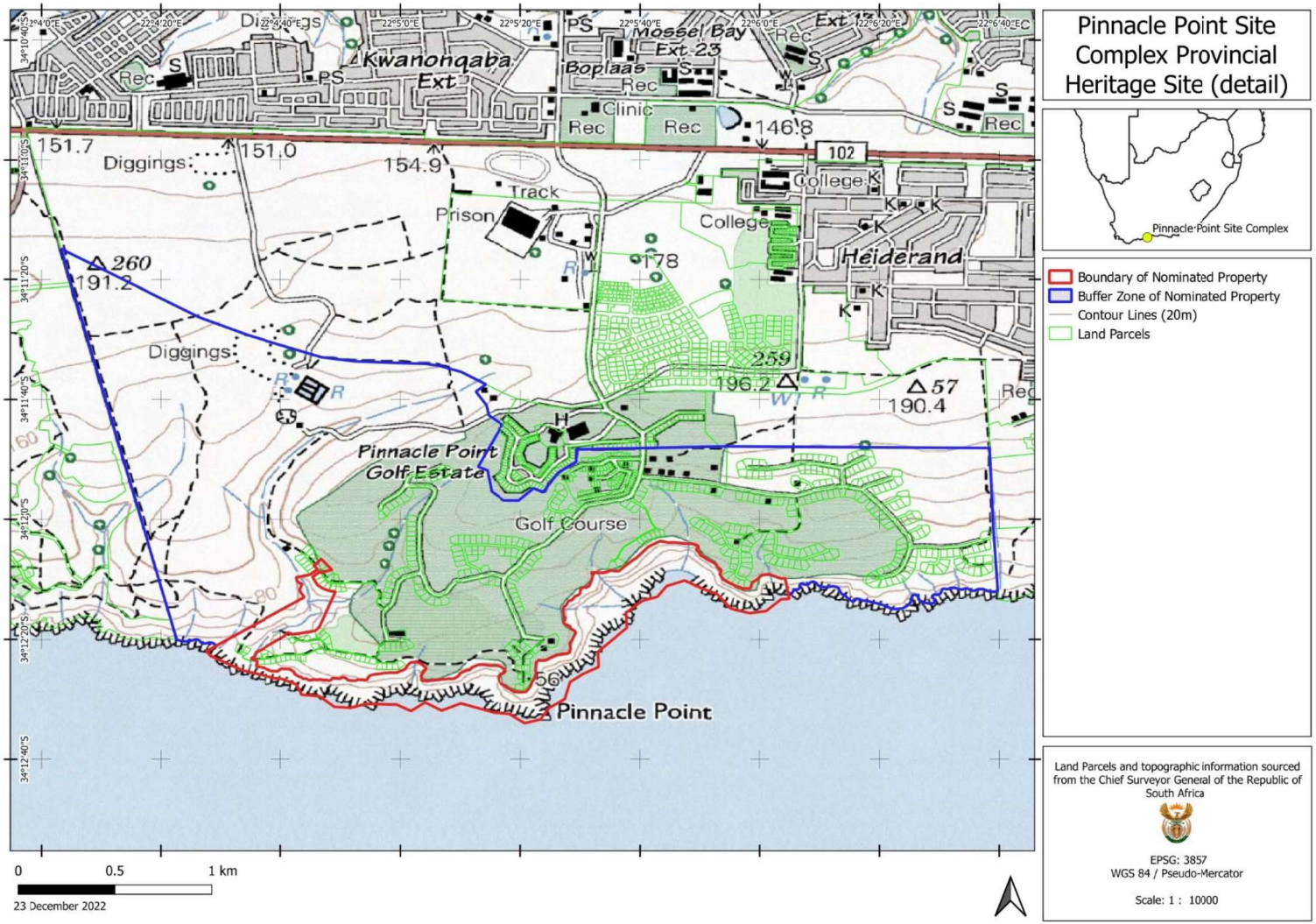
Map 3. Close up of Diepkloof Property boundaries. Scale 1: 2 000.



Map 4. Satellite Close up of Map 2. Diepkloof Property boundaries. Scale 1: 2 000.

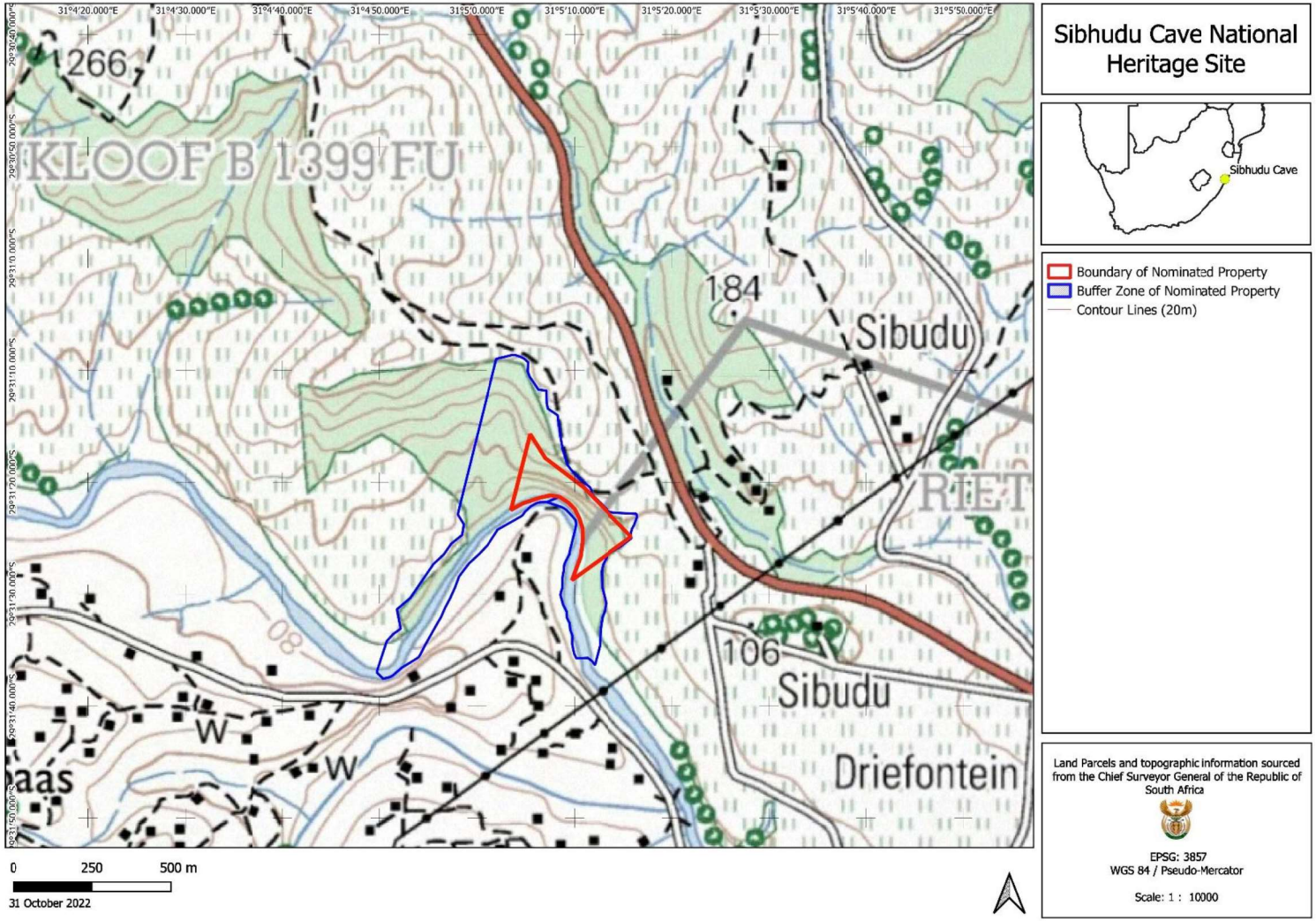


Map 5. Pinnacle Point Site Complex Property and Buffer zone. Scale: 1:10 000.

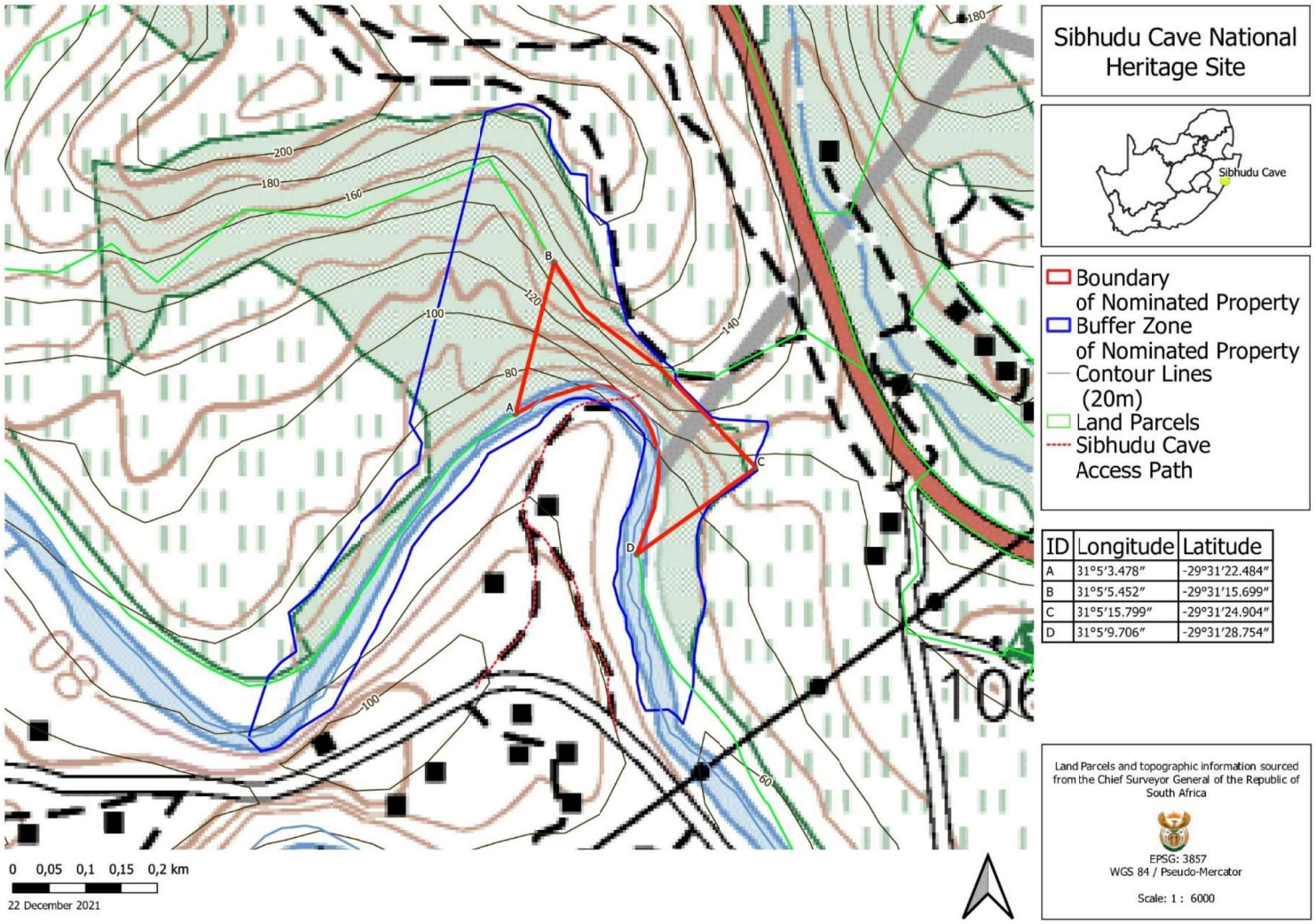


Map 6. Pinnacle Point Site Complex Property and Buffer zone with land parcels indicated. Scale: 1:10 000.

Map 7. Satellite close up of the property of Pinnacle Point Site Complex. Scale 1: 6 000.



Map 8. Sibhudu Cave Property and Buffer zone. Scale 1: 10 000



Map 9. Close up of Sibhudu Cave Property and Buffer zone. Scale 1: 6 000.

1.f Area of nominated property (ha) and proposed buffer zone (ha)

Table 3. Area of individual serial properties.

No.	Name of component part	Municipality	District	Coordinates of central Point	Property area (ha)	Area of proposed Buffer zone (ha)	Total area
001	Diepkloof Rock Shelter	Cederberg	West Coast	32° 23' 11.92" S, 18° 27' 9.49" E	2.1	531	533.1
002	Pinnacle Point Site Complex	Mossel Bay	Garden Route	34° 12' 27" S, 22° 05' 22" E	51	416	467
003	Sibhudu Cave	KwaDukuza	iLembe	29° 31' 19" S, 31° 05' 08" E	4.3	18.5	22.8
	Total area (in hectares)				**57.4**	**965.5**	**1022.9**

At Pinnacle Point Site Complex, the near continuous distribution of archaeological sites along the coastline, and its novel representation of a band of human settlement varying through time and space, warranted the inclusion of the entire extent of the coastline in the nomination. For this reason, it is recognised that the Property consists of the section of the Provincial Heritage Site that includes the coastal area between the Cape St Blaize Trail and the provincial boundary at sea level below the cliffs, within the Pinnacle Point Estate property, with an additional section on the western boundary to include the site of the hyena den (PP30). The proposed World Heritage Property also includes the full extent of the caves and rock shelters below the cliff. Some additional minor sites included in the Provincial Heritage Site are not part of the proposed World Heritage Property, since these sites are of no exceptional significance and are not linked to the development of modern human behaviour during the Middle to Late Pleistocene.

The remaining extent of the Pinnacle Point Estate and the adjacent property, Erf 15390, will act as a Buffer zone for the proposed World Heritage Property. Erf 15390 is owned by the Municipality and the southern part of it, bordering the Pinnacle Point Estate, has been designated as a Critical Biodiversity Area and declared a nature reserve as per the Spatial Development Plan 2018.

At Diepkloof Rock Shelter the boundaries of the World Heritage Property correspond to the boundaries of the already formally protected Provincial Heritage Site. The Buffer zone follows the cadastral boundaries of Portion 3 of Farm 5 Groote Drift, where the Property is also located.

At Sibhudu Cave, the extent of the National Heritage Site is proposed as the boundaries of the World Heritage Property. The forest around the Cave was identified as Buffer to the Property, since it already forms a natural physical Buffer zone for protecting the cave. It is thickly wooded and steep, and as such the forest is still intact and has not been impacted by agricultural expansion. The forest borders are easily discernible and are additionally separated on the north-western to eastern sides by farm roads which are located on top of a steep cliff. On the northeast and southeast side of the cave, the Buffer zone is also defined by the forest. Here the Buffer zone is small since it runs along the edge of the forest tree line and of the dirt road, however because of the steep slope between the cave and the buffer zone boundary, no further expansion can take place. On the south side of the cave, the Buffer zone has been extended by 20m south of the uThongathi River south bank.

DESCRIPTION

2. DESCRIPTION

2.a Description of nominated property

Two of the sites in this serial nomination, The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa, are located within the Western Cape Province, and one in KwaZulu-Natal Province. Pinnacle Point Site Complex in the Western Cape is located on the coastline, whereas Diepkloof Rock Shelter, in the Western Cape, and Sibhudu Cave, in KwaZulu-Natal, are situated about 10 km from the coastline.

Setting

The two nominated sites in the Western Cape Province are situated within the Cape Fold Belt (CFB) of South Africa, which consists of an extensive series of sedimentary fold mountains that created a visually striking landscape. The CFB formed between 270 and 230 million years ago, and was the result of an ancient continental collision of what are now called Africa, Antarctica and South America (Compton, 2011). Continental drift resulted in the separation of these continents. The CFB remains as a series of broad, parallel mountain ranges that extend from the eastern shores of South Africa for roughly 800 kilometres to the west before swinging northwards for a further 300 kilometres (Compton, 2011). The CFB is comprised of high mountains with rocky cliff faces and steep river gorges that could have been a physical obstacle limiting early human movement during glacial and interglacial climate cycles.

Coastal plains developed at the base of the CFB. These are referred to as the Southern Coastal Plain (SCP) and the Western Coastal Plain (WCP) (Compton, 2011). The confluence of two major oceanic systems (the Benguela Upwelling and the Agulhas Current) along the SCP resulted in the formation of a rich marine ecosystem (e.g. dense and diverse shellfish, fish and sea mammal communities) and a climate conducive to the development of the floristically hyper-diverse and unique Cape Floral Region (CFR), the world's smallest floral kingdom, which extends into the Western Cape Province. The Cape Floral Region Protected Areas also constitute one of the ten existing World Heritage Sites within South Africa. Pinnacle Point is located within the SCP, while Diepkloof Rock Shelter is situated on the WCP.

Sibhudu Cave is situated in the sandstone of the Natal Group which mostly consists of a thick sequence of sediments, deposited onto the stable platform formed from the erosion of the mainly granitic rocks of the Natal Metamorphic Province. The sandstone at the Cave is purple-red, medium-grained (in hand specimen) and it comprises grains

of well-sorted, sub-rounded quartz, feldspar, and some hornblende (Pickering, 2006). Some clay is also present between the grains, especially on the exposed surfaces of the cliff, and it is a product of the *in-situ* weathering of the feldspars. In this part of KwaZulu-Natal, these arkosic sandstones reach maximum thicknesses of 300 to 400 m; the thicker sandstone layers are more resistant to erosion and form prominent cliffs such as the one in which Sibhudu Cave formed (Uken, 1999).

Their internal morphology is typical of sandy, braided river environments. Individual sets of planar cross-beds show pronounced changes in dip, resulting from discharge fluctuations, and they are often capped by fine-grained siltstone, which is generally eroded away resulting in the stepped morphology of the sandstone cliff at Sibhudu. The south-westerly side of the shelter is exposed to more weathering than the more sheltered eastern section of the shelter. The south-western cliff face has a smooth, shiny, black to silvery coloured stain. This surface feature is most likely a polish formed from the hands and feet of animals that still inhabit the shelter. These include rock hyraxes and vervet monkeys.

The Cave was cut into a cliff face during a period of downcutting by the uThongathi River, which today flows at the base of the cliff (Pickering 2006). The sandstone cliffs adjacent to Sibhudu are cut by several intrusive dolerite dykes, which are post-Karoo in age (Tankard *et al*., 1982). One such dyke is exposed in the cliff face below the shelter, about 15 m upstream from the vertical entrance to the shelter (Pickering, 2006). The dyke crosscuts the surrounding sandstone at an angle of about 40°, corresponding to the orientation of the major regional joint set. The contact between the dyke and sandstone is sharp, with only a few dolerite stringers extending 2–3 cm into the sandstone, and minimal alteration of the surrounding sandstone.

Stratigraphy and dating techniques applied

Several dating techniques and methodologies were used to date the artefacts and deposits in the nominated caves and rock shelters. These include thermoluminescence (TL) dating, optically stimulated luminescence (OSL), isotope dating and electron spin resonance (ESR) spectroscopy. Table 4 indicates the time range of occupation of the three sites in relation to each other.

The stratigraphy of the MSA layers shows that the dated levels reflect a reliable and sequential record of human behaviour through many tens of thousands of years. However, one cannot speak of continuity, as ancient visits were demonstrably brief and episodic. These brief visits are captured in chronological sequence and can therefore inform on both environmental and behavioural changes through time. These

events can be dated with a set of luminescence methods that provide age estimates for the deposition of cultural materials, for the heating of stone tools in the more distant past, and for other sediments of natural and anthropogenic origin. These luminescence methods are now the tools of choice for dating Early Stone Age (ESA) and MSA artefacts and the behaviours they reflect.

Table 4. Time range representing occupation of the three sites.

Years ago	Diepkloof	Pinnacle Point	Sibhudu
300			
1000			
2 000			
10 000			
20 000			
30 000			
40 000			
45 000			
50 000			
60 000			
70 000			
80 000			
100 000			
110 000			
120 000			
130 000			
140 000			
150 000			
160 000			
170 000			
180 000			

Diepkloof Rock Shelter

Diepkloof Rock Shelter (DRS), which takes its name from the nearby Diepkloof stream, is situated about 180 km north of Cape Town and 17 km upstream from the mouth of the Verlorenvlei River between Elands Bay and Redelinghuys. The site is located on Portion 3 of the Farm Groote Drift 5, Piketberg, on a ridge about 550 m from the edge of the Verlorenvlei wetland. The coastal lake, or 'vlei' in Afrikaans, can be seen to the east of both rock shelters, and to the south-east the village of Redelinghuys is visible across Grootdrif and Witklip. This rock shelter formed within a freestanding outcrop of

Table Mountain Series quartzites, which formed a butte or 'koppie' surrounded by rocks and sand (Parkington, 2006). The highest point of the koppie is 151 m above current sea level. Two adjacent rock shelters, Diepkloof 1 and Diepkloof 2, make up the Diepkloof site.

The area proposed as the World Heritage property is located above the 100 m contour line of this koppie. No significant archaeological resources are located below this line.

Figure 1 and Figure 2 show Diepkloof 1 (DRS 1), the main shelter, comprising a large 'cathedral' that is 35 m wide, 20 m deep and 20 m high. A large boulder is located at the entrance of the shelter with smaller boulders strewn across the shelter floor. The fall of the large boulder marked the start of sediment accumulation within the rock shelter, as it provided a protective barrier against the erosive effects of wind and water. The extensive archaeological deposits date back more than 100 000 years (Table 5). Within the last 1 500 years, the rock shelter was used by herders as a kraal for sheep. The archaeological deposit covers a large part of the floor area of DRS 1 and it is here that the most important MSA discoveries have been made (Figure 4 and Figure 5).

Figure 1. View of Diepkloof 1 within Diepkloof Rock Shelter from the farm.

Diepkloof 2 (DRS 2) (Figure 3) is situated to the south-east of DRS 1. It is a smaller shelter that is 20 m wide, 15 m deep and 15 m high, with the upper slope approximately 105 m above sea level. Small to medium-sized boulders are located at the front of the shelter with sandy deposit developed towards the back of the shelter. DRS 2 is recognised for its rock art (Figure 6), and its archaeological deposits are less significant

than those excavated in DRS 1, although it does preserve thus far largely uninvestigated MSA deposits (Parkington, pers. comm., 2018).

Figure 2. Closer view of Diepkloof Rock Shelter 1.

Figure 3. Closer view of Diepkloof Rock Shelter 2.

Figure 4. Excavation area at Diepkloof Rock Shelter at the end of the last excavation season in 2013.

Figure 5. Excavation at Diepkloof Rock Shelter in 2013.

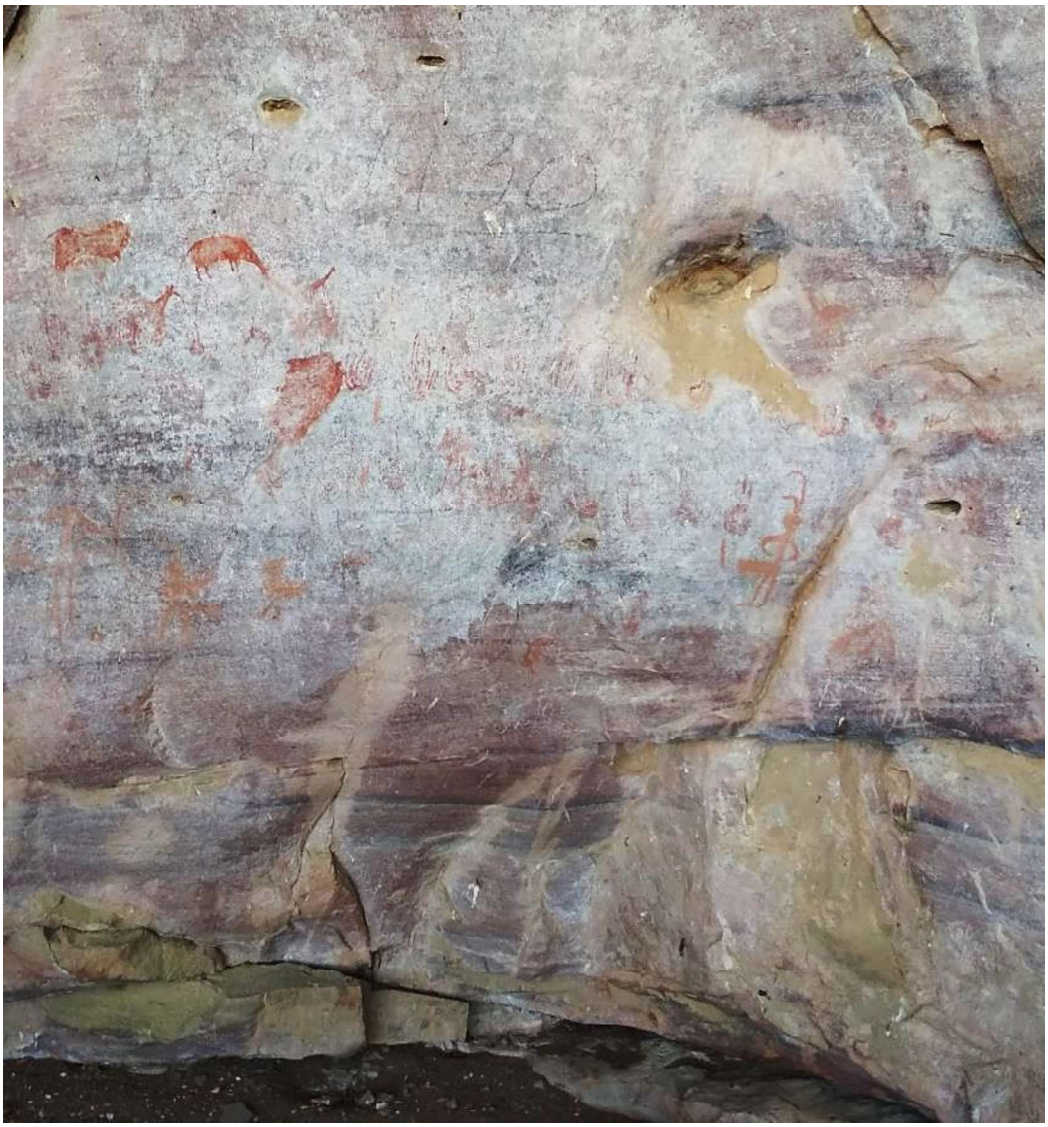


Figure 6. Rock art at Diepkloof Rock Shelter 2.

The results of the analysis of materials from the excavations in DRS 1, in particular those undertaken after 1998, demonstrate that the technological, cultural and environmental changes that took place at Diepkloof Rock Shelter during the MSA were similar, but not identical, to those observed at other sites on the south coast, including Klasies River, Blombos Cave and Pinnacle Point (Porraz et al., 2013b) (Figure 8). The excavations uncovered a 3m long MSA sequence without reaching bedrock and without significant sedimentary hiatuses (Figure 8 and Figure 7) (Miller et al., 2013).

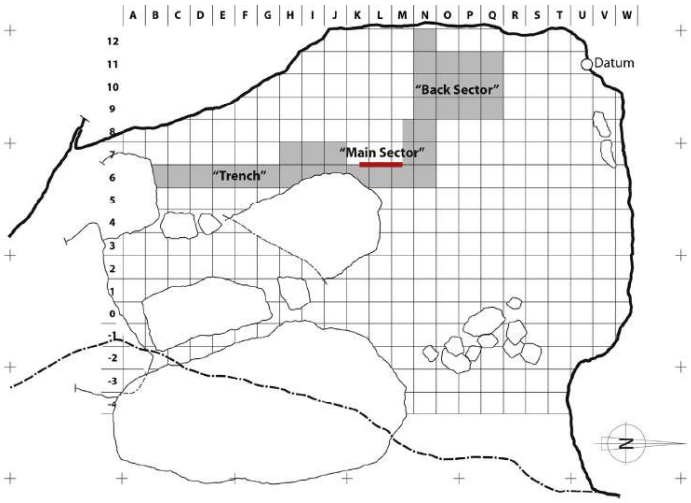


Figure 7. Excavation plan at Diepkloof Rock Shelter 1 (from Miller et al., 2013)

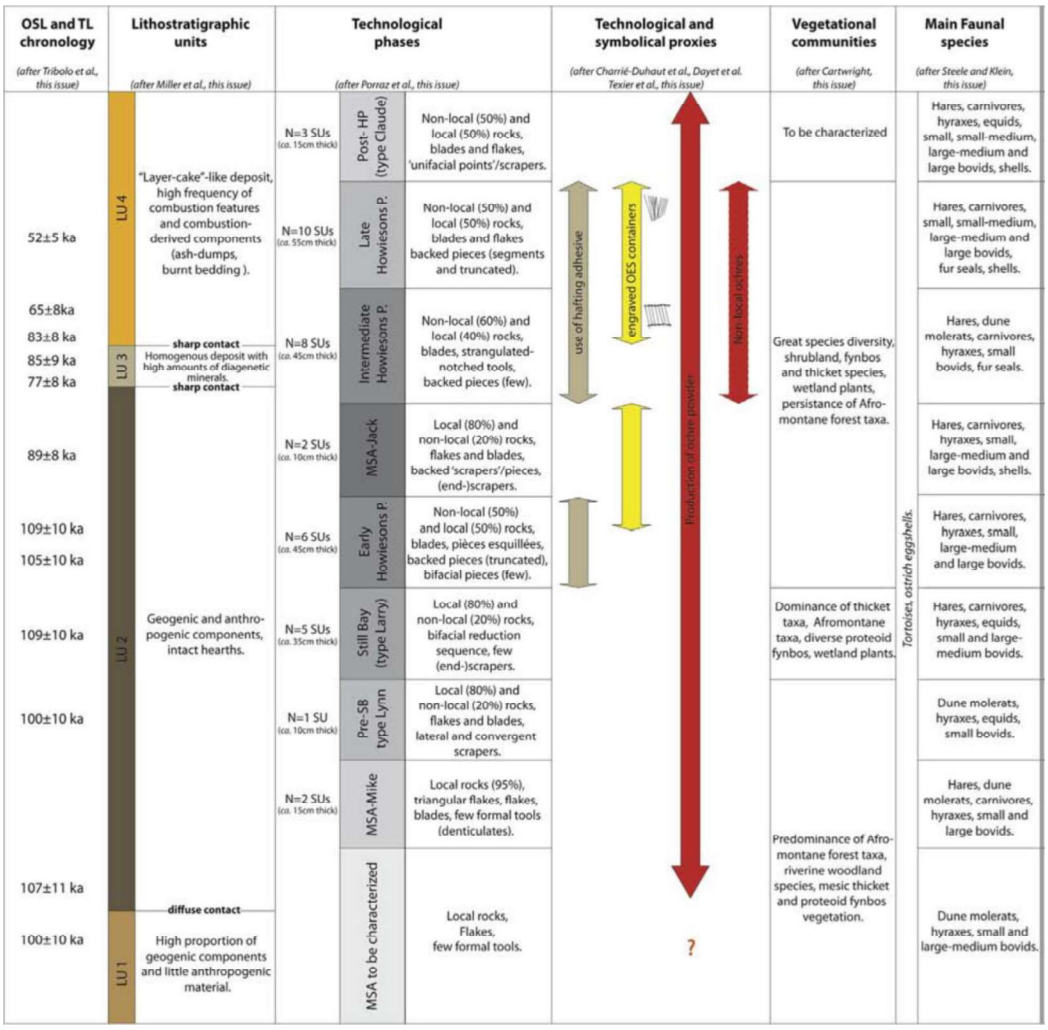


Figure 8. Summary of the main artefactual changes recorded throughout the MSA sequence of DRS 1 (from Porraz et al., 2013b).

Stratigraphy and dating

Diepkloof contains one of the most complete and continuous MSA sequences in southern Africa (Rigaud et al., 2006; Texier et al., 2010). The archaeological sequence extends from before 130 000 BP to about 50 000 BP and includes the pre-Still Bay, Still Bay (SB), Howiesons Poort (HP), and post-Howiesons Poort periods (Tribolo et al., 2009, Porraz et al., 2013b). The MSA deposits have been dated using both TL and OSL methods. The updated chronological ages for Diepkloof are presented in Table 5 below (Tribolo et al., 2013). The five technological phases from the base upwards are: (1) MSA-type 'Mike', (2) pre-Still Bay-type 'Lynn', (3) Still Bay, (4) Howiesons Poort and (5) Post-Howiesons Poort.

Table 5. The stratigraphy and dating of the Diepkloof deposits.

Technological phase	Date (ka)	Method	Reference
Late Howiesons Poort	52 ± 5	OSL	Tribolo et al., 2013
Intermediate Howiesons Poort	65 ± 8	OSL	Tribolo et al., 2013
Intermediate Howiesons Poort	83 ± 8	OSL	Tribolo et al., 2013
Intermediate Howiesons Poort	85 ± 9	OSL	Tribolo et al., 2013
Intermediate Howiesons Poort	77 ± 8	OSL	Tribolo et al., 2013
MSA type Jack	89 ± 8	OSL	Tribolo et al., 2013
Early Howiesons Poort	105 ± 10	OSL	Tribolo et al., 2013
Still Bay	109 ± 10	OSL	Tribolo et al., 2013
Pre-Still Bay type Lynn	110 ± 10	OSL	Tribolo et al., 2013
Uncharacterised Lower MSA	110 ± 10 and 107 ± 11	OSL	Tribolo et al., 2013

Evidence for modern human behaviour

Engraved ostrich eggshells

Of particular interest for cultural development, and one of the factors that makes DRS 1 a site of outstanding signifi, is the clear and unambiguous evidence of engraved geometric patterns on ostrich eggshell that complement the patterns engraved on ochre at Sibhudu Cave, and to a lesser extent on ochre found also at DRS 1. Over 400 fragments of engraved ostrich eggshell pieces (Figure 9) were found and were dated as early as 109 000 ± 10 000, although most of them are retrieved from layers dated to between at 85 000 ± 9 000 and 52 000 ± 5 000 (Tribolo et al., 2013). These engravings were made on functional items (containers) used in the daily activities of the shelter occupants. Fragments of holes or apertures that were made in the ostrich eggshells are very similar to those found on ostrich eggshell water flasks used by present-day San people, who indicate ownership by marking their water containers with engraved geometric patterns. These engraved fragments of ostrich eggshells showcase the first development of a graphic tradition — the ability of our ancestors to conceptualise patterns and forms that do not exist in nature — and the complex use of symbols to mediate social interactions.

Figure 9. Engraved ostrich eggshell from Frank layer dated between about 80 000 and 70 000 years ago, Diepkloof Rock Shelter.

Bifacial points, heat treatment and other lithic industries

The appearance of more refined stone tool industries, such as the Still Bay and subsequent Howiesons Poort (HP) industries of the southern African MSA (in which fine-grained raw materials were pressure flaked and blades were backed for hafting) (Figure 10), provides evidence for abstract thinking, technological innovation, and the ability to plan and strategize (Lombard, 2012). Dates for the pre-Still Bay confirm that the innovation characterised by bifacial pressure flaking, bladelets and shaping flakes emerged at Diepkloof as early as 110 000 years ago, although the bifacial technology fully developed only during the Still Bay industry. The backed blades associated with the Howiesons Poort industry, may also have emerged somewhat earlier than at other sites, i.e. prior to 74 000 years ago (Porraz et al., 2013b). Shaping bifacials with pressure flaking and producing bladelets with soft hammer percussion have proved to have as a pre-condition the heat treatment of the raw material, especially silcrete (Porraz et al., 2020).

Figure 10. Silcrete core from the Late Howiesons Poort occupation layers at DRS.

The pre-SB Lynn layer at Diepkloof bares certain evidence of heat treatment of the silcrete used to shape bifacials. The advantage of heat treatment of silcrete, at Diepkloof Rock Shelter, as at Pinnacle Point Site Complex and Sibhudu Cave, is that once heat treated, the raw material properties change and silcrete becomes more malleable and more predictable, as such the knappers achieved better accuracy and control during the artefact making (Porraz et al., 2020; Pargeter and Schmidt, 2020). Heat treatment is present throughout the lithic sequence at Diepkloof, however, it seems that the initial pre-Still Bay phases were mostly experimental, with pre-heated material being used to produce bladelets, to shape scrapers, and to produce blanks by bipolar percussion (Porraz et al., 2020).

Hafting

Hafting evidence on unifacial points starting from the pre-Still Bay industry corroborate the use of hafting during this time period, as also seen in the pre-Still Bay layers of Sibhudu Cave. This may, as in the instance of Sibhudu Cave, be linked to the use of projectile tools, however no such evidence is identified in the pre-SB layers at Diepkloof (Porraz et al. 2020).

Engraved bone

In the pre-Still Bay layer of SU-Lynn, archaeologists uncovered a splinter of a long bone shaft of a large ungulate (most probably an eland - *Taurotragus oryx*) with grooves that intersect in rhomboidal patterns on the cortical surface (Figure 11) (Porraz et al., 2020). This engraving, dated to the pre-Still Bay, is the oldest abstract geometric engraving so far discovered in the southern African Middle Stone Age (Porraz et al., 2020) and it coincides chronologically with similar engraved ochre pieces at Blombos Cave and Klasies River. The rhomboidal structure of the engraving is however different from other more recent engraved bone specimens which display mostly parallel and perpendicular incisions and not rhomboidal (Porraz et al., 2020). These are also similar to the ostrich eggshell incisions both at Diepkloof and Klipdrift Shelter during the Howiesons Poort when the geometric designs are abundant and have a more prominent stylistic variety (Porraz et al., 2020). While it is not possible at this stage to fully attribute a symbolic meaning to this engraving, this engraved bone during the pre-SB at Diepkloof Rock Shelter is considered as the dawn of graphic symbols which are about to be established within the cultural repertoire of the population (Porraz et al., 2020).

Figure 11. Different views of the engraved bone from the stratigraphic unit Lynn at Diepkloof Rock Shelter with a diacritic drawing of the engraved cortical surface.

Subsistence

While Diepkloof Rock Shelter has never been on the coast, the overall environment around it and its distance from the shoreline changed substantially between 100 000 and 40 000 years ago. Faunal evidence suggests that the MSA groups occupying

Diepkloof based their hunting strategies around resources that were available at the coast. For example, the Still Bay layers contained two dolphin vertebrae that were collected when sea levels were as high as, or higher than, today's. The higher sea levels may have allowed dolphins and other marine species to enter the coastal lake, where they could have become stranded and an easy source of food for the rock shelter occupants, while during lower sea levels, during the Howiesons Poort, seal bones were found (Steele and Klein, 2013).

Exploitation of nocturnal felines

Recent studies of Diepkloof Rock Shelter (Val et al., 2020) showed that inhabitants at the rock shelter during the Still Bay and Howiesons Poort technocomplexes were hunting, for their fur, solitary and dangerous felines with nocturnal habits, such as caracals, African wild cats and leopards. The pattern of cut marks on the bones of these felines is evidence of careful and intentional removal of the most complete furs possible, most likely in anticipation of their use. The skinning of these dangerous carnivores is to be interpreted within the context of symbolically loaded cultural traditions and practices (Val et al., 2020).

Pinnacle Point Site Complex

Pinnacle Point is a rocky headland, and like many rocky headlands in South Africa it is home to an assortment of caves, rock shelters, and other geological formations of interest (Figure 12 and Figure 13). The Pinnacle Point Site Complex is situated on the Pinnacle Point Estate, Erf 15391 (a portion of Erf 2001) in Mossel Bay. This site complex borders the provincial boundary at the coastline to the south and lies along the southern and western edge of Erf 15391 (a portion of Erf 2001). The western edge follows the Provincial Heritage Site boundary within Erf 15390, which is owned by the Mossel Bay Municipality and has already been partially declared a conservation area.

The sites are formed within the Table Mountain Sandstone quartzites that are overlain throughout the area by calcretes, shallow leached soils and sand dunes (Bar-Matthews et al., 2010). As a result, the site complex comprises numerous wave-cut caves and rock shelters that stretch westwards from Cape St Blaize at 'The Point' in Mossel Bay to the western boundary of the Provincial Heritage Site. Over the last 200 000 years, the coast was further away from the sites than it is today, as global sea level would have dropped by as much as 130 m during two of the glacial cycles. MSA and LSA hunter-gatherers occupied the sites episodically. At times of higher sea level, the contents of some of the lower caves were washed out, but when sea level was lower and beach sand was exposed, dunes filled the entrance to some of the caves, limiting access over

thousands of years (Jacobs, 2010). As a result, the history of each of these caves is different.

Figure 12. Shoreline of Pinnacle Point showing Site 1 (an unexcavated cave) at the far east of the property.

Figure 13. View of the shoreline at Pinnacle Point from boat with the Cave 13 system in 2005, before the establishment of the Estate.

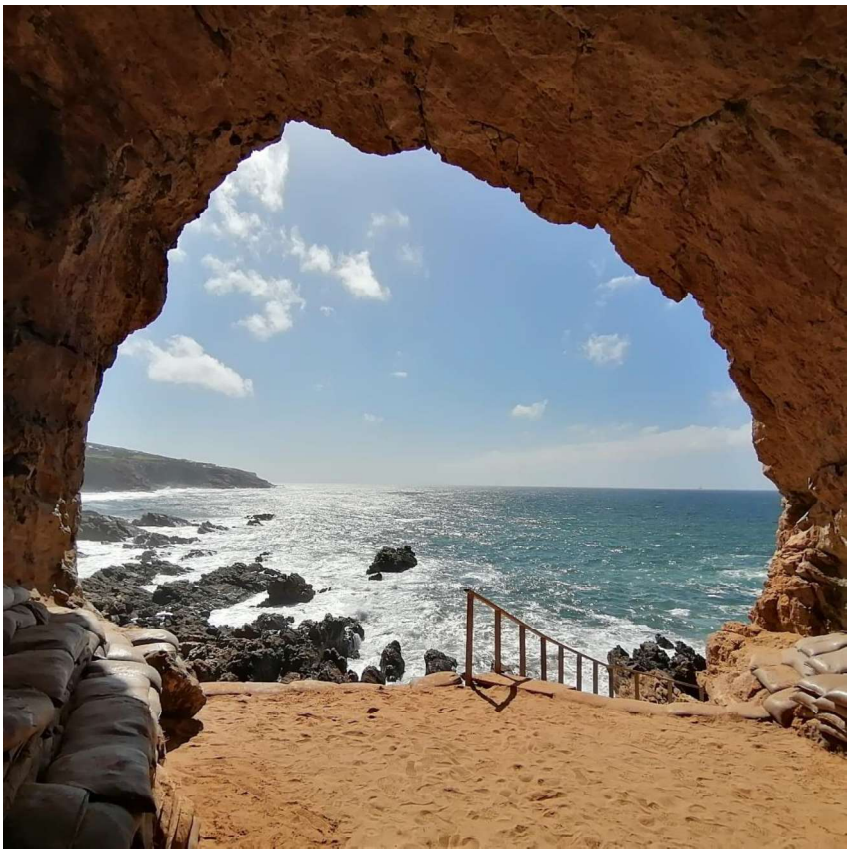


Figure 14. Outside view from inside Cave 13B

Figure 15. Excavation at Pinnacle Point Cave 13B.

Currently, only two sites are known to have long sequences of human occupation, namely PP13B (Figure 14 and Figure 15) and PP5-6 (Figure 16). Together these provide the longest composite sequence of all coastal sites in South Africa. Another two archaeological sites (PP9 and PP13A) have been excavated from this series, as well as other caves and shelters without human occupation, such as Crevice Cave (Bar-Matthews et al., 2010) and Staircase Cave (Braun et al., 2019), which provide unique and high-resolution palaeoclimatological records that give context to human developments at Pinnacle Point and beyond. The formation of their geological features is well dated by a diversity of geochronological techniques, and the oldest caves and rock shelters were formed 1.1 million years ago (Pickering et al., 2013).

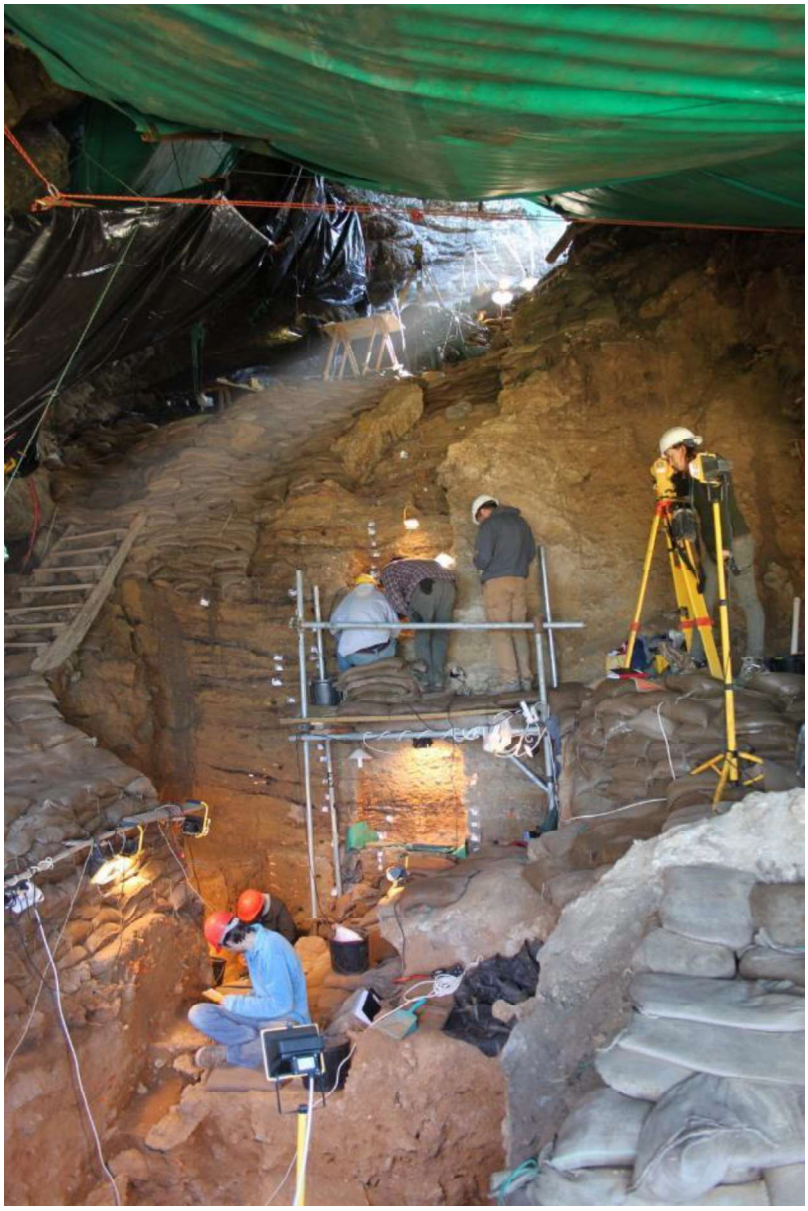


Figure 16. Excavation at Site 5-6 at Pinnacle Point Site Complex.

Stratigraphy and dating

So far two sites have been excavated within the Pinnacle Point Site Complex: cave PP13B and rock shelter PP5–6. Both sites were excavated as part of the South African Coast Paleoclimate, Paleoenvironment, Paleoecology, Paleoanthropology Project (SACP4) under the directorship of Prof. Curtis Marean. The sites were excavated in 50 cm quadrants within 1 m^2 squares, which were named according to their location as NE, NW, SE and SW. Additionally, within each quadrant the excavation followed the stratigraphic unit, and each find was therefore identified by square first, quadrant second and stratigraphic unit last. Furthermore, each find identified during the excavation was plotted directly to total station in three dimensions, whereas finds that were missed during the excavation were eventually captured by nested 10–3–1 mm wet-sieving (Marean et al., 2010), since all deposit was sieved.

The deposits at Pinnacle Point were dated using several methods (Table 6 and Table 7), including OSL, uranium-series dating, radiocarbon (C14), and cryptotephra, which were applied to generate a chronology (Jacobs, 2010, Marean et al., 2007, Marean et al., 2010; Smith et al., 2018). A series of high-resolution speleothem records are dated from around 330 000 to 13 000 years ago (Bar-Matthews et al., 2010; Braun et al., 2018, 2020) and, along with other paleoclimate and paleoenvironmental archives, provides deep contextual information for the human occupations.

The PP13B cave (Table 6) was formed by 1.1 ma (Pickering et al., 2013), but sediments begin to accumulate with the high sea level of marine isotope stage 11 at about 400 000 years, which likely washed out earlier sediments. Human occupation commences during a short high sea level that is globally dated to about 165 000 years ago. At this time there was a narrow (about 3 km) plain between PP13B and the coast, and these first MSA human coastal occupations focused on rocky inter-tidal shellfish species with occasional scavenging of whales and seals (Marean, 2010). Notable early expressions of complex culture such as heat treatment of stone tools, modified ochre, and small stone blades are present. The sea then retreated and there is a grassland MSA occupation with people hunting large plains animals. Around 130 000 years there is a prolonged sea level rise that cuts off access to the cave, and then a slight decline in sea level and at this time PP13B documents intensive use of coastal resources including dense shell middens, the use of both rocky shore and sandy beach shellfish species, sea shells, and worked ochre. At about 90 000 years the cave was sealed by the accumulation of a large dune that blocked entry to the cave until about 40 000 years ago (Jacobs, 2010).

The Pinnacle Point occupation history is then continued at PP5-6 (Table 7). The archaeological deposits that reach about 15 vertical meters at PP5-6 rest on the 90 000 years ago dune that seals PP13B. From 90 000 to 74 000 years ago a narrow plain existed between the site and the sea and the Stone Age humans exploited a broad range of shellfish species and hunted animals on the plain. Modified ochre is abundant, and heat treated silcrete rises and falls in abundance, but the tools are dominated by quartzite. At 74 000 the world shifts to a glacial phase, an aeolian sand dune forms in the rock shelter, the result of sea level retreat, and dated by OSL and cryptotephra to 74 000 years ago. At this same time, the super volcano Toba in Indonesia erupted, and Toba cryptotephra (microscopic glass shards ejected at eruption) were discovered in these dune sediments. The Pinnacle Point team are the first to find the volcanic glass shards of Toba in an African site, and these are the furthest travelled volcanic shards yet discovered (Smith et al. 2018). The results showed that human occupation continued across the time of the eruption, despite the likelihood that it created a long global volcanic winter, and since the eruption is precisely dated, it confirms the OSL age model at PP5-6. Just after the Toba eruption at 74 000, the occupations at PP5-6 become very dense, and there is a strong shift to the use of heat treated silcrete in tool production. The silcrete is used to make stone tools dominated by blades and bladelets, and at this time is found the earliest microlithic technology. While the coast is around 10 km distant, there is still a dense accumulation of shellfish present along with clear evidence for regular use of the grassy plain in the form of hunted animals. By about 65 000 years ago this balanced coastal and terrestrial diet continues, but a shift in the form of the shape of the microliths signals the presence of the Howiesons Poort. The Howiesons Poort layers continue to document a balanced diet of sea and land foods, use of heat treatment on silcrete, and dense occupation of the site. At about 60 000, there is a significant change in deposition at the site, and the Howiesons Poort is replaced by a succession of stone tool assemblages with rapidly changing raw materials and very dense occupations. The site is abandoned around 50 000 years ago, probably because the sediments nearly filled the site up to the roof of the rock shelter.

Table 6. The stratigraphy and dating of the Pinnacle Point deposits at Cave PP13B. The sequence is dated by 31 OSL ages and 13 uranium-series ages (Jacobs, 2010; Marean et al., 2010). Ka = thousands of years.

Technological phase	**Date (ka)**	**Method**	**Reference**
Cave opens but no occupation	~39	OSL, U-series, C14	Jacobs, 2010; Marean et al., 2010

Technological phase	Date (ka)	Method	Reference
Cave closed by dune	~90-39	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010
MSA with shell middens including sandy beach species and sea shells	~98-91	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010
MSA with shell middens	~130-115	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010
MSA during low sea level with coast far away	~162-155	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010
MSA with earliest use of coastal resources, worked ochre, and small blades	~162	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010
Accumulation of sediment but no human occupation	~414-162	OSL, Uranium-series	Jacobs, 2010; Marean et al., 2010

Table 7. The stratigraphy and dating of the Pinnacle Point deposits at the rock shelter PP5-6. The sequence is dated by 90 OSL ages with an age model created with a Bayesian model, and independently validated with cryptotephra dating (Smith et al., 2018). Ka = thousands of years.

Technological phase	Date (ka)	Method	Reference
Occupation stops perhaps because sediments filled the rock shelter	~50	OSL	Brown et al. 2009; Smith et al. 2018
MSA with very dense occupations	~60-50	OSL	Brown et al. 2009; Smith et al. 2018

Technological phase	Date (ka)	Method	Reference
MSA Howiesons Poort and shell middens	~65-60	OSL, cryptotephra	Brown et al. 2009; Smith et al. 2018
MSA with shell middens, early microlithic technology dominated by heat treated silcrete	~74-65	OSL, cryptotephra	Brown et al. 2009; Smith et al. 2018
MSA with shell middens, increase in heat treated silcrete	~74	OSL, cryptotephra	Brown et al. 2009; Smith et al. 2018
MSA with shell middens, heat treated silcrete, worked ochre	~90-74	OSL, cryptotephra	Brown et al. 2009; Smith et al. 2018
Sterile dune	~90	OSL	Brown et al. 2009; Smith et al. 2018

Evidence for modern human behaviour

Use of ochre

The South African archaeological record is among the world's earliest and richest for the continual and focused use of pigments, such as the production of pigment powders, and engraved ochre. PP13B modified ochre dates to at least about 162 000 years ago. A total of 57 pieces of red ochre pigment were recovered from Cave 13B, mostly from the stratigraphic layer named 'LC-MSA Lower'. Ten pieces had definite signs of having been ground to make powder, possibly for body painting (Figure 17). This sample of ochre shows that people were consciously choosing red ochre over other colours, and intensively grinding it (Watts, 2010).

Pyrotechnology

Pyrotechnology, or the controlled use of fire, stands at the very core of human evolution. The first use of fire may date back a million years or more, but was likely restricted to the production of light and heat. The next major step was when humans used fire and heat to manipulate raw materials. Pinnacle Point has the best-preserved evidence known so far for the heat treatment of stone for the production of stone artefacts at about162 000 years ago (Brown et al., 2009). The stone artefacts from the

layer LC-MSA Lower at Cave 13B are of particular interest because they include an unusually high percentage of bladelets that have previously been found only in more recent deposits in southern Africa (Marean et al., 2007). Their size suggests that they were probably hafted, thus representing composite tools and evidence for advanced cognitive abilities in their production. More particularly, heat treatment of silcrete lithic raw material was conducted to improve its flaking capabilities for the making of bladelets and other stone artefacts. Recent discoveries at the Qesem Cave in Israel (Agam et al., 2020) identified burnt flint artefacts that may have been heat treated as early as 300 000 years ago, but the intentionality of the burning has not been ascertained.

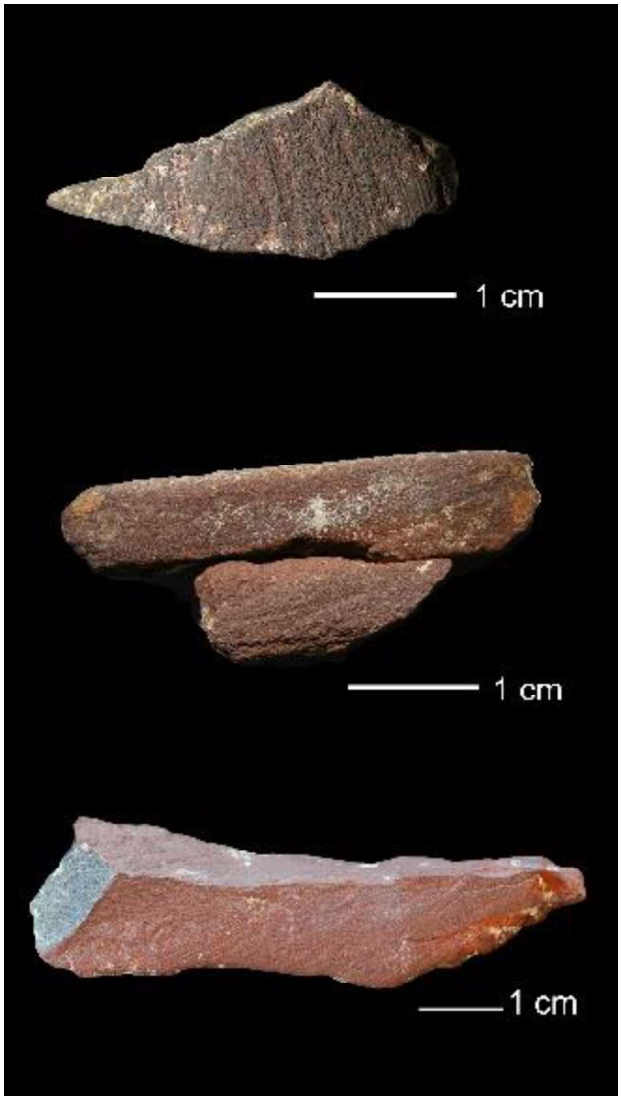


Figure 17. Modified ochre from Cave 13B at Pinnacle Point, from layer LC-MSA Lower, dating to ~162 000 years ago.

Brown and colleagues used three independent methods (archaeomagnetism, thermoluminescence and maximum gloss) for identifying which silcrete pieces from Pinnacle Point had been heated. The gloss analysis of the silcrete pieces from Pinnacle Point provides early evidence of heat treatment dating to 162 000 years ago (Brown et al., 2009) (Figure 18).

Figure 18. Heat-treated microliths.

Heat-treatment technology involves the controlled alteration of the physical properties of stone through heating. During excavation at site PP5-6 in 2008, a large piece of silcrete with the same lustre as the silcrete used to make the bladelets was found embedded in ash. Experiments by Dr Brown showed that heating raw silcrete changed its physical properties and made it much easier to flake (Brown et al., 2009). Thermoluminescence analysis determined that the silcrete tools from Pinnacle Point were obtained from intentionally heated stone sources. Results of further analyses

showed that intentional heat treatment was a dominant technology at Pinnacle Point by 72 000 years ago at PP5-6, and that people employed it intermittently as far back as 162 000 years ago in Cave PP13B.

Marean (2010b) notes that the process of treating by heat testifies to two uniquely modern human cognitive abilities: 'First, people recognized that they could substantially alter raw material to make it useful — in this case, engineering the properties of stone by heating it, thereby turning a poor-quality rock into high-quality raw material'(Marean, 2011). 'Second, they could invent and execute a long chain of processes. The making of silcrete blades requires a complex series of carefully designed steps: building a sand pit to insulate the silcrete, bringing the heat slowly up to 350 degrees Celsius, holding the temperature steady and then dropping it down slowly' (Marean, 2010b). These cognitive abilities were therefore present at the southern tip of Africa much earlier than has been assumed before. As such, it is a very early manipulation of the physical properties of a naturally occurring material by heat, and the basis of many technologies crucial to human civilization (Marean, 2010a).

Microlith industries

A major advance in stone technology was when humans begin miniaturising stone artefacts (Figure 19) so that they could be mounted to wood and bone darts as projectile points.

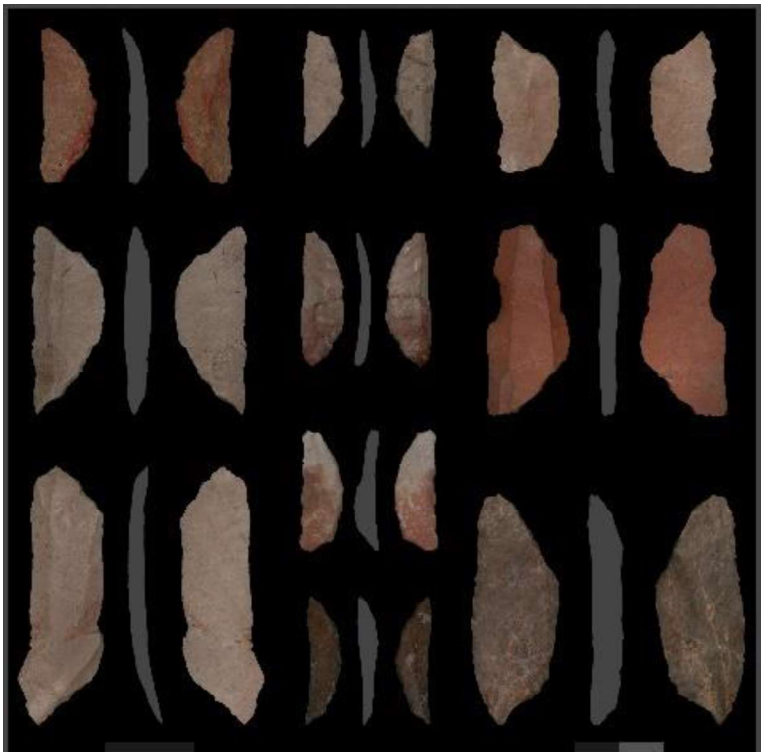


Figure 19. Microlith artefacts from Cave 5-6.

PP5-6 provides some of the earliest evidence for this advanced microlith technology at about 70 000 years ago (Brown et al., 2012), which is about 50 000 years earlier than its dispersal in Europe and Asia.

Subsistence and marine diet

Pinnacle Point Site Complex preserves the earliest dated occurrences of the systematic dietary use of shellfish dated at 162 000 years ago (Marean et al., 2007). The Pinnacle Point shellfish record shows the earliest evidence of shellfish in the expansion of early human diets at PP13B around 162 000 years ago (Marean et al., 2007; Jerardino, 2016). While much of the fluctuation in shellfish species is explained as the result of coastal palaeoenvironmental changes (Cawthra et al., 2020a), the procurement behaviour of one taxon among them, namely the *Donax serra* clam, is indicative of an aspect of human behavioural modernity. The collection of *Donax serra* clams along sandy beaches requires complex decision-making, because this species is found under moving waters and burrows further and very quickly into the sandy substrate when disturbed. Hence, anticipation, planning, the likely cooperation with other people and/or the use of containers is necessary. Moreover, while the earliest systematic collection of *Donax serra* around 110 000 years ago consisted of mostly unselective procurement of animals (in terms of shell size) along the tidal gradient and beach depth, this changed soon after by 91 000 years ago, when people gathered mostly larger clams by focusing their procurement on the mid-tidal beach zone. This positive adaptive process reflects relatively fast learning and the transmission of knowledge to other MSA people and generations.

Collection of non-food mollusc species

A few dead shells from only two other species were also selectively picked up from beaches by the Stone Age people. Many of them display beach-wear from being agitated in the surf and thus were collected dead and without food in them. Although they were not perforated for use as pendants, they were probably selected among a range of other shells for their aesthetic qualities and taken back to PP13B for non-utilitarian purposes, as keepsakes, since these are species known to have beautiful colours and/or shapes (Figure 20). '

MSA people might have conferred some special value to these particular shells because it seems to have warranted the collection of even broken and/or weathered specimens, a choice that is not repeated with other shells from different species' (Jerardino and Marean, 2010). These mementos are some of the earliest proxy expressions for material engagement, representation, and symbolic thought that support the foundations of aesthetic appreciation.

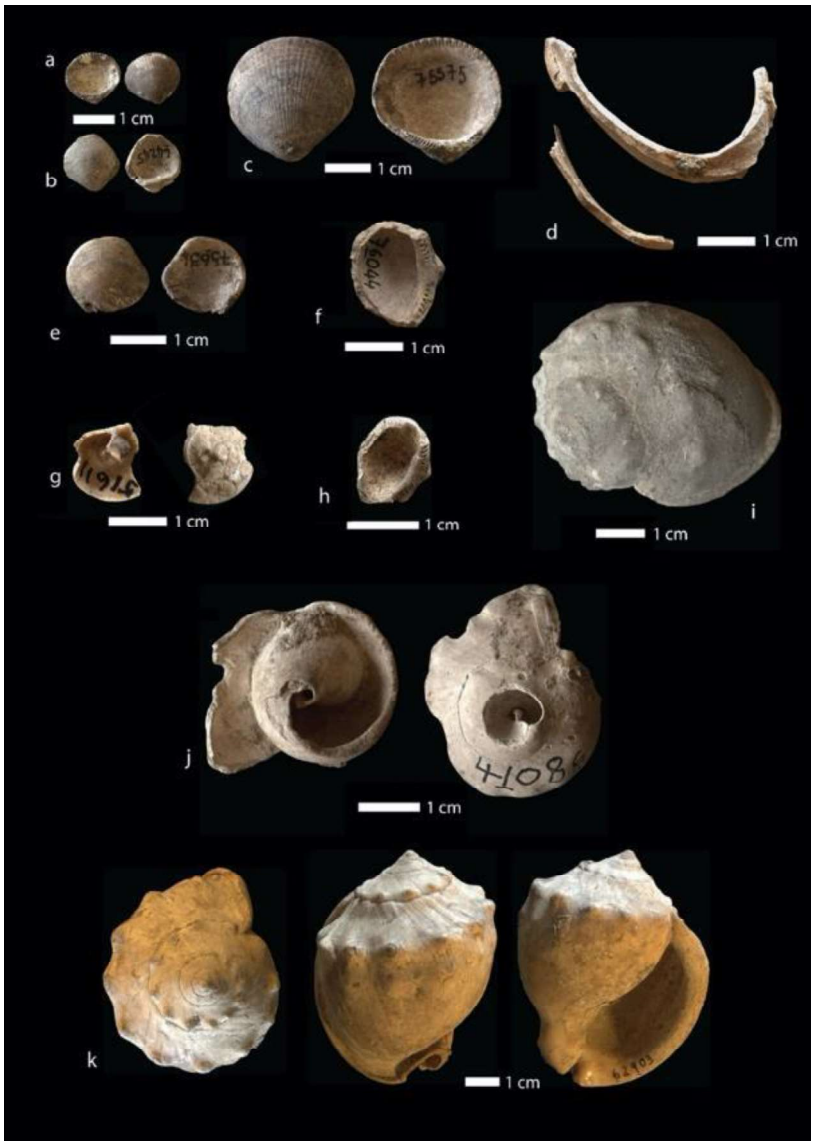


Figure 20. Sample of marine shells collected for non-utilitarian purposes (possible keepsakes) from Pinnacle Point Cave 13B.

Sibhudu Cave

Sibhudu Cave is situated on Portion Sibhudu of Erf 16902 of Farm Sinembe, KwaDukuza Local Municipality, iLembe District Municipality, in KwaZulu-Natal. The cave is located 40 km north of Durban and about 10 km inland from the Indian Ocean, about 100 m above sea level.

Sibhudu Cave is a shelter 55 m long and about 18 m in breadth, sloping from north to south, with a deposit up to 3 m in depth (Figure 22 and Figure 23). The site is positioned in a steep, forested cliff that overlooks the uThongathi River (Figure 21), in an area that is now a sugar cane plantation. The cave was formed by erosional downcutting of the river, which now lies 7–10 m below the site. The site looks through the coastal forest

across the uThongathi River. The indigenous plant life is highly varied, and a rare tree, *Celtis mildbraedii*, grows on the edge of the cave. Only about 36 of these trees survive in South Africa today (Wadley, 2011).

Figure 21. View looking up on the large rock shelter of Sibhudu from the uThongathi River.

Sibhudu Cave is cut in the sandstones of the Natal Group which mostly consist of a thick sequence of sediments, deposited onto the stable platform formed from the erosion of the mainly granitic rocks of the Natal Metamorphic Province. The sandstone

at the Cave is purple-red, medium-grained (in hand specimen) and it comprises grains of well-sorted, sub-rounded quartz, feldspar, and some hornblende (Pickering, 2006). Some clay is also present between the grains, especially on the exposed surfaces of the cliff, and it is a product of the *in-situ* weathering of the feldspars. In this part of KwaZulu-Natal, these arkosic sandstones reach maximum thicknesses of 300 to 400 m; the thicker sandstone layers are more resistant to erosion and form prominent cliffs such as the one in which Sibhudu Cave formed (Uken, 1999).

Their internal morphology is typical of sandy, braided river environments. Individual sets of planar cross-beds show pronounced changes in dip, resulting from discharge fluctuations, and they are often capped by fine-grained siltstone, which is generally eroded away resulting in the stepped morphology of the sandstone cliff at Sibhudu. The south-westerly side of the shelter is exposed to more weathering than the more sheltered eastern section of the Cave. The south-western cliff face has a smooth, shiny, black to silvery coloured stain. This surface feature is most likely a polish formed from the hands and feet of animals that still inhabit the shelter. These include rock hyraxes and vervet monkeys.

The sandstone cliffs adjacent to Sibhudu are cut by several intrusive dolerite dykes, which are post-Karoo in age (Tankard *et al*. 1982). One such dyke is exposed in the cliff face below the shelter, about 15 m upstream from the vertical entrance to the shelter (Pickering, 2006). The dyke crosscuts the surrounding sandstone at an angle of about 40°, corresponding to the orientation of the major regional joint set. The contact between the dyke and sandstone is sharp, with only a few dolerite stringers extending 2–3 cm into the sandstone, and minimal alteration of the surrounding sandstone.

From an environmental perspective, Sibhudu Cave is situated in a remnant of forest in which evergreen, deciduous and semi-deciduous species occur. Mucina and Rutherford (2006) classify this vegetation type as 'KwaZulu-Natal Coastal Belt', within the larger 'Indian Ocean Coastal Belt' bioregion. Some of this vegetation include *Albizia sp, Erythrina sp*. and *Acacia sp*. This Indian Ocean Coastal Belt bioregion is the southern-most limit of humid, tropical to subtropical coastal forests. There is, however, not just one vegetation type near the Site. On the east- and north-facing hillsides near the uThongathi River there is a mosaic vegetation that includes savanna, a tropical vegetation type equally represented by woody plants and grasses. Most woody species in savanna are deciduous and usually shed all their leaves in a single season.

To some extent, the present vegetation communities survive in their current form because of heavy human habitation in modern KwaZulu-Natal, yet environmental studies suggest that mosaic vegetation may also have existed when the site was

occupied in the MSA (Wadley, 2013). Vegetation has been cleared over the years to pave way for sugar cane farming and other subsistence farming activities.

Figure 22. Overview of the excavation at Sibhudu Cave in 2018.

Alien invasive plant species found in the area include *Melia azedarach* (Syringa), *Eucalyptus sp* (Blue gum), *Solanum mauritianum* (Bugweed) and *Lantana camara* (Lantana).

From an anthropological perspective, minimal human skeletal remains recovered at Sibhudu Cave were described by Plug (2004). These are two human remains (a lateral malleolus of a fibula and the distal phalanx of an adult hand) from the MSA sediments dated to 49 000 years ago, and another two (a toe phalanx and a fragment of a putative human sternum) dated to 58 000 years ago (Plug, 2004). Unfortunately, for these remains it is unclear whether they are dated to the MSA or whether they are an intrusion from the Iron Age layers. More certain is the attribution of the five deciduous teeth identified in different stratigraphic layers and analysed by Riga (HUM. TO 1 and TO2) (Riga et al., 2018) and by Will (SIB 1, 2 and 3) (Will et al., 2019). HUM. TO1 is a Left deciduous molar$_1$ and HUM. TO2 a Right deciduous$_1$, found in layers dated to the pre-Still Bay (77.2 ± 2.2ka) and Howiesons Poort (64.7 ± 2.3ka) respectively (Riga et al., 2018).

SIB1, 2 and 3 were identified during Conard's excavation in the sieving material. SIB1 is a deciduous tooth, the attribution of which is unclear, whereas SIB 2 and 3 are deciduous molars. SIB 1 and 2 are both from pre-77 ka occupation layers. SIB 3 was identified in a Howiesons Poort layer (PGS3) dated to 64.7 ± 2.3 ka. All the teeth were identified as belonging to anatomically modern humans.

Figure 23. Closer view of the excavation at Sibhudu Cave in 2013.

These teeth add to the pool of MSA human fossil records from another 15 sites in South Africa and therefore assist in understanding both the anatomical features and the individual variability within the human fossil record of *Homo sapiens* (Riga et al., 2018). Specifically, measurements from all five teeth confirmed a comparable teeth size of the MSA and Upper Palaeolithic population of *Homo sapiens* that lies in between the earliest member of the species and recent humans (Riga et al., 2018; Will et al., 2019).

Stratigraphy and dating

Sibhudu Cave has a complex but clear stratigraphy consisting of over 50 MSA layers, with deposits that are particularly suitable for OSL dating because of the brightness and size of the quartz grains (Wadley and Jacobs, 2004). The preservation of layers is exceptional, and this has allowed for laminated, articulated phytoliths and centimetre-thick layers of undisturbed, carbonised bedding to be easily recognisable, sometimes across several metres of sediment (Schiegl et al., 2004). Only some minor natural and anthropogenic disturbance has occurred to some parts of the site in the form of burrowing by animals, rockfall and digging of pits during the Iron Age within the MSA layers (d'Errico et al., 2012). Most of the sediments at the site are of anthropogenic

origin with extremely high find densities of stone tools and faunal remains (Goldberg et al., 2009; Conard & Will, 2015). The Sibudan sequence has a particularly evident stratigraphic sequence with over 20 finely-laminated horizons of MSA occupations spanning only a couple of centuries or few millennia at most, providing a uniquely high-resolution insight into the lifeways of early modern humans (Fig. 23; Conard et al. 2012; Miller 2012; Will et al. 2014)

Sibhudu was occupied during the MSA from about 120 000 to 38 000 years ago (Figure 24 and Figure 25). Occupation at Sibhudu was punctuated with hiatuses between the occupational phases that each lasted up to 10 000 years (Wadley and Jacobs, 2006).

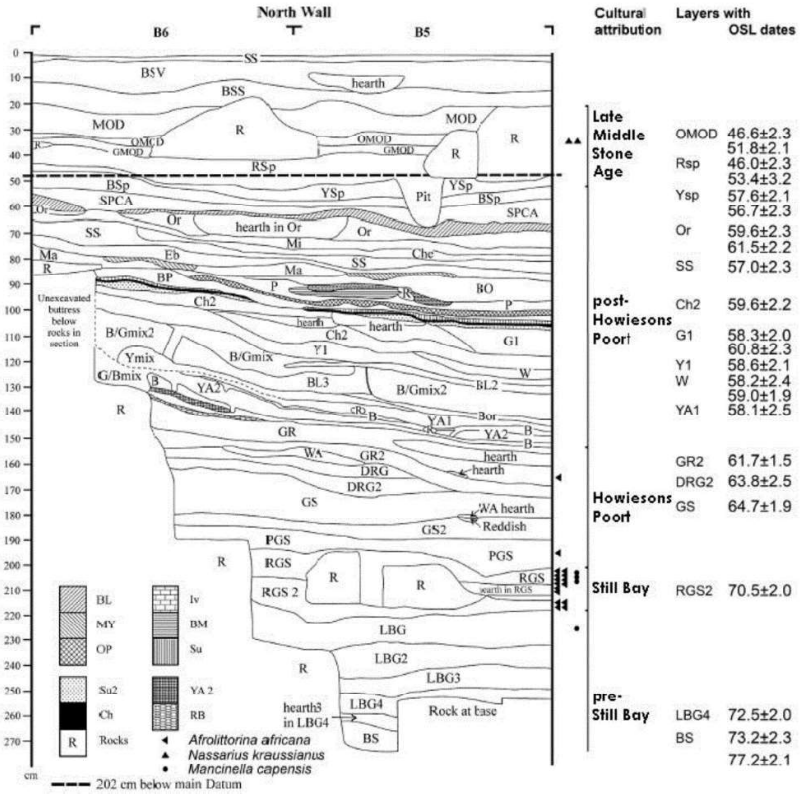


Figure 24. Sibhudu Cave stratigraphy of the east profile of squares B4 and C4. The industries associated with the strata are marked on the right (from Vanhaeren et al., 2019, dates after Wadley and Jacobs, 2006 and Jacobs et al., 2008a, b).

The phases are defined according to the technological assemblage in:

- Pre-Still Bay (before about 77 000) (pre-Still Bay bifacial points; non-bifacial bearing layers)
- Still Bay (about 72 000 -70 000) (bifacial points)
- Howiesons Poort (about 65 000 – 62 000) (quartz bifacial points and segments with ochre hafting line)
- Post-Howiesons Poort (now called Sibudan) or Sibhudu technocomplex (about 58 000) (Sibudan unifacial points)

- Late MSA (about 48 000) (unifacial points) and
- Final MSA (about 38 000) (hollow-based points and bifacial points).

Micromorphological analysis of the stratigraphy has identified several burning episodes, where hearths are built up on top of each other, some of them most likely being the result of burning monocotyledonous bedding for maintenance (Goldberg et al., 2009, Wadley et al., 2011).

Most of the dating was conducted using OSL by Jacobs and colleagues in 2008 (Jacobs et al., 2008a, b) and was then refined by Jacobs and Roberts using single-grain OSL in 2017 (Jacobs and Roberts, 2017) (Table 8). Most recent unpublished dates by Tribolo indicate that the lowermost layers excavated by the Conard team date to about 120 0000 years ago (Conard, pers. comm. 2021).

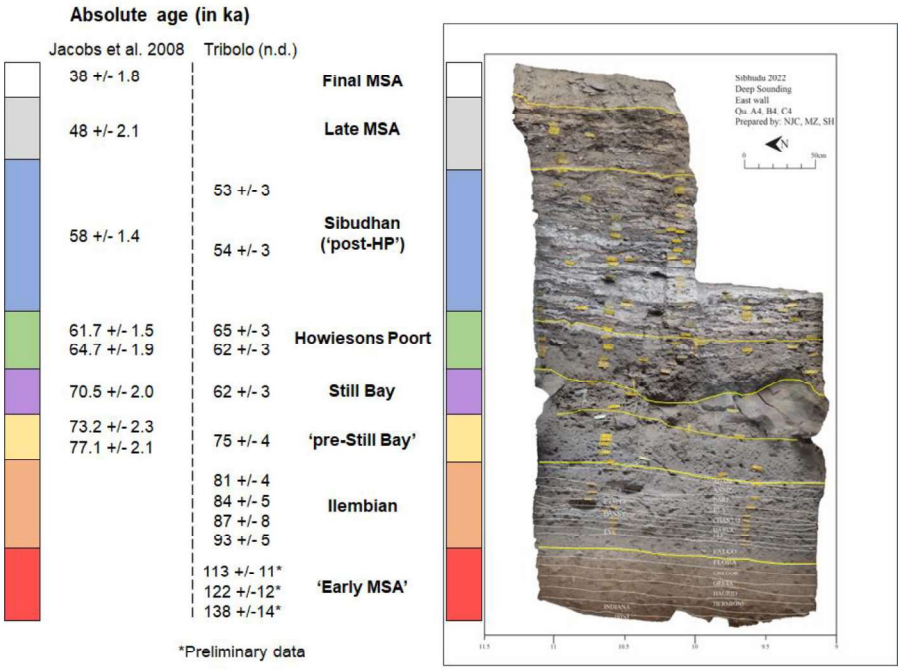


Figure 25. Stratigraphy overview from the Conard excavations 2011-2022.

Table 8. The stratigraphy and dating of Sibhudu Cave (* - average weighted mean OSL).

Technological phase	Layer	Sample name	Date (ka)	Method	Reference
Iron Age occupation	BSS		960 ± 25	Radiocarbon	Wadley, 2001

Technological phase	Layer	Sample name	Date (ka)	Method	Reference
Final MSA	Co; BU; LBMOD*	SIB22; 11; 10	38 6 ± 1.9	OSL	Jacobs et al., 2008a; b
Late MSA	MOD; OMOD; OMOD-BL; RSp; RD*	SIB7; 13; 14; 12; 8	48.0 ± 1.4	OSL	Jacobs et al., 2008a
Post-Howiesons Poort (Sibudan)		SIB-9	50.2 ± 2.5	OSL	Jacobs and Roberts, 2017
	Ch2; Y1; B/G mix; BSp; SS and P*	SIB1; 2; 3; 4; 6; 9	58 5 ± 1.4	OSL	Jacobs et al., 2008a and b
Howiesons Poort		SIB-15	61.7 ± 1.5	OSL	Jacobs and Roberts, 2017
		SIB-17	63.8 ± 2.5		
		SIB-19	64.7 ± 1.9		
Still Bay	RGS	SIB-20	70.5 ± 2	OSL	Jacobs and Roberts, 2017
Pre-Still Bay	LBG	SIB-21	72.5 ± 2.5	OSL	Jacobs and Roberts, 2017
	LBG 2	SIB-24	73.2 ± 2.7	OSL	Jacobs and Roberts, 2017
	BS1	SIB-23	77.2 ± 2.6	OSL	Jacobs and Roberts, 2017
	A-I		undated	OSL	In preparation

Evidence of modern human behaviour

The organic preservation at the site is exceptionally good and has therefore allowed for the recovery of a variety of rare organic cultural remains, which are normally absent in MSA sites. Because of this outstanding organic preservation, geoarchaeologists consider the Sibhudu sediments to be amongst the best in the world for identifying behavioural moments in time.

Shell beads as personal ornamentation

Sibhudu Cave carries evidence of the use of personal ornamentation for the first time in southern Africa and Africa overall. The use of personal ornamentation in the form of shell beads implies that MSA people living at these sites expressed group or individual identity, which is considered an expression of symbolic behaviour. Clusters of shells, often associated with ochre and around specific hearths, were uncovered in the Still Bay layers (70.5 ka ± 2.0 ka). Of these shells, 17 are *Afrolittorina africana* (Figure 26) and three, possibly four, are *Mancinella capensis.* Six *A. africana* and one specimen of *M. capensis* were intentionally drilled and used as beads (d'Errico et al., 2008; Wadley, 2012; Vanhaeren et al., 2019). Accidental transport to the site of this species seems improbable, except for one sample of *N. kraussianus*, which may have reached the site in the stomach of a turtle.

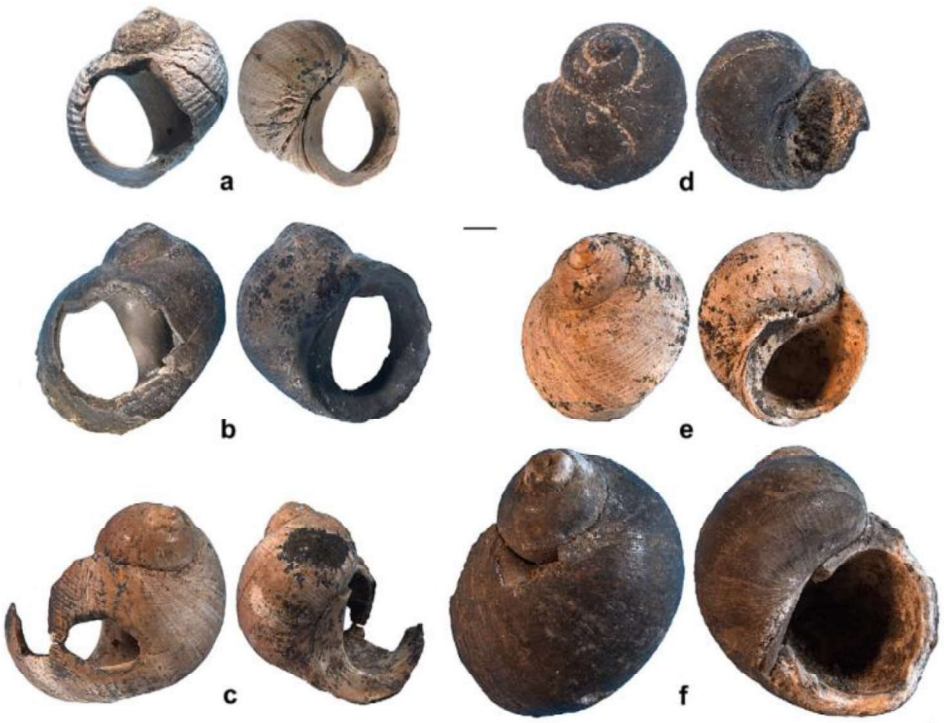


Figure 26. *Afrolittorina africana* shells from the lowermost Howiesons Poort and Still Bay layers at Sibhudu Cave. Scale bar = 1 mm

Additionally, all the shells are too small to have been used as a food source, and microscopic analysis and survey and fragmentation analysis of modern assemblages show that perforations on these shells are of human origin (d'Errico et al., 2008), most likely conducted with bone, lithic or hard wood (Vanhaeren et al., 2019).

Another two *Nassarius kraussianus* shells were identified in a more recent layer dated to 46.6 ± 2.3 ka, with one of the two specimens perforated. Despite the intentional perforation, none of these shells display obvious signs of use wear (Vanhaerean et al., 2019).

One *A. africana* shell bead was recorded from the Howiesons Poort layer; however, it is proposed that it was displaced by the rock fall disturbance from the Still Bay layers.

Bow-and-arrow technology

At Sibhudu Cave archaeologists have uncovered the world's earliest projectile points inferred to be used as arrow points, dated as early as 77 000 years ago. Bow-and-arrow technology, or flexible spear-throwers, is thought to indicate higher-level cognitive functions since arrowheads propelled by a tool, rather than a hand, require a more complex function than a simple hand throw (Backwell et al., 2018). Additionally, microlith-tipped projectile weapons increase hunting success rate and reduce the extent of injuries caused by close hunting encounters (Brown et al., 2012 and references within). As such, the use of projectile points and bow-and-arrow technologies is considered a mark of modern human behaviour. Overall, weaponry (arrows and maybe spears) was composite at the time because there is also clear evidence for the use of barbs, as well as evidence for the use of several recipes for compound adhesives.

Compound adhesive used in hafting

A central technology in the development of the use of the bow and arrow is hafting, which is necessary to ensure that the point is adequately connected to the wood or bone shaft. As with the use of the bow and arrow itself, hafting demonstrates the ability of *Homo sapiens* at the time to multi-task and think abstractly, indicating complex cognition.

Residues studies on MSA stone and bone (Figure 27) have been pioneered at Sibhudu Cave over the past 15 years to understand the composition and production of the compound adhesives (Langejans, 2012; Lombard, 2004, 2005, 2006a, b, 2008; Lombard et al., 2004; Rots et al., 2017; Wojcieszak and Wadley, 2019). These studies have shown that haft materials and hafting configurations of the lithic points changed over time (Lombard, 2008), offering the opportunity to understand changes in styles and

behaviours over the overall course of the MSA occupation. Adhesive components included resins, plant tissues, fibres, phytoliths and ochre. Plant twine was most likely the preferred binding material for hafting the points (Lombard, 2008). Amongst the resins, one of the most commonly used was the resin of the conifer *Podocarpus falcatus* (commonly known as Outeniqua Yellowwood). No polysaccharides (plant gum) were detected (Rots et al., 2017).

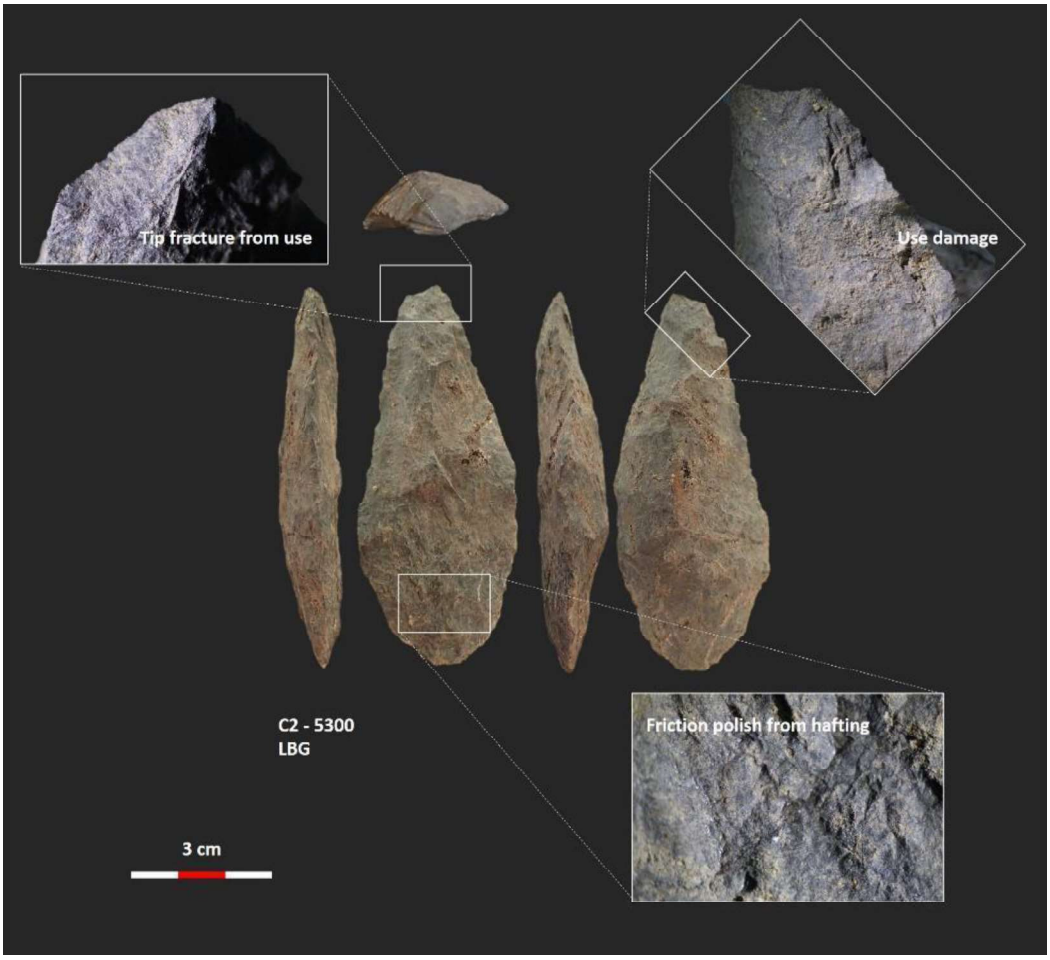


Figure 27. Bifacial piece with use wear traces from Sibhudu Cave.

Formal bone tools (including bone needles)

The production of formal tools during the MSA is one of the main indicators of the development of modern human behaviour in *Homo sapiens* (d'Errico et al., 2012). Formal bone tools (Figure 28) are implements fully modified with techniques specific to bone material, such as grinding, scraping and cutting (d'Errico et al., 2012). This differentiates these formal tools from older (1 to 2 Ma old) reworked bone material found, for instance, at Swartkrans, Drimolen or Olduvai Gorge, where deliberate

modification of bone occurs, but not with techniques specific to a bone material (d'Errico et al., 2012).

The rare and particularly rich collection of bone tools from Sibhudu Cave includes several typologies that are not known elsewhere in the world and appear to be part of a local tradition which is also absent at contemporaneous or more recent southern African sites (Backwell et al., 2008). This highlights the differences in material culture and evolutionary trends related to the various MSA technocomplexes at different time periods, sites and regions. Sibhudu Cave, overall, retains a collection of bone tools which are more varied than many other MSA sites in terms of conception, morphology, variety and task for which they were used (d'Errico et al., 2012).

The formal bone-tool manufacturing tradition at Sibhudu Cave comprises 23 pieces recovered from the pre-Still Bay, Howiesons Poort, post-HP (Sibuduan) and final MSA layers. No formal bone tool production has been identified in the SB layers. In the pre-Still Bay layers only one possible notched piece was excavated (d'Errico et al., 2012), but one formal bone tool in this layer (77.2 to 72.5 ka) is the second oldest in southern Africa after the tool identified in M2 at Blombos Cave. In the Howiesons Poort layers archaeologists have recovered 15 bone tools, including pins, smoothers, wedges, pressure flakes, awls and scaled pieces (*pieces esquillées*). The production of these *pieces esquillées* in bone is recorded for the first time in the archaeological record at Sibhudu Cave. In the post-HP (Sibudan) layers archaeologists have recovered only five tools, inclusive of notched pieces, smoothers, *pieces esquillées,* wedges and pressure flakers. Only one bone pin was found in the final MSA layer (d'Errico et al., 2012). No evidence of bone engraving has yet been recorded at Sibhudu Cave. The current excavations by the University of Tübingen have uncovered dozens of additional bone tools that span the entire MSA occupations of the site, testifying to the continuity and importance of bone as a raw material for tools at the site.

The formal bone-tool manufacturing tradition at Sibhudu Cave comprises 23 pieces recovered from the pre-Still Bay, Howiesons Poort, post-HP (Sibuduan) and final MSA layers. No formal bone tool production has been identified in the SB layers. In the pre-Still Bay layers only one possible notched piece was excavated (d'Errico et al., 2012), but one formal bone tool in this layer (77.2 to 72.5 ka) is the second oldest in southern Africa after the tool identified in M2 at Blombos Cave. In the Howiesons Poort layers archaeologists have recovered 15 bone tools, including pins, smoothers, wedges, pressure flakes, awls and scaled pieces (*pieces esquillées*). The production of these *pieces esquillées* in bone is recorded for the first time in the archaeological record at Sibhudu Cave. In the post-HP (Sibudan) layers archaeologists have recovered only five

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Figure 28. Refitted Howiesons Poort bone point from Sibhudu Cave. Scale bar = 1 cm.

Use of medicinal plants and manufacture of plant bedding

Sibhudu Cave, along with the Howiesons Poort layers at Diepkloof Rock Shelter and Border Cave, is one of the MSA sites at which the development of plant bedding was first identified, starting from the pre-Still Bay layers for the extent of the whole occupation. Because of the excellent organic preservation, archaeologists have been able to recover phytoliths, burnt sedge seeds, burnt culms and burnt river clay with plant impressions, as well as a burnt layer of plants. These have allowed a better understanding of both the human behaviour and the environment. Sedges and other monocotyledons (Figure 29), which were covered with leaves from *Cryptocarya woodii*, were used for bedding. When crushed, these leaves are aromatic and contain

traces of α-pyrones, cryptofolione, and goniothalamin chemicals that have insecticidal and larvicidal properties (Wadley, 2012; Wadley et al., 2011).

Figure 29. Clay fragment with monocotyledonous plant impressions from Sibhudu Cave.

Widespread use of ochre

From 73 000 years ago, there is evidence that bedding started being burnt, presumably for site maintenance. Additionally, by 58 000 years ago, bedding construction, burning, and other forms of site use and maintenance intensified (Wadley et al., 2011), as recorded by an increased rate of anthropogenic sedimentation with longer occupation periods, which also suggests a change in settlement strategies (Wadley et al., 2011).

As mentioned for the other sites within this nomination, evidence for the use of ochre during the MSA is common at many sites, including Sibhudu Cave. Large quantities of red and yellow pigmentaceous material, in the form of unworked fragments, ground pieces, and patches of ground powder, are frequent throughout the entire MSA sequence at Sibhudu (Figure 30) (Hodgskiss, 2010).

More than 9 000 pieces of ochre have been recorded from excavations at Sibhudu Cave by Wadley, with several thousand pieces added by the Conard excavations. Of these, about 12% display signs of anthropogenic use, in the form of grinding, rubbing,

engraving and powdering (Hodgskiss, 2010). Most of the intensively utilised pieces have mica inclusions and therefore produce a bright red, glistening powder (Hodgskiss, 2013a and b). As with the findings at Pinnacle Point 13B, this indicates that the visual qualities of this colour were sought after.

Grinding and rubbing of ochre, either alone or together, were the most frequent uses identified within the assemblage from the pre-Still Bay period to the final MSA (Hodgskiss, 2012). Ground ochre was used mixed with resinous material for the development of a compound adhesive for hafting, indicating its functional use. Additionally, from the Howiesons Poort layers to the late MSA layers, there is increased evidence of direct transfer of ochre powder onto a soft material by rubbing. This is an innovative use of ochre in the Sibhudu assemblage, and is evidence of behavioural innovation (Hodgskiss, 2013b). Ochre was also identified on shells used as body decoration (d'Errico et al., 2008; Lombard, 2008). In addition, ochre residues and polish from wear on a few Sibhudu scrapers dated to 58 000 years ago imply their use on hides (Wadley and Langejans, 2014). In the Post-HP (Sibudan) layers archaeologists have uncovered cemented hearths which have been interpreted as pigment-working surfaces or receptacles for ochre powder (Wadley, 2010b, d'Errico et al., 2012).

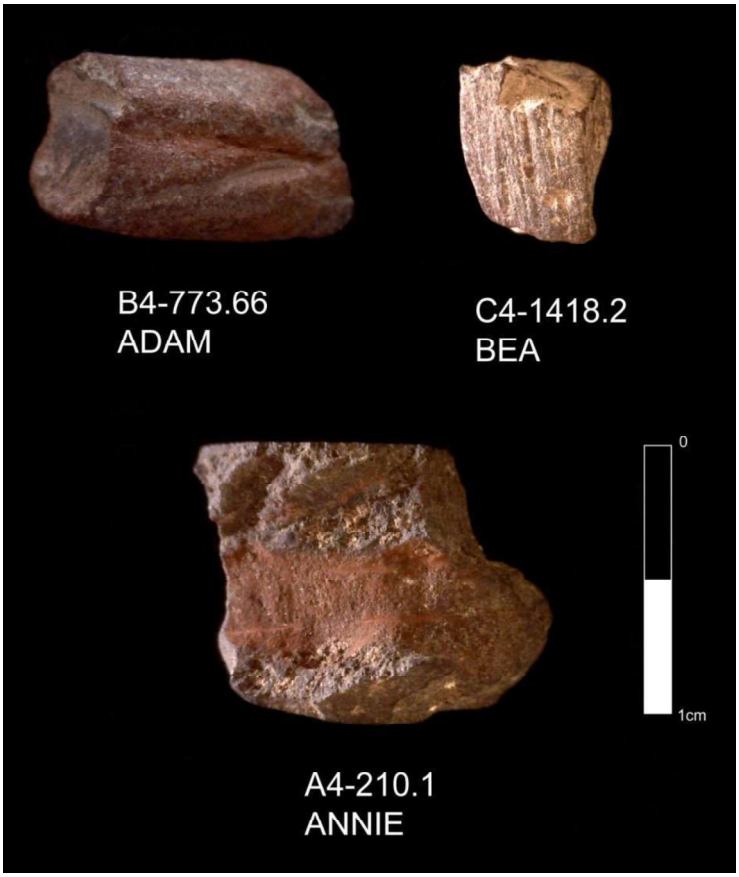


Figure 30. Modified ochre pieces from the >77 ka layers at Sibhudu Cave.

Additionally, some of the pieces, starting in the pre-Still Bay layers, present evidence of scoring and engraving, suggesting that the incisions and their shape were deliberate, and that some significance was likely associated with them; however, it is less clear than in other assemblages whether these potential engravings held a message understood by others (Hodgskiss, 2013b). Overall, the presence of engraved pieces of ochre is generally considered a hallmark of symbolically mediated behaviour and evidence of the development of modern human behaviour (Mackay and Welz, 2008; Henshilwood et al., 2009; d'Errico et al., 2012).

Serrated bifacial pieces by pressure flaking

The production of bifacial points characterises the Still Bay layers of many MSA sites, but at Sibhudu Cave they occur in many more of the different technocomplexes (Will et al. 2018). Within this nomination, Still Bay bifacial points are identified at Diepkloof Rock Shelter and Sibhudu Cave. However, no bifacial points have so far been recovered from Pinnacle Point Site Complex (Wilkins et al., 2017).

The preferred raw materials for the development of bifacial points at Sibhudu were locally available dolerite, quartz and quartzite (Rots et al., 2017).

The most recent studies on the bifacial points recovered at Sibhudu Cave show that different technologies were used at different periods of the occupation, confirming the idea that bifacial points are part of different MSA technocomplexes (Will et al. 2018). The pre-SB occupation at Sibhudu, dated to 77 000 years ago, is the only site, apart from Umhlatuzana Shelter (Lombard and Phillipson, 2010), where serrated bifacial points (Figure 31) were manufactured. Diepkloof Rock Shelter does not display them. These serrated bifacial points were manufactured by pressure with bone compressors and are restricted to a few contexts within the MSA, making them a strong techno-cultural marker when identified (Rots et al., 2017).

Unlike other MSA sites, Sibhudu Cave presents evidence of the capture and consumption of fast, small game, such as blue duiker, and birds. The capture of these animals requires the acquisition of innovative remote-capture technologies, such as blunt-tipped projectiles, bows and arrows, bolas, nets and snares (Clark and Plug, 2008; Wadley, 2010b; Clark, 2011, 2017; Val et al., 2016). More specifically, analysis of the BS layer, dated to the pre-Still Bay, indicates that the use of snares or traps may extend back to as early as 77 000 years ago (Clark, 2019).

At Sibhudu Cave, .Homo *sapiens* is known to have exploited birds as one of the earliest examples in the archaeological record at 77 000 years ago. In addition to the technologies mentioned above, evidence is also in the form of butchery marks, peeling, perforations associated with disarticulation of the forewing, and tooth marks.

Taxa exploited at Sibhudu are mostly pigeons and doves, but Galliformes, raptors, and waders are also included (Val et al., 2016).

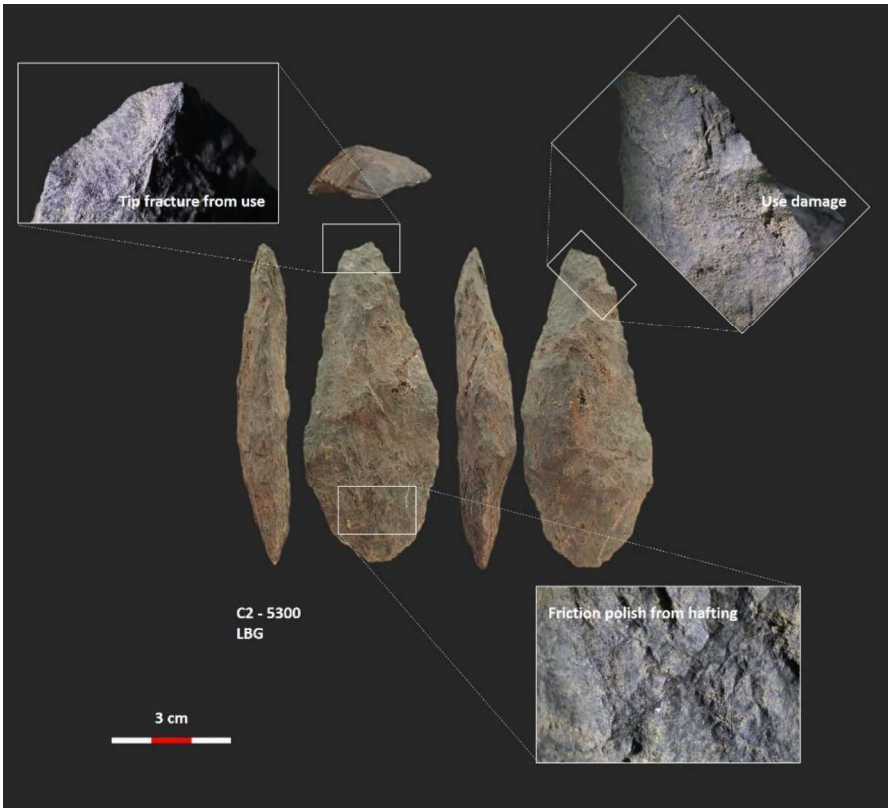


Figure 31. Bifacial piece with use wear traces from Sibhudu Cave.

Subsistence and bird exploitation

Middle Stone Age

As the MSA progressed in southern Africa, several highly innovative and varied industries were developed that included pointed artefacts, blades, retouched flakes, end and side scrapers, and grindstones. The MSA in southern Africa has included a variety of industries and regional expressions, which include amongst many others the Still Bay, Proto-Still Bay, Pietersburg, Bambatan, Howiesons Poort, Hagenstad, Mazelspoort, Magosian, pre-Still Bay, and post-HP (de la Peña et al., 2018). Along with innovative stone tools, the Still Bay and Howiesons Poort industries had associated arrays of innovative bone tools. These industries are discussed further below.

Still Bay industry

The Still Bay industry is the name given to an MSA stone tool manufacturing style that was first identified and described at the site of Still Bay in South Africa (Goodwin and van Riet Lowe, 1929; Sampson, 1974). The early Still Bay industry emerged as early as

100 000 years ago at Diepkloof Rock Shelter, before it became widespread throughout southern Africa between 76 000 and 71 000 years ago (Jacobs et al., 2008; Chase, 2010). The defining tools of the Still Bay are the bifacial pressure-flaked bifacial points, often made from fine-grained, nonlocal lithic materials (Figure 32). This knapping technology has been proved to require a long period of apprenticeship (d'Errico et al., 2012).

Figure 32. Still Bay Bifacial points from Diepkloof Rock Shelter.

Still Bay people prepared the silcrete raw material selected for stone tool production by preheating it in anthropogenic fires. Soft wood or bone hammers were used in the shaping of the stone. Careful trimming of the edges using a pressure-flaking process finished off the stone tools. Pressure flaking was a major advance during this time, as it allowed to produce sharper, more finely made stone tools, and for the placement of notches to facilitate hafting (Mourre et al., 2010). The discovery of Still Bay points showed that the invention of pressure flaking had occurred in Africa at least 50 000 years earlier than observed at European sites (Mourre et al., 2010). Differences have been identified in the Still Bay across southern Africa. Bone tools are absent from the Still Bay layers at Diepkloof Rock Shelter but are a significant aspect of the assemblage at Sibhudu Cave (d'Errico et al., 2012). In addition, perforated shell beads are recorded in the Still Bay at Sibhudu Cave (d'Errico et al., 2008).

Howiesons Poort industry

The Howiesons Poort industry was named after Howiesons Poort Shelter near Makhanda, in South Africa (Deacon, 1995). In the South African MSA cultural sequence, the Howiesons Poort industry superseded the Still Bay.

The Howiesons Poort is associated with various artefacts, but most notably with backed blades in a variety of geometric shapes. Backed blades are important because they signal advanced projectile technology and are normally embedded in a miniaturized technology called "microlithic technology". These backed blades of the Howiesons Poort originated 75 000 to 70 000 years ago on the southern coast of South Africa in the transition to the glacial period, and then became more widely dispersed throughout southern Africa towards the end of the glacial period from 66 000 to 58 000 years ago. The Howiesons Poort backed blades are produced from thin small blades blunted along one or more sides, struck off a prepared stone core, and generally measure 10 to 50 millimetres in their longest dimension (Soriano et al., 2007). A large percentage of the Howiesons Poort artefacts were manufactured from fine-grained silcrete and quartz. The small blades or bladelets were likely mounted onto hafts (Lombard, 2008; Henshilwood et al., 2014; Douze et al., 2018).

Although the small backed blades of the Howiesons Poort are less visually impressive than the Still Bay points, and hardly seem to represent an advance in technology over them, they are considered to have revolutionised toolkits and hunting as they are part of composite tools and often used for advanced projectiles such as spear-throwers and bows and arrows. As in the case of the earlier Still Bay industry, the Howiesons Poort culture produced symbolic artefacts such as engraved ochre, ostrich eggshells and shell beads (Henshilwood et al., 2014; Delagnes et al., 2016; Douze et al., 2018).

Middle Stone Age at Diepkloof Rock Shelter

At Diepkloof Rock Shelter, the MSA sequence comprises five distinct technological phases (Porraz et al., 2013a) which encompass changing traditions of stone toolmaking (Table 5). The five technological phases from the base upwards are: (1) MSA-type 'Mike', (2) pre-Still Bay-type 'Lynn', (3) Still Bay, (4) Howiesons Poort and (5) Post Howiesons Poort.

MSA-type 'Mike' is located near the base of the excavated sequence. The lithic assemblage is characterised by blades and triangular flakes that were manufactured from locally procured raw materials. The locally sourced coarse-grained quartzite largely dominates the MSA-type 'Mike' technological phase. These stone tools are dominated by notches and denticulates.

The pre-Still Bay-type 'Lynn' lithic assemblage contains unifacial and bifacial points, and is dominated by irregular flakes and quartzite as raw material. The dominant non-local raw material the site is silcrete. The most striking feature of this phase concerns the frequency and nature of the formal tools, which comprise lateral and convergent scrapers. Double-patinas, reflecting re-tooling, were also frequently observed on silcrete and, occasionally, on quartz tools. A significant finding in this layer is the identification of a deliberately engraved bone which is considered as the oldest engraved bone in Africa.

The Still Bay phase is characterised by bifacial pieces manufactured from mainly fine-grained quartzites, but also present are other less numerous tools such as scrapers and denticulates. A lower percentage of tools were also made from non-local silcrete. It has been observed that there is a gradual decrease in the proportion of local rocks from the base to the top of the Still Bay.

The Howiesons Poort phase accounts for the largest part of the archaeological sequence at Diepkloof Rock Shelter, and is subdivided into different phases (Early, Intermediate and Late), but only the upper phases resemble the so-called 'classic' Howiesons Poort (Porraz et al., 2013a). The Howiesons Poort pattern of raw material selection is preferentially oriented towards non-local, fine-grained rocks, particularly silcrete. Only the last sub-phase of the Late Howiesons Poort (type 'Eric') documents a discrete change, with a higher frequency of local quartz. In the Early phase of the Howiesons Poort there are two sub-phases. The first is dominated by exotic, fine-grained silcretes, while the second uses local quartzites and quartz. Blades and bladelets were the main tools produced in both sub-phases. Porraz and colleagues (Porraz et al., 2013a) identify an Early Howiesons Poort phase that is stratigraphically and technologically distinct from the classic Howiesons Poort as reported at other sites.

In two layers, referred to as 'Frank' and 'Darryl', which contained stone tools typical of the Howiesons Poort complex, more than 250 engraved ostrich eggshell fragments were found, and smaller numbers continued into the underlying layers, making a total of 408 fragments. This is many more than has been found at any other site so far.

The Intermediate Howiesons Poort phase tools are composed predominantly of exotic silcrete. Typical of this phase is the high frequency of strangulated-notched pieces. The Late Howiesons Poort phase is characterised by the preferential selection of fine-grained varieties of silcrete and by the presence of typical Howiesons Poort core forms. Compared to preceding phases, the proportion of irregular blades relative to regular blades increases and is coupled with an increase in flakes and backed flakes production.

The post-HP phase is characterised by the use of silcrete, quartz and quartzite in the production of stone tools. Materials are sourced from both local material (quartzite and quartz) and non-local silcrete. Stone tools include flakes that are morphologically more variable than in preceding layers, as well as scrapers.

Middle Stone Age at Pinnacle Point Site Complex

The lithic assemblage from PP13B provides a picture of MSA coastal lithic technology in South Africa from about162 000 to 90 000 years ago, and PP5-6 continues the sequence from 90 000 to 50 000.

The PP13B assemblage is similar to other South African MSA assemblages that precede the Still Bay. The majority of the lithic artefacts are made from local quartzite, while fine-grained raw materials such as silcrete are rare. The lithic artefacts comprise blades, points and quadrilateral flakes. Retouch observed on the artefacts is rare, but when present is informal, so that retouched tool forms are essentially non-existent. There is abundant evidence for core preparation, and the early stages of lithic manufacture are present, yet cores are rare (Thompson et al., 2010; Marean, 2010a). Overall, the stone tools are remarkably consistent through the 162 000 to 90 000 time range.

At PP5-6, the stone tools that date between 90 000 and 74 000 continue the pattern at PP13B (Wilkins et al., 2017). While dominated by quartzite, there are some phases where silcrete rises in abundance. Just after 74 000 years ago, heat treated silcrete starts increasing and then, rather sharply, there is a further dramatic rise to the point where silcrete dominates. Blade technology becomes a dominant feature of the assemblage. Microliths appear at this time. By 65 000 years ago, the Howiesons Poort appears and lasts until 60 000. From 60 000 to 50 000 years ago there are sharp changes in the abundance of a wide selection of stone tools and then occupation stops at about 50 000 years ago.

Middle Stone Age at Sibhudu Cave

At Sibhudu Cave the MSA sequence includes seven separate technological phases: the A-I layers, the pre-Still Bay, the Still Bay, the Howiesons Poort, the post-HP (Sibudan), the Late MSA and the Final MSA.

The A-I layers are the pre-SB layers excavated by Prof. Conard. These layers have not been dated yet but they are likely to date between 120 000 and 80 000 years ago. These are the layers on which excavations focused on the latest seasons. They are characterised by serrated points shaped by pressure flaking and laminar reduction, and used as projectiles (Rots et al., 2017; Schmid et al., 2019). The serrated pieces and the laminar reduction system represent a key set of innovations at this occupation at

Sibhudu, and no clear equivalent is yet found outside of KwaZulu-Natal (Rots et al., 2017; Schmid et al., 2019). More recent excavations since 2019 have uncovered even earlier layers that have different stone tools, predominantly characterized by unretouched large Levallois flakes and much lower find densities. Bedrock at Sibhudu has not been reached by March 2022, requiring additional excavations in the future.

The lowermost layers excavated by Wadley are the pre-Still Bay layers (77 000 to 72 500 years ago). These layers describe lithic assemblages with flakes as well as blades and few formal tools, excluding bifacial pieces (Rots et al., 2017) and possibly two bone notched pieces (d'Errico et al., 2012).

During the Still Bay layers (70 500 to 65 000 years ago), most of the lithic industry is almost entirely produced through bifacial shaping. Studies confirm that these tools were primarily designed as cutting devices optimised for long-life use through resharpening cycles (Soriano et al., 2015). No bone tools were identified during this phase. Hafting residues that were chemically identified contained ochre as one ingredient.

During the Howiesons Poort (66 000 to 58 000 years ago), small blades and a backed tool tradition emerged, dominated by segments of a variety of sizes, including small quartz segments possibly used as arrowheads (Wadley, 2010a). Similarly, the Howiesons Poort layers also record the first evidence in the archaeological record of the development of bone arrowheads (Backwell et al., 2018). Studies on the preferred material during the Howiesons Poort show that dolerite, hornfels, quartz, quartzite and sandstone were used throughout the Howiesons Poort. However, ten different layers within the Howiesons Poort do not present similar patterns in the usage of raw material. More than 60% of the stone tools recovered from the earliest Howiesons Poort layers (Grey Rock and Reddish Brown) are made of locally available dolerite, 10% of hornfels, which was sourced about 20 km or more from the site, and 10–20% of sandstone. These percentages vary significantly throughout the Howiesons Poort (de la Peña and Wadley, 2017). Rare pieces of cryptocrystalline quartz and cherts were probably found as small pebbles in local conglomerates. Overall, there is a clear diachronic trend in the Howiesons Poort sequence which sees the gradual abandonment of its typical elements such as backed tools and blade technology (Will & Conard, 2020).

The post-HP (58 000 to 47 000 years ago), or the Sibudan technocomplex, is recognised as a local tradition and has four phases ('Upper/Classic,' 'Upper Middle,' 'Lower Middle' and 'Lower' Sibudan), based on techno-typological variability through time and first defined by Conard et al. (2012). Quartz and quartzite predominate in the earliest phase, Lower Sibudan, and there are many splintered pieces, but only a few unstandardized retouched tools from the excavations done by Wadley. Additionally,

according to Will and Conard (2018), tiny quartz bifacial points, notched tools and denticulate also occur in the Lower Sibudan. In other, younger assemblages, unifacial points are more common than points elsewhere in the Sibhudu sequence and are associated with an increased use of non-local hornfels (Mohapi, 2012). Overall, the Sibudan is particularly characterized by various well-defined types of finely retouched unifacial points that occur often in the middle part of the Sibudan sequence and dominate in number at its top (Will et al., 2014; Conard & Will, 2015). Extensive use of non-local hornfels is also a defining and special characteristic of this technocomplex as is the remarkable variability in technology over a relatively short time span (Conard & Will, 2015)

During the Late MSA (from 48 000 years ago), Sibhudu Cave inhabitants were still making bifacial points, although most of them were unifacial, broad, thick and longer than in the other technocomplexes (Mohapi, 2012). They were also hunting large plains game, especially zebra.

During the Final MSA, which is the most recent layer (38 000 years ago), bifacial points are once again more prominent than unifacials. Compared to earlier phases, bifacial points are now shorter, but wider and thicker. They also include a hollow-based shape, which is normally considered unusual and has been recovered in other Late MSA layers, such as at Umhlatuzana (Kaplan, 1990; Mohapi, 2012) and at Umbeli Belli (Bader et al., 2018), a quartzite rock shelter located in the Mpambanyoni river valley in KwaZulu-Natal, which has been excavated from 2016-2020. This type of tool can be classified as a regional variant of the final MSA.

2.b History and development

South Africa can justifiably claim among the most ancient of human histories, closely associated with the emergence and development of our early hominin ancestors as far back as four million years ago. Many scientists think that the origin population of all modern humans derived from the southern tip of Africa and eventually spread across the globe (Henn et al., 2011; Schlebusch et al., 2017). The southern African Early Stone Age (ESA) occurred from about 2 million years ago to 300 000 years ago. The ESA comprises two culture-stratigraphic units, namely the Oldowan Tradition from 2 and 1.5 million years ago, and the Acheulean Tradition between 1.5 million years ago and 250 000 to 200 000 years ago. The Acheulean is distinguished from the Oldowan mainly by the addition of hand axes, cleavers, and other large bifacial tools. At the end of the Acheulean, bifacial tools are often thinner, more symmetrical, and more trimmed than earlier ones, and later Acheulean flake tools resemble those of the succeeding MSA. Human fossils have rarely been found, but confirm that the ESA people in southern

Africa were part of the evolving genus *Homo*, with some already having been on or near the line to modern *Homo sapiens* (Klein, 2000).

Current archaeological research suggests that the MSA is associated with both anatomically modern humans (*Homo sapiens*) as well as archaic *Homo sapiens.* The MSA began approximately 300 000 years ago and lasted until about 25 000 years ago. Genetic and fossil evidence suggests that origins of anatomically modern humans lie in Africa between 300 000 and 150 000 years ago. Cognitive advances were identifiable within the MSA period, and the origin of our species is linked to the appearance of MSA technology (McBrearty and Brooks, 2000; Wadley, 2015) and behavioural flexibility (Wadley, 2015; Kandel et al., 2016). The MSA is therefore best known for innovations that appear in the archaeological record at various times after about 300 000 years ago with the first appearance of *Homo sapiens*. In the period after 50 000 years ago, such evidence is well documented in much of Europe, Africa and south-east Asia, and is widely considered as typifying 'modern' human culture, but earlier evidence is rare (Wadley, 2015).

Substantial evidence for the origins of modern human behaviour has been identified in the southern coastal sites of South Africa (Wadley 2015; Marean 2015). Key questions are whether anatomical and behavioural modernity developed in tandem, and what criteria archaeologists should use to identify modern behaviour. Most scientists think that evidence for symbolic behaviour, and complex reasoning and teaching are good indicators of modern human behaviour. Considering this, *Homo sapiens* were, at least in southern Africa, behaviourally modern by at least 100 000 years ago (Henshilwood et al., 2002, 2011; Wadley, 2015; Marean, 2015). The fact that the artefacts were created, and that most of them were deliberately made with representational intent, strongly suggests that these functioned within a society where behaviour was mediated by symbols.

History of research and future research plans

Diepkloof Rock Shelter

In the late 1960s and 1970s, John Parkington and Cedric Poggenpoel (University of Cape Town) excavated various archaeological sites, including what is now Diepkloof Rock Shelter, in the vicinity of Elands Bay and Verlorenvlei (Parkington, 2006). The main purpose of the project was to record and analyse the spatial distribution of Stone Age sites. These sites included shell middens on the coast, and rock shelters and open-air sites in the adjacent Sandveld and the Cederberg mountains.

In 1973, Diepkloof Rock Shelter was first excavated to examine the period of LSA occupation (Parkington and Poggenpoel, 1987). These pilot excavations focused only on the upper levels that sampled the Holocene with LSA occupation, and the uppermost MSA. Between 1998 and 2013, a South African-French partnership enabled the expansion of these excavations, under the leadership of Prof. Parkington from the University of Cape Town and Prof. Pierre-Jean Texier and Dr Guillaume Porraz from the University of Aix-Marseille and the French National Centre for Scientific Research (CNRS). The primary purpose of these excavations was to investigate the MSA artefacts and associated materials (Tribolo et al., 2009), to establish site dates and to compare Diepkloof Rock Shelter with other sites of similar age in southern Africa (Tribolo et al., 2009, 2013).

Palaeoenvironmental studies of changes in sea level, vegetation and fauna have further complemented this work. The faunal remains and MSA stone tools excavated from Diepkloof Rock Shelter have been analysed through several research projects, including an entire edition of the *Journal of Archaeological Science* (Vol. 40) in 2013 which was devoted to the results of the research at Diepkloof (Cartwright, 2013; Charrié-Duhaut et al., 2013; Dayet et al., 2013; Igreja and Porraz, 2013; Miller et al., 2013; Parkington et al., 2013; Porraz et al., 2013a, b; Schmidt et al., 2013; Steele and Klein, 2013; Texier et al., 2013; Tribolo et al., 2013; Verna et al., 2013). The very long and relatively well-preserved deposit at Diepkloof Rock Shelter has also allowed the development of a detailed chronology that has challenged the status quo of the current understanding of the Still Bay and Howiesons Poort industries.

Between the 1970s and 1990s, students associated with archaeological field schools assisted in the excavation and survey of rock art and artefacts within the Sandveld. Since 2000, time has been spent updating and digitising the topographic maps that highlight the locations of the surveyed archaeological sites for the South African Heritage Resources Information System (SAHRIS), the database administered by the national South African Heritage Resources Agency (SAHRA). This has assisted in placing Diepkloof Rock Shelter within its broader environmental and geographic context.

No excavations are currently taking place at Diepkloof Rock Shelter and there are no plans to conduct further excavations in the immediate future. The site was last excavated in 2013, and while it is still in good condition, it requires safe closure and protection. Funding obtained in 2019 by the U.S. Ambassadors Fund for Cultural Preservation will be utilised for this purpose. Plans and actions are in place to fully stabilise the standing sections and thus preserve the integrity of the archaeological record, so that additional excavation may be conducted when and if required.

While no excavations are currently being undertaken at Diepkloof Rock Shelter, it still maintains a high research value, as several papers have been published since 2013 in prestigious scientific journals such as *Nature* on already excavated material (Feathers, 2015; Jacobs and Roberts, 2015; Dayet et al., 2016; Collins et al., 2017; Val, 2019; Porraz et al., 2020; Val et al., 2020). All recovered archaeological assemblages are curated at the Iziko South African Museum in Cape Town.

Pinnacle Point Site Complex

In 1997, plans for a golf course and casino development for the area above the cliffs near Mossel Bay were submitted. The proposal triggered an environmental impact assessment as required in terms of the then Environment Conservation Act (1989). Following the environmental impact assessment, the archaeological sites at Pinnacle Point were first recorded as part of an archaeological impact assessment (Kaplan, 1997). The survey covered an area of approximately 2 km from west to east, and 1 km from the coast inland, and a total of 28 archaeological sites were recorded (Marean et al., 2004). Caves and rock shelters accounted for 15 of these sites. Furthermore, 21 of the 28 sites were associated with the MSA (Marean et al., 2004). Sites that were related to the same formation (a similar history), were given a number and a letter; for example, 13A and 13B adjoin each other. In 1999, the research potential of Pinnacle Point was established, when Peter Nilssen and Curtis Marean surveyed the area in greater detail. Four of the cave sites at Pinnacle Point were selected for test excavations, namely PP9, PP13A, PP13B, and PP13C. Scatters of MSA stone tools are abundant on the surface in most of the caves and rock shelters in this area, although in only a few instances are these *in situ* deposits. The four caves mentioned above were chosen based on their proximity to one another, with the high potential site PP13B as the centre.

These four caves are near the base of a nearly vertical cliff face 40–60 m from base to top, making hiking up and down the cliff during fieldwork hazardous. The construction of a 176-step wooden staircase from the top of the cliffs to the bottom was therefore commissioned. Water pipes (municipal water) were also installed from above the cliff down to the excavations so that the excavated materials could be wet sieved with fresh water. In July 2000, test excavations were conducted at PP9, PP13A, and PP13B, funded by the National Science Foundation (NSF) (USA) and the National Research Foundation (NRF) (RSA), after which came several weeks of logistical work that included curation and study. Excavations were then conducted at sites PP9, PP13A, and PP13B (Marean et al., 2004).

Between 2001 and 2002, Marean and Nilssen continued with surveying and mapping the surrounding area. During the 2003 field season, several specialists joined them for sampling and excavation at PP13B. Sites 13A and 13B yielded rich MSA horizons with outstanding preservation of lithic assemblages, fossil bone and marine shell (Marean et al., 2004).

In 2005, a large (US$2.5 m) NSF grant was received to fund multi-proxy studies of the archaeological, palaeoclimatic, and palaeoenvironmental records. At this time, Marean developed the South African Coast Paleoclimate, Paleoenvironment, Paleoecology, Paleoanthropology Project (SACP4) to recognise the broad multi-disciplinary research being conducted. Since 2005, excavations have continued at PP13B up to 2007, with some excavations also shifting to PP9B and PP9C. Excavations from 2007 focused exclusively on the very long section at PP5-6 and on the MSA open-air sites at the adjoining Vleesbaai. Marean et al. (2007) published in *Nature* the discovery of the world's oldest evidence for coastal foraging and worked ochre at PP13B. Brown (Brown et al. 2009) published in *Science* the world's earliest evidence for heat treatment of flaked stone, which moved the date for this pyrotechnology from 25 000 years ago in Europe to 162 000 years ago in South Africa.

In 2010, Marean published a paper for the general public on these results and the general scientific research conducted at Pinnacle Point. The article was featured on the cover of *Scientific American* magazine (Marean, 2010b). Also, in 2010, the SACP4 team published a special issue devoted to PP13B in the *Journal of Human Evolution* (Marean 2010c). In 2011, the NSF awarded Marean another grant, totalling US$1 m, to continue and to expand the research programme. In 2012, research at Pinnacle Point was featured on the cover of *Nature* (Brown et al., 2012) reporting on the world's earliest microlithic stone tools. In 2015, Marean published another paper for the general public featuring the Pinnacle Point research in *Scientific American*, and this one was also given the front cover. Later, in March 2018, the team announced, also in *Nature*, the discovery of microscopic shards of volcanic ash from the Indonesian Toba super-volcanic eruption 74 000 years ago (Smith et al., 2018). It has been argued that this massive eruption caused a long volcanic winter that nearly drove humans extinct. The Pinnacle Point team showed that people on the southern coast of South Africa actually thrived through this event (Smith et al., 2018). In 2020, the SACP4 team published a special issue in the journal *Quaternary Science Reviews* (Cleghorn et al. 2020) on their work reconstructing the now submerged plain to the south of the sites, and its significance to the Stone Age people. The SACP4 team is currently on an excavation hiatus due to Covid-19 and are preparing a new series of analyses and publications. There is currently no active excavation permit for the site.

Despite a great deal of research effort, there are still some temporal gaps in the coastal South African sequence, namely between about 200 000 and 165 000 years ago, and between about 145 000 and 130 000 years. Marean expects that both time periods hold some very important information, and, notably, that the time around 200 000 years may provide researchers with even earlier evidence for coastal adaptations than the date of about165 000 at PP13B. Marean's team has test excavated two sites at Pinnacle Point that may fill these gaps. These include PP13A (test excavated in 2000), and PP5-6S (test excavated over several years under the PP5-6 excavation permit). The anticipated research schedule is:

- 2023–2027: Excavations at PP5-6S and possibly PP5-6N if the research team determines that a larger sample is needed from selected parts of the sequence.
- 2027–2031: Excavations at PP13A.

Funding is available until 2025 to initiate excavations at PP5-6S. These excavations will be a dual project of the Institute of Human Origins at Arizona State University and the African Centre for Coastal Palaeoscience at Nelson Mandela University, where Marean is the International Deputy Director. The project aims to reconstruct the palaeolandscape through interdisciplinary research, and to stimulate and facilitate national and international collaborative research on evolution in the region. Pinnacle Point Site Complex is one of the primary sites that contributes to this research. While the Palaeoscape specialist team is focused on the overall reconstruction of the regional palaeolandscape, many of these researchers work directly on research material from the Pinnacle Point Site Complex itself. In May 2020, a special issue of *Quaternary Science Reviews* was devoted to the Palaeo-Agulhas Plain (Botha et al., 2020; Braun et al., 2020; Cawthra et al., 2020a, b, c; Cleghorn et al., 2020; Cowling et al., 2020; De Vynck et al., 2020; Esteban et al., 2020; Faltein et al., 2020; Grobler et al., 2020; Helm et al., 2020; Hodgkins et al., 2020, Jacobs et al., 2020; Kraaij et al., 2020; Marean et al., 2020; Matthews et al., 2020; Sealy et al., 2020; Venter et al., 2020; Williams et al., 2020; Wren et al., 2020). This body of information is exceptional in identifying the palaeoenvironmental changes on this now submerged area over the course of the occupation periods of Pinnacle Point Site Complex. These studies assist with the reconstruction of the changes in fauna and vegetation, which in turned influenced the subsistence choices of *Homo sapiens* and altered their diet and hunting capacity, possibly also affecting their technological adaptations.

The archaeological assemblage from Pinnacle Point Site Complex is permanently curated at the Iziko South African Museum in Cape Town. The material is, however, stored temporarily at the end of each excavation season in the Bartolomeu Dias Museum in Mossel Bay, where a specific building of the museum complex has been

allocated to a laboratory for conducting many of the analyses of Pinnacle Point material. Once these studies are completed, the material is transported to the Iziko South African Museum for safe permanent storage.

Sibhudu Cave

Sibhudu Cave is mentioned in the site records of the Natal Museum (now the KwaZulu-Natal Museum) dating from 1929. It was first excavated by Aron Mazel in 1983. Mazel was employed by the Natal Museum at the time of the first excavation and was interested in the identification of an LSA site. He excavated one square metre in the shelter and then abandoned the site, because the entire Stone Age component of the site appeared to be MSA.

Prof. Lyn Wadley of the University of the Witwatersrand began excavations at the site in 1998, after which two excavation seasons per year were conducted until 2011 under her supervision for an excavation of a total of 21 m^2 (Figure 33).

In 2011, Prof. Nicholas Conard of the University of Tübingen, Germany, took over the directorship of the site excavation, with Wadley beings still involved in the excavations of the first year. Conard's team has been excavating the site since then on a yearly basis and funding is available to continue the excavation in the foreseeable future. The current excavation by Conard has so far covered a total of 10 m^2.

Wadley's excavation was conducted in 50 x 50 cm quadrants following natural stratigraphy; if layers exceeded five centimetres in depth, they were divided into artificial spits (Wadley and Jacobs, 2006). All sediments were sieved through nested 2 mm and 1 mm screens.

When Conard started his excavation in 2011, a new excavation system, developed by the University of Tübingen, was applied. This new method involves the excavation of the site into distinctive excavation units. In each quarter of the 1 m^2 units, the excavation is conducted in 10–30 mm thick distinctive excavation units, which follow the natural slope of the stratigraphic unit. Each archaeological unit is composed of more than one distinctive excavation unit (Schmid et al., 2019). All single finds over 30 mm are piece-plotted with a Leica total station and the EDM programme (Dibble and McPherron, 1996). Every bucket of sediment is then dry sieved with superimposed screens of 5 mm and 1 mm mesh, which allows researchers to record the provenience of the finds from the screens within a sub-square metre and the thickness of the excavation unit from which it originates (Schmid et al., 2019).

All excavated material from the Sibhudu Cave is kept for permanent storage at KwaZulu-Natal Museum in Pietermaritzburg, in close collaboration with the chief

archaeological curator Dr Gavin Whitelaw. During excavations, newly recovered materials are temporarily stored at a private 'dig house' in Ballito, where the researchers and students process and analyse the finds. At the end of each field season, all material is returned to the permanent storage at the KwaZulu-Natal Museum.

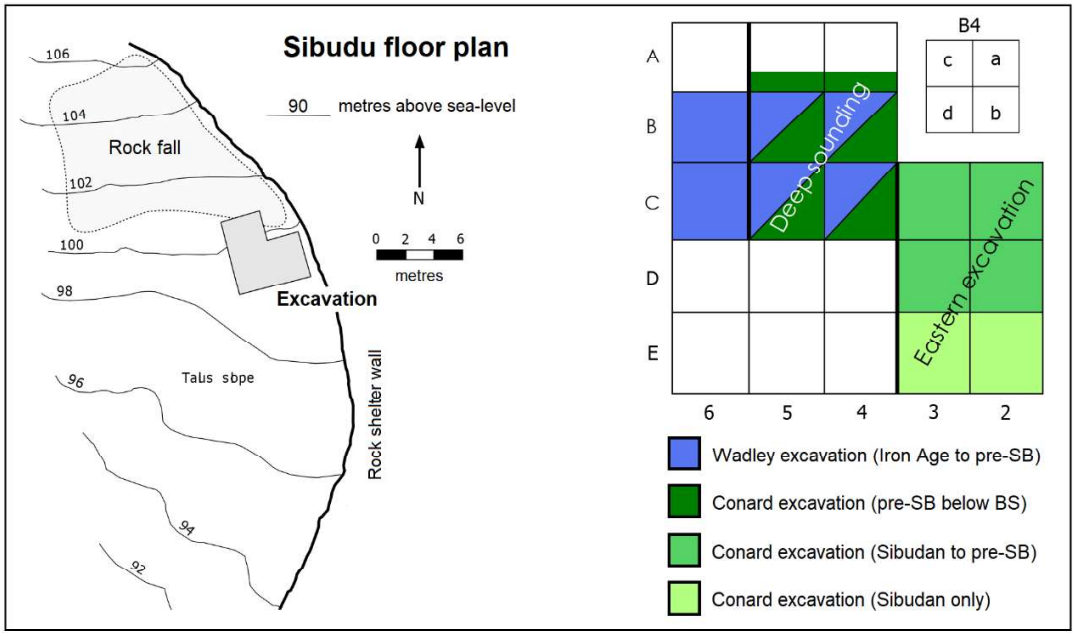


Figure 33. Excavation overview graphic of Sibhudu Cave.

Palaeoenvironmental change

Extensive palaeoenvironmental studies have been completed on all the sites included in this nomination. Studies on the macro- and micromammal assemblages, shellfish, tooth enamel, sediments, seeds, phytoliths, charcoal, fossil tracksites, and flowstones, stromatolites and other carbonates, coupled with very accurate dating, have provided the opportunity to extensively develop an understanding of the palaeoenvironment in the different phases of the site occupations at all three sites. It is argued (Mellars, 2006; Henshilwood, 2008; Bar-Matthews et al., 2010; Mackay, 2011; Potts and Faith, 2015; Brooks et al., 2018) that changes in these environments influenced the cognitive development of modern humans.

Diepkloof Rock Shelter

Faunal and floral remains excavated from Diepkloof Rock Shelter suggest that, although the site was occupied during times when climatic conditions were cooler than those at present, the overall environment around Diepkloof between 100 000 and 40 000 years ago changed (Porraz et al., 2013b). The site was strategically selected by its inhabitants for its elevated position at the interface of distinct ecological niches, with

access to a mosaic of vegetation communities (Cartwright, 2013). This places Diepkloof Rock Shelter in a different environmental niche to those of Pinnacle Point, which were more obviously affected by changes in sea level during times of colder temperatures worldwide between about 100 000 and 11 000 years ago.

During much of the MSA, when sea levels were often lower, Diepkloof Rock Shelter would have been slightly more distant from the coast than it is today. Seal bones (associated with the Howiesons Poort complex) found in the Diepkloof layers, would have been carried there from the coastline, which would have been 18 km or more to the west (Steele and Klein, 2013). In addition, the Diepkloof faunal remains suggest that the Late Pleistocene environment was significantly grassier, due to higher or more effective precipitation in the region. The woody plants identified from MSA charcoals at Diepkloof (Cartwright, 2013) and the terminal Pleistocene charcoals at nearby Elands Bay Cave (Cowling et al., 1999) confirm this. The absence of deposits that date to between about 40 000 and 11 000 years ago indicates that the shelter was not occupied when the sea level dropped during the Last Glacial Maximum and the coastline moved about 20 to 30 km westwards.

Pinnacle Point Site Complex

Pinnacle Point Site Complex (PPSC) preserves a rich record of the palaeoclimate and palaeoenvironment in the form of speleothems (Bar-Matthews et al., 2010; Braun et al., 2019, 2020), raised beaches and fossil dunes (Roberts et al., 2012), and faunal remains and palaeontological assemblages (Rector and Reed, 2010; Thompson, 2010; Matthews et al., 2009, 2011, 2020). All are spread continuously across the area, and together provide a globally unparalleled record of human, climate, and environmental coevolution.

Two glacial cycles occurring over the last 200 000 years would have resulted in the global sea level dropping by as much as 130 m. This meant that at those times the Pinnacle Point sites would have been further away from the present-day coastline position. Fisher's palaeoscape model shows that the coastline was as far away as 90 km during glacial maxima (Fisher et al., 2010), and that there was a continuous flat, featureless plain to the south of the current neo-coastline that was typically several kilometres wide (Compton, 2011; Fisher et al., 2010; Cawthra et al., 2020).

The majority of the cave and rock shelter sites at the PPSC are 10 m or more above sea level, at an elevation which preserved deposits dating to prior to 130 000 years ago, when sea levels were higher than they are today. The elevation of some of the sites meant that at times of high sea level the archaeological assemblages possibly present in them were washed out, while caves situated at higher elevations were not affected.

A drop in sea level resulted in the exposure of beach sands, causing the development of dunes that often filled the entrances to some of the caves, thereby limiting access to the caves during glacial periods. These factors have resulted in each of the sites having a different archaeological history. Additionally, the rise and fall of the sea level and the resulting fluctuations in distance from the coastline of the archaeological sites dictated the type of environment around the sites.

Marean and colleagues (Marean et al*.,* 2007) have shown that by 162 000 years ago (the glacial period during which a short sea level rise brought the coastline within 5 to 10 km south of its present position), Pinnacle Point humans had expanded their diet to include marine resources, perhaps as a response to these challenging environmental conditions. The earliest previous evidence for human use of marine resources and coastal habitats had been dated to 125 000 years ago (Walter et al*.,* 2000; Erlandson, 2001).

Extensive work on the Palaeo-Agulhas Bank carried out by many scientists, including those based at the African Centre for Coastal Palaeoscience at Nelson Mandela University in South Africa, has allowed for a detailed understanding of the type of environment along the southern Cape coast at the different times of occupation. These studies, published in 21 papers in a special issue of the journal *Quaternary Science Reviews,* revealed that the now submerged coastal plain was a rich mosaic of grassland and woodland, criss-crossed by rivers and streams, with large numbers of both extinct and extant large mammals (see reviews in Cleghorn et al., 2020 and Marean et al., 2020)

The southern coast may have followed a somewhat different rainfall regime than the interior, as indicated by the results from an analysis of a Pinnacle Point speleothem (Braun et al., 2020). The speleothem record from Crevice Cave provided a proxy record of the changing influence of winter and summer rainfall systems originating from the west and east, respectively (Bar-Matthews et al*.*, 2010; Braun et al. 2019, 2020). It indicates that during the cooler periods, as the sea level dropped, the PPSC and the surrounding south coast received more summer rainfall. Marean (2010a) suggests that the Cape flora grasses and evergreen hard-leafed shrubs may have followed the coastline out onto the Palaeo-Agulhas Bank. More recent studies (Braun et al., 2020; Cawthra et al., 2020a, b and c; Cowling et al., 2020; Marean et al., 2020; Matthews et al., 2020; Oestmo et al., 2020; Rishworth et al., 2020; Sealy et al., 2020; Venter et al., 2020; Williams et al., 2020; Wren et al., 2020;) on the now mostly submerged Agulhas Bank detail what type of environment could be expected at the different occupation times, and how the movement of the coastline changed the subsistence strategy of the inhabitants of the PPSC over the course of its occupation.

Sibhudu Cave

A wide range of palaeoenvironmental studies have been carried out at Sibhudu Cave, including studies on archaeomagnetism, charcoal, phytoliths, seeds, avian fauna and macrofauna (Allott, 2004, 2005, 2006; Plug, 2004; Wadley, 2004; Herries, 2006; Reynolds, 2006; Sievers, 2006; Clark and Plug, 2008; Bruch et al., 2012; Clark, 2013, 2017, 2019; Val, 2016; Murungi, 2017; Robinson and Wadley, 2018; Lennox and Wadley, 2019; Zwane and Bamford, 2020). The excellent preservation of seeds, charcoal, bones, teeth and other organic material has enabled an exceptionally detailed environmental reconstruction from 100 000 years ago to the latest MSA levels of occupation (Figure 34). This exceptional organic preservation is attributed to the slightly acidic soils at Sibhudu Cave, which are conducive to organic preservation (Williamson, 2004).

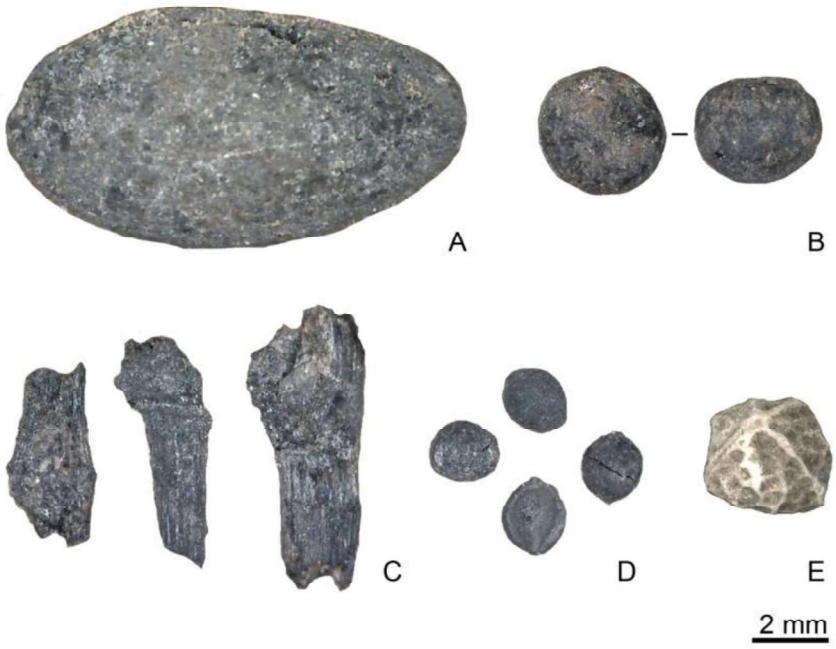


Figure 34. Various carbonized plant remains from Sibhudu Cave.

Palaeoenvironmental reconstruction indicates a mosaic of habitats during all occupation layers of Sibhudu Cave (Clark and Plug, 2008; Jacobs et al., 2008a). From the pre-Still Bay to the post-HP (Sibudan) period, the environment was characterised by a more closed, likely evergreen, wet habitat characteristic of a closed, moist, forested area (Robinson and Wadley, 2018).

Amongst the charcoal and floral remains recovered in the pre-Still Bay to post-HP layers are the *Podocarpus spp.* (Yellowwood), together with Proteaceae, Asteraceae, and Rubiaceae/Aponynaceae (Lennox and Wadley, 2019; Clark and Plug, 2008; Allott, 2006; Wadley, 2004), the presence of which suggests a woodland environment.

Studies of seeds and charcoal also show that during the Howiesons Poort, winters were slightly colder and drier than they are at present, whereas summer conditions were rather like those of today. In all three periods, the macromammal faunal assemblage was 90% dominated by species that prefer a forested environment, such as the blue duiker (*Philantomba monticola*) and the bushpig (*Potamochoerus larvatus*) (Clark, 2019), along with primates commonly found in evergreen forests, such as the vervet monkey (*Chlorocebus pygerythrus*) and the Sykes' monkey (*Cercopithecus albogularis*). In the pre-Still Bay and Still Bay period, analysis of the macromammals also includes a few open-dwelling species, such as warthog (*Phacochoerus africanus*), African buffalo (*Syncerus caffer*) and equids, which indicates the possibility that these species most likely dwelled around the uThongathi River (Clark, 2019).

In the post-HP (Sibudan) period there was a gradual shift towards larger plains game and grazers, such as zebra, blue wildebeest and hartebeest, whose habitat is characterised by open conditions, including open savannah and grassland. Conditions were colder during winter and drier during summer than during the Howiesons Poort (de la Peña and Wadley 2017; Robinson and Wadley, 2018). With these drier conditions, the environment gradually started to become more open, producing a savannah-like environment in the late post-HP, and grassland with more deciduous species in the later MSA. In the late MSA sequence at Sibhudu, riverine taxa were omnipresent, however charcoal studies show more bushveld and evergreen deciduous taxa, indicating drier conditions, warm bushveld and even more open savannah than during the previous time period (Allott, 2006). The late MSA was warmer in winter, with increased summer precipitation, and slightly more closed vegetation (Bruch et al., 2012).

JUSTIFICATION FOR INSCRIPTION

3. JUSTIFICATION FOR INSCRIPTION

3.1.a Brief synthesis

All living humans belong to a single species — *Homo sapiens*. Modern humans are unique among all living animals in having a complex culture that acts as our primary adaptation to the world and its challenges. That culture is made possible by several key features possessed by all modern humans, namely complex cognition, a proclivity to cooperate at large scales with kin and non-kin, and a unique form of social learning through careful observation and high-fidelity copying behaviour. Scientists often refer to these three features collectively as 'modern human behaviour', to set them apart from the behavioural repertoire of other animals. Scientific research on the origin of anatomically modern humans and the modernity of their behaviour is crucial to understanding the evolutionary history of all living modern humans. It has been proposed that there are four key characteristics for modern human behaviour that reflect the above-mentioned three evolved features. These include:

i) symbolic behaviour,
ii) abstract thinking,
iii) behavioural, social, economic and technological innovations, and
iv) the ability to cooperatively plan and strategize (Wadley, 2015).

Some of this is archaeologically recognisable in transformative technologies such as heat treatment of rocks and ochre; the manufacture of compound adhesives and paints; engraving symbols on ochre and stone, the making and use of advanced projectiles weapons, and in the procurement of challenging subsistence items (large mammals and mastering the characteristics of the ocean to exploit sea animals). These are all attributes present in each component of this nomination.

When searching for evidence of symbolic behaviour in the MSA, three lines of evidence are considered (Wadley, 2015; Marean, 2015). These are:

i) direct evidence, reflecting concrete examples of symbols, such as the production of geometric or iconographic patterns;
ii) indirect evidence, reflecting behaviours that would have been used to convey symbolic thought; and
iii) technological evidence, reflecting the tools and skills that would have been used to produce art.

Scientific research on the origin of anatomically modern humans and on the timing and nature of what behavioural characteristics make us 'modern', is centred on

archaeological sites that have provided outstanding evidence for modern behaviour, as those presented here. In South Africa, Blombos Cave, Diepkloof Rock Shelter and the Pinnacle Point Site Complex in the Western Cape, together with Klasies River in the Eastern Cape, and Border Cave and Sibhudu Cave in KwaZulu-Natal, provide excellent scientific evidence for the first appearance of a suite of evidence of modern human behaviour dating back over 162 000 years ago. The sites thus far present the best-preserved record of the behaviour of the earliest modern humans worldwide. They preserve dense records of human behaviour, contain outstanding early evidence for advanced behaviour and culture, and have been the subject of studies by local and international scientists using advanced scientific methods. The sites offer powerful testimony to the development of distinctly modern human behaviour in the MSA at the southern tip of Africa between 162 000 and 30 000 years ago.

Three sites, namely Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave, have been identified as the first components of this serial nomination to the World Heritage List. Collectively, they have preserved long and outstanding sequences of habitation remains with artefacts such as flaked stone and polished bone tools, early evidence for preparation of stone by heating to improve its flaking qualities for sophisticated toolmaking, engraved patterns on ochre, shell beads and decorated ostrich eggshell, evidence of consistent use of hearths, making of paint from pigments such as ochre, and mastering the rhythms of the sea to exploit its food sources. The findings have demonstrated significant social, behavioural and technical innovations of people occupying the caves during the MSA, and as such cover all four characteristics of modern human behaviour as described by Wadley (2015).

At Diepkloof Rock Shelter, there is evidence of patterns engraved on ostrich eggshell (the earliest evidence of possession) and the processing of pigment. Diepkloof Rock Shelter and Pinnacle Point Site Complex have further evidence of technological know-how that enabled MSA people to improve the flaking qualities of silcrete by deliberately heating it at a high temperature in a controlled manner, which requires complex cognition and the ability to plan. Additionally, from at least 162 000 years ago at Pinnacle Point Site PP13B people were collecting shellfish and bringing it back to the cave, showing the first evidence of the systematic use of shellfish and the cognitive ability to plan trips to the ocean during the correct tide.

Another modern trait and a unique evidence of people's self-awareness is the evidence of personal adornment that has been found in the form of shell beads at Sibhudu Cave. The palaeoenvironmental record at all three sites is also outstandingly preserved, thanks to the geological settings. Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave have well-substantiated evidence for changes in

palaeoclimate and palaeoenvironment reflected in the faunal remains of animals that were hunted and traces of plants that have been preserved in the deposits. Exceptional organic preservation is recorded also at Sibhudu Cave, where some of the earliest evidence for sedge and plant bedding at 77 000 years ago could be recorded thanks to the exceptional organic preservation in a dry environment

As a group, these sites and the evidence they contain are vital to our understanding of the origin of modern humans, the transitions of climate that they survived, and their modern cognitive abilities and origin of culture. Moreover, considering that southern Africa may be the area of origin of all humanity based on current knowledge, the sites contribute towards the understanding of the broader process of evolution from hominids to behaviourally modern humans.

Current sites on the World Heritage List cover the development of modern human anatomy during the Early and Middle Stone Age, but none cover the emergence of modern human behaviour at these early stages of the Middle Stone Age. As such, the sites fill a significant gap in the World Heritage and Tentative Lists as identified by the HEADS review and published by the World Heritage Centre (Sanz and Keenan, 2011). More specifically, the following two narratives within HEADS are relevant to this nomination:

2. *Fossil traces of cognitive steps: cognitive changes and human biological and cultural evolution*

    a) The manufacture of artefacts.
    b) Conceptual ability and transmission, including symbolic behaviour (the use of *ochre, art, personal ornaments and burial)*.

3. *Fossil traces of technological and subsistence innovation — economic and cultural adaptation to changing environments*

    a) Fire control, behavioural changes from scavenging to animal domestication by means of hunting and collecting marine resources, and plant/animal preservation in the environment.
    b) The technological progress of artefacts from simple flakes to pottery by means of prepared cores and composite tools.
    c) Habitat patterns, e.g. shelter construction.

3.1.b Criteria under which inscription is proposed and justification for inscription under these criteria

The 'Emergence of Modern Humans' nomination comprises a series of sites proposed for inscription on the basis that together they form an outstanding example that illustrates first in the archaeological record a full set of evidence for the emergence of modern human behaviour and culture during the MSA. The sites are proposed for inscription under the following criteria:

Criterion (iii): Bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.

The latest literature (Rito et al., 2019; Scerri et al., 2018; Soares et al., 2016; Stringer, 2016; Gunz et al., 2009) in the field agrees that modern humans evolved in Africa and spread from there throughout the world around 70 000 years ago. The nominated sites provide unique and rich information on the cultural tradition of the Middle and Late Pleistocene, when anatomically modern humans became behaviourally modern.

The archaeological layers of the Emergence of Modern Humans sites in the proposed World Heritage Nomination provide exceptional evidence and insight into the behavioural and palaeoenvironmental remains of the MSA cultural tradition. These sites contain early evidence of symbolic thought and advanced technologies in the form of:

- extensive ochre processing
- engraved patterns on ochre
- estuarine shellfish beads used for body decoration
- decorated ostrich eggshell
- evidence of lithic technological advancement in the Howiesons Poort and Still Bay industries, and the use of pyrotechnology and development of microliths
- advanced projectiles such as spear throwers and bows and arrows
- compound adhesives
- sedge and grass bedding
- earliest use of medicinal plants
- collection of sea shells
- mastering the tides to exploit coastal resources.

From this evidence, we have gained insight into the origins of art, technological innovation, language, and belief systems, which developed during the MSA in South Africa. The archaeological evidence was produced, used, and ultimately deposited at these sites, and as such, the landscape, the caves and the finds are an ensemble

representing an exceptional example of an early cultural tradition of modern humans and an extinct culture.

Criterion (iv): Be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.

These sites preserve exceptionally well-stratified archaeological sequences dating from 162 000 to 38 000 years ago. These sequences represent a range of evidence of a technological ensemble that exhibits important developments during the significant stage of human history when anatomically modern humans started developing modern human behaviour during the MSA in southern Africa.

This evidence is found in the technological assemblage, which records the first evidence of:

- the deliberate heat treatment of stone for toolmaking
- prepared-core stone blades and backed tools
- microlithic technology
- polished bone points that are similar to those used in later times for arrows
- advanced projectiles such as spear throwers and bows and arrows
- engraved bone tools, and
- some of the earliest recorded evidence of 'art' in the form of incised patterns on both ochre and ostrich eggshell

All the above technological evidence is indicative of complex cognition, and therefore collectively illustrate a significant stage in human history when anatomically modern humans started developing more complex cognitive abilities which characterised them as behaviourally modern.

More specifically, at Diepkloof Rock Shelter an engraved bone tool dated to 109 000 years ago and over 400 engraved ostrich eggshells, which were used as functional items (containers/water flasks) and dated also as early as 109 000 years ago illustrate the ability of our ancestors to think abstractly and to conceptualise patterns and forms. These patterns on ostrich eggshell were most likely used to indicate possession. In addition, the early appearance (74 000 to 100 000 years ago) of composite tools using bone points and microlithic tools provides evidence for abstract thinking, technological innovation, and the ability to plan and strategize.

At Pinnacle Point, PP13B contains the world's earliest evidence for systematic coastal exploitation (shellfish), the earliest radiometrically dated modified pigment (ground red ochre), and some of the earliest evidence for complex bladelet technology and

heat treatment of silcrete. PP5-6, currently under excavation, has one of the thickest continuous stacks of MSA sediments in South Africa (> 15 metres), currently dated between 90 000 and 50 000 years ago, and documents the earliest evidence for microlithic technology and the furthest travelled evidence of the super-volcanic eruption of Mount Toba.

Sibhudu Cave holds some of the earliest evidence in the archaeological record for the use of bone tools and implements. These, along with compound adhesives, were used in bow-and-arrow technology, which displays the complex cognition of our ancestors to multi-task and think abstractly. The outstanding lithic assemblage of Sibhudu Cave, unique also amongst the sites represented in this nomination, meticulously illustrates the technological achievements of the MSA at the point of evolution of modern human behaviour. Evidence for the earliest exploitation of birds implies the use by our ancestors of new and innovative acquisition techniques, such as the use of blunt-tipped projectiles or bows and arrows, bolas, nets and snares. This is the first time we see this used by *Homo sapiens.*

Additionally, the presence of shell beads for personal ornament illustrates the development of symbolic behaviour.

For hundreds of thousands of years, caves and rock shelters were abodes for humans. These sites are superb examples of such early homes that were repeatedly occupied over the millennia and thus built up extraordinary, world-renowned and well-dated sedimentary records of ancient human life. The significant and consistent amount of evidence pre-dates other sites on the continent.

Criterion (v): Be an outstanding example of a traditional human settlement, land-use or sea-use which is representative of a culture, or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change

The majority of people on the planet today live near coastlines. Despite humans being terrestrial mammals, we have in many instances become dependent on the sea and its resources.

Pinnacle Point Site Complex provides some of the earliest and best-preserved evidence in the world for the consistent exploitation of coastal resources during the Middle and Late Pleistocene (Marean et al., 2007). Scientists suggest that an increased consumption of long-chain omega-3 fatty acids (specifically DHA), found in aquatic and coastal food resources, ensured the healthy development of our brains and the early expansion of anatomically modern humans' advanced cognitive abilities, which contributed to our ancestors' behavioural and technological progress during the MSA (Broadhurst et al., 2002; Kyriacou et al., 2016).

As current sea levels rise due to climate change, much of the ancient record of human coastal resource use has been obliterated or is in grave danger. Yet, Cave 13B at Pinnacle Point Site Complex, which contains exceptionally well-preserved evidence from the Middle to Late Pleistocene, is located 13m above sea level, as such, its archaeological record has survived the rising sea levels following its occupation up to 90 000 years ago. The remains of 11 different mollusc species are represented, and show that the cave inhabitants were harvesting shellfish and carrying some of it back to the cave, some as sea shells. The oldest deposits at 162 000 years ago are the earliest evidence in the world of the systematic collection of shellfish and the use of marine resources as a food source.

PPSC preserves a rich record of the palaeoclimate and palaeoenvironment in the form of speleothems, raised beaches, fossil dunes, a fossil hyena assemblage and palaeontological assemblages. All are spread continuously across the area and together provide a globally unparalleled record of human, climate, and environmental coevolution. There are many unexcavated caves and rock shelters at PPSC that will provide scientists a rich record of scientific knowledge of human evolution for generations to come.

The meticulous palaeoenvironmental reconstruction which was made possible at Sibhudu Cave by the outstanding organic preservation of the archaeological record allowed scientists to identify significant changes within the environment and the adaptation of humans to a changing environment. People living at Sibhudu had already identified 77 000 years ago that they could exploit plants and leaves for their insecticidal and larvicidal properties.

Additionally, all three sites are pivotal in the preservation of outstanding evidence for palaeoclimates and palaeoenvironments. This is specifically recorded in the form of speleothems (e.g., stalagmites and stalactites) at Pinnacle Point, in faunal, floral, and geological remains, including from the cores of the now submerged Palaeo-Agulhas Bank. At Sibhudu Cave the overall dry conditions at the site favoured the exceptional preservation of organic material.

Thanks to this outstanding body of evidence, scientists have been able to reconstruct in great detail the palaeoenvironment and the unique human interaction with and adaptation to it.

Table 9. Significance of each site per criterion.

	Criterion iii	**Criterion iv**	**Criterion v**
Diepkloof Rock Shelter	The tangible heritage of the modern human population that lived in the Diepkloof Rock Shelters and surrounding landscape is expressed in the artefacts. The exceptionally well-preserved and long sequence, dating from within the past 1 000 years to beyond 100 000 years, provides the opportunity to study assemblage and behavioural changes through a crucial period of human evolutionary history.	An engraved bone tool dated to 109 000 years ago and over 400 engraved ostrich eggshells, which were used as functional items (containers/water flasks) and dated as early as 109 000 years ago illustrate the ability of our ancestors to think abstractly and to conceptualise patterns and forms. These patterns on ostrich eggshell were most likely used to indicate possession. In addition, the early appearance (74 000 to 100 000 years ago) of stone-tool industries provides evidence for abstract thinking, technological innovation and the ability to plan and strategize.	Faunal evidence suggests that the MSA hominins occupying Diepkloof based their hunting strategies around certain resources that were available at the coast, reflecting the earliest systematic exploitation of marine foods.
Pinnacle Point Site Complex	Starting from 162 000 years ago, PPSC preserves a unique	PP13B contains the world's earliest evidence for	The remains of 11 different mollusc species are

	Criterion iii	**Criterion iv**	**Criterion v**
	sequence of human occupation during the MSA, embedded in a rich record of climate and environmental change.	systematic coastal exploitation (shellfish), the earliest radiometrically dated modified pigment (ground red ochre), and some of the earliest evidence for complex bladelet technology and heat treatment of silcrete. PP5-6, currently under excavation, has one of the thickest continuous stacks of MSA sediments in South Africa (> 15 metres), currently dated between 90 000 and 50 000 years ago.	represented, and show that the cave inhabitants were harvesting shellfish and carrying some of it back to the cave. This is among the earliest evidence in the world of the systematic collection of shellfish and the use of marine resources as a food source. PPSC preserves a rich record of the palaeoclimate and palaeoenvironment in the form of speleothems, raised beaches, fossil dunes, a fossil hyena assemblage and palaeontological assemblages. All are spread continuously across the area and together provide a globally unparalleled record of human, climate, and environmental coevolution.
Sibhudu Cave	The site preserves a very detailed record	Sibhudu Cave holds some of the earliest	The meticulous palaeoenvironmental

	Criterion iii	**Criterion iv**	**Criterion v**
	of MSA occupation from ca. 120 000 to 38 000 years ago. The research conducted on site is pivotal for the understanding of the development of the behaviour of modern humans in sub-Saharan Africa. As such, it bears exceptional testimony to a cultural tradition and a critical stage in human evolution that has disappeared.	evidence in the archaeological record for the use of bone tools and implements. These, along with compound adhesives, were used in bow-and-arrow technology, which displays the complex cognition of our ancestors to multi-task and think abstractly. The outstanding lithic assemblage of Sibhudu Cave, unique also amongst the sites represented in this nomination, meticulously illustrates the technological achievements of the MSA at the point of evolution of modern human behaviour. Evidence for the earliest exploitation of birds implies the use by our ancestors of new and innovative acquisition techniques, such as the use of blunt-tipped projectiles or	reconstruction which was made possible at Sibhudu Cave by the outstanding organic preservation of the archaeological record allowed scientists to identify significant changes within the environment and the adaptation of humans to a changing environment. People living at Sibhudu had already identified 77 000 years ago that they could exploit plants and leaves for their insecticidal and larvicidal properties.

	Criterion iii	**Criterion iv**	**Criterion v**
		bows and arrows, bolas, nets and snares. This is the first time we see this recorded in *Homo sapiens.* The presence of shell beads for personal ornament illustrates the development of symbolic behaviour.	

3.1.c Statement of integrity

The current serial nomination of Pinnacle Point Site Complex, Diepkloof Rock Shelter and Sibhudu Cave represents three sites, each containing long sequences of human occupation over tens of thousands of years, with evidence dated to the period of the emergence of modern humans to between about 162 000 and 38 000 years ago.

As a result of its relatively remote location and because of its location on private property where there were no development pressures, Diepkloof Shelter has remained remarkably intact throughout the years.

Pinnacle Point Site Complex's location within a real estate development site, and the cooperation of the scientists and landowners, prevented further development that could have spilled over to the shoreline itself.

Sibhudu Cave is currently located in an area used for the cultivation of sugar cane, and possible development in the area is being discussed with the current municipality.

All three sites have been formally declared protected areas under the National Heritage Resources Act, no 25 of 1999. The protected area for each site includes all the occupation deposits inside the caves and in the immediate vicinity.

Each of the sites has a fully adequate Buffer zone. Archaeological excavations have been conducted following the highest international standards and methods available. All finds have been carefully curated and catalogued, and numerous highly significant papers that interpret this material have been published in international peer-reviewed journals. Existing and ongoing research, and subsequent finds and features, have

continued to demonstrate the reliability and quality of the information produced by these sites.

Additionally, the designated property defined in this serial nomination conserves the sense of place and experience of these sites within the landscape and it is of adequate size to ensure the complete protection and representation of features highlighting the property's significance. Extensive survey, research and analysis have been carried out at the three sites over the course of decades. The boundaries of each component were defined based on the outcome of this research to ensure the integrity of each site and to include all significant sites and elements.

At Pinnacle Point Site Complex all significant sites are included below the cliff, with the exception of the hyena den, or site PP30, located about a 600 m inland from the coastline. This site is however included within the Property, along with all other significant Middle to Late Pleistocene sites related to this nomination narrative.

The visual integrity of Pinnacle Point Site Complex has been assessed by a visual impact assessment (see Annexure 4), and while it cannot be denied that the development of the Golf Estate has partially impacted on the visual integrity of the site, with the implementation of the recommended mitigation measures, the impact of the Estate on the sense of place is expected to be minor.

At Pinnacle Point Site Complex, excavation and survey work are ongoing. Arguably the most comprehensive and up-to-date study of the palaeoenvironment and the variable coastline exposed during previous glacial maxima has been conducted here, along with extensive studies on the Palaeo-Agulhas Bank. The golf course and housing estate keep strict control over access. Since archaeological publications on these sites reached a worldwide audience, the owners (the Home Owners' Association) have been actively involved in ensuring that no negative developments affecting the scientific significance of these sites take place. The local component of the Pinnacle Point scientific team regularly survey all the sites to check on their status.

Several of the cave and rock shelter sites at Pinnacle Point Site Complex are more than 10 m above sea level, which has preserved deposits older than 125 000 years, when sea levels were higher than they are today.

The building of the golf course and houses compromised the integrity of a few LSA open-air shell middens and other smaller artefact scatters, but although they were of general interest, they were not of outstanding universal value. These problems have since been resolved and the ongoing monitoring programme should prevent any recurrence of development near the shell middens.

At Diepkloof Rock Shelter, uninterrupted views of the Verlorenvlei enhance visitors' ability to feel and imagine a time when our ancestors stood and lived in those very places.

Farming activities have not encroached on the site or on the visual interface of the shelter with the Verlorenvlei that it overlooks. The shelter is very large and only a small portion of it (25%) has been excavated, which makes it an exciting site to work on in the future, given the abundance of significant finds that have been made thus far. Diepkloof Rock Shelter therefore offers great potential for further scientific work in and around the cave to understand the context and sources of organic and inorganic remains.

The unexcavated deposits that still contain further evidence at Diepkloof Rock Shelter are in good condition. The site is relatively inaccessible, and the deposit is well sheltered by a deep rock overhang that has contributed to the retention of the site's integrity over a protracted period of time. The excavated areas have been backfilled in a manner that prevents degradation of the remaining deposit. However, the site currently requires more maintenance to permanently close it, since there are no plans for further excavation.

Sibhudu Cave is located about 10 km from the Indian Ocean, at an elevation of 100 m above sea level and 7–8 m above the uThongathi River, in a semi-rural environment. For the past 150 years it has been surrounded by sugar cane plantations and remnants of a forest. This setting has not impacted on the deposit itself.

Although the site does not have any fencing, the river on the southern side of the site acts as a natural barrier. The Dasa family, who live on the other side of the uThongathi River at about 200 m from the site, has been monitoring the safety of the site for the past 30 years by ensuring that there are no unwanted visitors.

The 620 ha Wewe Driefontein mixed-zone development, which is going to include a shopping centre, 4 000 low-cost houses, and schools, was first proposed in 2011. The proposed boundary of this development was 400 m from Sibhudu Cave. After an agreement was reached with the provincial heritage authority (KwaZulu-Natal Amafa and Research Institute) and the Sibudu Trust, the planned development was amended to ensure that a Buffer zone is set between Sibhudu Cave and the development, and that measures will be in place to minimise the risks of increased access to the site.

The excavations and palaeoenvironmental studies of the sites have all been invaluable contributions to the increasing body of knowledge concerning the emergence of modern human behaviour. Many more scientific discoveries will undoubtedly be made from these sites as new material is analysed or new methods and questions are applied

to previously excavated finds. These sites have particularly well-organised and well-curated collections, and, relatively speaking, the science of understanding modern human behaviour is still in its infancy. Numerous palaeoenvironmental studies undertaken at and around these sites have laid the groundwork for past climatic reconstructions that are crucial to understanding the evolution of our species and the threats confronting modern society. There are also large as yet unpublished collections which are currently being analysed by researchers.

3.1.d Statement of authenticity

The MSA cultural tradition saw innovations through a significant stage in human history, as modern behaviour evolved and *Homo sapiens* adapted to major landscape shifts when global climate change caused sea levels to rise and fall, covering and then exposing the offshore continental shelf (the Palaeo-Agulhas Bank) at the southern tip of Africa. The three proposed sites are archaeological sites of the MSA. The evidence that contributes to the OUV of Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave has been shown to be authentic in the many important and diverse scientific discoveries made at these sites. Many of the finds consist of the same objects that were used by anatomically modern humans between about 162 000 and 38 000 years ago.

The sediments that accumulated when people were living in in PP13B and PP5-6 of the Pinnacle Point Site Complex have been well protected, as the elevation of these sites is above the past and current high-water mark of the ocean. Both Diepkloof Rock Shelter and Sibhudu Cave are located about 10 km from the current shoreline.

Favourable depositional processes have led to steady accumulations of archaeologically significant deposits that were not eroded away by natural conditions. Human activity and development in the immediate vicinity of these sites have also been restricted and have not destroyed the archaeological archive contained within these shelters. The quality and intensity of the research that has taken place has further borne testimony to the authenticity of the antiquity and the context of the finds.

At Diepkloof Rock Shelter, the setting of the shelter is the same as it was during the MSA and has not been altered. The form and design of the material found at Diepkloof is as it was used and left behind by people during the MSA. The artefacts found can be interpreted as evidence for the coexistence of a different MSA technological tradition, in the form of three phases of the Howiesons Poort industry, with backed blades from between 105 000 and 50 000 years ago preceded by a short phase of pre-Still Bay and the Still Bay industry, from about 109 000 to 100 000 years ago. Evidence for hafting adhesive and decorated ostrich eggshell water flasks has been dated to as early as

109 000 years ago, although most of the ostrich eggshell fragments are retrieved from layers dated to between at 85 000 and 52 000. An engraved bone was found in the pre-SB layer Lynn dated to 109 000 years ago.

At the Pinnacle Point Site Complex, some human habitation has taken place after the MSA, but this has not altered the authenticity of the different caves. The entrance and inside of the caves are still as they were during the MSA period. The form and design of the artefacts found are the original material as made by the people during the MSA. The evidence found at the different caves includes stone artefacts and modified materials that were selected for use and include heat-treated silcrete from about 162 000 years ago. Howiesons Poort artefacts have been identified at least PP5-6, but PP13B was sealed off by dune sand between 90 000 and 40 000 years ago. During excavations at site PP5-6, pieces of silcrete with the same lustre as the silcrete used to make the bladelets were found embedded in ash. More artefact sequences are expected at the other sites in the complex that have not yet been excavated.

At Sibhudu Cave, the site has been meticulously excavated since 1998 using the latest available techniques. A team of international and interdisciplinary researchers has been working on the site for the past twenty years. Given its position, Sibhudu Cave has been largely unaffected by sea-level changes (de la Peña and Wadley, 2017) and the sedimentary deposits show no significant reworking or mixing (Wadley, 2013b). The stratigraphy is complex, but is clear and well preserved (d'Errico et al., 2012). Geoarchaeological investigations demonstrate that the site' stratigraphic layers have integrity and that there is minimal vertical mixing between the anthropogenically formed layers (Goldberg et al., 2009; Wadley et al., 2011).

The Iron Age occupation has caused some damage in some of the MSA layers where pits were dug into the deposit. However, this damage is highly localised and the areas that have been affected by the pits are well controlled and well documented, and they do not impact on the authenticity of the overall site (d'Errico et al., 2012).

3.1.e Protection and management requirements

Protective measures have been implemented at all the sites in the form of sandbags that fill the excavated areas. there is 24-hour security at Pinnacle Point due to its location on a private estate, which further aids in protecting these sites from unauthorised access.

South Africa has established a well-developed system for the protection of its heritage capital through its heritage, environmental and land-use planning legislation and associated frameworks.

In Table 10 are set out in the following Acts of Parliament, all of which combine to provide the protective framework necessary for the sites that make up this serial nomination:

Table 10. Legislative framework for protecting the nominated sites.

Legislation number	**Name**	**Function**
Act 49 of 1999	World Heritage Convention Act	Provides for incorporation of the World Heritage Convention into South African law and for management of World Heritage Sites.
Act 25 of 1999	National Heritage Resources Act	Provides for the protection of South Africa's National Estate and has been used to protect each of the nominated properties. Other provisions of the Act provide for control of impacts on these sites.
Act 107 of 1998	National Environmental Management Act	Provides for a system of impact assessment, and in so doing controls impacts on the properties.
Act 57 of 2003	National Environmental Management: Protected Areas Act	Provides a range of environmental protections for World Heritage Sites and prevents mining and prospecting in such areas.
Act 16 of 2013	Spatial Planning and Land Use Management Act	The Act provides for each municipality to have a Land Use Management System, which determines

Legislation number	Name	Function
		and manages development rights and can be used to protect the areas around World Heritage Sites.

Management Authority

In terms of Sections 8, and 9 of the South African World Heritage Convention Act (No. 49 of 1999), a Management Authority (MA) serves to provide an effective system for the management of World Heritage Sites in line with the Operational Guidelines for the Implementation of the World Heritage Convention (WHC), and the National Heritage Resources Act (NHRA).

At the provincial level, the management system will be coordinated and hosted by the Member of the Executive Council (MEC) of for Cultural Affairs and Sport in the Western Cape for Pinnacle Point Sit Complex and Diepkloof Rock Shelter and by the correspondent MEC for Sport, Arts and Culture in KwaZulu-Natal overseeing the management of Sibhudu Cave. Both Departments have committed funds for the operation of the two prospective Management Authorities, and, as a result, these authorities have standing budget allocations which enable them to meet their conservation and management responsibilities of the sites.

The two authorities will jointly serve as the Overall Management Authority of the Emergency of Modern Human nomination through the establishment of a Joint Management Committee (JMC). For each of the proposed sites, a Site Management Committee is recommended. A Site Management Committee will have an advisory role and will include representatives of the main stakeholders involved with the management of the site.

The proposed structure of the Management Authority is presented in Figure 35 below.

Each of the Management Authority should perform the following functions in accordance with section 13 of the World Heritage Convention, including *inter alia*:

- Implement the ICMP;
- Communicate regularly with other stakeholders and authorities;
- Monitor the State of Conservation of the sites;
- Manage and mitigate risks;

- Provide input and express opinions on proposals for work of any nature on the sites;
- Raise and allocate funds for management of the sites;
- Coordinate the responsibilities and work of its members and other stakeholders regarding the sites;
- Investigate possibilities for coordinating with local community and other tourism initiatives;
- Align programmes to local municipality Integrated Development Plans;
- Develop and implement policies; and
- Enter into heritage agreements with various stakeholders.

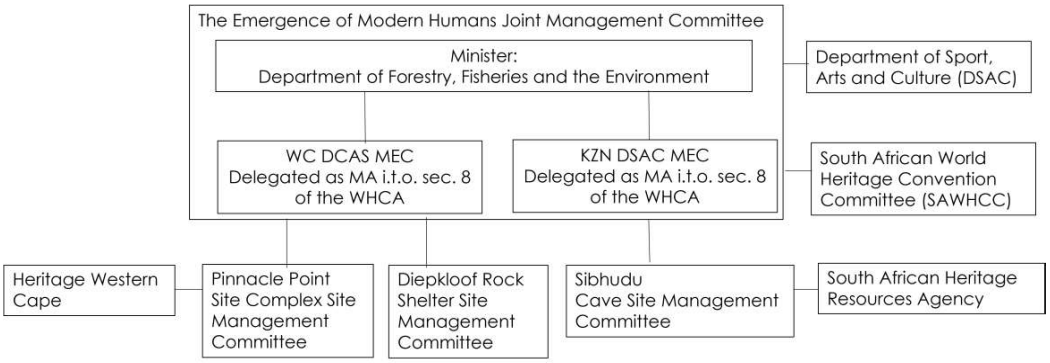


Figure 35. Proposed Structure of the proposed overall Management Authority for the Emergence of Modern Humans WHS. A Site Management Committee is proposed for each site included in the nomination.

The Joint Management Committee

The JMC will meet biannually and as and when necessary. The JMC will be established through an MoU in place setting out functions and responsibilities, thus ensuring that the appointed Management Authorities work together in harmony and support one another in their efforts to achieve the vision and objectives of the World Heritage Site. The JMC will be chaired by the Deputy Director-General: Biodiversity and Conservation of the Department of Forestry, Fisheries and the Environment, which is the focal point. The members of the JMC will also be the HODs of the Department of Cultural Affairs and Sport in the Western Cape Government and of the Department of Sport, Arts and Culture in KwaZulu-Natal, and/or their duly authorized delegates.

The JMC shall:

- ensure a management system or mechanisms for the co-ordinated management of the separate components and the development of a joint integrated vision and objective for the entire prospective World Heritage Site with detail provided in their

individual Integrated Management Plans (IMP's) (as required in terms of World Heritage Convention Act, 1999 (Act No. 49 of 1999) (WHCA);

- harmonize and coordinate all relevant policies to facilitate a uniform approach to the management of the entire prospective World Heritage Site;
- serve as a platform whereby all parties work together and support one another in their efforts to achieve the vision and objectives of the World Heritage Site in terms of the World Heritage Convention, WHCA and the UNESCO Operational Guidelines;
- serve as a vehicle for the identification of common goals and liaising with heritage resource agencies authorities on a national, provincial and local government level and with the consent of the DFFE, international partners as well as donors;
- appoint technical teams with concise Terms of Reference and timeframes to deal with specific technical issues as and when required;
- implement the monitoring framework to ensure monitoring and evaluation of the management effectiveness of the prospective World Heritage Site;
- coordinate the identification of financial needs by the two provincial departments to ensure management of threats affecting the integrity of the prospective World Heritage Site in order to develop sustainable funding mechanisms for the World Heritage Site;
- ensure the development and implementation of a joint branding and marketing strategy for The Pleistocene Occupation Sites of South Africa that should be used in conjunction with the branding and marketing strategies adopted by the individual sites, and
- ensure the development of an appropriate fund-raising mechanism for the serial sites for purposes of community beneficiation, scientific research etc.

Site Management Committee

The nominated sites represent different situations, in terms of their tangible and to some extent intangible heritage, their stakeholders, the way they are used, and the specific management challenges that they face. For that reason, it is proposed that each site has its own Site Management Committee that is firmly rooted in the local context, and that relies on local authorities and the involvement of relevant local stakeholders such as local community, local government, scientists, heritage authorities, the Management Authority, and landowners (Table 11). This SMC will be responsible for communicating regularly with other stakeholders and authorities; monitoring the site; managing and mitigating risks; providing input and expressing opinions on proposals for work of any nature on the site; raising and allocating funds for management of the site; coordinating the responsibilities and work of its members and other stakeholders;

assisting in the development of accessibility and tourism on the site and reporting to the Management Authority.

The Site Management Committees for each of the three sites are an integral part of the overall Management Authority for the Emergence of Modern Humans: The Pleistocene Occupation Sites World Heritage Property.

Table 11. Composition of proposed site management committees for each site included in the nomination.

ID	Site	Proposed Management Committee
001	Diepkloof Rock Shelter	Landowner Scientist Elands Bay Museum EBEDAG Cedarberg Municipality The Baboon Point Reference Group West Coast District Municipality Management Authority
002	Pinnacle Point Site Complex	Estate Manager (Home Owners' association) Permit holder/scientist Point of Human Origins The Point Discovery Centre NPC Bartolomeu Diaz Museum Complex Heritage Mossel Bay Mossel Bay Municipality Management Authority
003	Sibhudu Cave	Landowner Permit holder/scientist KwaDukuza Municipality Qwabe Traditional Council Sibudu Trust iLembe Tourism

ID	Site	Proposed Management Committee
		Management Authority

In addition, DSAC serves as the custodians for Cultural heritage sites in SA and will also be informed of all activities happening within the site. The South African Heritage Resources Agency and Heritage Western Cape, as compliance authorities, are responsible for the monitoring of research and conservation of the site respectively for Diepkloof Rock Shelter and Pinnacle Point Site Complex (HWC), and for Sibhudu Cave (SAHRA).

The South African World Heritage Convention Committee (SAWHCC) is an intergovernmental committee appointed by the Minister of DFFE in terms of 6(2) of the World Heritage Convention Act, Act No. 49 of 1999 to advise on issues pertaining to the establishment, conservation and management of world heritage sites in South Africa, including implementation of other provisions of the World Heritage Convention Act No. 49 of 1999. The implementation of the Convention at a World Heritage Site level get reported in this forum.

3.2 Comparative analysis

The HEADS Programme, that was submitted during the 33rd session of the World Heritage Committee in Seville (2009) and accepted in Brasilia (2010), is an important basis for the evaluation of Stone Age Properties. The section of the HEADS Programme that is relevant to this nomination is titled 'Early archaeological sites and the beginning of cultural diversity'. One of the key objectives of the HEADS 2010 Action Plan is 'iii: to recognize sites that are outstanding demonstrations of traces of the earliest interaction between humankind and the land, early cultural behaviour, cognitive steps and creative expressions'. This nomination, The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa, easily fits into this Action Plan.

Cultural complexity in this comparative analysis is identified in evidence from archaeological sites that demonstrate 'the capacity for abstract thought, analogical reasoning, cognitive fluidity, innovative thought, complex goal-directed actions, flexibility in problem-solving, multi-tasking, task switching, response inhibition and planning over long distances or time. Some of these attributes are archaeologically recognizable in transformative technologies such as heat treatment of rocks and ochre, and the manufacture of compound adhesives and paints' (Wadley, 2013a).

Broadly, the evolution of humans can be understood according to the following time periods: Pre-Early Stone Age, Early Stone Age, Middle Stone Age (MSA), and Later

Stone Age (LSA). Table 12 demonstrates that the period covered by this proposed nomination is poorly represented on the World Heritage List.

This World Heritage Site nomination centres on evidence of the emergence of modern human behaviour in anatomically modern humans. Several sites in Africa exist that demonstrate evidence of human evolution by way of human remains, and the most outstanding of these have become World Heritage Sites (e.g., the Fossil Hominids Sites of South Africa, the Lower Valley of the Awash, and the Lower Valley of the Omo). However, the World Heritage List lacks sites that demonstrate full evidence of the development of modern behaviour by *Homo sapiens* during the Middle to Late Pleistocene (Deacon, 2012). The sites proposed in this nomination perfectly fill that specific gap.

Table 12. Sites on the World Heritage List covering human evolution. Behavioural development refers to the introduction of new technologies, not related necessarily to *Homo sapiens*.

Time	**Anatomical development**	**Behavioural development**
Pre-Early Stone Age	Fossil Hominid Sites of South Africa (South Africa) Sangiran Early Man Site (Indonesia) Peking Man Site at Zhoukoudian (China)	The Lower Valley of the Omo (Ethiopia) The Lower Valley of the Awash (Ethiopia)
Early Stone Age 2.6 million – 300 000 years ago	Fossil Hominid Sites of South Africa (South Africa) Sangiran Early Man Site (Indonesia) Peking Man Site at Zhoukoudian (China)	The Lower Valley of the Omo (E6thiopia) Sangiran Early Man Site (Indonesia)
Middle Stone Age 300 000 – 30 000 years ago		**The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa (South Africa)**
Later Stone Age	Wilandra Lakes Region (Australia)	Wilandra Lakes Region (Australia)

Time	Anatomical development	Behavioural development
		The Caves and Ice Age Art in the Swabian Jura (Germany)

As a first screening, a wide range of sites were examined in terms of whether they contained the main tenets of modern behaviour by anatomically modern humans (see Table 13 below).

Table 13. Parameters against which the current nomination is compared.

Parameter	Description
1. Early modern human anatomy	The earliest fossils of anatomically modern humans are from the MSA and date from about 300 000 years ago.
2. Modern human behaviour	There are four characteristics of modern human behaviour: i) symbolic behaviour, ii) abstract thinking and analogical reasoning, iii) behavioural, economic and technological innovations, and iv) the ability to plan and strategize (Wadley, 2015). Some of the sites presented here date from 50 000 onwards, the time period after which evidence of expressions of symbolic thought is known in Europe and Asia.

When looking for comparable sites elsewhere in Africa and the world, none were found that contained and shared the full set of characteristics of early modern human behaviour to the same extent that the proposed sites do. A more detailed analysis is provided in the sections below.

3.2.a National comparison

The three nominated sites provide an unmatched record of palaeoenvironmental and human history in an important phase of human evolution, namely the development of anatomically modern humans. Sites associated with this time period with such extensive deposits are rarely discovered. The three nominated sites have been thoroughly and extensively researched, and have contributed rare artefactual evidence to the record of the emergence of modern humans.

Comparative sites are assessed here based on early evidence of cognitive behaviour of anatomically early modern humans during this time period. This includes evidence of symbolic thought, abstract thinking and technological innovations. Other South African sites dating to the same time period include:

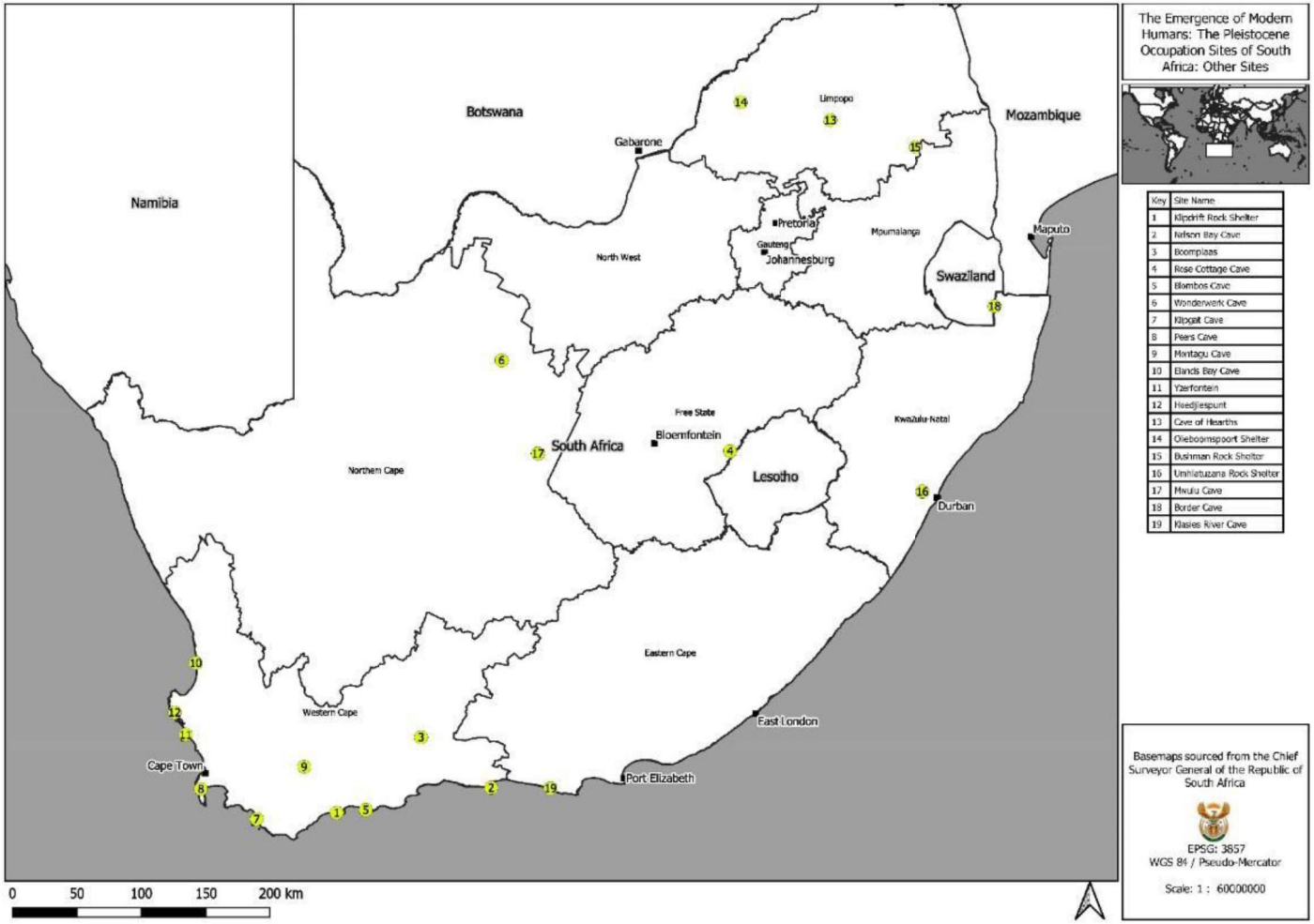
- Blombos Cave, Klipdrift Shelter, Nelson Bay Cave, Boomplaas Cave, Elands Bay Cave, Klipgat Cave, Montagu Cave, Peers Cave, Yzerfontein, and Hoedjiespunt in the Western Cape Province;
- Rose Cottage Cave and Florisbad in the Free State;
- Wonderwerk Cave in the Northern Cape;
- Cave of Hearths, Mwulu Cave and Olieboompoort Cave in Limpopo Province;
- Border Cave and Umhlatuzana Cave in KwaZulu-Natal;
- Klasies River Rock Shelter in the Eastern Cape; and
- Bushman Rock Shelter in Mpumalanga.

All these are listed in Table 14 at the end of this section and on Map 10, with additional information for some of the sites given below.

Blombos Cave, Border Cave and Klasies River are the three sites that were included in the Tentative List of this nomination but are currently not included in the nomination dossier. The excavation of Border Cave and Klasies River has recently restarted after a hiatus of more than a decade, and they will be included in the list once the results of the recent research and findings have been published.

Klipdrift Shelter

Located 40 km west of Blombos Cave in the De Hoop Nature Reserve, Klipdrift Shelter contains Howiesons Poort deposits dated at 66 000 to 59 000 years ago. Controlled and accurate excavations of the discrete layers have resulted in the recovery of a hominin molar, marine shells, terrestrial fauna, floral remains, organic materials, hearths, lithics, ochre, and ostrich eggshell. More than 95 pieces of the latter, distributed across the layers, are engraved with diverse, abstract patterns (Henshilwood et al., 2014). The preliminary results from Klipdrift Shelter provide new insights into the Howiesons Poort era in this sub-region and contribute further to ongoing knowledge about the complex behaviours of early *Homo sapiens* in southern Africa. Excavations at the Klipdrift Complex are ongoing, and more evidence in line with that of the current nominated three sites might be found. While this site has the potential to contribute to the serial nomination, its excavation is not complete enough to be included in the current nomination.



Map 10. Other significant Middle Stone Age sites in South Africa.

Nelson Bay Cave

Nelson Bay Cave is located on the Robberg Peninsula facing Nelson's Bay near Plettenberg Bay. The cave has yielded rich archaeological material covering its intermittent MSA and LSA occupation dating from a few hundred to more than 125 000 years ago. MSA artefacts include the Howiesons Poort industry (with backed blades) (Klein, 1972; Volman, 1984). Results of the archaeological research are summarised in displays at the site, which is managed by CapeNature and is visited by more than 3 000 people each year. The site is one of the few sites, together with the nominated Pinnacle Point Site Complex, that are open to the public. The site differs from the nominated three sites, as the evidence found is less well preserved.

Boomplaas Cave

Boomplaas Cave is situated in the Cango Valley in the foothills of the Swartberg mountain range, north of Oudtshoorn. The cave has a long sequence of MSA and LSA occupation dating from less than 2 000 years ago to about 79 000 years ago (Faith, 2013; Pargeter et al*.,* 2018). The Howiesons Poort lithic industry is observed whereas the Still Bay lithic industry is absent from the MSA stratigraphic sequence (Deacon, 1995). The cave differs from the nominated sites in that its sequence is more recent and the evidence is not as extensive, as the artefact sample is small.

Rose Cottage Cave

Rose Cottage Cave is located on the Platberg River near Ladybrand in the eastern Free State. The cave is known for the manufacture and transferal of red and shiny ochre powder in the early MSA, which provides further evidence of complex behaviour taking place in southern Africa almost 100 000 years ago (Hodgskiss and Wadley, 2017). Although ochre, which may have been used for symbolic purposes, is present, its use is more recent than the proposed sites in this nomination.

Wonderwerk Cave

Wonderwerk Cave formed originally as an ancient solution cavity in the dolomite rocks of the Kuruman Hills, located between Danielskuil and Kuruman in the Northern Cape Province. The cave site reflects human and environmental history from the Early, Middle and Later Stone Ages to the present. The site provides unambiguous evidence — in the form of burned bone and ashed plant remains — that burning took place in the cave during the early Acheulean occupation, approximately one million years ago. This is the earliest secure evidence for burning in an archaeological context (Berna et al., 2012). Though significant, the site does not show clear evidence of early modern human behaviour.

Table 14. Comparison of similar caves in South Africa within the MSA.

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Klipdrift Rock Shelter	Western Cape Province	c. 71.6 ± 5.1 to 5.7 ± 3.3	Molar	Worked ochre and engraved ostrich eggshell (OES)	Hearths and lithics (incl. HP industry)	Marine shells	Speleothem and faunal record
Nelson Bay Cave	Western Cape Province	c. 125 to 50	NA[3]	Worked ochre	Lithics (incl. HP industry)	Marine shells	Faunal remains
Boomplaas Cave	Western Cape Province	c. 79 to c. 23	NA	Worked ochre, OES beads	LSA stone hearths, MSA lithics (incl. HP industry) and LSA with Robberg,	NA	Speleothem and faunal analysis; fossil charcoal analysis; pollen analysis; micro-

[3] Human remains found at Nelson Bay Cave are dated to the Later Stone Age.

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
					Albany and Wilton industries		mammals from owl pellets
Elands Bay Cave	Western Cape Province	250 to 329	NA	Worked ochre	Lithics, hearths	Marine shells	Pollen analysis, faunal analysis, fossil charcoal analysis
Klipgat Cave (Die Kelders Cave 1)	Western Cape Province	c. 70 ± 10 to 57	24 isolated teeth, a mandibular fragment, and two manual middle phalanges	Worked ochre	Hearths, lithics	Marine shells	Faunal analysis

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Montagu Cave	Western Cape Province	c. 50.8 to ± 19.6	NA	Worked ochre	MSA lithics, including HP	NA	NA
Peers Cave	Western Cape Province	MSA sequence not properly dated	Mid-Holocene skeleton	Worked ochre	Lithics (incl. MSA, SB, HP, post-HP industry)	Marine shells	Yes
Yzerfontein	Western Cape Province	c. 119 to 46	NA	Worked ochre (rubbing or grinding)	Lithics (flaked stone but no HP or SB); control over fire; pigment use	Marine shells	Faunal analysis
Hoedjiespunt	Western Cape Province	c. 130 to 40	Two molars and two mandibular incisors	Worked ochre	Lithics (incl. rare faceted platform flakes but no HP or SB)	Marine shells	Faunal analysis

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Rose Cottage Cave	Free State Province	c. 96 to c. 27	NA	Worked ochre (rubbing, grinding and scoring)	Hearths, hafted blades and other lithics (incl. pre-HP, HP industry and post-HP industries)	NA	Fossil charcoal
Florisbad	Free State	280 ± 47 to 3.3	Fossil cranium			NA	Faunal analysis, pollen and micromorphology
Wonderwerk Cave	Northern Cape Province	> 220 to ± 70	NA	Portable paleoart (incised lines on stones), collections of exotic river pebbles and quartz crystals, ochre	Lithics (incl. Acheulean and Late-Acheulean assemblage)	NA	Faunal and phytolith analysis

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Cave of Hearths	Limpopo Province	Date for MSA sequence was not located	Juvenile mandibular body with teeth and part of a right radius	Worked ochre	Hearths, lithics	NA	Faunal analysis
Mwulu Cave	Limpopo Province	c. 130 to 80 (MIS 5)	NA	Worked ochre, specularite 'pencils'	Lithics (Pietersburg industries)	NA	Pollen and phytolith analysis
Olieboompoort Shelter	Limpopo Province	Date for MSA sequence not available	NA	Haematite 'pencils', beads, OES pendants	Ochred grindstones, lithics	NA	NA

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Umhlatuzana Cave	KwaZulu-Natal Province	c. 70 to 35	NA	Worked ochre	Lithics (incl. HP, pre-HP and SB and hollow points)	NA	Phytoliths, overall poor preservation of organic material
Bushman Rock Shelter	Mpumalanga Province	MSA sequence, predates c. 100	Infant mandible	Worked ochre	Lithics (inc. Pietersburg industry), hearths	NA	Faunal analysis
Border Cave&	KwaZulu-Natal Province	c. 227 to 38	One infant skeleton and remains of five adults	Worked ochre, OES beads	Lithics (incl. HP industry, post-HP Industries); use of bedding and medicinal plants	NA	Faunal analysis; micromorphology; organic preservation of bedding

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
Klasies River	Eastern Cape Province	<125 to ± 57.9	27 human fossils, comprising 24 isolated teeth, a mandibular fragment, an ulna, and two manual middle phalanges	Worked ochre (incl. engraved) and shell beads	Hearths, lithics, (incl. HP industry); bone tool technology; roasting of plant starches	Marine shells	Faunal analysis
Blombos Cave	Western Cape Province	100 000 – 30 000	NA	Engraved ochre, ochre drawing, toolkit for ochre	Lithics; bone tool technology, knotting	Marine shells	Faunal analysis

Site name	Location	Occupation periods during MSA (ka)	AMH remains*	Evidence of symbolic thought	Industries and technological innovation displaying modern human behaviour	Evidence of coastal adaptation	Palaeoclimate reconstruction
				processing, perforated shell beads, bone engravings			

*AMH: Anatomically modern humans dated to the Middle to Late Pleistocene and MSA; LSA remains are not included in this table.

& These sites are included in the Tentative List of this current nomination, and will be added at a later stage.

3.2.b Global comparison

Similar artefact sequences from the MSA have been found at sites such as Haua Fteah in Libya, Mumba Cave in Tanzania, Mumbwa in Zambia, Grotte des Pigeons and Jebel Irhoud in Morocco, and Qafzeh Cave in Israel. Below and in Table 15 is a comparison of these archaeological sites in Africa where evidence from anatomically and behaviourally modern humans is found. So far, the earliest evidence of modern human behaviour in *Homo sapiens* has been recorded on the African continent and in the Middle East. No other sites across the globe are therefore relevant for discussion here.

Haua Fteah Cave, Libya

The Haua Fteah cave is located in north-eastern Libya. The cave is regarded as a significant research site associated with anatomically modern humans because it was occupied since the MSA up until approximately 300 BP (McBurney, 1953, 1960, 1967; Douka et al., 2014). The evidence of modern human presence in the cave dates back 80 000 years. Two modern human mandible fragments were discovered in the excavation and have been dated to between 73 000 and 65 000 years ago (Hublin, 2000). These are associated with the first and earliest phase of flake and blade artefacts (Douka et al., 2014). This site differs from the nominated ones as the evidence is more recent than that from the South African sites. Furthermore, the site has more anatomical than behavioural evidence of modern humans.

Mumba Cave, Tanzania

Mumba Cave is located in northern Tanzania. The site is considered significant for understanding the behaviour of MSA peoples due to the discovery of the remains of five archaic *Homo sapiens* individuals. Three molars were excavated from MSA levels of the cave (Bräuer and Mehlman; 1988; Mehlman, 1989). These teeth are smaller than any verifiable archaic *Homo sapiens* examples and are considered to possibly represent early anatomically modern *Homo sapiens* (Bräuer and Mehlman, 1988). Uranium series dates suggest that the teeth and stone tools from the site are dated to 130 000 years ago (Bräuer and Mehlman, 1988), with microlith industry dated from 60 000 to 49 000 years ago (Gliganic et al., 2012). Mumba remains among the richest and most continuous East African MSA–Iron Age sequences and consequently has repeatedly been held up as the benchmark for this period (Prendergast et al., 2007; Marks and Conard, 2008; Díez-Martin et al., 2009. This site differs from the nominated ones, as the evidence has remains of anatomically modern humans but not the full hallmarks of evidence for modern human behaviour.

Mumbwa Caves, Zambia

The Mumbwa Caves are in the Kafue National Park in central Zambia. The site contained *Homo sapiens* fossil molars, a left femoral diaphysis and a fragment of a right radius associated with the MSA (Protsch, 1977; Barham, 1995). Bone-working technology found in the caves has been linked to anatomically modern humans, associated with MSA assemblages dating back to as early as 120 000 years ago (Pearson et al., 2000). Additionally, hearths and traces of the use of ochre from MSA levels were found, as well as a mix of stone artefacts produced mainly from quartz (Barham, 1995). These include flake tools, unifacial and bifacial points, and small bifaces produced on blanks from radial and multiple platform cores (Barham, 1995). The site also included modified bone in the form of ground points, drilled fragments and a single decorated bird bone, which are dated to the MSA/LSA transition and LSA (Barham, 1995). While the site displays evidence of the evolution of modern human behaviour, this is overall more recent than its South African counterparts.

Grotte des Pigeons, Morocco

The Grotte des Pigeons is in eastern Morocco, near the village of Taforalt. The cave contains an MSA sequence with evidence of human habitation dating back approximately 85 000 years. In addition, younger archaeological layers containing dozens of burials have been identified, suggesting that the cave is possibly the earliest cemetery in North Africa (Humphrey et al., 2012). Perforated *Nassarius gibbosulus* shell beads come from archaeological layers dated to 82 000 years ago (Bouzouggar et al., 2007). The marine shells are of the same genus as the shell beads found in the younger archaeological layers at Blombos Cave. Studies of the wear patterns on the marine shells suggest that some of the shells were suspended and they were also covered in red ochre (Bouzouggar et al., 2007). However, no evidence is present for the deliberate collection of these shell species for ornamental purposes (Steele et al., 2019). Overall, the evidence of the South African sites is earlier.

Jebel Irhoud, Morocco

Jebel Irhoud cave is located south-east of the city of Safi in Morocco. It is known for the hominin fossils that were discovered at this site in the early 1960s. The human remains were originally thought to be Neanderthals, but the species has since been assigned to archaic *Homo sapiens* and has been dated at 315 000 years old (Richter et al., 2017). Excavations undertaken in 2004 revealed more than 20 additional bones associated with at least five hominins (Hublin et al., 2017). The finds included part of a skull, a jawbone, teeth and limb bones, which had come from three adults and a juvenile. The bones looked facially similar to those of modern hominins, with the exception of a larger lower jaw and elongated braincase (Hublin et al., 2017). They

have similar features to the Florisbad skull, which has been attributed to *Homo sapiens* based on the Jebel Irhoud finds (Hublin et al., 2017; Sample, 2017).

While the significance of the Jebel Irhoud site for some of the earliest evidence of anatomically modern humans is irrefutable, no full evidence of modern human behaviour has yet been recorded.

Qafzeh Cave, Israel

Qafzeh Cave is a rock shelter located at the base of Mount Precipice, south of Nazareth in Israel. The site, which has been dated to 92 000 years ago, is famous for its abundant fossil remains of anatomically modern humans, comprising seven adults and eight juveniles (Vandermeersch, 1981; Valladas et al., 1988; Tillier, 1999). Other finds include hearths, stone tools and animal bones. Some of the earliest evidence of death ritual comes from this site (Vandermeersch, 1981; Tillier, 1999). One of the skeletons was found with a deer antler strategically placed on its chest, suggesting a symbolic meaning on the part of those who placed it there (Vandermeersch, 1970). Additional important finds were the remains of ochre found on human bones, as well as 71 pieces of ochre that were associated with burial practices (Hovers et al., 2003). Archaeologists also recovered at the site a collection of ten *Glycimeris nummaria* bivalve shells from a layer dated to 92 000 years ago. These shells are suggested to have been used as personal ornaments. Seven of the shells are naturally perforated on the umbo, but two of these natural holes are further enlarged and another four of them preserve evidence of smoothing or notching, which is interpreted as being the result of stringing. Additionally, three of them also preserve evidence of red and yellow ochre on the exterior of the shell. These are all considered evidence of the use of these naturally perforated shells as body decoration and ornaments (Bar-Yosef Mayer et al., 2009; Steele et al., 2019).

This site differs from the nominated ones, as the evidence of human behaviour at the South African sites dates back further and presents a full set of characteristics for modern human behaviour.

Table 15. Global comparison of similar sites within the Middle to Late Pleistocene (MSA in South Africa – 300 000 to 30 000).

Site name	**Location**	**Associated time periods during the Middle to Late Pleistocene (ka)**	**AMH remains**	**Evidence of symbolic thought**	**Technological innovation**	**Evidence of coastal adaptation**	**Palaeoclimate evidence**
Haua Fteah Cave	Libya	c. 80 to 40	Mandible fragments	NA	MSA flake and blade lithic artefacts[4]	NA	Faunal analysis
Mumba Cave	Tanzania	c. 130 to 30	Molars	Ostrich eggshell beads[5]	Microlith Mumba industry	NA	Extensive, from geomorphological studies
Mumbwa Caves	Zambia	120 to Iron Age	Left femoral diaphysis and a	Ochre processing (possibly	MSA lithic artefacts[6]	NA	Faunal analysis

[4] The development of MSA flakes and blade artefacts does not necessarily indicate modern human behaviour. No additional technological innovation was recorded.

[5] These are dated by OSL from 49.1 ± 4.3ka (Gliganic et al., 2012).

[6]. The development of MSA flakes and blade artefacts does not necessarily indicate modern human behaviour. No additional technological innovation was recorded

Site name	Location	Associated time periods during the Middle to Late Pleistocene (ka)	AMH remains	Evidence of symbolic thought	Technological innovation	Evidence of coastal adaptation	Palaeoclimate evidence
			fragment of a right radius	symbolic)			
Jebel Irhoud	Morocco	c. 315	Skull, a jawbone, teeth and limb bones (5 individuals)	NA	MSA lithic artefacts[7]	NA	Faunal analysis
Grotte des Pigeons (Taforalt)	Morocco	c. 85 to 12.6	Not during the MSA	Perforated *Nassarius gibbosulus* shell beads (c. 82 ka)			Faunal and charcoal analysis

[7] The development of MSA flakes and blade artefacts does not necessarily indicate modern human behaviour. No additional technological innovation was recorded.

Site name	Location	Associated time periods during the Middle to Late Pleistocene (ka)	AMH remains	Evidence of symbolic thought	Technological innovation	Evidence of coastal adaptation	Palaeoclimate evidence
Qafzeh Cave	Israel	c. 92	7 adults and 8 juveniles	Purposeful burials; oche processing; marine shells used as ornamentation	Strung shell beads	NA	Faunal analysis
The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa	South Africa	167 to 38	Molars	Body decoration (e.g., perforated shell beads); first identified engraved patterns; earliest and richest record for the continual and focused use of pigments	Lithics (Still Bay and Howiesons Poort); projectile technology; stone pyrotechnology; microlith technology; bone tools; use of sedges for beds	Systematic use of marine shells	Extensive palaeoclimatic reconstruction

3.2.c Comparisons with other sites on the Tentative List

No site on the current Tentative List of World Heritage Sites is comparable, in terms of narrative and findings, with the nomination presented here. Melka Kunture, presented below, is within the African continent, and is overall older. However, although it bears evidence of archaic *Homo sapiens*, it has not yet borne evidence of the evolution of modern human behaviour.

Melka Kunture and Balchit, Ethiopia

Melka Kunture is part of the Upper Awash Valley, in the highlands of Ethiopia. Evidence of *Homo erectus* and archaic *Homo sapiens* has been discovered during the excavation of about 30 sites within the area. Overall, the archaeological deposits of Melka Kunture are a unique archive of human evolution, spanning over more than 1.7 million years, from Oldowan layers to a very long and complex sequence of Acheulean layers, to MSA and LSA layers. Three archaic *Homo sapiens* skull fragments were recovered from the site of Garba III, dated to between 250 000 and 150 000 years ago (Piperno, 2001; Chavaillon and Bethelet, 2004).

3.2.d Comparisons with other sites on the World Heritage List

Numerous sites on the World Heritage List cover diverse aspects of human evolution. Sites such as the Lower Valley of the Awash (Ethiopia), Gorham's Cave Complex (Gibraltar, United Kingdom), the Archaeological Site of Atapuerca (Spain), the Cave of Altamira (Spain), the Paleolithic Cave Art of Northern Spain (Spain), the Caves and Ice Age Art in the Swabian Jura (Germany), the Willandra Lakes Region (Australia) and the Prehistoric Sites and Decorated Caves of the Vézère Valley (France) either preserve evidence of the human evolutionary processes over the Early to Middle Pleistocene, or evidence of fully developed human behaviour during the Late Pleistocene. However, the time period of *Homo sapiens* developing modern human behaviour, illustrated in Table 16, is not present in these sites. As a result, only a few of them were selected for comparison with the current nomination. While sites such as the Sangiran Early Man Site in Indonesia and the Zhoukoudian Peking Man Site in China do provide evidence for different phases of the human evolution, their evidence does not include the evolution of modern human behaviour in *Homo sapiens* since they mostly predate the Middle to Late Pleistocene.

The site of Gorham's Cave Complex in Gibraltar is contemporary to the sites within the Emergence of Modern Humans, however the Gorham's Cave Complex provides an exceptional testimony to the cultural traditions of the Neanderthal, and not of *Homo sapiens*.

The Caves and Ice Age Art in the Swabian Jura (Germany) narrates the expression of modern human behaviour through early evidence of art, musical instruments and personal ornamentation, but their occupation post-dates the period considered in the proposed nomination for the emergence of modern human behaviour in *Homo sapiens.*

Willandra Lakes Region (Australia) and the Prehistoric Sites and Decorated Caves of the Vézère Valley (France) preserve evidence of the human evolutionary processes over the Early to Middle Pleistocene and evidence of a fully developed human behaviour during the Late Pleistocene. However, the time period of *Homo sapiens* developing modern human behaviour covered within this nomination is not present at these sites.

A few other sites in the World Heritage List, presented in Table 16 and Table 17, reflect similar time periods and have contributed evidence of the modern human phenotype, symbolic thought and modern human innovation. Nevertheless, what makes the South African sites unique is that, as yet, they provide some of the earliest known evidence for symbolic thought and modern human innovation, they provide multiple examples, and fill a gap in the development of fully recognised modern human behaviour during the MSA from 162 000 years ago.

Table 16. Gap in the World Heritage Site List covered by the nomination of The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa.

Time	**Anatomical development to *Homo sapiens***	**Behavioural development of *Homo sapiens***
Early Stone Age (Early to Middle Pleistocene) **2.6 million – 300 000 years ago**	Fossil Hominid Sites of South Africa (South Africa) Sangiran Early Man Site (Indonesia) Peking Man Site at Zhoukoudian (China) Lower Valley of the Omo (Ethiopia) Archaeological Sites of Atapuerca (Spain)	

Time	**Anatomical development to *Homo sapiens***	**Behavioural development of *Homo sapiens***
Middle Stone Age (Middle to Late Pleistocene) **300 000 – 30 000 years ago**	Willandra Lakes Region (Australia) The Nahel Me'arot/Wadi el-Mughara Caves, Mount Carmel, Israel (Israel)	**The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa (South Africa)**

The Fossil Hominid Sites of South Africa

The Fossil Hominid Sites of South Africa, also referred to as the Cradle of Humankind World Heritage Site, is a serial listing that includes the Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs (Gauteng Province), the Makapan Valley (Limpopo Province), and the Taung Skull Fossil Site (North West Province). The serially nominated sites are situated in unique natural settings that have created a suitable environment for the preservation of skeletal remains. More than 30 palaeoanthropological sites have been identified within the extensive area covered by the Fossil Hominid Sites of South Africa. All sites within this nomination have produced and keep producing abundant scientific information on the evolution of modern humans over at least the past 3.5 million years. Since the 1920s, findings from within the Cradle of Humankind have played a crucial role in furthering our understanding of human evolution.

Amongst the finds at the Fossil Hominid Sites of South Africa are the Taung Child (*Australopithecus africanus*, from the site of Taung) (Dart, 1925), Little Foot (*Australopithecus Prometheus*, from Sterkfontein) (Clark, 2019 and references within), Mrs Ples (*Australopithecus africanus*, from Sterkfontein) (Broom, 1947; Broom and Robinson, 1947), *Homo naledi* (from Rising Star) (Berger et al., 2015) and *Australopithecus sediba* (from the site of Malapa) (Berger et al., 2010). These are just some of the most significant hominid finds within the sites included in the serial nomination. Alongside, and pre-dating the hominid period of occupation, is a sequence of fossil mammals, micro-mammals and invertebrates which provides a window onto faunal evolution, palaeobiology and palaeoecology stretching back into the Pliocene (Maguire and Klapwijk, 2004).

The current nomination covers a time period and a phase of human evolution which has not yet been identified in the Cradle of Humankind.

The Nahel Me'arot/Wadi el-Mughara Caves, Mount Carmel, Israel

The site includes the caves of Tabun, Jamal, el-Wad and Skhul, and is situated on the western slopes of the Mount Carmel range in Israel. The caves contain cultural deposits that represent at least 500 000 years of human evolution and provide evidence for the appearance of modern humans, the hunting of large game, deliberate burials, and the existence of both Neanderthals and early anatomically modern humans within the Middle Palaeolithic (Stringer et al., 1989; Mercier et al., 1993; Weinstein-Evron et al., 2007; Yeshurun et al., 2007).

The Tabun Cave was occupied intermittently during the Lower and Middle Paleolithic (c. 500,000 to 40,000 years ago) and features one of the longest sequences of human occupation in the Levant. It is one of the few sites known for having a complete skeleton of a Neanderthal woman ('The Woman from Tabun') dated to c. 60,000 - 50,000 years ago. The Jamal Cave comprises a single chamber cave which yielded artefacts attributed to the Acheuleo-Yabrudian cultural entities (c. 400,000 - 250,000 ago). The El-Wad Cave is the largest and deepest cave of the group of caves. Excavations have yielded finds over a sequence from the Middle Palaeolithic to the Neolithic (c. 60,000 - 6,000 ago). The Skhul cave is a rock shelter of only a few meters deep. Excavations yielded Middle Palaeolithic finds (c. 150,000 - 45,000 ago), including eleven skeletons of early Anatomically Modern Humans dated to c. 120,000 - 80,000 ago. This cave demonstrates evidence of ritual burial reflected in the manner in which some of the skeletons were intentionally buried. One example is of a skeleton embracing the jaw of a large boar which is interpreted as being a symbolic grave good. Tick-shell beads were also included in these burials. The individuals associated with the manufacture of this shell jewellery in the Levant were considered to be symbolically burying their dead 100,000 years ago (Liberty-Shalev et al., 2011). While this evidence is certainly significant, the suite of evidence from the Emergence of Modern Humans sites is more comprehensive and pre-dates some of the Levant's sites.

The African Great Rift Valley — Olorgesailie Prehistoric Site, Kenya

The site of Olorgesailie is in Kenya on the floor of the Great Rift Valley between two extinct volcanoes (Department of Museums, Sites and Monuments of the National Museums of Kenya, 2010). The site preserves archaeological evidence dated from 1.2 million to 500 000 years ago, with extensive evidence of the Acheulean industry before 400 000 years ago. While a gap in the record does not allow for the study of the period between 500 000 and 320 000, at 320 000 archaeologists on site were able to date a technological change from the Acheulean industry to an MSA industry characterised by smaller and more precise blades and points. This change corresponds also to a

change in the environmental conditions of the site. The site also includes evidence of the use of red and black pigment and of the long-distance (up to 90 km) transport of obsidian to produce MSA stone tools (Brooks et al., 2018; Deino et al., 2018; Potts et al., 2018). The remains of *Homo erectus* have been found on site and dated to 900 000 years ago; however, changes in the palaeoenvironment are significant for the technological innovation from Acheulean material to MSA. No remains of *Homo sapiens* have been found on site yet.

Lower Valley of the Omo, Ethiopia

The Lower Valley of the Omo in Ethiopia is inscribed on the World Heritage List for the discovery of many fossils, especially *Homo sapiens*, which has been of fundamental importance in the study of human evolution (Shea, 2008). This area includes the site of Omo Kibish I (Omo 1), among the earliest examples of hominid species found and estimated to be 195 000 years old (McDougall et al., 2005; Aubert et al., 2012). Currently, Omo I is classified as an anatomically modern human (*Homo sapiens*) as it has several features that are in line with our species, including a flat face, high forehead and prominent chin. Extensive more recent studies on the archaeological assemblage of the Omo Kibish Formation have proved its exceptional stability over time in the production of East African MSA lithic (Shea et al., 2007).

The Lower Omo Valley also includes the Konso and Fejej palaeontological research locations with sedimentary deposit going back to the Plio-Pleistocene period. These sites have produced numerous hominid and animal fossils, including fragments of *Australopithecus*. The deposits of human vertebrae fauna, and the evidence of palaeoenvironmental evolution, shed light on the earliest stages of the origins and development of *Homo sapiens* in Africa (UNESCO, n.d.).

Compared to the sites included in this nomination, the sites in the Lower Valley of the Omo do not display evidence of modern human behaviour during the MSA.

3.2.e Conclusion

In summary, this comparative analysis confirms that the proposed nomination, with its three components, successfully displays, for the earliest time in the archaeological record, a suite of attributes which are proxy for the evolution of modern human behaviour. This is not matched in any of the sites on the World Heritage List and other sites of local and international significance.

Many other World Heritage sites, including the Fossil Hominid Sites of South Africa and other palaeoanthropological and archaeological properties within the African continent, narrate the anatomical evolution to *Homo sapiens*, but not its evolution to

behavioural modernity. Similarly, the outstanding universal values of other prehistoric World Heritage properties are related to evidence for symbolic behaviour, abstract thinking, and technological innovation, but they are chronologically younger than the African sites presented here.

This property has demonstrated to be able to fill the gap between sites linked to the anatomical evolution of the genus *Homo* and sites which already display a fully developed modern human beahviour at a later stage in the archaeological record.

Table 17. Comparison of proposed sites with other sites on the World Heritage List.

Site name	Location	Associated time periods	AMH remains	Evidence of symbolic thought in AMH	MSA industries and technological innovation	Evidence of coastal adaptation	Palaeoclimate evidence
Melka Kunture and Balchit*	Ethiopia	1.7 ma to historic times	Archaic *Homo sapiens*	NA	Early MSA	NA	Extensive reconstruction
The African Great Rift Valley — Olorgesailie Prehistoric Site	Kenya	1.2 ma to 36 ka	NA	Use of red and black pigment – potentially symbolic	- Earliest securely dated MSA tools - Long-distance transport of obsidian as raw material	NA	Extensive reconstruction
The Fossil Hominid Sites of South Africa	South Africa	From 3.67 ma	NA	NA	NA	NA	Extensive reconstruction in different time period and context
Sites of Human	Israel	500 ka onwards	Yes (along with	Yes, in the use of ochre (potential)		NA	Faunal assemblage

Evolution at Mount Carmel: The Nahel Me'arot/Wadi el-Mughara Caves			Neanderthal)	and burials			
Lower Valley of the Omo	Ethiopia	195 ka to 3.2 ka	Yes	NA	Not evidence for modern behaviour	NA	Faunal assemblage
The Emergence of Modern Humans: The Pleistocene Occupation Sites of South Africa	South Africa	167 ka to 38 ka	Molars	Body decoration (e.g., intentionally perforated shell beads); first identified engraved patterns; earliest and richest record for the continual and focused use of pigments	Still Bay Howiesons Poort Inclusive of heating of raw material to improve its workability at 162 ka	Consistent consumption of marine shells	Extensive palaeoclimatic reconstruction

* This site is on the Tentative List.

3.3 Draft Statement of Outstanding Universal Value

a) Brief synthesis:

Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave are three archaeological cave sites in South Africa. Two of them, Sibhudu cave and Diepkloof Rock Shelter, are located within 15km from the current shoreline, while Pinnacle Point Site Complex is located directly on the coast. These sites provide the best-preserved record worldwide of the development of modern human behaviour dating back over 162 000 years ago.

As a group, they are vital to our understanding of the origin of behaviourally modern humans, the climatic transitions that they survived, and their cognitive abilities and cultures.

b) Justification for criteria (iii, iv and v)

Criterion (iii): These sites provide an exceptional example of the early cultural tradition of modern humans, when *Homo sapiens* became behaviourally modern. The archaeological layers of these sites provide exceptional evidence and insight into the behavioural and palaeoenvironmental remains of the Middle Stone Age. They contain early evidence of symbolic thought and advanced technologies in the form of extensive ochre processing; engraved patterns on ochre and bone; estuarine shellfish beads used for body decoration; decorated ostrich eggshell; lithic technologies used for advanced projectile weapons; heat treatment and microliths; and the capture and use of fur of dangerous nocturnal felines.

Criterion (iv): These sites furthermore preserve exceptionally well-stratified and well-dated sedimentary records of ancient human life dating from about 162 000 to 38 000 years ago. They bear evidence of the development of complex cognition through the deliberate heat treatment of stone for toolmaking, prepared-core stone blades and backed tools; polished bone points; engraved bone tools, and some of the earliest recorded evidence of art in the form of incised patterns on ochre and ostrich eggshell.

Criterion (v): Diepkloof Rock Shelter, Pinnacle Point Site Complex and Sibhudu Cave offer some of the earliest and best-preserved evidence in the world for the consistent exploitation of coastal resources during the Middle and Late Pleistocene. The consumption of nutrients included in this food may have contributed to the healthy development of the *Homo sapiens* brains and the expansion of its advanced cognitive abilities during the MSA.

As current sea levels rise due to climate change, much of the ancient record of human coastal resource use has been obliterated or is in grave danger. As such, the excellent

preservation of these sites is pivotal in the preservation of outstanding evidence for palaeoclimates and palaeoenvironment.

c) Statement of integrity

Each of these sites contain long sequences of human occupation. Diepkloof Rock Shelter and Sibhudu Cave have remained remarkably intact, while Pinnacle Point Site Complex was only identified during the impact assessment process for a high-end real estate development. The implementation of the recommendations included in the impact assessment for this estate development has ensured that the site is preserved and not negatively impacted by further development.

Archaeological excavations have been conducted following the highest international standards and methods available. All findings have been carefully curated and catalogued in national collections, and their significance and interpretation have been reported in many highly significant papers published in international journals. Ongoing research at these sites continues to demonstrate the reliability and quality of the existing information. Additionally, many more scientific discoveries will undoubtedly be made from these sites, as new material is analysed or new methods and questions are applied to previously excavated finds.

The designated property defined in this serial nomination conserves the sense of place and experience of these sites within their current landscape.

d) Statement of authenticity

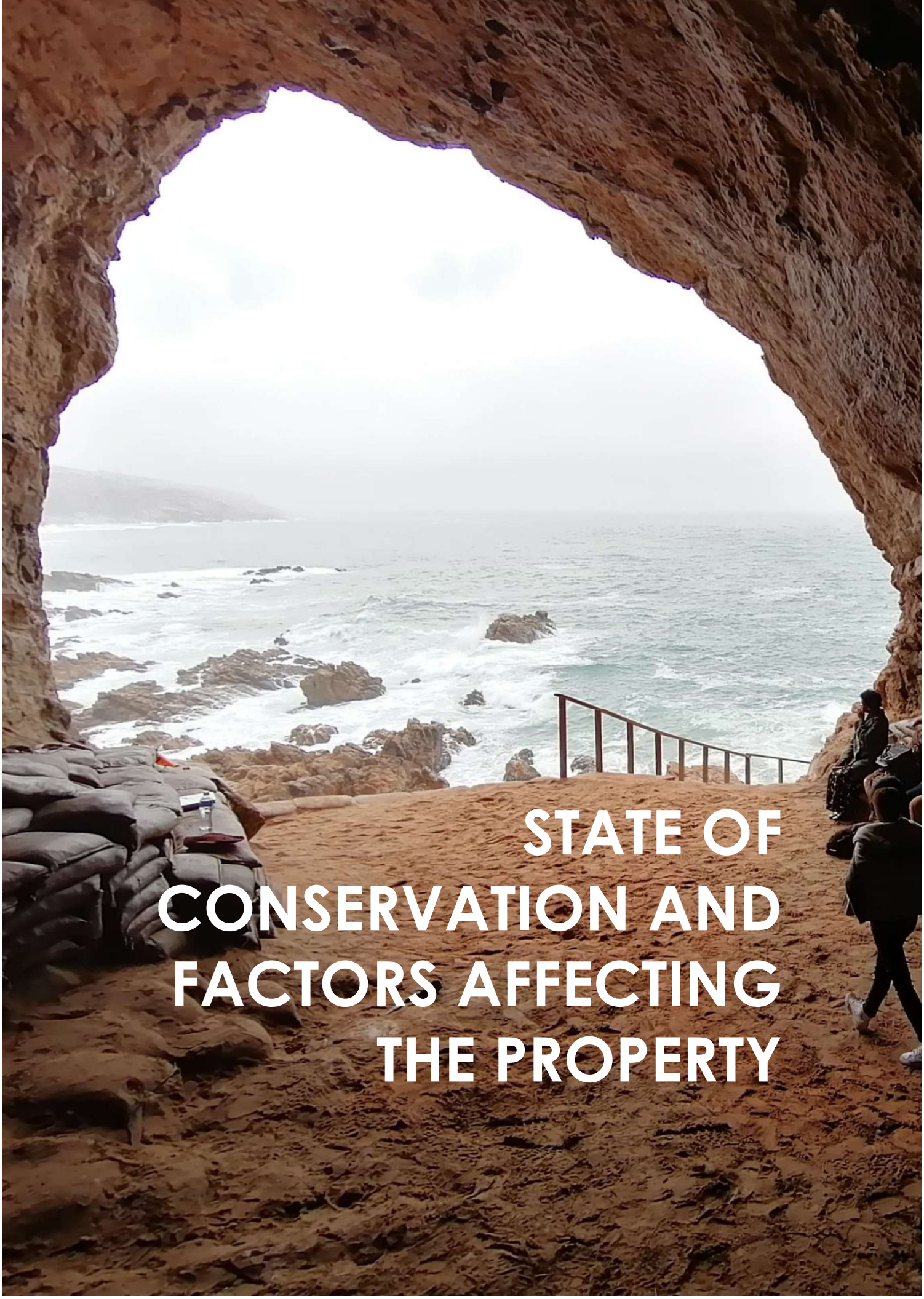
Archaeological discoveries at the three sites have revealed authentic evidence of an original cultural phase in our evolution as humans. All three sites have been excavated by different international multidisciplinary teams of experts, leaders in their field of speciality. These specialists are also linked to some of the most prestigious universities worldwide.

Favourable depositional processes have led to the steady accumulation of archaeologically significant deposits with little or no loss of them due to natural erosion. Fortunately, human activity and development in the immediate vicinity of these sites has been restricted, thus largely minimising or even avoiding damage of these significant archives of key steps within our evolution as a species. The cultural sediments in PP13B and PP5-6 of the Pinnacle Point Site Complex are well protected, as these sites are situated well above the high-water mark of the ocean. At Diepkloof Rock Shelter, the site is located on a small hill about 15 km from the current shoreline. Similarly, Sibhudu Cave is well protected from floods.

e) Requirements for protection and management

All three sites are formally protected under the national heritage legislation and 'no person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such a site' (s. 27(18)).

The sites are also subject to a comprehensive management framework of laws, regulations and planning instruments relating to heritage, conservation and environmental protection, which are detailed in the integrated management plans developed for each site. Besides a Management Authority and a Joint Management Committee rooted in the provincial and national structures, each site has a Management Committee based in the local context and relies on local authorities and the involvement of relevant local stakeholders.



STATE OF CONSERVATION AND FACTORS AFFECTING THE PROPERTY

4. STATE OF CONSERVATION AND FACTORS AFFECTING THE NOMINATED PROPERTY

4.a Present state of conservation

Diepkloof Rock Shelter

The site is elevated well above the Verlorenvlei and their entrances face away from the prevailing wind direction, thereby giving the shelter a fair degree of natural protection. The areas that have been excavated are backfilled with sandbags up to the level of the shelter floor and are considered stable (Figure 36 and Figure 37). There have been no reports of recent vandalism to the rock art or archaeological deposit, although there is some graffiti from the 19th and early 20th centuries, which is now considered part of the heritage of the site.

Figure 36. State of conservation of the excavation area in Diepkloof Rock Shelter 1.

Diepkloof Rock Shelter is protected as a Provincial Heritage Site under Section 27 of the NHRA. As such, and regarding site conservation, HWC can prescribe conservation measures to be taken during and after excavation. Regarding the deposit, ~10% of the volume and ~25% of the area of Diepkloof 1 has been excavated to date.

At the entrance to the main shelter, a small shed has been placed to store the tools of the researchers and archaeologists. This shed will be removed during conservation work to be conducted in 2022.

Figure 37. Current site stabilisation in Diepkloof Rock Shelter 1.

Pinnacle Point Site Complex

Pinnacle Point Site Complex is formally protected as a Provincial Heritage Site in terms of Section 27 of the NHRA. As such, and regarding site conservation, HWC can prescribe conservation measures to be taken during and after excavation.

The excavated sites at PP9, PP13A, PP13B, PP13c and PP5-6 are stabilised with sandbags that protect the sites from erosion, heavy rainfall and potential damage by people. Annexure 5 provides an overview of the sites at Pinnacle Point Site Complex with a basic description for them.

The Archaeological Conservation Management Plan (ACMP) approved by HWC in 2014 (Nilssen et al., 2009), and the current Integrated Conservation Management Plan (IMP) for the site complex reflects the state of conservation of each of the sites. It is unlikely that the conservation status of each of the sites would change, as conditions on the sites remain consistent, and in some cases have improved, such as with site PP5-6 after the water flow issue had been mitigated. However, it is recommended that an

assessment or evaluation of each of the sites should take place every five years, the next evaluation being within the life span of the ICMP.

Sibhudu Cave

The site is currently under excavation by a team under the leadership of Prof. Conard from the University of Tübingen. The site is therefore still open for research and is closed temporarily at the end of each excavation season. Given the current depth of excavation at about 2.7 m, it is important for the site to be kept safe both for the preservation of the deposit itself and for the excavators. In order to make the site safe for excavation, tensioning poles are erected when the site is opened. These poles help to secure wooden boards against the eastern and northern faces of the excavated squares (Figure 38 and Figure 39). The site is filled with bags at the end of each excavation season. For the last 10 years, this arrangement after yearly closing of the excavations has proven successful, without any damage or erosion to the site and its archaeological sediments.

Figure 38. The Cave floor with sandbags to protect the excavation trench and the archaeological deposits.

The KZN Amafa and Research Institute employs a local custodian to watch the site from his homestead across the river when excavations are not being conducted.

Figure 39. Tensioning Poles to Protect the Excavation Pits

4.b Factors affecting the nominated property

4.b (i) Development pressures and management response

Buildings and development

Diepkloof Rock Shelter

The farm owner's house is located in the Buffer zone of Diepkloof Rock Shelter, at the entrance to the property. Based on the municipal zoning regulations, development is limited since the farm is zoned as Agricultural.

The site is located on a small rocky hill, with no clear path to the site, which makes it unsuitable for any development that could jeopardise the OUV. The only planned

development in the buffer zone, is the establishment of tourism facilities including a small reception area, ablution facilities and a parking area for prospective visitors at the site. The formalization of the path from the facilities to the shelter is also planned. The development of these facilities is regulated by municipal, provincial and national legislation.

Pinnacle Point Site Complex

Presently, about 720 people live permanently on the Pinnacle Point Estate[8]. This number excludes daily guests playing on the golf course or temporarily staying on the Estate. The plans for the development of the houses were approved in 2003, before the major finds at Pinnacle Point Site Complex were revealed, and before the Department of Environmental Affairs and Development Planning issued an Environmental Authorization on 29 October 2003 (Department of Environmental Affairs and Development Planning, 2003). Although this development could be seen as a threat to the site, overall, the Pinnacle Point Estate development has been a major contributor to the protection of the caves through controlled access.

A visual impact assessment has been conducted to ensure that the impact of the current and proposed development on the integrity and authenticity of the site, if any, is adequately captured and mitigated (Annexure 4). This assessment identified a number of visual impacts on the attributes to the site's OUV, including visual intrusion, litter and erosion caused by construction activities, visual intrusion on the integrity of the historic landscape, an alteration of the sense of place, and changes to the visual setting that could affect the character of the archaeological assets. Accompanying mitigation measures were, however, identified for each of these impacts to minimise their significance. The visual impact assessment therefore concluded that with the implementation of these mitigation measures, the significance of most of the impacts could be reduced to a low level.

The approved future development at the Estate will be largely in keeping with the development that has already occurred. With the implementation of mitigation, the impact is not anticipated to erode the integrity and authenticity of PPSC's OUV.

A Boutique Hotel is proposed in proximity of the current Club House on the cliff above the proposed World Heritage property, within its Buffer zone. A Heritage Impact Assessment was conducted as part of the Environmental Impact Assessment process. The building will have a maximum height of 10.5m and 2m building lines will be

[8] Personal conversation Mr C. van der Linde, January 2021.

provided on all side boundaries and the street boundary. At the time of writing, recommendations were made by the relevant heritage authority to ensure that the hotel fits within the landscape and that prescription from the Visual Impact Assessment are considered in the design.

In 2007 seepage of irrigation water and storm water from the golf course on specific points of PP13B and PP5-6 deposits was detected. Algae grew from the dripping water and stained some areas of the rocks green. Action was taken to reduce the flow by, amongst other things, moving one of the golf course greens and installing a lining between the grassed surface of the playing areas and the underlying calcrete sediments. Buckets have been placed under the drips to collect the water as part of a monitoring programme. A record is kept of the quantity of water that accumulates to ascertain its potential damage to archaeological sediments, and samples are analysed for chemical content. Future contamination will be mitigated by preventive measures to avoid or minimise damage, as determined through the monitoring programme. The Home Owners' Association works in collaboration with the scientists to assure the integrity of the heritage resources.

Sibhudu Cave

Sibhudu Cave is located in a rural area. Plans are in place for a mixed zone development located about 0.5 km from the cave. The development will include a shopping centre, 4 000 low - cost houses and schools for a total of 620 ha. A 0.5 km distance has been imposed between the Cave and the development zone to ensure that the development does not affect the site negatively.

No major infrastructure development is proposed at the Site. Plans are at an initial stage for the potential development of an Interpretation Centre either by the local custodian's homestead, about 200m from the site, on the other side of the river, or at other alternative locations considered with the assistance of the Department of Economic Development, Tourism and Environmental Affairs in KwaZulu-Natal and the KwaDukuza Municipality.

These are necessary facilities and will not significantly impact the landscape, even if located in proximity of the surrounding homesteads.

Transportation, utilities or service infrastructure

Infrastructure development on the sites themselves and in their Buffer zones is regulated as shown below.

Diepkloof Rock Shelter

There is limited infrastructure around Diepkloof Rock Shelter. The gravel road, which runs from the tarred road across the Verlorenvlei towards the farm, falls under the jurisdiction of the West Coast District Municipality, which is also responsible for its maintenance. A power line (and electrical servitude) runs via the north-east of Diepkloof Rock Shelter towards the east of the site, but it is some distance away from the property and does not obstruct the view of or from the site. Plans are in place for the development of tourism facilities within the buffer zone of the World Heritage Site to welcome tourists on site.

Pinnacle Point Site Complex

The establishment of the golf course and houses on Pinnacle Point Estate above the cliffs and caves was planned and approved before the significance of the archaeological finds were revealed, and before the value of the Pinnacle Point Site Complex was recognised. Despite this, the current management of the Estate is supportive of the research and tourism initiative, and is implementing mitigation measures to avoid any damage to the site. The Buffer zone comprises private roads and electrical and service infrastructure within the Estate. No infrastructure is located within the proposed Property.

Sibhudu Cave

Currently an access path within the Cave is developed with stones indicating the preferred walking route for visitors (Figure 40). A path from the river to the Cave is also delineated to ensure safe access and conservation of the vegetation around the site.

A farm road is located on the top of the cliff, indicating the boundary of the property. No electrical infrastructure is present in the proposed property.

Figure 40. Path within the Cave indicating walking route for visitors.

Biological resources use/modification (fishing, agriculture, forestry)

Diepkloof Rock Shelter

The farm where Diepkloof Rock Shelter is located is a working farm. The farm is normally used for sheep grazing, although the farmer recently had to relocate the sheep because of leopard attacks on the property.

The south-eastern portion of the farm, behind the proposed Property, it is currently adapted to rooibos farming and limited forestry for firewood.

No mining activities are proposed in the property, buffer zone or adjacent area.

Pinnacle Point Site Complex

The Pinnacle Point Estate is a golf course, with no agricultural or forestry activities on the property. Recreational fishermen do however use the coastline within the proposed Property. Their activities are expected to have no impact on the OUV. Fishing has been a traditional activity in the area. With the establishment of the Estate, controlled access to the coastline was introduced, reducing the freedom of fishermen and other community members to use the coastline. Fishermen do however still access the coastline through the Estate controlled access.

No mining activities are proposed in the property, buffer zone or adjacent area.

Sibhudu Cave

Agriculture is not a threat as the forested area around the Cave is not arable given the steep gradients. This provides a natural buffer to the site. Sugar cane fields are located beyond the Buffer zone.

There is currently recorded some illegal extraction of sand for building from the river and the riverbanks. The local natural environment has been impacted with erosion, loss of vegetation and a deep channel developing in this section of river close to the Cave. Consultation with the relevant stakeholders is ongoing to ensure that sand mining on the river's south bank and riverbed is prohibited.

4.b (ii) Environmental pressures, natural disasters and risk preparedness

All sites in the nomination are exposed to the physical environmental factors. However, the sites have conservation and maintenance plans to mitigate the degradation of structures and to facilitate general risk monitoring.

Local conditions affecting physical fabric (wind, humidity, temperature and dust)

Diepkloof Rock Shelter

The large overhang protects the site against wind, sunlight and rain.

As a result of limited annual rainfall (~200 mm), the area around Diepkloof Rock Shelter is generally dry. Although the immediate environment does not support dense vegetation, bushes still grow on the slopes close to the cave. Therefore, without adequate fire management and a quick response from firefighters, fire outbreaks pose a risk. In addition, the nearest fire station is in Clanwilliam, 1.5 hours away from Elands Bay, which has a bearing on the response time of firefighters, who will likely not arrive in time to extinguish a fire when it occurs[9]. As a mitigation measure, a firebreak will be established and maintained at the bottom of the hill on which the rock shelters are located.

Pinnacle Point Site Complex

Given the complex's proximity to the coastline, one of the major threats is erosion. It is evident that the rock shelter (site PP5-6) is more exposed than the cave sites. While a cave creates a microhabitat for organisms, a rock shelter is an overhang with one side remaining open. The sea is closer to the site than it has been at times in the past and this too poses a potential risk. Heavy rains result in streams that flow through parts of the site, and these could potentially destroy archaeological evidence. Erosion also poses a risk to PP13B, but since this is a cave, exposure to the elements is limited. PP5-6 has experienced intense erosion during heavy rains, when a stream forms at the top of the site (to the north) and runs through the site. This storm water is currently being controlled by the construction of diversionary channels.

While fire is identified as a potential risk, it is not regarded as a major risk. The area around the Pinnacle Point Site Complex is generally rocky, and therefore provides limited fuel for fires. Access to the cave is currently by means of guided tours and human-induced fires appear to be less of a risk in this context. However, public access to the coast and the use of the coast by fishermen may pose a risk of human-induced fire. The Estate has developed an Integrated Fire Management Plan which will further ensure that the Estate is able to prevent and, in cases where they occur, manage wildfires on the property.

The ICMP for the Pinnacle Point Estate includes actions to prevent the spread of wildfire and erosion in the Estate. A Conservation Management Programme has also been

[9] Personal conversation with Mr. Jevonk, Disaster Management Officer, Cederberg Municipality, on 6 September 2016.

developed by the Estate to ensure the maintenance of the biodiversity and also of the wildlife corridors within the Estate, to ensure people's safety, and to maintain a pleasant, scenic and diverse landscape (van Zyl, 2014; Du Preez, 2018).

Sibhudu Cave

Sibhudu Cave is well preserved in its natural setting as no direct sunlight nor rain enter the Cave. Water erosion does not take place within the Cave as it is sheltered by an overhanging cliff. The Cave is dry but without grass or other vegetation, which rules out the threat of fires.

Subtropical climatic conditions are partly influenced by conditions at sea which is only 10 km away. It is generally mild all year round, but summer is characterised by high humidity and high temperatures. The area receives summer rain averaging 750 mm, with most rain occurring from October to January. Winter rainfall averages about 250 mm per annum. These conditions do not seem to affect the Site as the interior of the Cave is always dry. The cliff overhang and the thick surrounding forest give natural protection to the Site.

Invasive/alien species and hyperabundant species

Diepkloof Rock Shelter

Because of the rocky and sandy nature of the environment around the shelter, there is no threat of invasive alien species affecting the site. The site is located within the Terrestrial Critical Biodiversity Area, of non-threatened species.

Pinnacle Point Site Complex

The site complex is located along a cliff next to the ocean, and there are no alien invasive species. On the coastal platform above the cliffs and caves, a positive impact of the establishment of the Pinnacle Point Estate is that invasive plant species were identified and eradicated and replaced with indigenous coastal fynbos species. The Conservation Management Programme makes very detailed provisions for the conservation management of fynbos in the Estate.

Sibhudu Cave

Some invasive plant species are included in the forested area delineating the Buffer zone, including *Melia azedarach* (Syringa), *Eucalyptus sp* (Blue gum), *Solanum mauritianum* (Bugweed) and *Lantana camara* (Lantana).

Pollution

Diepkloof Rock Shelter

There is no industry in the vicinity, so the site is not susceptible to pollution.

Pinnacle Point Site Complex

In 2006, irrigation water from the golf course seeped into the caves around PP13B. Chemicals in the water stimulated artificial growth (algae), resulting in the rocks appearing green. Action was taken to reduce the flow by, amongst other things, moving one of the greens on the golf course and installing a lining between the grassed surface of the playing areas and the underlying calcrete sediments. Buckets have been placed under the drips to collect the water as part of a monitoring programme and a record is being kept of the quantity of water that accumulates, to ascertain its potential damage to archaeological sediments. Samples are also analysed for chemical content. Future contamination will be mitigated by preventive measures to avoid or minimise damage, as determined through the monitoring programme. No contamination has yet been recorded.

Sibhudu Cave

Poor management of plastic litter was noticed at the Custodian's homestead and neighbouring households, outside the proposed Property and Buffer zone. Disposed plastic was observed on the banks of uThongathi River, probably transported by the river from sources upstream. The river water is also possibly polluted as it has a greenish tinge which could be caused by agro-chemicals. Although this does not have a direct effect on the Cave itself, the natural environment is affected.

Climate change and severe weather events (storms, flooding, desertification)

Diepkloof Rock Shelter

The already limited rainfall in the area is likely to be further reduced as a result of the effects of climate change. The area around DRS will become drier thereby increasing the risk of and frequency of fires, although the climate in the area around the cave has varied from much wetter to much drier than at present, without affecting the deposits in the cave. For example, the site still retains good organic preservation, which shows the efficacy of the natural protections of the site. In addition, across the entrance to both caves are rocks accumulated over time that act as a natural retaining wall to protect the deposit.

Diepkloof Rock Shelter is located 150 m above the Verlorenvlei, 250 m from the boundaries of a dry riverbed. No flooding events has been recorded at the site, nor it

is expected. The Verlorenvlei is however managed by the Verlorenvlei Management Estuary Plan developed by the Department of Environmental Affairs and Development Planning of the Western Cape Provincial Government in line with the South African National Estuarine Management Protocol promulgated in May 2013 under the National Environmental Management: Integrated Coastal Management Act (Act No. 24 of 2008, as amended by Act No. 36 of 2014), and which sets out the minimum requirements for individual Estuarine Management Plans.

Pinnacle Point Site Complex

An increase in the frequency of intense rainfall as a result of the effects of climate change may increase the risk of water erosion, particularly at site PP5-6. Sea-level rise is also a result of the effects of climate change and poses a further risk with the coastline which is receding. It to note that the sea-level rise during MIS 5 at 125 000 years ago, when sea level was about 6 m higher than today, at its maximum recorded, it did not impact the deposit at Cave 13B.

Sibhudu Cave

Subtropical climatic conditions are partly influenced by conditions at the coast which is only 10 km away. Climate change is known to induce erratic weather patterns. At the present time, the short- and long-term impacts of climate change have not been evaluated. Its location about 7-8m above the uThongathi River, protects it from flooding. While the river often floods seasonally (Figure 41), making the crossing to the site impractical, there are no historical records of flooding having directed impacted the site or models predicting its potential impact.

Figure 41. Crossing the uThongathi river to Sibhudu Cave during the rainy season.

Sudden ecological or geological events (volcanic eruption, earthquake, tsunami, tidal waves)

According to the seismotectonic map of Africa and the data available at the Council of Geoscience in South Africa, all three sites are located in a not defined seismic zone and no historical or instrumental earthquake activities are recorded for the proximity of these three sites. As such, earthquakes are not considered a potential factor impacting negatively on these sites.

4.b (iii) Visitation, other human activities and sustainable use

Current levels of tourism

Diepkloof Rock Shelter

Elands Bay is currently a popular holiday resort and surfer's paradise. Despite the presence of the Elands Bay Cave and several archaeological middens, there is no active cultural tourism yet.

Currently, Diepkloof Rock Shelter is not open to the public as the site is on private property and is vulnerable to damage by visitors. As a result, there is no clear demarcation or signage indicating where the site is located. Considering the sensitivity of the site, it will be mandatory for all visitors to be accompanied by a qualified guide.

Since 2021 Diepkloof Rock Shelter has been included in the Cape Camino experience, along the Sandveld and Strand route on the day between Klarefontein and Elands Bay.

Pinnacle Point Site Complex

As with Still Bay, Mossel Bay is located along the popular Garden Route. In 2017, Mossel Bay experienced an increase in tourists, particularly from India (Western Cape Government, 2018). Existing attractions in Mossel Bay include The Point, which is popular among surfers, and where a natural rock pool is a favourite swimming spot at low tide. It is also the starting point for the St Blaize trail and is the ideal place from which to watch the whales and dolphins at play in season. Other attractions include the Attequas Kloof Pass, the Anglo-Boer/South African War blockhouses and the Bartolomeu Dias Museum Complex.

Tourism to the Pinnacle Point Site Complex started in 2013 and has grown since. Currently, the site complex receives a limited number of visitors under the supervision of a qualified guide (3101 for the 2019/2020 financial year; pre-pandemic). A private company offers guided tours of Pinnacle Point Site Complex with a qualified and specially trained guide or a professional archaeologist who is also an accredited tour

guide (Point of Human Origins, n.d.). This experience is currently rated the top outdoor activity to do in Mossel Bay in terms of traveller ranking, according to Tripadvisor (Tripadvisor, n.d.).

The Pinnacle Point Site Complex has fairly substantial tourism infrastructure. Much of this is associated with the Estate, such as the clubhouse, which has a restaurant and bar facilities and is the starting point for tours down to the caves. In addition, there are extensive pathways and boardwalks connecting the clubhouse to the cave sites, with two wooden stairways leading down the cliffs to the shoreline.

Sibhudu Cave

No official tourism is currently present at Sibhudu Cave, although educational programmes are organised on an ad-hoc basis when excavations are underway. Amafa and Research Institute and the KwaZulu-Natal Museum have partnered to organise guided tours also on an ad-hoc basis, especially directed to school learners, but not limited to them.

Proposed official tourism activities are under discussion with the tourism office of the iLembe District Municipality. A building in disuse, previously used by the Tongaat Hulett sugar company as a workers' compound, has been identified as a possible location for an interpretation centre for the World Heritage Site. Discussions are underway with the relevant stakeholders for the development and funding of this project.

Projected levels of visitation due to inscription

It is difficult to estimate the projected visitor numbers after inscription. However, following international trends, tourism figures are likely to increase. Since 2008, foreign tourism to South Africa has increased steadily, growing between 2% and 4% annually (Statistics South Africa, 2017) despite the global recession. In 2017, 10.3 million foreign tourists visited South Africa, an increase of 2.4% on 2016 (South African Tourism, 2017). The tourism sector continued to create jobs in 2017 and accounted for 4.6% of the workforce, or 726 500 people, a 1.6% increase on 2016. As an industry, tourism contributes 3% to the Gross Domestic Product. Tourism was expected to employ 1.1 m people and contribute almost R500 bn to the national economy by 2020, however because of the current Covid-19 pandemic, more updated projections are difficult to be obtained.

Western Cape

In the Western Cape, the Department of Cultural Affairs and Sport has launched the Cradle of Human Culture, an archaeological and palaeontological heritage tourism route which has sprung from the importance of the three prospective World Heritage

Sites in the province. The route is divided into two sections: the Artist's Journey, along the West Coast, and the Coastal Journey, along the southern Cape coast. These routes aim to introduce visitors to these tourism routes and will provide an opportunity to attract more tourists to the two sites, thereby potentially creating employment for the local community living in and around them.

Diepkloof Rock Shelter

The possibility exists for small-scale tourism to Diepkloof Rock Shelter with a small number of day visitors (a maximum of 12 people) accompanied by a qualified guide. This small group of potential visitors would need to be carefully managed. Visitor management would cover different aspects of visitor interactions: i) identifying how visitors get to the site; ii) managing access and visitor numbers to the site; and iii) identifying specific actions that should be implemented by the Diepkloof Committee. Proposed tourism to Diepkloof Rock Shelter should follow the Responsible Tourism Guidelines outlined by UNESCO (Pederson, 2002). These guidelines include small-scale and restricted access. These principles will be followed during the development of the small tourism infrastructure planned at Diepkloof Rock Shelter for the end of 2021. Controlled access and a limited number of visitors under the direct supervision of a guide are the main principles guiding the development of the reception area and the path leading to the site.

The expectations of visitors about the site, and the expectations of the local community members about the economic potential of tourism, should be managed to avoid unreasonable expectations that could create a negative perception of the site. Tourism should therefore be developed slowly and in line with the existing capacity of community members.

Pinnacle Point Site Complex

Current tourism numbers to Pinnacle Point are low, about 3 000 visitors/year. Improved marketing of the site complex to the Estate could increase these numbers. The group size should be limited to 15 with one guide and possibly 25 if two guides are brought to site. Group numbers above 15 are however discouraged since they would provide a more limited visitor experience.

To avoid increased pressure on the site itself, the Mossel Bay Municipality has plans to develop the Point Precinct in the town and to create a multi-purpose interpretation centre, also referred to as the Point Discovery Centre. The interpretation centre should be the place to which most of the visitors interested in Pinnacle Point Site Complex go to, as the adjacent Cape St Blaize Cave is an authentic MSA site that has a similar chronological sequence as in Pinnacle Point MSA sites. For PPSC, collaboration with the

planned interpretation centre on future tourism development is essential to ensure that tourists to both sites are assured of a quality experience.

KwaZulu-Natal

Tourism is one of the key economic sectors in the KZN Province but has been in a state of decline for quite some time. The sector is supported by the numerous hotels and restaurants across the Province. In 2010 there were 956 550 tourists visiting KZN, which decreased to 908 277 in 2011, and further decreased to 891,822 tourists in 2012, 847 146 in 2013, 768 228 in 2014 and 743 615 in 2015 (KwaZulu-Natal Tourism Authority, 2019). The tourist numbers indicate that the number of foreign tourists from Africa has decreased slightly, from 393 017 in 2010 to 371 218 in 2015 with a decrease in road trips South Africans are making to KZN.

Tourism remains one of the mainstays of the local economy. Many domestic tourists visit the area (KwaDukuza Municipality, 2020). Developing new and appealing destinations in the Province is a critical function of KZN's Tourism Development Department (TKZN).

Sibhudu Cave

Currently, only ad-hoc tourism is allowed at Sibhudu Cave. However, during the compilation of the Integrated Conservation Management Plan, suggestions have been put in place and discussion were started about the possible development of a suspended bridge which will allow for the crossing of the river by a guided number of tourists.

Socio-economic benefits and the growth of heritage tourism

Locally and internationally, heritage and cultural tourism is a growing competitive niche tourism segment. Tourists are increasingly seeking authentic and memorable experiences through meaningful interaction with local peoples and their cultures (Viljoen and Unathi, 2017). In addition, the potential exists for heritage and cultural tourism to contribute to economic development, social cohesion, the creation of awareness, and the conservation of natural and cultural resources.

Western Cape

In the Western Cape the cultural diversity of the existing heritage products is under-represented, and as a result under-performing, despite being considered highly desirable by tourists (Department of Tourism, 2012). In 2017, the tourists who were most interested in cultural and heritage activities were visitors from Norway (63%), France (58%) and the Netherlands (57%) (South African Tourism, 2017). If properly managed, increased tourism to the heritage sites would add to the sites' sustainability, since there

would be a steady flow of financial resources, from either entrance fees or the purchase of souvenirs and food, that would contribute to enhancing the livelihoods of the local communities. Potential negative effects could be mitigated by undertaking carrying capacity studies (Robben Island Museum, 2017).

Diepkloof Rock Shelter

The establishment of the interpretation centre in Elands Bay for Diepkloof Rock Shelter and other local sites is well underway. The Elands Bay Museum has been proclaimed a local museum and seed funding has been made available by the Western Cape Government for setting up the museum infrastructure.

Local guides will be trained for the sites in the area and for the interpretation centre. Additionally, the interpretation centre is expected to hire a minimum of three people.

The town of Elands Bay has one of the highest levels of unemployment in the province and in the country. While it initially developed as a fishing community, the introduction of a quota fishing system and the overall decline in marine resources in the area have impoverished the community even further. Therefore, the development of an interpretation centre linked to the World Heritage Site is expected to support and boost the existing tourism in the area, which is so far mostly focused on surfing and birdwatching.

Pinnacle Point Site Complex

The team excavating the Pinnacle Point Site Complex has involved the community in the project since its inception in 2004. Since inception of the excavation, the team has trained and employed several locals and currently employs five people all year round, who are responsible for the excavation and post-excavation process. All five people currently employed by the project have become highly trained and skilled sorters or excavators. Three of the five workers are from previously disadvantaged backgrounds. The way in which this project has harnessed local skills is exemplary of the achievements that an international excavation project can bring to local communities (Marean, 2018).

As mentioned above, the current tourism activities at Pinnacle Point have created employment so far for one local archaeologist and one guide; however, the Department of Economic Development and Tourism is currently in the process of training additional guides for the sites included in the Cradle of Human Culture heritage tourism route and for the proposed interpretation centre in Mossel Bay. Mossel Bay hosts the Bartolomeu Dias Museum, which currently narrates the history of Mossel Bay and receives about 100 000 visitors every year. The Bartolomeu Dias Museum Complex may

serve as the institutional base for the organisation and management of guided tours to the Pinnacle Point Site Complex, at least while the interpretation centre is being set up. This relationship with the museum, which is also managed by the Western Cape Government, is expected to increase the number of visitors to the Pinnacle Point Site Complex and therefore provide more work for the local communities.

The proposed interpretation centre in Mossel Bay is, moreover, expected to employ an additional number of people, although the exact number cannot currently be indicated.

KwaZulu-Natal

The KZN province has many of the South Africa's prime heritage sites. These sites include monuments, museums, built environments, heritage precincts, cultural and natural landscapes, places of worship, archaeological sites, fossil sites, caves, middens and rock art. Of these sites, two are UNESCO World Heritage Sites namely the iSimangaliso Wetlands Park and Maloti-Drakensberg Mountains. However, not all heritage sites are accessible to tourists, because either they are: i) remotely located; ii) located on private land; iii) vulnerable; and/or iv) do not have adequate tourism infrastructure.

A key feature of heritage tourism within KwaDukuza Municipality is the history associated with King Shaka who died on the 24th of September 1828. The 24th of September was commemorated yearly as the 'Shaka Day' by the Zulu people, and later on became the 'Heritage Day' and is celebrated by the whole country as a public holiday.

The King Shaka Cultural Heritage Tourism Trail is in process of being implemented in KwaDukuza in honour of the heritage that King Shaka left behind. This project is also known as the "Gateway to the Zulu Kingdom" of KwaZulu-Natal.[10]

KwaDukuza also boasts to be the home of the first African to win the Nobel Peace Prize, Chief Albert John Mvumbi Luthuli (KwaDukuza Municipality, 2007). During the month of August 2004, South African from all occupations joined the people of KwaDukuza in celebrating the life and times of this Son of Groutville. The Chief Albert Luthuli's House is also a popular tourism asset that boosts heritage tourism for the area. Additionally, Chief Luthuli's Grave as well as the renovation of Church in which Chief Albert Luthuli's body laid in state (KwaDukuza Municipality, 2007) are also key assets. On 4th of

[10]https://www.kzndhs.gov.za/Uploads/documents/Services/Integrated_Planning/Kwadukuza%20Municipal%20Housing%20Sector%20Plan/KwaDukuza%20Housing%20Plan%202007-2012-Five%20Year%20Plan.pdf. Accessed on 17 February 2021.

November 2007, the then President of Republic of South Africa Mr T. Mbeki and his cabinet joined thousands of people from KZN and KwaDukuza in celebrating the life of Chief Albert Luthuli on the 40th Anniversary of his death.

The name KwaDukuza epitomizes the historical background of the area being the home to King Shaka Gravesite and Memorial. The town KwaDukuza is built on the original site of King Shaka's Royal settlement called Dukuza. The KwaDukuza Museum is situated opposite the site of King Shaka Memorial and is dedicated to the sugar industry and colonialism, the cultural heritage of the early settlers of the town KwaDukuza.

Furthermore, there are plans for the extension of Cradle of Human Culture to KZN. Amafa Research and Institute plans to carry out a Feasibility Study for the extension of this route to KZN. Sibhudu Cave and Border Cave will form part of the Route. The Feasibility Study will present a good opportunity to explore tourism potential for the two Caves, and the work will include the possibilities of developing an Interpretation Centre for each site.

Sibhudu Cave

The establishment of the interpretation centre for Sibhudu Cave will create a few jobs within the local community, once it is set up. This, coupled with opening the site to limited guided site visits, will contribute to limited job creation within the surrounding community.

PROTECTION AND MANAGEMENT OF THE NOMINATED PROPERTY

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5. PROTECTION AND MANAGEMENT OF THE NOMINATED PROPERTY

5.a Stakeholders

Extensive stakeholder consultation was conducted as part of both the compilation of the Integrated Conservation Management Plans and the preparation of the nomination dossier.

The public consultation meeting invitations were sent to all ward councillors, local and district municipalities, indigenous groups, duly registered conservation bodies, heritage organisations, tourism offices, chambers of commerce, landowners, custodians of the properties, community at large.

A stakeholder consultation report is attached to this dossier as Annexure 6.

5.a (i) Ownership and inhabitants

All three properties are located on private land and their ownership is described in Table 18.

Diepkloof Rock Shelter and its Buffer zone fall within the Cederberg Local Municipality, which is in the West Coast District Municipality. The site is included within one single portion, Portion 3 of the Farm Groote Drift 5. The portion is owned by Verlorenvlei Vakansieplaas, a private company whose sole director is Mr Steyn, who lives and works on the property with the family.

Pinnacle Point Site Complex and its Buffer zone fall within the Mossel Bay Local Municipality, which is in the Garden Route District Municipality. The proposed property is included within Erf 15391, owned by the Pinnacle Point Home Owners' Association Non-Profit Company (Map 11).

The buffer zone includes:

- The residential erven within Erf 15391, which are privately owned with the owners being represented by the Pinnacle Point Home Owners' Association Non-Profit Company;
- Erf 15390 which is owned by the Mossel Bay Municipality and lease to the Pinnacle Point Estate for conservation purposes for 99 years. Only 6ha of the northern section of the Buffer zone were earmarked for a sport field, community use and single residential zone as users.

The property of Sibhudu Cave is included within the KwaDukuza Local Municipality, within the iLembe District Municipality. The site is located on Portion 10 of the Farm Sinembe no. 16902-fu, owned by Mr Mhlongo (Map 12). The Sibudu Trust is in the process of applying for subdivision of this property and acquire the newly formed portion Sibhudu from Mr Mhlongo. The subdivision is in the process of being approved by the Local Municipality.

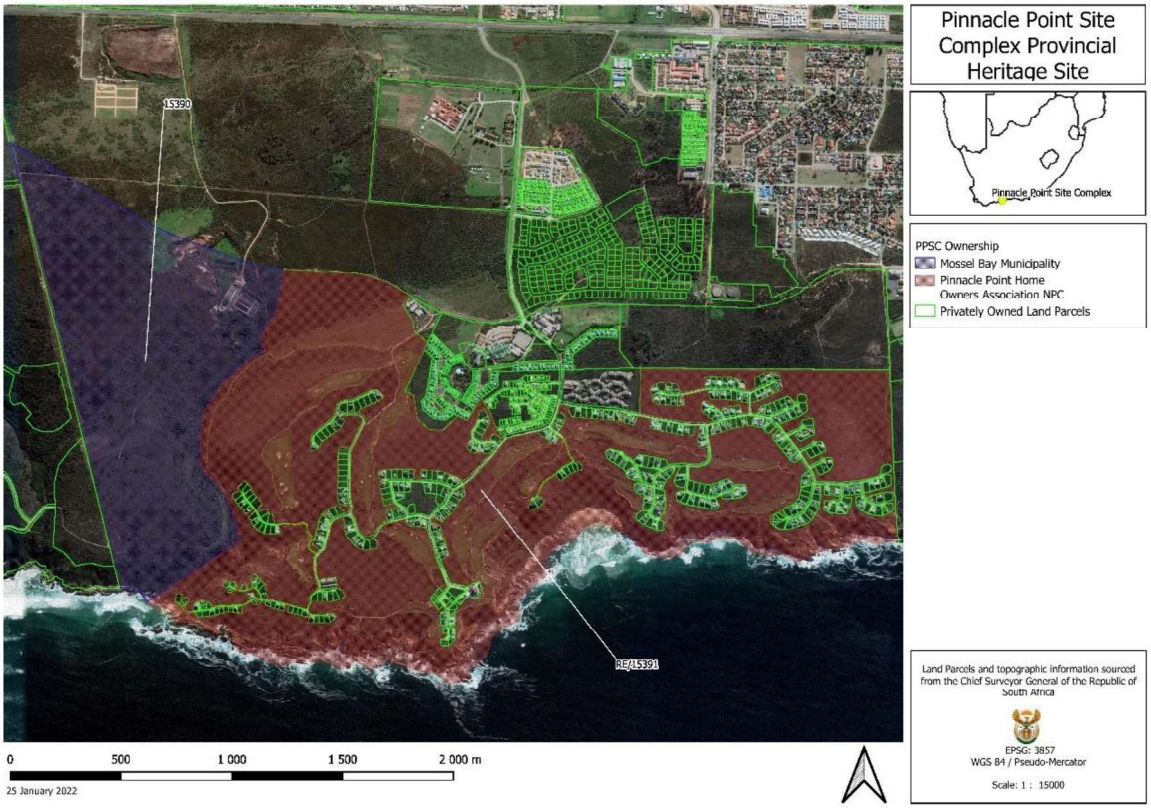
The buffer zone is divided between the KwaDukuza and the Ndwedwe Local Municipalities, the boundaries of which is the uThongathi River. Both are located in the iLembe District Municipality. The Buffer zone is divided as follow:

- Portion 10 of the Farm Sinembe no. 16902-fu, owned by Mr Mhlongo.
- Portion 17 of Farm 16902, owned by Yethu Family Trust leased to Hulett Tongaat
- Portion 1 of Farm 17825, owned by KDC Consulting and Development

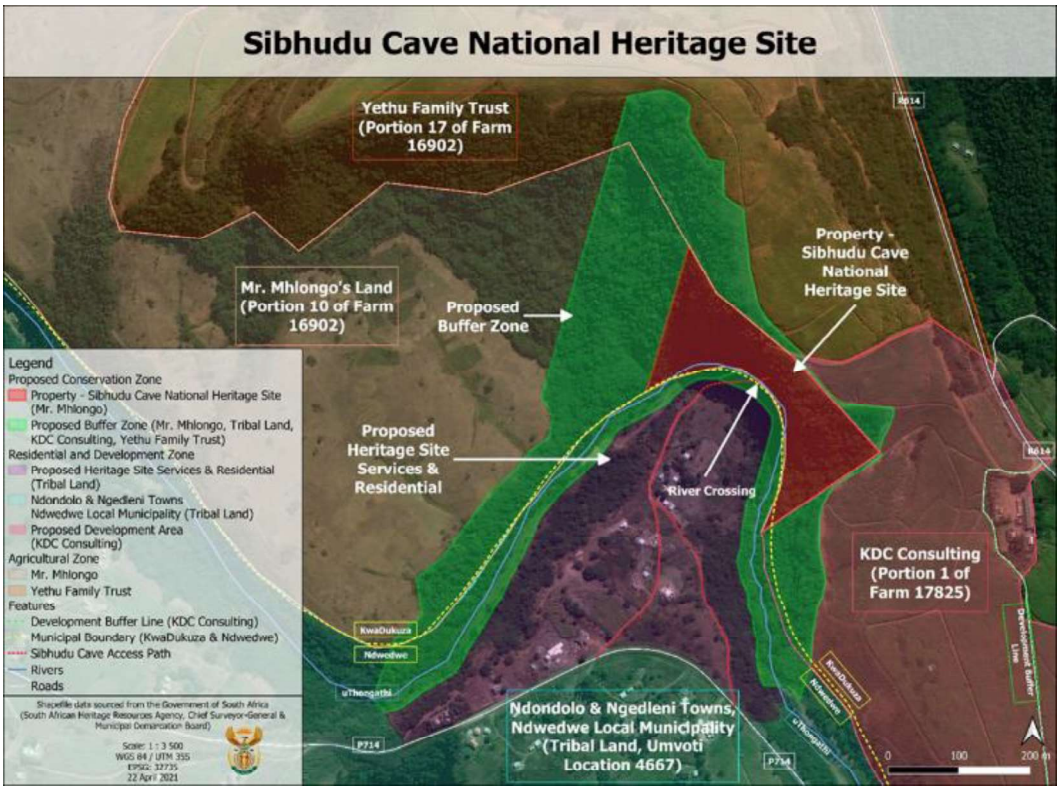
Table 18. Ownership of nominated properties and buffer zones

Name of site	**Type**	**Erf No.**	**Owner**
Diepkloof Rock Shelter	Property	Portion 3 of the Farm Groote Drift 5	Verlorenvlei Vakansieplaas
	Buffer zone	Portion 3 of the Farm Groote Drift 5	Verlorenvlei Vakansieplaas
Pinnacle Point Site Complex	Property	Erf 15391	Pinnacle Point Home Owners' Association
	Buffer zone	Erf 15391	Pinnacle Point Home Owners' Association
		Residential erven within Erf 15391	Privately owned with the owners being represented by the Pinnacle Point Home Owners' Association Non-Profit Company
		Erf 15390	Mossel Bay Municipality

Name of site	Type	Erf No.	Owner
Sibhudu Cave	Property	Portion 10 of Farm Sinembe no. 16902-fu	Mr Mhlongo
	Buffer zone	Portion 10 of Farm Sinembe no. 16902-fu	Mr Mhlongo
		Portion 17 of Farm 16902	Yethu Family Trust
		Portion 1 of Farm 17825	KDC Consulting and Development



Map 11. Map of ownership of at Pinnacle Point Site Complex. Scale 1: 15 000.



Map 12. Map of ownership of Property and Buffers at Sibhudu Cave. Scale 1: 3 500.

Number of inhabitants within the nominated property

Diepkloof Rock Shelter

There are no inhabitants within the nominated Property, but a residential house inhabited by the landowner's family (four people) is located in the Buffer zone.

Pinnacle Point Site Complex

No inhabitants are living within the nominated Property. However, about 720 people currently live in the Buffer zone, where residential houses exist as part of the Estate.

Sibhudu Cave

There are no inhabitants within the nominated property of Sibhudu Cave and its buffer zone.

Estimated local population within:

Area of Nominated Property: 0

Buffer zone: about 724

Total: about 724

Year: 2022

5.a (ii) Indigenous Peoples

While the three sites are located on privately owned land, extensive public participation was conducted with communities living in proximity of the sites. This included descendants of Khoe and San indigenous populations, where applicable.

Representatives of these communities were invited at all stakeholder meetings held during both the drafting of the nomination dossier and the drafting of the Integrated Conservation Management Plans. A version of the Integrated Conservation Management Plans and of the nomination dossier were sent to all invitees. While the language of these documents is English, at the public participation meetings participants were allowed to express themselves in the language they feel the most comfortable with, which is usually Afrikaans for the Khoe and San descendants in the Western Cape. This is in line with the language policy of the Western Cape Government.

The first round of public participation meetings hosted at the Municipal Hall in Mossel Bay did not hold the expected participation, therefore, two special stakeholder meetings were organised specifically inviting Khoe and San descendant representatives. These two meetings were held in 2019 in KwaNonqaba and in Groot Brak. The minutes of these meetings are included in the stakeholder engagement report attached to this document. Communities and representatives of Indigenous People are favourable to the declaration of the three sites, however they would like to be involved in the management of the site themselves and potentially in the economic beneficiation of the site.

Since 2020, an Open Day has been organised for these sites, specifically focusing on Indigenous Population groups.

Once the establishment of the Management Authority is completed, the site management committees will include a representative of the Indigenous Populations.

Additionally, the Cradle of Human Culture which is the archaeological and palaeontological heritage tourism route which uses as anchor sites the sites within this nomination, includes in its steering committee San and Khoe representatives.

5.a (iii) Participation

Public participation meetings were held in all communities adjacent to the sites. E-mails with the relevant documentation was sent to all registered conservation bodies for the area; heritage organisations; community representatives, ward councillors, local museums; academic and archaeologists; site neighbours and adjacent communities.

Advertisements for the meetings were also hung at the community centres when necessary. Numerous presentations on the Cradle of Human Culture and its relation with the nomination dossier of the Emergence of Modern Humans were held in different fori.

The project was also presented separately to provincial government (KZN and WC) and all local and district Municipalities.

All these stakeholder engagements were held for all three sites in the preferred language of discussion of the participants: isiZulu and English for Sibhudu Cave and Afrikaans and English for Pinnacle Point Site Complex and Diepkloof Rock Shelter.

A complete stakeholder report is attached in Annexure 6 inclusive of identified stakeholders and means of engagement.

Additionally, the final nomination dossier was submitted in November 2021 to the Economic Sectors, Employment and Infrastructure Development (ESIEID) Cluster, in December to the ESIEID Cabinet Committee and final approval was received by national Cabinet in February 2022.

5.b Protective designation

South Africa has a well-developed system for the protection of its heritage, which has been established through its heritage, environmental and land-use planning legislation and associated frameworks. These are set out in the following Acts of Parliament, all of which combine to provide the protective framework necessary for the three sites that make up this serial nomination:

- World Heritage Convention Act, No. 49 of 1999: Provides for the incorporation of the World Heritage Convention into South African law and for the management of World Heritage Sites.
- National Heritage Resources Act, No. 25 of 1999: Provides for the protection of South Africa's National Estate and has been used to formally protect each of the three nominated properties. Other provisions of the Act provide for the control of impacts on these sites.
- National Environmental Management Act, No. 107 of 1998: Provides for a system of impact assessment, and in so doing controls impacts on the properties.
- National Environmental Management: Protected Areas Act, No. 57 of 2003: Provides a range of environmental protections for World Heritage Sites and prevents mining and prospecting in such areas.
- Spatial Planning and Land Use Act, No. 16 of 2013: Through providing for each municipality to have a Land Use Management System, the Act determines and

manages development rights and can be used to protect the areas around World Heritage Sites.

The relevant provisions of each piece of legislation dealt with above, and how they are applied, is set out in detail below, insofar as they apply to this nomination and are applied to the sites it concerns.

World Heritage Convention Act

The World Heritage Convention Act, No. 49 of 1999, incorporates the World Heritage Convention into South African law and establishes a framework for the establishment and management of World Heritage Sites. The latter specifically includes a system for the management of World Heritage Sites, including the establishment, under Chapter III, of management authorities for each of them, and the provision of Integrated Management Plans in terms of Chapter IV.

National Environmental Management Act

The National Environmental Management Act (NEMA), No. 107 of 1998, as amended, provides for a system of environmental impact assessment, which, as set out above, is well integrated with the system provided for by the NHRA. The principles for impact assessment are set out in Chapter V of NEMA, as well as regulations for the system of assessment. The national or provincial department responsible for environmental matters makes the decision based on the advice of the relevant Heritage Resources Authority (HRA). In terms of the principle of administrative fairness set out in Section 3(2)(a) of the Promotion of Administrative Justice Act, No. 3 of 2000, it has been established that the national or provincial department should only deviate from such advice in the event of a conflict between environmental and heritage considerations, and then only after a process of consultation with the relevant HRA. NEMA also makes provision for an appeal system, in this case to the Minister of Environment Affairs or the Minister's provincial counterpart, and thereafter provides for recourse to the courts of law.

National Environmental Management: Protected Areas Act

The National Environmental Management: Protected Areas Act (NEM:PAA), No. 57 of 2003, as amended, is the legislation used to protect national parks, provincial nature reserves and certain other categories of formally declared environmental reserves, including, via the provisions of Section 9(b), all of South Africa's World Heritage Sites. Once a site is inscribed on the World Heritage List and gazetted as such, Section 13 of the NEM:PAA automatically applies to both the Property and its Buffer zone. This Act and its regulations provide a wide range of environmental and related protections,

applicable to national parks and other protected natural areas. The NEM:PAA regulations are far reaching and provide a useful tool for the management of visitors to World Heritage Sites and for the control of various potential impacts on these sites. For example, Section 48(1) expressly prohibits mining and prospecting in protected areas. In addition, the regulations of the Act provide a broad array of measures useful in the day-to-day protection and management of World Heritage Sites. These are particularly useful for managing access, development, and the environmental resources within the site.

National Heritage Resources Act

The National Heritage Resources Act (NHRA), No. 25 of 1999, is comprehensive heritage legislation that provides for South Africa's system of heritage resources conservation and management at national, provincial and local level. At national and provincial level, independent public entities have been established to implement the relevant provisions of the Act, in the form of the South African Heritage Resources Agency (SAHRA) at national level and a Provincial Heritage Resources Authority (PHRA) in each province. Some provinces have elected to enact their own legislation covering certain aspects regarding heritage administration, but are bound by the standards set in the NHRA and are subjected to biennial evaluation by SAHRA.

Section 27 of the NHRA outlines the regulations around the formal protections of national or provincial heritage sites. It states that 'No person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any heritage site without a permit issued by the heritage resources authority responsible for the protection of such site'. In addition, 'the responsible heritage resources authority may make regulations pertaining to heritage sites under its control, or to any other heritage site with the consent of the owner of that site: (a) safeguarding heritage sites from destruction, damage, disfigurement, excavation or alteration; (b) regulating the conditions of use of any heritage site or the conditions for any development thereof; or (c) regulating the admission of members of the public to a heritage site, and the fees payable for such admission'. Moreover, 'the responsible heritage resources authority may, by agreement with the owner of a heritage site —

(a) conserve or improve any heritage site;

(b) construct fences, walls or gates around or on a heritage site;

(c) acquire or construct and maintain an access road to a heritage site over any land, and construct upon such land fences, walls or gates; or

(d) erect signs on or near a heritage site'.

According to Section 42 of the NHRA, a provincial or local authority, conservation body or community may enter into a heritage agreement with the owner of a heritage property to provide for the conservation, improvement or presentation of a clearly defined heritage resource, subject to the consent of the owner of the property.

Section 38 of the NHRA sets out a system for the assessment of development impacts with regard to heritage resources. It is applied in conjunction with the impact assessment provisions of NEMA (see discussion below) and provides for the relevant HRA to make inputs to the environmental authority concerning impacts on heritage resources, and in so doing to influence its decision-making processes. In addition, Section 38(1) of the NHRA also provides for a system of heritage impact assessment in instances where NEMA would not trigger an assessment. These circumstances are set out in detail and are as follows:

(a) the construction of a road, wall, powerline, pipeline, canal or other similar form of linear development or barrier exceeding 300 m in length;

(b) the construction of a bridge or similar structure exceeding 50 m in length;

(c) any development or other activity which will change the character of a site—

(i) exceeding 5 000 m^2 in extent; or

(ii) involving three or more existing erven or subdivisions thereof; or

(iii) involving three or more erven or divisions thereof which have been consolidated within the past five years; or

(iv) the costs of which will exceed a sum set in terms of regulations by SAHRA or a provincial heritage resources authority;

(d) the re-zoning of a site exceeding 10 000 m^2 in extent; or

(e) any other category of development provided for in regulations by SAHRA or a provincial heritage resources authority.

The provisions of Section 38 of the NHRA apply to any development of the scope set out that might occur in the Buffer zone or in close proximity to the nominated Properties.

Further to the above, the NHRA provides for a two-tier system of appeal against any decision of an HRA. Section 49(1) provides for an internal appeal system within the HRA and Section 49(1) for a further right of appeal to a tribunal established by the national Minister for Sport, Arts and Culture, and at provincial level the Member of the Executive Council (i.e., a provincial minister). Thereafter, there may still be recourse to the courts of law.

Spatial Planning and Land Use Management Act

The Spatial Planning and Land Use Management Act, No. 16 of 2013, is used by municipalities to manage land use and development rights. The two relevant requirements under this legislation are the Spatial Development Framework (SDF) and the Land Use Management System (LUMS).

The SDF is a long-term development policy framework, which is linked to and informs general municipal development planning, and which determines the allocation of development rights. The provisions of an SDF relating to land use and development rights are thereafter set out in detail in a LUMS, in effect a zoning scheme, which precisely defines the uses to which each parcel of land (lot, erf or farm sub-division) may be put, and prescribes and limits the forms of development appropriate in each instance. Relevant to this discussion is that between the SDF and LUMS, a series of maps showing land-use categories and a set of tables setting out maximum development rights for each land-use type are generated.

This system of determination of land use and development rights is useful in protecting heritage sites from the impacts of development on surrounding land parcels, through its ability to control the type of land use and determine the maximum extent to which an allocated land use may be developed. It is hence used as a mechanism for the determination of the Buffer zones of certain of the nominated Properties. A useful mechanism that can be provided in a LUMS is the creation of a special zone that restricts development across a geographical area, and beyond the limitations of the development restrictions associated with specific land uses within the geographical area so designated.

The drafting process for an SDF or LUMS involves extensive consultation with landowners and other stakeholders, and is usually conducted in several phases, the objective being, as far as possible, to build consensus around land use and development rights issues.

Proposed World Heritage Properties

The properties that make up this nomination are all protected as Provincial or National Heritage Sites. As the PHRA for the province of the Western Cape, HWC is responsible for the protection of formally protected sites in terms of Section 27(16) of the NHRA (i.e., Diepkloof Rock Shelter and Pinnacle Point Site Complex), whereas in terms of Section 27(15) of the NHRA, the South African Heritage Resources Agency is responsible for the protection of National Heritage Sites (i.e. Sibhudu Cave).

Section 27(18) stipulates that a permit is required from the relevant heritage authority to 'destroy, damage, deface, excavate, alter, remove from its original position, subdivide

or change the planning status of the declared area'. According to Section 13 of the NEM:PAA, as amended, the sites that are inscribed as a serial World Heritage Site will also become protected areas, which is the most strenuous designation possible under environmental law.

Buffer zones

The sites to be included in the Emergence of Modern Humans World Heritage Property all have a Buffer zone. While the core sites are protected in terms of Section 25 of the NHRA, Buffer zones are treated differently in terms of the Act. There are two ways in which the declaration of a Buffer zone can be implemented.

The first is to declare the area a protected area in terms of Section 28 of the NHRA. The Act allows for an area to be declared a protected area, ensuring consultation between the affected landowners, SAHRA and the Management Authority. The Act states:

28.(2) the heritage authority may, with the consent of the owner of an area, by notice in the provincial Gazette designate as a protected area—

a) such area of land surrounding a provincial heritage site as is reasonably necessary to ensure the protection and reasonable enjoyment of such site, or to protect the view of and from such site; or
b) such area of land surrounding any wreck as is reasonably necessary to ensure its protection; or
c) such area of land covered by a mine dump.

The second option is to declare the Buffer zone a heritage area in terms of Section 31 of the NHRA. In this case the Buffer zones would be integrated into the local municipal zoning scheme. This would allow close local implementation of the various management measures from the Site Management Plan (SMP) for each site. It should be noted that this form of Buffer zone management works better in larger, mature municipalities with a working building inspectorate.

Buffer zones are also protected in terms of the National Environmental Management: Protected Areas Act (No. 57 of 2003) (NEM:PAA). A Buffer zone is declared under Sections 28(1) and (2)(a), according to which 'The Minister or the MEC may by notice in the Gazette (a) declare any area specified in the notice (i) as a protected environment; or (ii) as part of an existing protected environment; and (b) assign a name to the protected environment'. This declaration 'may only be issued to regulate the area as a buffer zone for the protection of a special nature reserve, World Heritage Site or nature reserve'.

5.c Means of implementing protective measures

Two sites have Provincial Heritage Site status and one has National Heritage Site status (Table 19), both of which fall under the provisions of Section 27 of the NHRA, which, in Section 27(18), prescribes that 'No person may destroy, damage, deface, excavate, alter, remove from its original position, subdivide or change the planning status of any (provincial) heritage site without a permit issued by the heritage resources authority responsible for the protection of such site'.

Table 19. Status and date of declaration of sites.

Name of Site	Status	Date
Diepkloof Rock Shelter	Provincial Heritage Site	23 September 2014
Pinnacle Point Site Complex	Provincial Heritage Site	14 December 2012
Sibhudu Cave	National Heritage Site	18 December 2020

Diepkloof Rock Shelter

The area below the 100 m contour line of Portion 3 of Farm Groote Drift 5 is the proposed Buffer zone for Diepkloof Rock Shelter. A small portion of the farm on the far southern end of the parcel of land is currently used for agriculture, with the remainder retained as a wilderness area. Satellite imagery from over the past 14 years shows that the agricultural land appears to have been planted only irregularly, and has not been planted at all for several years. Map 3 shows the proposed Property and Buffer zone of Diepkloof Rock Shelter.

Map 13. Protected area under Section 28 of the NHRA for the Property of Diepkloof Rock Shelter.

A section of the Buffer zone, indicated in Map 8, has been declared a protected area (Map 7) under Section 28 of the NHRA, allowing for the development of tourism infrastructure within the Buffer to service the proposed World Heritage Site.

Pinnacle Point Site Complex

In terms of the provisions of the Western Cape's Land Use Planning Act of 2014, a 'heritage buffer zone' has been created by the Mossel Bay Municipality, following approval by the Municipal Council in September 2015, and Gazetted on the 18th of November 2021 in Provincial Gazette 8520 as a response to the proposed World Heritage Nomination. This heritage area involved the creation of a special zone that applies across conventional land use zones and encompasses the entire extent of the Pinnacle Point Estate, i.e., Erf 15391 (a portion of Erf 2001), and the numerous residential and 'other' erven that fall within its boundaries.

Additionally, whilst recognising existing land uses and development rights, the Act requires that all changes to land use and any new development applications must be processed by Heritage Western Cape. This ensures that such proposals do not have a negative impact on heritage resources. The heritage buffer zone became an overlay zone when the Mossel Bay Municipality implemented the new Town Planning Scheme By-Law in March 2017.

If Pinnacle Point Site Complex obtains World Heritage Site status, the Protected Areas Act will also automatically apply.

In World Heritage terms the 'Property' of the site is completely included within the Provincial Heritage Site, although the extent of the Provincial Heritage Site is wider than the extent of the Property. The boundary of the Property is set for most of the extent to the Cape St Blaize Trail, which is a registered servitude footpath in the name of the Mossel Bay Municipality[11]. This servitude is in effect a 'right of way', as the trail is part of the national trail system. In addition, the St Blaize Trail creates an opportunity for the public to access the coastal zone. Public access to the coast is also in effect a 'right of way', because the Integrated Coastal Management Act gives South African citizens right of access to and along the coast.

Sibhudu Cave

The Property is currently vacant and unused, apart from the cave area. The Property is zoned for agricultural purposes and is outside the provisions of the KwaDukuza Local

[11] C. Van der Linde, pers, com. 2016. General Manager, Pinnacle Point Estate.

Municipality Land Use Scheme. The adjacent portions of farm sites are also zoned for agriculture, except for sites across the uThongathi River, comprising of Ndwedwe settlement zoned for residential purposes. The densities are generally low, with a single house per plot, in keeping with the traditional way of developing rural settlements. The portion of land in question is very steep, as the caves are in a cliff face overlooking the uThongathi river.

The forest around the Cave already forms a natural buffering mechanism for protecting the Cave. It is thickly wooded and steeply sloped and for that reason the forest is still intact. The proposed buffer is the forest itself as it enclaves the Cave. Its borders are easily discernible as it follows the perimeter of the forest. It is always helpful to have easily discernable borders for a buffer zone, such a road or a natural feature that stands out, to avoid confusion.

The thickly vegetated area surrounding the Cave which is delimited as buffer zone has never been cleared for agriculture by Tongaat Hullet, undoubtedly because of the steepness of the slope, and it is unlikely to be cleared in the future. The owners are in full support of the World Heritage Nomination, however the buffer zone should be indicated as such in municipal planning documents such as the Spatial Development Framework, etc.

5.d Existing plans for the municipality and the region in which the nominated property is located

In terms of Chapter 5 of the Local Government: Municipal Systems Act, No. 32 of 2000, every municipality in South Africa is required to have an Integrated Development Plan (IDP). An IDP is a five-year plan conforming to the term of office of a Municipal Council, and is revised and updated annually to inform the budget of the municipality, which may not incur development expenditure outside of the provisions of its IDP. It sets out the development projects to be undertaken over the five-year period and allocates resources to projects to be undertaken during the financial year in question. An IDP can be used by a municipality to undertake development of, or related to, a World Heritage Site, or to mitigate impacts on it. In effect, an IDP provides the municipality with a basis for its expenditure on development related to World Heritage Sites. As with SDFs and LUMS, an IDP is compiled via a consultation process with the residents of the municipality, and within the confines of the permissible areas for municipal expenditure citizens may recommend projects for inclusion in the IDP.

Diepkloof Rock Shelter

The following projects relating to nominated properties are set out in the current IDPs of the relevant municipalities:

- West Coast District Integrated Development Plan (IDP) (2017–2022) Review 2;
- West Coast District Spatial Development Framework (SDF) (2020);
- Cederberg Local Municipality. Integrated Development Plan (IDP) (2017–2022);
- Cederberg Local Municipality. 2015. Public Participation Policy;
- Cederberg Local Municipality. 2013. Integrated Tourism Development and Marketing Strategy for the Cederberg Municipal Area: 2013–2018;
- Cederberg Local Municipality Spatial Development Framework (SDF) (2017-2022);
- Cederberg Local Municipality. Draft Disaster Management Plan (2019); and
- Cederberg Local Municipality. Draft Integrated Infrastructure Investment Plan (in preparation).

Pinnacle Point Site Complex

Regional and local planning guidelines and frameworks were assessed to ensure that the ICMP is integrated with the development planning of the region, and include the following:

- Province of the Western Cape: Provincial Gazette Extraordinary 8520, 18 November 2021;
- Mossel Bay Local Municipality. 2020. Integrated Development Plan 2020/2021 (Final Review);
- Mossel Bay Local Municipality. 2018. Spatial Development Framework. Final Report;
- Mossel Bay Local Municipality. 2019. Amended Integrated Zoning Scheme By-Law. To regulate and control municipal zoning;
- Mossel Bay Local Municipality. 2016. New Town Planning Scheme parameters/uses/conditions (implemented from March 2017);
- Mossel Bay Local Municipality. 2015. Standard By-Law on Municipal Land Use Planning. To regulate and control municipal land use planning;
- Mossel Bay Local Municipality. 2013. Mossel Bay Point Precinct Development Plan;

- Mossel Bay Local Municipality. 2017 Local Economic Development and Tourism Strategy and Implementation Plan 2017-2022;
- Garden Route District Municipality. 2020. Final Reviewed Integrated Development Plan 2020/2021;
- Garden Route District Municipality. 2019. Garden Route & Klein Karoo Tourism Strategy 2019-2023;
- Garden Route District Municipality. 2013. Disaster Risk Assessment Update Report;
- Garden Route District Municipality. 2012. Coastal Management Programme, Phase 2;
- Maree, K.S. and Vromans, D.C. 2010. The Biodiversity Sector Plan for the Hessequa and Mossel Bay Municipalities: Supporting land-use planning and decision-making in Critical Biodiversity and Ecological Support Areas. Produced by CapeNature as part of the C.A.P.E. Fine-Scale Biodiversity Planning Project. Kirstenbosch.
- Eden District Municipality. 2017. Eden District Spatial Development Framework.
- Mossel Bay Municipality 2019. Mossel Bay Corridor Precinct Plan Local Spatial Development Framework For The Western Precinct Of Mossel Bay. Draft.

Map 14. Overview of existing and planned residential erven at Pinnacle Point Estate.

Sibhudu Cave

The following current regional and local planning instruments, for both iLembe and KwaDukuza Municipalities do not include any references to Sibhudu Cave, however, it is recommended that to ensure an integrated management for the site, the management of Sibhudu Cave is included in all local, district and provincial development plans and frameworks:

- ilembe District Municipality, 2019. 2019/2020 Integrated Development Plan for the iLembe District Municipality. https://ilembe.gov.za/wp-content/uploads/2020/05/IDP-Review-mastercopy-19.03.2020.pdf
- iLembe District Municipality, 2020. 2020/2021 Draft Integrated Development Plan Review. https://ilembe.gov.za/wp-content/uploads/2020/05/IDP-Review-mastercopy-19.03.2020.pdf
- KwaDukuza Municipality 2020. KwaDukuza Municipality Final 2020/2021 Integrated Development Plan (IDP) https://www.kwadukuza.gov.za/index.php/idp/final2020-21.

Each of the three proposed World Heritage Sites has an Integrated Management Plan (IMP) as required in terms of Chapter 4 of the World Heritage Convention Act, No. 49 of 1999. The plans applying to each site are Annexures 3 to 3.3 to this nomination dossier. The Management Plan will be reviewed every five years and an action plan, derived from the Management Plan, will be reviewed annually.

An Archaeological Conservation Management Plan has been developed for Pinnacle Point Site Complex outlining the specific conservation of the middens and caves on the site. Additionally, an Operational Environmental Management Plan was developed in 2015 to specifically address the environmental aspects at and around the site. The Pinnacle Point Estate is bound by the Pinnacle Point Development Plan and the Architectural Code, which provide guidelines for development at Pinnacle Point. Similarly, the visual impact assessment conducted in 2020 included additional recommended guidelines for approved developments to follow to minimise the visual impact (see Annexure 4)

At Diepkloof Rock Shelter, because of the right of way servitude, people driving along the servitude road are currently able to access the site without supervision, should they be willing to face the walk to the site. However, stricter control measures are in place by the landowner to ensure more stricter supervision on potential visitors. Once the infrastructure is developed on site, access will be more regulated.

Protective measures have been installed at all the sites in the form of sandbags filling the excavated areas. Boardwalks overlie sensitive archaeological deposits at Pinnacle Point Site Complex. There is also 24-hour security at Pinnacle Point due to its location

within the golf course estate, which further aids in protecting the site from unauthorised access.

At Sibhudu Cave, a caretaker is currently paid by Amafa and Research Institute to report any illegal activities on site and ensure that no unauthorised access happens to the site. Plans for the development of an interpretation centre and guided tours to the site are being developed. This will ensure that access to the site may be regulated to ensure perfect conservation of the site.

5.e Property management plan or other management system

For each of the proposed World Heritage Sites an Integrated Conservation Management Plan (ICMP) was developed as required in terms of the World Heritage Convention Act. The plans applying to each site are Annexures to this nomination dossier.

The Integrated Conservation Management Plans for Diepkloof Rock Shelter and for Pinnacle Point Site Complex were approved in 2017 and are valid for 5 years until 2022, and they will be revised and extended for another 5 years until 2027. The Integrated Conservation Management Plan for Sibhudu Cave was compiled and approved in 2021 and will be valid until 2026.

The vision for the Integrated Conservation Management Plans is to have sites that will be financially sustainable, managed effectively and protected through collaboration between key stakeholders, while enhancing the appreciation of the site by all people through education and interpretation, and potentially contributing to local economic development through community-based heritage tourism.

Eight Strategic Objectives (SO) were identified to pursue the Vision:

SO 1: To establish a management framework for the sites.

SO 2: To ensure conservation of archaeological deposit and related archaeological material on site.

SO 3: To monitor and assess the economic, social and environmental impacts of activities at and around the sites.

SO 4: To achieve financial sustainability using a diverse range of sources in an integrated, effective manner that will support site management.

SO 5: To encourage collaboration between stakeholders to conserve the sites and promote them as a heritage tourism attraction.

SO 6: To increase the awareness and appreciation of the sites by the local and global community through research, education and interpretation of the cultural heritage of the site.

SO 7: To build capacity of local people in heritage tourism to ensure responsible tourism to the sites.

SO 8: To encourage the generation of community benefits through on-the-job training, integration of local entrepreneurship and job creation projects.

For each of these objectives there are Action Categories, Specific Actions Expected Outcomes, and Performance Indicators. The tasks identified in the Action Plan emerged from the review of documents, information obtained during consultation with relevant stakeholders, with linkages to the Vision, Strategic Objectives and desired state of conservation. In addition, the Lead Parties, the Main Stakeholders involved particular actions, and a Timeline is presented.

The three ICMPs also examine management issues and outlines institutional arrangements and mechanisms for the successful implementation of the Management Plan. A detailed description of the proposed Management Authority, the Joint Management Committee and the related Site Management Committees, including the stakeholders who will participate in them, are presented in section 3.1.e above "Protection and management requirements".

The Management Plans aim to a desired state of conservation in which all three sites are well managed, protected and promoted. Stakeholders collaborate to safeguard the authenticity and integrity of the sites and ensure the sites are integrated into local development plans as well as into the broader cultural landscape. Responsible heritage tourism is implemented and guided by a local tourism and marketing plan. Visitor numbers to the site are controlled through the required use of qualified guides to access the site. Awareness and appreciation of the value of the site is enhanced and the local and national community contributes to the long-term care of the site. A sustainable finance mechanism is implemented to secure long-term funding for the protection of the site and economic benefits are shared with the local community. The ICMP examines and presents the actions that need to be taken to move from the current to desired state.

The management of the Western Cape sites is coordinated and hosted by the MEC of the Western Cape Cultural Affairs and Sport, whereas the management of the KwaZulu-Natal sites is coordinated and hosted by Amafa and Research Institute. Site Management Committees (SMC) made up of local stakeholders are constituted as Advisory Committees and supported through the respective Provincial Departments,

which will bear their operational costs. The MECs of WC DCAS and KZN DSAC would be declared a Management Authority in terms of Section 8 of the World Heritage Convention Act, no. 49 of 1999.

The proposed structure of the Management Authority is presented in Figure 42.

The practicalities referred to above need to be considered in the development of the Site Management Authority. The eventual six sites to be included in the WHS are spread over three provinces. The sites are all under private ownership and are regulated by three different heritage authorities under two sets of legislation. Pinnacle Point and Diepkloof Rock Shelter are Provincial Heritage Sites, while Sibhudu Cave is declared a National Heritage Site. Integrated Conservation Management Plans (ICMPs) have been compiled for each of the sites in terms of s. 47 of the National Heritage Resources Act, no. 25 of 1999 and of the World Heritage Convention Act, no. 49 of 1999.

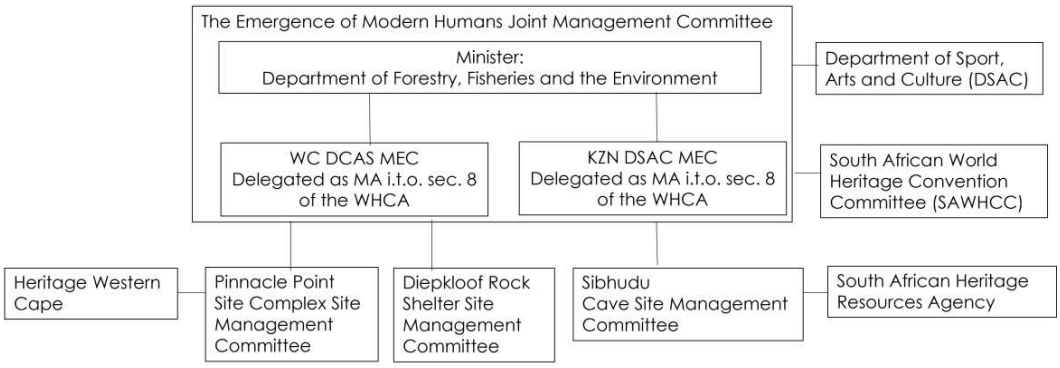


Figure 42: Management Authority situated in the MECs of Cultural Affairs and Sport in the Western Cape and Arts and Culture in KwaZulu-Natal.

In managing each site, the World Heritage Convention Act requires certain governance processes to be in place, such as strategic planning and financial auditing. The practical management of each site in its individual context requires that people who are actively engaged on the ground are closely involved in the management structures. As the Emergency of Modern Humans World Heritage Site will be a serial nomination, a one-size-fits-all approach to managing the sites would not make sense. Though local stakeholders need to be actively involved, it would be unreasonable and impractical to expect that a local, mostly volunteer, committee would be able to report independently to DFFE and UNESCO, as well as providing the materials stipulated for the governance processes such as financial reports or strategic plans.

The long-term security and good management of the sites will need to be addressed through creating structures at the most suitable level so that these can function optimally.

In terms of Sections 8, and 9 of the South African World Heritage Convention Act (No. 49 of 1999), a Management Authority (MA) serves to provide an effective system for the management of World Heritage Sites in line with the Operational Guidelines for the Implementation of the World Heritage Convention (WHC), and the National Heritage Resources Act (NHRA).

At the provincial level, the management system will be coordinated and hosted by the Member of the Executive Council (MEC) of for Cultural Affairs and Sport in the Western Cape for Pinnacle Point Sit Complex and Diepkloof Rock Shelter and the MEC of Sport, Arts and Culture in KwaZulu-Natal for Sibhudu Cave. The two authorities will jointly serve as the Overall Management Authority through the establishment of a Joint Management Committee (JMC). For each of the proposed sites, a Site Management Committee is recommended. A Site Management Committee will have an advisory role and will include representatives of the main stakeholders involved with the management of the site.

Each of the Management Authorities should inter alia perform the following functions:

- Implement the ICMP;
- Communicate regularly with other stakeholders and authorities;
- Monitor the State of Conservation of the Site;
- Manage and mitigate risks;
- Provide input and express opinions on proposals for work of any nature on the site;
- Raise and allocate funds for management of the site;
- Coordinate the responsibilities and work of its members and other stakeholders regarding the site;
- Investigate possibilities for coordinating with local community and other tourism initiatives;
- Align programmes to local municipality Integrated Development Plans;
- Develop and implement policies; and
- Enter into heritage agreements with various Stakeholders.

The JMC will meet biannually as and when necessary The JMC will be established through an MoU in place setting out functions and responsibilities, thus ensuring that the appointed Management Authorities work together in harmony and support one another in their efforts to achieve the vision and objectives of the World Heritage Site. The JMC will be chaired by the Deputy Director-General: Biodiversity and Conservation of the Department of Forestry, Fisheries and the Environment, which is the focal point. Its members will be the HODs of the Department of Cultural Affairs and Sport in the Western

Cape Government and of the Department of Sport, Arts and Culture in KwaZulu-Natal and/or their duly authorized delegates.

Joint Management Committee

The JMC shall:

- ensure a management system or mechanisms for the co-ordinated management of the separate components and the development of a joint integrated vision and objective for the entire prospective World Heritage Site with detail provided in their individual Integrated Management Plans (IMP's) (as required in terms of World Heritage Convention Act, 1999 (Act No. 49 of 1999) (WHCA);
- harmonize and coordinate all relevant policies to facilitate a uniform approach to the management of the entire prospective World Heritage Site;
- serve as a platform whereby all parties work together and support one another in their efforts to achieve the vision and objectives of the World Heritage Site in terms of the World Heritage Convention, WHCA and the UNESCO Operational Guidelines;
- serve as a vehicle for the identification of common goals and liaising with heritage resource agencies authorities on a national, provincial and local government level and with the consent of the DFFE, international partners as well as donors;
- appoint technical teams with concise Terms of Reference and timeframes to deal with specific technical issues as and when required;
- implement the monitoring framework to ensure monitoring and evaluation of the management effectiveness of the prospective World Heritage Site;
- coordinate the identification of financial needs by the two provincial departments to ensure management of threats affecting the integrity of the prospective World Heritage Site in order to develop sustainable funding mechanisms for the World Heritage Site;
- ensure the development and implementation of a joint branding and marketing strategy for The Pleistocene Occupation Sites of South Africa that should be used in conjunction with the branding and marketing strategies adopted by the individual sites, and
- ensure the development of an appropriate fund-raising mechanism for the serial sites for purposes of community beneficiation, scientific research etc.

Site Management Committees

The nominated sites represent different situations, in terms of their tangible and to some extent intangible heritage, their stakeholders, the way they are used, and the specific management challenges that they face. For that reason, it is proposed that each site has its own Site Management Committee that is firmly rooted in the local context, and

that relies on local authorities and the involvement of relevant local stakeholders (Table 11). This SMC will be responsible for communicating regularly with other stakeholders and authorities; monitoring the site; managing and mitigating risks; providing input and expressing opinions on proposals for work of any nature on the site; raising and allocating funds for management of the site; coordinating the responsibilities and work of its members and other stakeholders; assisting in the development of accessibility and tourism on the site and reporting to the Management Authority.

In addition, DSAC serves as the custodians for Cultural heritage sites in SA and will also be informed of all activities happening within the site. The South African Heritage Resources Agency and Heritage Western Cape, as compliance authorities, are responsible for the monitoring of research and conservation of the site respectively for Diepkloof Rock Shelter and Pinnacle Point Site Complex (HWC), and for Sibhudu Cave (SAHRA).

The South African World Heritage Convention Committee (SAWHCC) is an intergovernmental committee appointed by the Minister of DFFE in terms of 6(2) of the World Heritage Convention Act, Act No. 49 of 1999 to advise on issues pertaining to the establishment, conservation and management of world heritage sites in South Africa, including implementation of other provisions of the World Heritage Convention Act No. 49 of 1999. The implementation of the Convention at a World Heritage Site level get reported in this forum

The Site Management Committees for each of the three sites are an integral part of the overall Management Authority for the Emergence of Modern Humans: The Pleistocene Occupation Sites World Heritage Property.

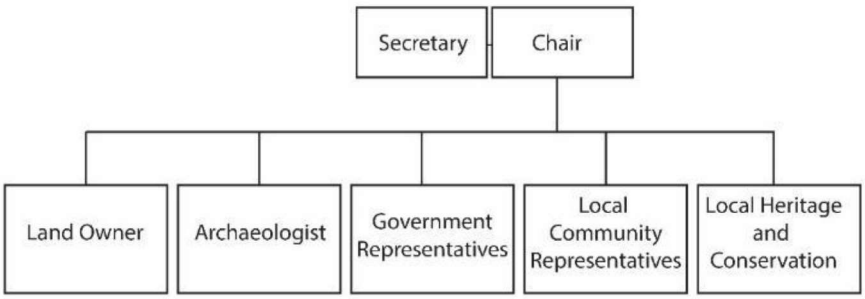


Figure 43: Proposed Site Management Committee Structure

Chair:

1. Chairs the meetings.
2. Function as the spokesperson for the WHS.

3. Liaise with chairs of other sites of the serial nomination on the management of the sites.
4. Participate in the implementation of the integrated management plan.
5. Is aware of every stakeholder and all that goes on in the WHS.
6. Collaborate with the landowner, archaeologist and municipality to transmit information about the WHS to the broader public, including awareness raising.
7. Assist with sourcing funding for the maintenance of the site.

Secretary:

1. Takes minutes of the meetings and circulate to stakeholders.
2. Updates the stakeholder list.
3. Keeps record of relevant documentation related to the World Heritage Site.

Landowners

1. Responsible for basic security of the site, such as creating fire breaks, repair and maintain fences around the property, removal of alien vegetation, trimming of grass.
2. Work closely with the local municipality and archaeologist regarding the access to the site and status of conservation.

Archaeologist

1. Undertake and report on the monitoring and evaluation of the site at regular intervals to assess the state of conservation.
2. Contribute to technical aspects a monitoring system for the site.
3. Develop and implement a baseline survey of the impact of activities around the site.
4. Liaise closely with the landowner and local municipality on the protection of the site.
5. Supervise the interventions undertaken as per the Integrated Management Plan.

Government representatives Municipality

1. Assist with providing financial and human resources support for the protection of the site.
2. Ensure the site is included in the municipal IDPs and SDFs as well as Disaster Management Plans.
3. Collaborate with the archaeologist and landowner to transmit information about the WHS to the broader public, including awareness raising.

Local Community representatives

1. Provide input to the actions of the Integrated Management Plan.

2. Raise concerns if any of the actions are adversely affecting the local community.

Local Organisations

1. Provide input to the actions of the Integrated Management Plan.
2. Provide support to the landowner, archaeologist and municipality when required.

Diepkloof Rock Shelter Stakeholders

Diepkloof Rock Shelter is situated midway between the town of Redelinghuys and Elands Bay. It is visible from the main road between the two towns and can attract visitors on weekends. The site is presently owned by Heine and Barbara Steyn who farm the property. The two rock shelters have been excavated over the years, primarily by a team lead by Prof. John Parkington, as well as members of a French team. The current round of excavations has been completed and the site will likely not be actively excavated in the foreseeable future.

The nearby town of Elands Bay has recently seen the establishment of a local Museum, the Elands Bay Museum, under the auspices of the Department of Cultural Affairs and Sport. The Elands Bay Museum, which is currently not yet open to the public, is expected to function as Interpretation Centre for Diepkloof Rock Shelter. The interpretation centre is located about 20 km from the site. The establishment of a potential Interpretation Centre at Elands Bay presents opportunities to include DRS material and information while limiting access to the DRS site to maintain conservation standards.

Also in Elands Bay, the Elands Bay Development Action Group (EBEDAG) is concerned with environmental and heritage conservation and is active in the area. While DRS is not in Elands Bay, EBEDAG has expressed an interest in the WHS and could be valuable in assisting with co-ordinating conservation efforts on the ground.

The West Coast District Municipality has expressed an interest in the site and is actively pursuing the creation of a West Coast Palaeontology and Archaeology tourist route.

The management of the site is presented in the Table below.

Table 20. Management responsibilities and structure for Site Management Committees at Diepkloof Rock Shelter.

What to manage	How to manage	Who within the SMC
The archaeology of the cave and OUV	Develop a cave monitoring system, using SMART indicators, in line with standard practice	Management Authority

What to manage	How to manage	Who within the SMC
	Implement annual cave inspections	Management Authority
	Create board walks at the site	DCAS/HWC
	Create a firebreak at the bottom of the koppie to decrease the risk of fires reaching the site	Landowners
	Train qualified guides on how to protect heritage	HWC, West coast tourism department, archaeologist
Access to the land	Install a gate at the entrance of the Erf to undesired people to enter	Landowners with HWC
	Install signage at the entrance and at the site itself	Landowners with HWC
	Place a visitor book at the gate to record the number of visitors coming to the site	Landowners with HWC

It is proposed that a Site Management Committee be established for DRS that includes the landowner, Prof. John Parkington as a knowledgeable archaeologist who has a long term relationship with the site and a representative from EBEDAG as the core Site Management Committee. The inclusion of other interested representatives including the Cedarberg Municipality, The Baboon Point Reference Group and the West Coast District Municipality would be useful.

Pinnacle Point Stakeholders

The Pinnacle Point Site Complex is situated on private property. The site has good access control and formalised visitor management systems. The sites are additionally protected by a buffer zone, including the whole of the Pinnacle Point Estate.

A small tourism company, led by Dr Peter Nilssen, operates on the site. The tour operation takes visitors down to the caves in small numbers. The caves visited by the public are not actively being excavated. The ongoing research at the site is continuingly revealing

scientific discoveries, and this is adding to the significance of the site. It is important that the scientific team is closely incorporated into the management of the sites.

The Pinnacle Point Estate is a carefully managed golf and housing estate. The buffer zone for the cave sites includes the rest of the estate. The Estate Manager, who oversees the operational management of the estate, has a key role as a central point around which a local management committee can be formed.

The scientific team led by Dr Curtis Marean, the small-scale tourism operations run by Dr Peter Nilssen, and the Estate Manager Mr Carl van der Linde have an existing working relationship.

Several stakeholders in the surrounding area have been identified, including the Bartolomeu Dias Museum Complex, the Mossel Bay Municipality, the Point of Discovery Centre, Heritage Mossel Bay and the Groot-Brak Museum.

The Bartolomeu Dias Museum Complex is the closest museum to the Pinnacle Point Site Complex. The Bartolomeu Dias Museum Complex and the Mossel Bay Municipality have a potentially significant role to play in the establishment of an Interpretation Centre at the Cape St Blaize Cave. The Non-Profit Company Point of Discovery Centre was set up within the Mossel Bay Municipality to drive the development of an interpretation centre for the site on the ground next to the Cape St Blaize Cave.

The Mossel Bay Municipality is integral in dealing with the various challenges of zoning and conservation in the region. While the Pinnacle Estate is largely established, with the proposed development laid out and it is recommended that the Mossel Bay Municipality takes measures to integrate the conservation and buffer zones on the estate into the local planning by-laws and Spatial Development Frameworks.

Heritage Mossel Bay is an I&AP in the establishment of the WHS. While they do not have direct managerial responsibilities, they serve as important community watchdog in the ongoing conservation efforts. The role of Heritage Mossel Bay as a conservation body is therefore important in maintaining the standard of conservation at Pinnacle Point Site Complex.

It is proposed that the Site Management Committee for the Pinnacle Point Site Complex consist of core stakeholders, such as the Estate Manager, the Leader of the scientific team and the tour operator, as well as a representative from the Bartolomeu Diaz Museum Complex, and Heritage Mossel Bay. A representative from the Municipality can also be included on an as needed basis.

Table 21. Management responsibilities and structure for Site Management Committees at Pinnacle Point Site Complex.

What to manage	How to manage	Who within the SMC
The archaeology of the Site Complex and OUV	Develop a site monitoring system using SMART indicators, in line with standard practice for caves, shelters and middens	Management Authority
	Implement quarterly site inspections, particularly to monitor the identified risks	Management Authority
	Evaluation of existing backfill method of sandbags and assessment of remedial action when necessary	Archaeologist, researchers
	Assessment of conservation status of each of the PPSC sites	Archaeologist
Access to the land	Confirm the boundaries of the PPSC	Landowners with HWC
	Install signage at the entrance and at the site itself	Landowners with HWC

Sibhudu Cave Stakeholders

Sibhudu Cave is on private property, owned by Mr Mhlongo. However, a subdivision and sale process is ongoing to transfer the ownership of the piece of land where the cave is located to the Sibudu Trust.

Sibhudu Cave has a strong and eager local community that is willing to be involved in the management of the Site. The Site Management Committee should engage regularly with the other external stakeholders around the Site regarding management of the Site. Representatives from the local municipalities will be needed.

Each stakeholder represented should be tasked with specific functions that pertain to its role in ensuring the conservation and sustainable management of Sibhudu Cave.

It is proposed that the Site Management Committee for Sibhudu Cave consist of representatives of the following stakeholders: the landowners; the Qwabe Traditional Council; the local custodian; the Sibudu Trust; Friends of Sibudu; Ward councillors; KwaDukuza Local Municipality; Ndwedwe Local Municipality; iLembe District Municipality; The archaeologists holding recent excavation permits for the Site; Relevant conservation bodies registered with the KZN Amafa Research and Institute and the KZN Tourism Authority.

Table 22. Management responsibilities and structure for Site Management Committees at Sibhudu Cave.

What to manage	How to manage	Who within the SMC
The archaeology of Sibhudu Cave and OUV	Develop a site monitoring system using SMART indicators, in line with standard practice for caves, shelters and middens	Management Authority
	Implement quarterly site inspections, particularly to monitor the identified risks	Management Authority
	Evaluation of existing backfill method of sandbags and assessment of remedial action when necessary	Archaeologist, researchers

5.f Sources and levels of finance

The following are the financial arrangements for each of the nominated properties:

Diepkloof Rock Shelter

Heritage Western Cape and the Department of Cultural Affairs and Sport have received a total of R500 000 for the conservation and management of the site from the US Ambassadors Fund for Cultural Preservation and R1.1m from the Western Cape Government for the development of tourism infrastructure on site.

With support from the landowners, partnerships with other (local) stakeholders, improved marketing as well as through integration of the site into local and regional development plans and spatial planning frameworks, a range of funding opportunities might be possible. The Diepkloof Site Management Committee and the Management Authority should actively engage with potential donors to source funding. Potential donors include non-governmental organisations (NGOs), the National Lottery Distribution Trust Fund, as well as the private sector and individuals. In addition, the Diepkloof Site Management Committee should ensure its presence in municipal planning forums (for example the annual IDP consultation process, exercises to consult on revision of the SDF, etc.) to take advantage of potential development grants and/or initiatives, which could provide funding for heritage-related projects.

The Elands Bay Museum was set up by the MEC of Cultural Affairs and Sport in November 2019. The Museum is expected to function as Visitor Centre for Diepkloof Rock Shelter. The Museum will be responsible for the tourist visitation at the site. The interpretation centre is expected to be supported by the Department of Cultural Affairs and Sport at the operational phase until it becomes sustainable. Many of the projects run by the museum will focus on the World Heritage Site. Additionally, profit from the Museum will contribute funding towards the management of the site. This is provided that the financial requirements to manage the site are relatively modest.

Funding from Heritage Western Cape and the Department of Cultural Affairs and Sport will be available for conservation of the site.

Pinnacle Point Site Complex

The tourism operation at the Pinnacle Point Site Complex itself already contributes substantially to the upkeep of the site. Currently about 5% of income received from Point of Human Origins Tours goes to the Home Owners' Association NPC and is used to cover the costs of monitoring water flow and quality in the caves, fixing the boardwalk and replacing sandbags. However, with the establishment of the Pinnacle Point Site Management Committee, managing such income will become its responsibility and should be channelled into conservation management issues in line with the provisions of the Site Management Plan.

A promising potential source of funding is the Interpretation Centre in Mossel Bay that it is intended to be established at the 'Point Precinct' next to Cape St Blaize. It is being developed with financial contributions from the local businesses in Mossel Bay. The centre will serve as a gateway to the future World Heritage Site and will explain the research conducted at Pinnacle Point Site Complex as well as the other sites to be included in the nomination. Cape St Blaize Cave will be used as a site that is less

vulnerable and is able to accommodate far larger numbers of visitors than the caves at Pinnacle Point. The Point of Discovery Centre Not for Profit Company is driving this project and has already commenced seeking funding through various sources. It also has approval from HWC for the redevelopment of the Point area and the proposed upgrade of the Mossel Bay Point (Heritage Western Cape, 2013).

Funding from Heritage Western Cape and the Department of Cultural Affairs and Sport will be available for conservation of the site.

About USD 54 813 are raised every year by Marean from the Arizona State University to maintain the project, including five permanent employees' salaries, vehicle maintenance and storage rental.

An additional R20 000 are currently necessary on an annual basis for the conservation of the site and the maintenance of the tourism infrastructure, which are currently covered by the tourism activities.

Sibhudu Cave

Funding is available for excavation, research and maintenance of the site within the excavation project led by Prof. Nicholas Conard from the University of Tübingen.

The development of Sibhudu Cave as a tourism attraction and the development of the Interpretation Centre has the potential to contribute funding towards the management of the Sibhudu Cave. This is provided that the financial requirements to manage the site are relatively modest. To increase funding, the Management Authority should actively engage with potential donors to source funding. Potential donors include Non-Governmental Organisations (NGOs), as well as the private sector and individuals.

Additionally, the KwaZulu-Natal Provincial Government has financially committed R5m to support the project for the current site and further additions.

5.g Sources of expertise and training in conservation and management techniques

As Provincial Heritage Sites, the two nominated properties in the Western Cape have Grade II status, which provides them with protection under South African heritage law. As such, they are subject to regular monitoring and inspection by HWC, which has the necessary expertise to undertake such work. As National Heritage Site, Sibhudu Cave in KwaZulu-Natal is subject to regular monitoring by the South African Heritage Resources Agency, which also has the necessary expertise to conduct the inspection.

With regard to the individual sites, capacity is as follows:

Diepkloof Rock Shelter

The establishment of the Elands Bay Museum, located about 20 km from the site, to function as interpretation centre for Diepkloof Rock Shelter, ensure that trained personnel on conservation measures is readily available for the monitoring of the archaeological site. The main archaeologist is based in Cape Town and currently undertakes visits on a regular basis.

In addition, the Cederberg Municipality recognises that the Provincial Heritage Sites are an important but vulnerable economic asset that have the potential to contribute to job creation. Currently, many citizens in the province are unaware of the importance of the features that make the Cederberg Municipality special, how to access economic opportunities in tourism, and how and where to gain the necessary skills to qualify for such economic opportunities.

Pinnacle Point Site Complex

The principal archaeologist of the site is closely involved in the management of the site and is very experienced in conservation techniques to protect the OUV of the site. He is currently a professor of archaeology at Arizona State University in the United States, and is an Honorary Professor in the African Centre for Coastal Palaeoscience at Nelson Mandela University, in Port Elizabeth, South Africa.

As mentioned above, the company involved in the running of tourism activities on site, Point of Human Origins, is also directed by a professional archaeologist and regularly conducts monitoring and maintenance on site with part of the revenues obtained from tourism.

Sibhudu Cave

The site is currently excavated by Prof. Conard from the University of Tübingen and is the subject of investigation by many international scientists who regularly visit the site.

A local family, the Dasa family, is the appointed custodian of Sibhudu Cave by the provincial heritage authority, Amafa and Research Institute. They watch over the Site from their homestead approximately 200m south of the Cave and ensures that no uncontrolled access occurs on site.

Necessary training would be provided for the Dasa's family and other community members so that, in the instance of the Dasa's being not available any longer, other community members would be able to assist and take over the custodianship of the site.

5.h Visitor facilities and infrastructure

A combination of existing and planned visitor facilities and infrastructure are present on all three sites.

Diepkloof Rock Shelter

Diepkloof Rock Shelter is located on private land, on which the landowner's family lives. No formal visitor facilities exist, but there is a small path that leads up to the shelters. Currently, about 20 people a month visit the site unsupervised. Most of the visitors are locals who have heard about the site from the media. Only visitors approved by the landowner are allowed onto the site.

Funding has already been made available from the Western Cape Government to the Elands Bay Museum for the development of tourism infrastructure on site. Due to Covid-19 pandemic, the project could not be fully implemented in 2020, but it is expected that the infrastructure will be fully established in 2021. This will include a parking area, a reception area for small tourist groups, interpretation signage for the site, a formal path leading to the cave and a boardwalk on site.

Additionally, Heritage Western Cape received in 2019 a fund for USD 32 606 from the U.S. Ambassadors Fund for Cultural Preservation for site conservation. This project is also expected to be fully implemented by the end of 2021.

A municipal building next to the Elands Bay Hotel has been earmarked to function as interpretation centre for Diepkloof Rock Shelter under the administration of the newly established Elands Bay Museum. Tourist groups are expected to be directed to the site through the interpretation centre and tourist guides at the museum will also be trained for the interpretation of the cave site.

Pinnacle Point Site Complex

Currently, only Pinnacle Point Site Complex formally receives about 1 400 on-site visitors per year. Booking of the tourist tour is highly recommended, but a guide is generally available for the whole day at the Estate if necessary.

Pre-bookings are however the preferred option. Upon registration at the entrance of the Estate, visitors are directed to the clubhouse where they are received by one of the local guides and given a brief introduction about the site. The Pinnacle Point Estate has excellent existing tourism facilities. The clubhouse, for example, has bathrooms, a restaurant and facilities to host meetings and presentations (Table 23).

A wooden boardwalk, composed by 175 steps, leads the visitors to the entrance of Cave 13B from the Cape St Blaize trail (Figure 44 and Figure 45).

A Not -for-profit (NPO) company, the Point of Discovery Centre, was set up within the Mossel Bay Municipality to drive the establishment of an interpretation centre in the empty field next to St Blaize Cave, at the Point, in Mossel Bay. A temporary centre was inaugurated in December 2022.

Figure 44. Boardwalk leading to Cave 13B at Pinnacle Point Site Complex.

Figure 45. Boardwalk leading from the top of the cliff, where the Clubhouse is located, to Cave 13B (not in picture). Other cave sites within the Pinnacle Point Site Complex are visible below the cliff edge.

Sibhudu Cave

The site of Sibhudu Cave is currently not very well known in the area and as such, there is no active tourism. The Cave is not open to the public unless prior appointment is made with the heritage authorities. Visitors are accompanied to the Site by heritage officials or by the resident custodian. For now, tourism should target the academic and research community and not more than one thousand people should access the Site per year.

It is recommended that visitors are not allowed in the Cave unless they are accompanied by a trained tour guide.

There are proposals for improving the crossing on the uThongathi River to allow for visitors to access the site more easily and with less inherent risk than currently present. A sturdy suspension bridge that is high above the water can be considered. Additional information is included in the Integrated Management Plan as Annexure 3.

The walkway inside the Cave will be clearly demarcated and will not lead visitors to the excavation trenches, but rather will conduct the visitors to a 'landing area' at the southern end of the Cave where people can re-organise themselves and receive a briefing from the guide.

No interpretation centre for Sibhudu Cave is currently available, but plans are at an initial stage for the possible development of an interpretation centre either in Ballito, located about 20 km from the site, and spearheaded by the Friends of Sibudu, or in proximity of the custodian's house on the opposite side of the riverbank than the site. So far, no approved plans are in place and no funds have been committed. The Friends of Sibudu is currently actively engaging with stakeholders for the development of the interpretation centre in Ballito.

Discussions with KDC Development, the owner of an abandoned workers' compound in proximity of the archaeological site, are also in process for the establishment of youth accommodation for educational camps.

Table 23. Visitor facilities at the different properties.

Site	**Facilities**
Diepkloof	Site conservation and on-site visitor infrastructure to be developed by the end of 2021. Interpretation centre in Elands Bay to be open by the end of 2021.

Site	Facilities
Pinnacle Point Site Complex	Ablutions for visitors, a wellness centre, a restaurant and accommodation that mainly caters for the golfers and existing visitors to the sites. Two local guides for archaeological tours. Off-site: proposed interpretation centre at Cape St Blaize in Mossel Bay.
Sibhudu Cave	An off-site interpretation centre currently being planned. Infrastructure for accessing the site is proposed in the Integrated Management Plan and will be taken into consideration by the relevant authority.

In terms of accessibility, all sites are not reachable by public transport as the sites are quite isolated. This will impact on the ability of previously disadvantaged local people, who often do not possess a car to visit these sites. In addition, none of the sites are suitable for people in wheelchairs, as their steep elevations necessitate a moderate level of fitness to negotiate steep and narrow access paths and steps on foot. The development of interpretation centres for each site will contribute to mitigating the physical inaccessibility of the sites.

5.i Policies and programmes related to the presentation and promotion of the nominated property

To promote the proposed sites and other cultural places in the Western Cape, the Cradle of Human Culture archaeological and paleontological tourism route has been developed. This route serves as an interpretation mechanism by which knowledge of the Western Cape Stone Age archaeology can be transferred to the public at large. Similarly, discussions are ongoing with tourism associations in KwaZulu-Natal to further expand the route to this Province. The three sites proposed for the nomination will act as anchor sites for the heritage route.

Once these sites are inscribed on the World Heritage List, promotion to a wider public audience will be able to be stepped up. At the same time, awareness could be raised on what it means to be a World Heritage Property and of the need to take proper care of our cultural and historical heritage in line with UNESCO requirements for World Heritage Properties. This will include the distribution of brochures, the development of a

website, and agreements with local tour guides and tour operators. Where applicable, this would also include the set-up of new signage.

It should be noted that archaeological, palaeontological and geological sites, especially those related to early humans, are generally less accessible to the public, and are of relatively lower visibility than monumental sites. Moreover, due to the nature of the sites and the need for their conservation, visits without a guide are not desirable and need to be discouraged.

All the proposed sites have the potential to facilitate entrepreneurial opportunities, with a strong emphasis on small, medium and micro enterprises and on associated training where possible.

Diepkloof Rock Shelter

An interpretation centre for Diepkloof Rock Shelter and the World Heritage Site is expected to open by the end of 2023. Once infrastructural work at the archaeological site is completed, it is expected that a limited and controlled number of tourists will be able to visit the actual archaeological site of Diepkloof Rock Shelter as part of the interpretation centre visitor package.

Pinnacle Point Site Complex

In 2012, the Mossel Bay Local Economic Development and Tourism Strategy and Implementation Plan was developed and is currently being implemented. This plan highlights the development of the heritage and tourism sectors, and includes provision for Pinnacle Point.

A plan is already in place for the development of an interpretation centre in the area next to Cape St Blaize Cave, in the core of the town of Mossel Bay, 9 km west of the Pinnacle Point Site Complex. Extensive planning has been conducted by the Point Discovery Centre NPO which was locally organised in Mossel Bay to focus on the development of an interpretation centre for Pinnacle Point Site Complex. Some funds is available for the initial construction but further funds are required at the time of writing for its completion. Outreach programmes are organised on an annual basis for learners and for members of the adjacent communities.

Sibhudu Cave

Outreach programmes are organised on an annual basis for learners and members of the adjacent communities by the excavation team. Additionally, plans for the establishment of tourism infrastructure and of an interpretation centre are included in the Integrated Management Plan (Appendix 3).

5.j Staffing levels and expertise

All three sites are formally protected under the national legislation, as such, they are regularly monitored by the relevant heritage agencies which have dedicated qualified staff for the management of the sites. All heritage staff within the agencies has graduate and postgraduate degrees in archaeology and/or heritage management.

Diepkloof Rock Shelter is located on private land, on which a family lives, who provide basic maintenance of the Buffer zone and Property. In addition, the archaeologist related to this site is based in Cape Town and is frequently in the area to check up on the site.

Additionally, one of the tasks of the prospective manager of the interpretation centre in Elands Bay will be the regular monitoring of Diepkloof Rock Shelter. The manger will be required to have a graduate or post graduate degree in heritage related disciplines.

At Pinnacle Point Site Complex, an archaeologist, with a post graduate degree in Middle Stone Age archaeology, and who was previously involved with the excavation of the site, runs a small tourism operation to guide visitors to some of the caves and middens. In addition, the manager of the Pinnacle Point Estate recognises the value of the archaeology on the site, and measures have been implemented over the years to enhance the protection of the site.

At Sibhudu Cave the site is monitored on a regular basis by the Dasa family, who has lived for over thirty years on the opposite site of the river from where the site is located. An official agreement between the Provincial Heritage Resources Authority (Amafa and Research Institute) and the Dasa family has been in place to regulate the monitoring of the site. The conservation of the site is managed by Amafa and Research Institute.

In addition, a Steering Committee, set up for the establishment of the Cradle of Human Culture route and the interpretation centres at the two Western Cape sites, consists of experts in the field of archaeology and relevant representatives of local and provincial government and WESGRO, the official tourism, trade and investment promotion agency for Cape Town and the Western Cape. This route is expected to be soon expanded to KwaZulu-Natal to include the site of Sibhudu Cave.

MONITORING

6. MONITORING

A comprehensive Monitoring, Evaluation, Learning and Intervention (MELI) has been established in the Site Management Plans (SMPs) and Integrated Management Plan (IMP) for the properties. The MELI is aligned with the respective Annual Performance Plans of entities such as the Western Cape Department of Cultural Affairs and Sport, the KwaZulu-Natal Department of Arts and Culture and the Department of Forestry, Fisheries and the Environment, which is the focal point for the State Party in terms of interacting directly with UNESCO. The MELI approach is described as follows:

Monitoring is the action of determining where the implementation of the Action Plan stands. It is the ongoing, systematic collection of data to provide management and the main stakeholders with a good indication of the progress in terms of the Implementation Plan in the different SMPs and the overall ICMP, as well as of the use of allocated funds for these purposes.

Evaluation relates to the outcomes and impacts of actions in the SMPs and ICMP. Evaluation informs the site management, the overall Management Authority, and stakeholders of the degree of effectiveness of the expected outcomes and impacts of the activities. Once indicators have been identified, baselines must ideally be established against which to measure progress. Evaluation must also assess unplanned outcomes and impacts, for which established baseline values may not exist.

Learning refers to the insights gained from the results of the monitoring and evaluation. Learning is a continuous process that includes knowledge of best practices but also analysis of the results of monitoring and evaluation. Ideally, key stakeholders and not only Management Authorities ought to be involved in evaluation and learning.

Intervention is evidence-based action, based on the results of monitoring, evaluation and learning, that must be taken to overcome obstacles or challenges faced during the implementation of the SMPs and the ICMP. The MELI is therefore a system of adaptive management, where collective ownership is encouraged, transparency is promoted, and a greater degree of cooperation and support from all stakeholders can be expected.

The performance indicators in the Action Plan act as pointers for the monitoring and evaluation of the SMPs. Learning and insights are derived from measurements of progress against the tasks and deliverables. While an organisation can monitor its progress in terms of the tasks set out in the Action Plan, it is neither appropriate nor credible, and indeed very difficult for landowners or site managers on their own, to measure the effectiveness and impacts of actions.

Pinnacle Point Estate underwent an audit as part of the Operational Environmental Management Plan (OEMP) in 2015. The main purpose of this audit was to: i) highlight areas where improvements may be necessary and create an implementation schedule for implementing such improvements; and ii) report non-compliance with the OEMP or the environmental authorization, with the necessary actions to rectify such non-compliance (van Zyl, 2014; Du Preez, 2018).

6.a Key indicators for measuring state of conservation

Objective 2 in each of the three Integrated Management Plans related to the "Conservation of archaeological deposit and related archaeological material on site". This objective has clearly defined actions linked to it, specific indicators, stakeholder responsible for each action and the timeframes linked to it.

Heritage Western Cape and SAHRA, as compliance authorities for Diepkloof Rock Shelter and Pinnacle Point Site Complex (HWC), and for Sibhudu Cave (SAHRA) respectively, shall be responsible for the monitoring of research by providing permits. To monitor the impact of visitation to the sites, the Site Management Authorities, in collaboration with HWC and SAHRA, should develop a suitable monitoring system. In addition, a survey should be undertaken at the start of the implementation of the ICMP to establish a baseline of the social and environmental impact of activities around each site. To evaluate the impact of the ICMP implementation, the same survey should be undertaken at the end of the ICMP time frame.

Table 24 presents a summary of the key indicators derived from the Integrated Management Plans of the three sites, whereas Table 25 presents a summary of the action plan for the conservation of the three sites.

Table 24. Monitoring Tools for the conservation of the sites

Indicator	**Periodicity**	**Location of Records**
Lack of vandalism on site	Ongoing examination with Annual Reporting	Management Authority and site management committees
Sandbags stabilising the site are in good conditions	Ongoing examination with Annual Reporting	Management Authority and site management committees, HWC and SAHRA

Indicator	**Periodicity**	**Location of Records**
Site stabilising measures are effective and well maintained	Ongoing examination with Annual Reporting	Management Authority and site management committees, HWC and SAHRA
A site monitoring system developed and implemented	Ongoing (MELI system evaluated annually)	Pinnacle Point Home Owners' Association/HWC/SAHRA in collaboration with Amafa
Site management guidelines developed and implemented	Ongoing and reviewed for each ICMP cycle (5 years)	Pinnacle Point Home Owners' Association/HWC/ SAHRA in collaboration with Amafa
Tourism development	Annually	Western Cape Department of Cultural Affairs and Sport, WESGRO, KwaZulu-Natal Department of Arts and Culture, Amafa in collaboration with local and district municipalities and local museums.
Tourism infrastructure are properly maintained	Annual	Management Authority
Tight access control	Ongoing	Site Management Committee
Materials and collections safeguarded and fully catalogued	Ongoing	Relevant institutions

Table 25. Action plan to Implement the site conservation at the three sites. A more complete action plan related to all objectives of the Integrated Management Plan is provided in Annexure 3.

Action Category	**Specific Action**	**Expected Outcomes**	**Performance Indicators**	**Stakeholders**	**Lead Parties**	**Timeframe**
Diepkloof Rock Shelter						
Development of infrastructure	Install signage at the entrance	The site is secured through implementation of appropriate infrastructure	Boards installed at the entrance and at the site	DCAS, HWC, Landowner, Site Management Committee	DCAS 2020-2022	
	Create a firebreak at the bottom of the koppie to decrease the risk of fires reaching the site	Development of a firebreak	A firebreak created			
	Establish boardwalks at the site	Construction of boardwalk on site	Boardwalk established at the site			
	Development of a path to the site.	Establishment of a path from the parking area to the site	Path established to the site			

Action Category	Specific Action	Expected Outcomes	Performance Indicators	Stakeholders	Lead Parties	Timeframe
Human Resource development	Ensure training of qualified guides on how to protect heritage	Human Resources involved have the capacity to protect the OUV of the site	Guides have certificate of qualification	DCAS, Elands Bay Museum, Diepkloof Site Management Committee, DEDAT.	DCAS. Elands Bay Museum, DEDAT	2020-2022
	Implement new conservation measures on site		Monitoring reports on the effectiveness of current methods			
Pinnacle Point Site Complex						
Infrastructure development to reduce the risk of damage to the site	Construction and maintenance of appropriate infrastructure when necessary	The site is secured through appropriate infrastructure development and maintenance	Appropriate and well-maintained infrastructure	DCAS, HWC, Landowner, Archaeologists	DCAS, Site Management Committee	2017-2022
Human Resource development	Evaluation of existing backfill method of sandbags and assessment of remedial action when necessary	Human Resources involved have the capacity to protect the OUV of the site.	Monitoring reports on the effectiveness of current methods	DCAS, DEDAT, Archaeologists, Pinnacle Point Site Management Committee	DCAS, DEDAT	2017-2022

Action Category	Specific Action	Expected Outcomes	Performance Indicators	Stakeholders	Lead Parties	Timeframe
Sibhudu Cave						
Development of infrastructure	Install directional and interpretive signage	The site is secured through implementation of appropriate infrastructure	Signage boards installed at the entrance and at the site	Amafa, Landowner, Ndwedwe Local Municipality, KwaDukuza Municipality SAHRA	Site Management Committee	2021-2023
	Develop a footbridge	The cave is easily accessible	A footbridge	Amafa, Landowner, KwaDukuza Municipality, Ndwedwe Local Municipality, Sibhudu Trust, Qwabe Traditional Council and the broader locale community	Site Management Committee	2021-2023

Action Category	Specific Action	Expected Outcomes	Performance Indicators	Stakeholders	Lead Parties	Timeframe
Human Resource development	Develop and implement a Human Resources Strategy	Human Resources involved have the capacity to protect the OUV of the site	Human Resources Strategy	Amafa, SAHRA, KZN DAC, Archaeologists, Site Management Committee	Site Management Committee	2022-2023
	Invest in training of staff such as guides on how to protect heritage [12]	• Human resource capacity is known and improved (knowledgeable, experienced, and skilled individuals) • Further training programmes are designed and provided to current staff for upskilling	• Guides have certificate of qualification • Skilled staff	Amafa, SAHRA, KZN DAC, Archaeologists, Site Management Committee	Site Management Committee	2022-2026

[12] This can be done with the help of the Department of Economic Development Tourism and Environmental Affairs (EDTEA) and the KZN Tourism Authority.

Action Category	Specific Action	Expected Outcomes	Performance Indicators	Stakeholders	Lead Parties	Timeframe
	Develop and implement an Annual Individual Performance Plan	Individual is measured on their directed tasks and is accountable for their actions	Annual Individual Performance Plan	Amafa, SAHRA, KZN DAC, Archaeologists, Site Management Committee	Site Management Committee	2022-2026
Broader Community participation	Create an evolving database of registered stakeholders, mechanisms, and opportunities for stakeholder involvement	• Stakeholders are identified • Mechanisms and opportunities for stakeholder involvement are identified • Productive engagement of stakeholders in planning, project development and implementation • Informed and aware community	• A registered stakeholder database • Stakeholder Engagement Reports	Amafa, Landowners, Qwabe Traditional Council, Site Management Committee	Site Management Committee	2021-2026

6.b Administrative arrangement for monitoring property

The World Heritage Convention Act (No. 49 of 1999) requires every World Heritage Property to have a Management Authority. Since this is a serial nomination, the overall Management Authority concentrates on cross-cutting competencies, of which monitoring the individual sites as well as the overall World Heritage Property is one of its functions. The overall Management Authority is supported by the respective Site Management Authorities and in some cases, where management is vested in a larger institution, Site Management Committees.

It is proposed that for the sites included within this nomination, a similar approach be taken to that of the Cape Floral Region Protected Areas and the Fossil Hominid Sites of South Africa. For the first five years of the proposed World Heritage Property's existence, it is recommended that the sites in the Western Cape be placed under the supervision of the Western Cape MEC (Member of the Executive Council) for Cultural Affairs and Sport, whereas Sibhudu Cave in KwaZulu-Natal be placed under the supervision of the KwaZulu-Natal MEC for Arts, Culture, Sport and Recreation. The two representatives, along with a representative of the National Department of Forestry, Fisheries and the Environment, will form the Joint Management Committee, which will meet biannually and when necessary. This would be in line with the current structure of other proposed and inscribed serial sites in South Africa. It would also acknowledge the preference of the South African government to appoint an existing organ of state to carry out the functions of the Management Authority rather than create a new public entity for the management of the sites.

It is recommended that the two management authorities have a revolving presidency and secretariat of one year each.

6.c Results of previous reporting exercises

N/A

DOCUMENTATION

7. DOCUMENTATION

7.a Photographs and audio-visual image inventory and authorisation form

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
1	JPG	View of Diepkloof 1 within Diepkloof Rock Shelter from the farm.	2009	Cuan Hahndiek	Cuan Hahndiek	chanhdiek@sahra.org.za	Yes
2	JPG	Closer view of Diepkloof Rock Shelter 1.	2012	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
3	JPG	Closer view of Diepkloof Rock Shelter 2.	2012	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
4	JPG	Excavation area at Diepkloof Rock Shelter at the end of the last excavation season in 2013.	2013	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
5	JPG	Excavation at Diepkloof Rock Shelter in 2013.	2013	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
6	JPEG	Rock art at Diepkloof Rock Shelter 2.	2019	Mariagrazia Galimberti	Western Cape Department of Cultural Affairs and Sport	Mariagrazia. Galimberti@westerncape.gov.za	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
9	JPG	Figure 9. Engraved ostrich eggshell from Frank layer dated between about 80 000 and 70 000 years ago, Diepkloof Rock Shelter.	2012	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
10	JPG	Silcrete core from the Late Howiesons Poort occupation layers at DRS.	2012	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
11	JPEG	Different views of the engraved bone from the stratigraphic unit Lynn at Diepkloof Rock Shelter with a	2018	Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
		diacritic drawing of the engraved cortical surface.					
12	JPEG	Shoreline of Pinnacle Point showing Site 1 (an unexcavated cave) at the far east of the property.	2011	Andrew Hall	Andrew Hall	Waitabout191@gmail.com	Yes
13	JPG	View of the shoreline at Pinnacle Point from boat with the Cave 13 system in 2005, before the establishment of the Estate.	2005	Curtis Marean	SACP4	Curtis.marean@asu.edu	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
14	JPG	Outside view from inside Cave 13B.	2019	Mariagrazia Galimberti	Western Cape Department of Cultural Affairs and Sport	Mariagrazia.galimberti@westerncape.gov.za	Yes
15	JPG	Excavation at Pinnacle Point Cave 13B.	2005	Curtis Marean	SACP4	Curtis.marean@asu.edu	Yes
16	JPG	Excavation at Site 5-6 at Pinnacle Point Site Complex.	2007	Curtis Marean	SACP4	Curtis.Marean@asu.edu	Yes
17	JPG	Modified ochre from Cave 13B at Pinnacle	2006	Curtis Marean	SACP4	Curtis.Marean@asu.edu	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
		Point, from layer LC-MSA Lower, dating to ~162 000 years ago.					
18	JPG	Heat-treated microliths.	2011	Curtis Marean	SACP4	Curtis.Marean@asu.edu	Yes
19	JPG	Microlith artefacts from Cave 5-6.	2011	Curtis Marean	SACP4	Curtis.Marean@asu.edu	Yes
20	JPG	Sample of marine shells collected for non-utilitarian purposes (possible keepsakes) from Pinnacle Point Cave 13B.	2010	Antonieta Jerardino	Antonieta Jerardino	amsjerardino@gmail.com	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
21		Figure 21. View looking up on the large rock shelter of Sibhudu from the uThongathi River.	2021	Manuel Will	Manuel Will	manuel.will@uni-tuebingen.de	Yes
22	JPG	Overview of the excavation at Sibhudu Cave in 2018.	2018	Mohsen Zeidi	Mohsen Zeidi	mohsen.zeidi@ifu.uni-tuebingen.de	Yes
23	JPG	Closer view of the excavation at Sibhudu Cave in 2013.	2013	Nicholas Conard	Nicholas Conard	nicholas.conard@uni-tuebingen.de	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
24	JPG	Sibhudu Cave stratigraphy of the east profile of squares B4 and C4. The industries associated with the strata are marked on the right (from Vanhaeren et al., 2019, dates after Wadley and Jacobs, 2006 and Jacobs et al., 2008a, b).	2006	Lyn Wadley	Lyn Wadley	Lyn.Wadley@wits.ac.za	Yes
25	JPG	Stratigraphy overview from the Conard excavations 2011-202	2022	Nicholas Conard, Manuel Will,	Nicholas Conard, Manuel Will,	manuel.will@uni-tuebingen.de	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
				Saman Hamzavi, Mohsen Zeidi	Saman Hamzavi, Mohsen Zeidi		
26	JPG	*Afrolittorina africana* shells from the lowermost Howiesons Poort and Still Bay layers at Sibhudu Cave. Scale bar = 1 mm	2008	Lyn Wadley	Lyn Wadley	Lyn.Wadley@wits.ac.za	Yes
27	JPEG	Figure 27. Bifacial piece with use wear traces	2020	Veerle Rots	Veerle Rots	Veerle.Rots@uliege.be	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
28	JPG	Refitted Howiesons Poort bone point from Sibhudu Cave. Scale bar = 1 cm.	2008	Lyn Wadley	Lyn Wadley	Lyn.Wadley@wits.ac.za	Yes
29	JPEG	Clay fragment with monocotyledonous plant impressions from Sibhudu Cave.	2011	Lyn Wadley	Lyn Wadley	Lyn.Wadley@wits.ac.za	Yes
30	JPEG	Modified ochre pieces from the >77 ka layers at	2020	Saman Hamzavi	Saman Hamzavi	saman.razavi@usask.ca	Yes
31	JPG	Bifacial piece with use wear traces	2020	Viola Schmid	Viola Schmid	v.schmid@arch.leidenuniv.nl	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
32	JPG	Still Bay Bifacial points from Diepkloof Rock Shelter.		Pierre-Jean Texier	Pierre-Jean Texier	pj.texier@gmail.com	Yes
33	JPG	Excavation overview graphic	2021	Aurore Val, Manuel Will	Aurore Val, Manuel Will	manuel.will@uni-tuebingen.de	Yes
34	JPG	ant remains from	2016	Alexander Weide	Alexander Weide	alexander.weide@arch.ox.ac.uk	Yes
36	JPG	State of conservation of the excavation area in Diepkloof Rock Shelter 1.	2018	Mariagrazia Galimberti	Western Cape Department of Cultural Affairs and Sport	Mariagrazia. Galimberti@westerncape.gov.za	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
37	JPG	Current site stabilisation in Diepkloof Rock Shelter 1.	2018	Mariagrazia Galimberti	Western Cape Department of Cultural Affairs and Sport	Mariagrazia. Galimberti@westerncape.gov.za	Yes
38	JPEG	The Cave floor with sandbags to protect the excavation trench and the archaeological deposits	2021	Francois Odendaal	Francois Oddendaal	francois@ecoafrica.co.za	Yes
39	JPEG	Tensioning Poles to Protect the Excavation Pits	2021	Francois Oddendaal	Francois Oddendaal	francois@ecoafrica.co.za	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
40	JPEG	Path within the Cave indicating walking route for visitors.	2021	Francois Oddendaal	Francois Oddendaal	francois@ecoafrica.co.za	Yes
41	JPEG	Crossing the uThongathi river to Sibhudu Cave during the rainy season.	2020	Nicholas Conard	Nicholas Conard	nicholas.conard@uni-tuebingen.de	Yes
44	JPG	Boardwalk leading to Cave 13B at Pinnacle Point Site Complex.	2020	Mariagrazia Galimberti	Western Cape Department of Cultural Affairs and Sport	Mariagrazia. Galimberti@westerncape.gov.za	Yes
45	JPG	Boardwalk leading from the top of the cliff, where the Clubhouse is located,	2020	Mariagrazia Galimberti	Western Cape Department	Mariagrazia. Galimberti@westerncape.gov.za	Yes

ID No	Format	Caption	Date of the photo (yr)	Photographer	Copyright Owner	Contact Details of Copyright Owner	Grant to UNESCO Non-Exclusive Cession of Rights (Yes/No)
		to Cave 13B (not in picture). Other cave sites within the Pinnacle Point Site Complex are visible below the cliff edge.			of Cultural Affairs and Sport		

7.b Texts relating to protective designation, copies of property management plans or documented management systems and extracts of other plans relevant to the nominated property

The main texts that relate to the designation, planning and management, are:

- The National Heritage Resources Act (No. 25 of 1999)
- The World Heritage Convention Act (No. 49 of 1999)
- Constitution of the Republic South Africa Act (No. 108 of 1996)
- National Environmental Management Act (No. 107 of 1998)
- National Environmental Management: Protected Areas Act (No. 57 of 2003)
- Promotion of Access to Information Act (No. 2 of 2000)
- Promotion of Administrative Justice Act (No. 3 of 2000)
- Local Government: Municipal Systems Act (No. 32 of 2000)
- Sibhudu Cave: Integrated Management Plan, 2021-2026
- Pinnacle Point Site Complex: Integrated Management Plan, 2017-2022
- Diepkloof Rock Shelter: Integrated Management Plan, 2017-2022.

7.c Form and date of most recent records or inventory of the nominated property

The South African Heritage Resources Agency (SAHRA) keeps a record of the listed sites and excavation permits given as per the National Heritage Resources Act (No. 25 of 1999), which is uploaded on the online register SAHRIS (South African Heritage Resources Information System). The online register contains information on the geographical location and name of the declared Property. In addition, the owners and managers of each site have a record of all previous excavation work done on the site. A complete copy of the inventory and excavation permits is also kept at Heritage Western Cape and Amafa AND Research Institute.

7.d Address where inventory, records and archives are held

Inventories are on file at the SAHRA Registry or archive, and some are available on the SAHRIS (http://sahra.org.za/sahris/), which is maintained by SAHRA.

South African Heritage Resources Agency

P.O Box 4637

CAPE TOWN, 8000

SOUTH AFRICA

7.e Bibliography

Agam, A., Azuri, I., Pinkas, I., Gopher, A., Natalio, F. 2020. Estimating temperatures of heated Lower Palaeolithic flint artefacts. *Nature Human Behaviour* 5: 221–228. https://doi.org/10.1038/s41562-020-00955-z

Allott, L.F. 2004. Changing environments in Oxygen Isotope Stage 3: Reconstructions using archaeological charcoal from Sibhudu cave. *South African Journal of Science* 100: 179–184.

Allott, L.F. 2005. *Palaeoenvironments of the Middle Stone Age at Sibudu Cave, KwaZulu-Natal, South Africa: An analysis of archaeological charcoal*. PhD thesis, University of the Witwatersrand, Johannesburg.

Allott, L.F. 2006. Archaeological charcoal as a window on palaeovegetation and wood-use during the Middle Stone Age at Sibhudu Cave. *Southern African Humanities* 18(1): 173–201.

Aubert, M., Pike, A.W.G., Stringer, C., Bartsiokas, A., Kinsley, L., Eggins, S., Day, M., Grün, R. 2012. Confirmation of a late middle Pleistocene age for the Omo Kibish 1 cranium by direct uranium-series dating. *Journal of Human Evolution* 63: 704–710.

Backwell, L., Bradfield, J., Carlson, K.J., Jashashvili, T., Wadley, L., d'Errico, F. 2018. The antiquity of bow-and-arrow technology: Evidence from Middle Stone Age layers at Sibudu Cave. *Antiquity* 92(362): 289–303.

Bader, G. D., Tribolo, C., Conard, N. J. 2018. A return to Umbeli Belli: New insights of recent excavations and implications for the final MSA of eastern South Africa. *Journal of Archaeological Science: Report 21*: 733-757

Barham, L.S. 1995. The Mumbwa Caves Project, Zambia, 1993–94. *Nyame Akuna* 42: 66–72.

Bar-Matthews, M., Marean, C.W., Jacobs, Z., Karkanas, P., Fisher, E.C., Herries, A.I.R., Brown, K.S., Williams, H.M., Bernatchez, J., Ayalon, A., Nilssen, P.J. 2010. A high resolution and continuous isotopic speleothem record of paleoclimate and paleoenvironment from 90 to 53 ka from Pinnacle Point on the south coast of South Africa. *Quaternary Science Reviews* 29: 2131–2145.

Bar-Yosef Mayer, D.E., Vandermeersch, B., Bar-Yosef, O. 2009. Shells and ochre in Middle Paleolithic Qafzeh Cave, Israel: Indications for modern behavior. *Journal of Human Evolution* 56(3): 307–314.

Berger, L.R., de Ruiter, D.J., Churchill, S.E., Schmid, P., Carlson, K.J., Dirks, P. H. G. M., Kibii, J.M. 2010. *Australopithecus sediba*: A new species of Homo-like australopith from South Africa. *Science* 328(5975): 195–204.

Berger, L.R., Hawks, J., de Ruiter, D.J., Churchill, S.E., Schmid, P., Delezene, L.K., Kivell, T.L., Garvin, H.M., Williams, S.A., DeSilva, J.M., Skinner, M.M., Musiba, C.M., Cameron, N., Holliday, T.W., Harcourt-Smith, W., Ackermann, R.R., Bastir, M., Bogin, B., Bolter, D., Brophy, J., Cofran, Z.D., Congdon, K.A., Deane, A.S. Dembo, M., Drapeau, M., Elliott, M.C., Feuerriegel, E.M., Garcia-Martinez, D., Green, D.J., Gurtov, A., Irish, J.D., Kruger, A., Laird, M.F., Marchi, D., Meyer, M.R., Nalla, S., Negash, E.W., Orr, C.M., Radovcic, D., Schroeder, L., Scott, J.E., Throckmorton, Z., Tocheri, M.W., VanSickle, C., Walker, C.S., Wei, P., Zipfel, B. 2015. *Homo naledi*, a new species of the genus Homo from the Dinaledi Chamber, South Africa. *eLife* 4. https://doi.org/10.7554/eLife.09560.001

Berna, F., Goldberg, P., Horwitz, L.K., Brink, J., Holt, S., Bamford, M., Chazan, M. 2012. Microstratigraphic evidence of in situ fire in the Acheulean strata of Wonderwerk Cave, Northern Cape province, South Africa. *Proceedings of the National Academy of Sciences of the United States of America* 109(20): E1215–E1220.

Botha, M.S., Cowling, R.M., Esler, K.J., de Vynck, J.C., Cleghorn, N.E., Potts, A.J. 2020. Return rates from plant foraging on the Cape south coast: Understanding early human economies. *Quaternary Science Reviews* 235: a106129. https://doi.org/10.1016/j.quascirev.2019.106129

Bouzouggar, A., Barton, N., Vanhaeren, M., d'Errico, F., Collcutt, S., Higham, T., Hodge, E., Parfitt, S., Rhodes, E., Schwenninger, J.L., Stringer, C., Turner, E., Ward, S., Moutmir, A., Stambouli, A. 2007. 82 000-year-old shell beads from North Africa and implications for the origins of modern human behavior. *Proceedings of the National Academy of Sciences of the United States of America* 104(24): 9964–9969.

Bräuer, G. and Mehlman, M.J. 1988. Hominid molars from a Middle Stone Age level at the Mumba Rock Shelter, Tanzania. *American Journal of Physical Anthropology* 75: 69–76.

Braun, K., Bar-Matthews, M., Matthews, A., Ayalon, A., Cowling, R., Karkanas, P., Fisher, E.C., Dyez, K., Zilberman, T., Marean, C. 2019. Late Pleistocene records of speleothem stable isotopic compositions from Pinnacle Point on the South African south coast. *Quaternary Research* 91(1): 265–288.

Braun, K., Bar-Matthews, M., Matthews, A., Ayalon, A., Zilberman, T., Cowling, R.M., Fisher, E.C., Herries, A.I.R., Brink, J.S., Marean, C.W. 2020. Comparison of climate and environment on the edge of the Palaeo-Agulhas Plain to the Little Karoo (South Africa) in Marine Isotope Stages 5–3 as indicated by speleothems. *Quaternary Science Reviews* 235: a105803. https://doi.org/10.1016/j.quascirev.2019.06.025

Broadhurst, C.L., Wang, Y., Crawford, M.A., Cunnane, S.C., Parkington, J.E., Schmidt, W.F. 2002. Brain-specific lipids from marine, lacustrine, or terrestrial food resources: potential impact on early African *Homo sapiens*. *Comparative Biochemistry and Physiology – B Biochemistry and Molecular Biology* 131: 653-673.

Brooks, A.S., Yellen, J.E., Potts, R., Behrensmeyer, A.K., Deino, A.L., Leslie, D.E., Ambrose, S.H., Ferguson, J.R., d'Errico, F., Zipkin, A.M., Whittaker, S., Post, J., Veatch, E.G., Foecke, K., Clark, J.B. 2018. Long-distance stone transport and pigment use in the earliest Middle Stone Age. *Science* 360(6384): 90–94.

Broom, R. 1947. Discovery of a New Skull of the South African Ape-man, *Plesianthropus*.

Broom, R. and Robinson, J.T. 1947. Further remains of the Sterkfontein Ape-man, *Plesianthropus*. *Nature* 160: 430–431.

Brown, K.S., Marean, C.W., Herries, A.I.R., Jacobs, Z., Tribolo, C., Braun, D., Roberts, D.L., Meyer, M.C., Bernatchez, J. 2009. Fire as an engineering tool of Early Modern Humans. *Science* 325: 859–862.

Brown, K.S., Marean, C.W., Jacobs, Z., Schoville, B.J., Oestmo, S., Fisher, E.C., Bernatchez, J., Karkanas, P., Matthews, T. 2012. An early and enduring advanced technology originating 71 000 years ago in South Africa. *Nature* 491: 590–593.

Bruch, A.A., Sievers, C., Wadley, L. 2012. Quantification of climate and vegetation from southern African Middle Stone Age sites — an application using Late Pleistocene plant material from Sibudu, South Africa. *Quaternary Science Reviews* 45: 7–17.

Cartwright, C.R. 2013. Identifying the woody resources of Diepkloof Rock Shelter (South Africa) using scanning electron microscopy of the MSA wood charcoal assemblages. *Journal of Archaeological Science* 40: 3463–3474.

Cawthra, H.C., Anderson, R.J., De Vynck, J.C., Jacobs, Z., Jerardino, A., Kyriacou, K., Marean, C.W. 2020a. Migration of Pleistocene shorelines across the Palaeo-Agulhas Plain: Evidence from dated sub-bottom profiles and archaeological shellfish assemblages. *Quaternary Science Reviews* 235: a106107. https://doi.org/10.1016/j.quascirev.2019.106107

Cawthra, H.C., Cowling, R.M., Andò, S., Marean, C.W. 2020b. Geological and soil maps of the Palaeo-Agulhas Plain for the Last Glacial Maximum. *Quaternary Science Reviews* 235: a105858. https://doi.org/10.1016/j.quascirev.2019.07.040

Cawthra, H.C., Frenzel, P., Hahn, A., Compton, J.S., Gander, L., Zabel, M. 2020c. Seismic stratigraphy of the inner to mid Agulhas bank, South Africa. *Quaternary Science Reviews* 235: a105979. https://doi.org/10.1016/j.quascirev.2019.105979

Charrié-Duhaut, A., Porraz, G., Cartwright, C., Igreja, M., Conan, J., Poggenpoel, C., Texier, P.-J. 2013. First molecular identification of a hafting adhesive in the Late Howiesons Poort at Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40(9): 3506–3518.

Chase, B.M. 2010. South African palaeoenvironments during marine oxygen isotope stage 4: A context for the Howiesons Poort and Still Bay industries. *Journal of Archaeological Science* 37: 1359–1366.

Chavaillon, J. and Berthelet, A. 2004. The archaeological sites of Melka Kunture. In J. Chavaillon and M. Piperno (eds.), *Studies on the Early Paleolithic site of Melka Kunture, Ethiopia*. Istituto Italiano Di Preistoria E Protostoria, Florence: 25–80. http://www.melkakunture.it/biblio/monograph/melka-25.pdf

Clark J.L. 2019. The Still Bay and pre-Still Bay fauna from Sibudu Cave: Taphonomic and taxonomic analysis of the macromammal remains from the Wadley excavations. *Journal of Paleolithic Archaeology* 2: 26–73.

Clark, J.L. 2011. The evolution of human culture during the later Pleistocene: Using fauna to test models on the emergence and nature of 'modern' human behavior. *Journal of Anthropological Archaeology* 30(3): 273–291.

Clark, J.L. 2013. Exploring the relationship between climate change and the decline of the Howiesons Poort at Sibudu Cave (South Africa). In J.L. Clark and J.D. Speth (eds.), *Zooarchaeology and modern human origins: Human hunting behavior during the Later Pleistocene, vertebrate paleobiology and paleoanthropology*. Springer: 9–18.

Clark, J.L. 2017. The Howieson's Poort fauna from Sibudu Cave: Documenting continuity and change within Middle Stone Age industries. *Journal of Human Evolution* 107: 49–70.

Clark, J.L. and Plug, I. 2008. Animal exploitation strategies during the South African Middle Stone Age: Howiesons Poort and post-Howiesons Poort fauna from Sibudu Cave. *Journal of Human Evolution* 54: 886–898.

Clarke, R. 2019. Excavation, reconstruction and taphonomy of the StW 573 Australopithecus prometheus skeleton from Sterkfontein Caves, South Africa. *Journal of Human Evolution* 127: 41–53.

Cleghorn, N., Potts, A.J., Cawthra, H.C. 2020. The Palaeo-Agulhas Plain: A lost world and extinct ecosystem. *Quaternary Science Reviews 235*: a106308. https://doi.org/10.1016/j.quascirev.2020.106308

Collins, J.A., Schefuß, E., Boom, A., Sealy, J. 2017. Investigation of organic matter and biomarkers from Diepkloof Rock Shelter, South Africa: Insights into Middle Stone Age site usage and palaeoclimate. *Journal of Archaeological Science 85*: 51–65.

Compton, J.S. 2011. Pleistocene sea-level fluctuations and human evolution on the southern coastal plain of South Africa. *Quaternary Science Reviews* 30: 506–527.

Cowling, R.M., Cartwright, C.R., Parkington, J.E., Allsopp, J.C. 1999. Fossil wood charcoal assemblages from Elands Bay Cave, South Africa: Implications for Late Quaternary vegetation and climates in the winter-rainfall fynbos biome. *Journal of Biogeography* 26: 367–378.

Cowling, R.M., Potts, A.J., Franklin, J., Midgley, G.F., Engelbrecht, F., Marean, C.W. 2020. Describing a drowned Pleistocene ecosystem: Last Glacial Maximum vegetation reconstruction of the Palaeo-Agulhas Plain. *Quaternary Science Reviews* 235: a105866. https://doi.org/10.1016/j.quascirev.2019.105866

d'Errico, F., Blackwell, L., Wadley, L. 2012. Identifying regional variability in Middle Stone Age bone technology: The case of Sibudu Cave. *Journal of Archaeological Science* 39: 2479–2495.

d'Errico, F., Vanhaeren, M., Wadley, L. 2008. Possible shell beads from the Middle Stone Age of Sibhudu Cave. *Journal of Archaeological Science* 35: 2675–2685.

Dart, R., 1925. *Australopithecus africanus.* The Man-Ape of South Africa. *Nature* 115: 195–199.

Dayet, L., Le Bourdonnec, F.-X. Daniel, F., Porraz, G., Texier, P.-J. 2016. Ochre provenance and procurement strategies during the Middle Stone Age at Diepkloof Rock Shelter, South Africa. *Archaeometry* 58(5): 807–829.

Dayet, L., Texier, P.-J., Daniel, F., Porraz, G. 2013. Ochre resources from the Middle Stone Age sequence of Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40(9): 3492–3505.

de la Peña, P. and Wadley, L. 2017. Technological variability at Sibudu Cave: The end of Howiesons Poort and reduced mobility strategies after 62,000 years ago. *PLoS ONE* 12(10): e0185845. https://doi.org/10.1371/journal.pone.0185845

de la Peña, P., Taipae, N., Wadley, L., Rots, V. 2018. A techno-functional perspective on quartz micro-notches in Sibudu's Howiesons Poort indicates the use of barbs in hunting technology. *Journal of Archaeological Science* 93: 166–195.

De Vynck, J.C., Difford, M., Marean, C.W., Cowling, R.M., Hill, K. 2020. The resilience to human foraging of intertidal resources on the south Cape coast of South Africa and

the implications for pre-historic foragers. *Quaternary Science Reviews* 235: a106041. https://doi.org/10.1016/j.quascirev.2019.106041

Deacon, J. 1995. An unsolved mystery at the Howieson's Poort. *South African Archaeological Bulletin* 50(162): 110–120.

Deacon, J. 2012. Ethnographic parallels for human evolution sites on the World Heritage List. In N. Sanz (ed.), *Human evolution: Adaptations, dispersals and social developments (HEADS) 2: Human origin sites and the World Heritage Convention in Africa*. World Heritage Papers 33: 30–34. https://unesdoc.unesco.org/ark:/48223/pf0000217748

Deeds Registration Office, 1932. Title Deed A2639/1931.

Deeds Registration Office, 1998. Title Deed T3284/1998.

Deeds Registration Office, 2017. Title Deed 15176/2017.

Deino, A.L., Behrensmeyer, A.K., Brooks, A.S., Yellen, J.E., Sharp, W.D., Potts, R. 2018. Chronology of the Acheulean to Middle Stone Age transition in eastern Africa. *Science* 360(6384): 95–98.

Delagnes, A., Schmidt, P., Douze, K., Wurz, S., Bellot-Gurlet, L., Conard, N.J., Nickel, K., van Niekerk, K.L., Henshilwood, C.S. 2016. Early evidence for the extensive heat treatment of silcrete in the Howiesons Poort at Klipdrift Shelter (layer PBD, 65 ka), South Africa. *PLoS ONE* 11(10): e0163874.

Department of Environmental Affairs and Development Planning. 2003. Record of Decision: The Proposed Residential Golf Resort Development at Pinnacle Point, Mossel Bay.

Department of Environmental Affairs. 2009. *A user-friendly guide to the Integrated Coastal Management Act of South Africa*. https://www.environment.gov.za/sites/default/files/docs/guideto_icm_act.pdf

Department of Museums, Sites and Monuments of the National Museums of Kenya. 2010. *The African Great Rift Valley — Olorgesailie Prehistoric Site*. UNESCO nomination. https://whc.unesco.org/en/tentativelists/5505/

Department of Tourism 2012. Final Draft: National Heritage and Cultural Tourism Strategy. Department of Tourism, Pretoria.

Dibble, H.L. and McPherron, S.P. 1996. *A multimedia companion to the Middle Paleolithic site of Combe-Capelle Bas (France)*. University of Pennsylvania Museum, Philadelphia.

Dibble, H.L., Marean, C.W., McPherron, S.P. 2007. The use of barcodes in excavation projects: Examples from Mossel Bay (South Africa) and Roc de Marsal (France). *SAA Archaeological Record* 7: 33–38.

Díez-Martin, F., Domínguez-Rodrigo, M., Sánchez, P., Mabulla, A.Z.P., Tarriño, A., Barba, R., Prendergast, M.E., de Luque, L. 2009. The Middle to Later Stone Age technological transition in East Africa. New data from Mumba rockshelter Bec V (Tanzania) and their implications for the origin of modern human behavior. *Journal of African Archaeology* 7(2): 147–173.

Douka, K., Grün, R., Jacobs, Z., Lane, C., Farr, L., Hunt, C., Inglis, R.H., Reynolds, T., Albert, P., Aubert, M., Cullen, V., Hill, E., Kinsley, L., Roberts, R.G., Tomlinson, E.L., Wulf, S., Barker, G. 2014. The chronostratigraphy of the Haua Fteah cave (Cyrenaica, northeast Libya). *Journal of Human Evolution* 66: 39–63.

Douze, K., Delagnes, A., Wurz, S., Henshilwood, C.S. 2018. The Howiesons Poort lithic sequence of Klipdrift Shelter, southern Cape, South Africa. *PLoS ONE* 13(11): e0206238. https://doi.org/10.1371/journal.pone.0206238

Du Preez, D. 2018. Audit Report: Pinnacle Point Beach and Golf Estate: Operational Environmental Management Plan. https://pinnaclepointestate.co.za/wp-content/uploads/2019/02/Pinnacle-Point-enviro-audit-report2018.pdf

Erlandson, J.M. 2001. The archaeology of aquatic adaptations: Paradigms for a new millennium. *Journal of Archaeological Research* 9: 287–350.

Esteban, I., Marean, C.W., Cowling, R.M., Fisher, E.C., Cabanese, D., Albert, R.M., 2020. Palaeoenvironments and plant availability during MIS 6 to MIS 3 on the edge of the Palaeo-Agulhas Plain (south coast, South Africa) as indicated by phytolith analysis at Pinnacle Point. *Quaternary Science Reviews* 235: a105667. https://doi.org/10.1016/j.quascirev.2019.02.022

Faith, J.T. 2013. Taphonomic and paleoecological change in the large mammal sequence from Boomplaas Cave, Western Cape, South Africa. *Journal of Human Evolution* 65: 715–730.

Faltein, Z., Esler, K.J., Midgley, G.F. Ripley, B.S. 2020. Atmospheric CO2 concentrations restrict the growth of *Oxalis pes-caprae* bulbs used by human inhabitants of the Paleo-Agulhas plain during the Pleistocene glacials. *Quaternary Science Reviews* 235: a105731. https://doi.org/10.1016/j.quascirev.2019.04.017

Feathers, J. 2015. Luminescence dating at Diepkloof Rock Shelter – new dates from single-grain quartz. *Journal of Archaeological Science* 63: 164–174. https://doi.org/10.1016/j.jas.2015.02.012

Fisher, E.C., Bar-Matthews, M., Jerardino, A., Marean, C.W. 2010. Middle and Late Pleistocene paleoscape modeling along the southern coast of South Africa. *Quaternary Science Reviews* 29: 1382–1398.

Garden Route District Municipality 2019. Garden Route & Klein Karoo Tourism Strategy 2019-2023.

Gliganic, L.A., Jacobs, Z., Roberts, R.G., Domínguez-Rodrigo, M., Mabulla, A.Z.P. 2012. New ages for Middle and Later Stone Age deposits at Mumba rockshelter, Tanzania: Optically stimulated luminescence dating of quartz and feldspar grains. *Journal of Human Evolution* 62: 533–547.

Goldberg, P., Miller, C.E., Schiegl, S., Ligouis, B., Berna, F., Conard, N.J., Wadley, L. 2009. Bedding, hearths, and site maintenance in the Middle Stone Age of Sibhudu Cave, KwaZulu-Natal, South Africa. *Archaeological and Anthropological Sciences* 1(2): 95–122.

Goodwin, A.J.H. and van Riet Lowe, C. 1929. The Stone Age cultures of South Africa. *Annals of the South African Museum* 27: 1–289.

Grobler, B.A., Cawthra, H.C., Potts, A.J., Cowling, R.M. 2020. Plant diversity of Holocene dune landscapes in the Cape Floristic Region: The legacy of Pleistocene sea-level dynamics. *Quaternary Science Reviews* 235: a106058. https://doi.org/10.1016/j.quascirev.2019.106058

Gunz, P. Bookstein, F.L., Mitteroecker, P., Sadlmayr, A., Seidler, H., Weber G.W. 2009. Early modern human diversity suggests subdivided population structure and a complex out-of-Africa scenario. *Proceedings of the National Academy of Sciences of the United States of America* 106: 6094–6098.

Helm, C.W., Cawthra, H.C., Cowling, R.M., De Vynck, J.C., Marean, C.W., Thesen, G.H.H., Venter, J.A. 2020. Pleistocene vertebrate tracksites on the Cape south coast of South Africa and their potential palaeoecological implications. *Quaternary Science Reviews* 235: a105857. https://doi.org/10.1016/j.quascirev.2019.07.039

Henn, B.M., Gignoux, C.R., Jobin, M., Granka, J.M., Macpherson, J.M., Kidd, J.M., Rodríguez-Botigué, L., Ramachandran, S., Hon, L., Brisbin, A. 2011. Hunter-gatherer genomic diversity suggests a southern African origin for modern humans. *Proceedings of the National Academy of Sciences* 108: 5154.

Henshilwood, C.S., 2008. Winds of change: Palaeoenvironments, material culture and human behaviour in the Late Pleistocene (about 77 ka–48 ka ago) in the Western Cape Province, South Africa. *South African Archaeological Society Goodwin Series* 10: 35–51.

Henshilwood, C.S., d'Errico, F., van Niekerk, K.L., Coquinot, Y., Jacobs, Z., Lauritzen, S.-E., Menu, M., García-Moreno, R. 2011. A 100 000-year-old ochre-processing workshop at Blombos Cave, South Africa. *Science* 334: 219–222.

Henshilwood, C.S., d'Errico, F., Watts, I. 2009. Engraved ochres from the Middle Stone Age levels at Blombos Cave, South Africa. *Journal of Human Evolution* 57(1): 27–47.

Henshilwood, C.S., d'Errico, F., Yates, R., Jacobs, Z., Tribolo, C., Duller, G.A.T., Mercier N., Sealy, J.C., Valladas, H., Watts, I., Wintle, A.G. 2002. Emergence of modern human behaviour: Middle Stone Age engravings from South Africa. *Science* 295: 1278–1280.

Henshilwood, C.S., van Niekerk, K.L., Wurz, S., Delagnes, A., Armitage, S., Rifkin, R., Douze, K., Keene, P., Haaland, M., Reynard, J., Discamps, E., Mienies, S. 2014. Klipdrift Shelter, southern Cape, South Africa: Preliminary report on the Howiesons Poort levels. *Journal of Archaeological Science* 45: 284–303.

Heritage Western Cape. 2013. Final Comment: HIA: Proposed upgrade of the Mossel Bay Point on Erf 3419, Erf 3794 and Portion of Erven 3626 & 15131. Case Number: 120309JL08.

Herries, A.I.R. 2006. Archaeomagnetic evidence for climate change at Sibhudu Cave. *Southern African Humanities* 18(1): 131–147.

Herries, A.I.R. and Fisher, E. C. 2010. Multidimensional GIS modeling of magnetic mineralogy as a proxy for fire use and spatial patterning: Evidence from the Middle Stone Age bearing sea cave of Pinnacle Point 13B (Western Cape, South Africa). *Journal of Human Evolution* 59: 306–320.

Heyns, L., Coughlan, L., Feng, A. 2020. Visual Impact Assessment: Pinnacle Point Site Complex. Pinnacle Point Estate, Erf 15391 and Erf 15390, Mossel Bay. Unpublished report commissioned by Heritage Western Cape.

Hodgkins, J., Marean, C.W., Venter, J.A., Richardson, L., Roberts, P., Zech, J., Difford, M., Copeland, S.R., Orr, C.M., Keller, H.M., Fahey, P.B., Lee-Thorp, J.A. 2020. An isotopic test of the seasonal migration hypothesis for large grazing ungulates inhabiting the Palaeo-Agulhas Plain. *Quaternary Science Reviews* 235: a106221. https://doi.org/10.1016/j.quascirev.2020.106221

Hodgskiss, T. 2010. Identifying grinding, scoring and rubbing use-wear on experimental ochre pieces. *Journal of Archaeological Science* 37: 344–3358.

Hodgskiss, T. 2012. An investigation into the properties of the ochre from Sibudu, KwaZulu-Natal, South Africa. *Southern African Humanities* 24(1). https://journals.co.za/doi/10.10520/EJC127432

Hodgskiss, T. 2013a. *Ochre use at Sibudu Cave and its link to complex cognition in the Middle Stone Age*. Unpublished doctoral thesis, University of the Witwatersrand, Johannesburg.

Hodgskiss, T. 2013b. Ochre use in the Middle Stone Age at Sibudu, South Africa: Grinding, rubbing, scoring and engraving. *Journal of African Archaeology* 11(1): 75–95.

Hodgskiss, T. and Wadley, L. 2017. How people used ochre at Rose Cottage Cave, South Africa: Sixty thousand years of evidence from the Middle Stone Age. *PLoS ONE* 12(4): e0176317.

Hovers, E., Ilani, S., Bar-Yosef, O., Vandermeersch, B. 2003. An early case of color symbolism: Ochre use by modern humans in Qafzeh Cave. *Current Anthropolgy* 44(4): 491–522.

Hublin, J.J. 2000. Modern-non-modern hominid interactions: A Mediterranean perspective. In O. Bar-Yosef and D. Pilbeam (eds.), *The geography of Neandertals and modern humans in Europe and the Greater Mediterranean. Peabody Museum Bulletin 8*. Peabody Museum of Archaeology and Ethnology, Cambridge, MA: 157–182.

Hublin, J.J., Ben-Ncer, A., Bailey, S.E., Freidline, S.E., Neubauer, S., Skinner, M.M., Bergmann, I., Le Cabec, A., Benazzi, S., Harvati, K., Gunz, P. 2017. New fossils from Jebel Irhoud, Morocco and the pan-African origin of Homo sapiens. *Nature* 546(7657): 289–292.

Humphrey, L., Bello, S.M., Turner, E., Bouzouggar, A., Barton, N. 2012. Iberomaurusian funerary behaviour: Evidence from Grotte des Pigeons, Taforalt, Morocco. *Journal of Human Evolution* 62(2): 261–273.

Igreja, M. and Porraz, G. 2013. Functional insights into the innovative Early Howiesons Poort technology at Diepkloof Rock Shelter (Western Cape, South Africa). *Journal of Archaeological Science* 40(9): 3475–3491.

Jacobs, Z. 2010. An OSL chronology for the sedimentary deposits from Pinnacle Point Cave 13B — A punctuated presence. *Journal of Human Evolution* 59: 289–305.

Jacobs, Z. and Roberts, R.G. 2015. An improved single grain OSL chronology for the sedimentary deposits from Diepkloof Rockshelter, Western Cape, South Africa. *Journal of Archaeological Science* 63: 175–192.

Jacobs, Z. and Roberts, R.G. 2017. Single-grain OSL chronologies for the Still Bay and Howieson's Poort industries and the transition between them: Further analyses and statistical modelling. *Journal of Human Evolution* 107: 1–13.

Jacobs, Z., Jones, B.G., Cawthra, H.C., Henshilwood, C.S. Roberts, R.G. 2020. The chronological, sedimentary and environmental context for the archaeological deposits at Blombos Cave, South Africa. *Quaternary Science Reviews* 235: a105850. https://doi.org/10.1016/j.quascirev.2019.07.032

Jacobs, Z., Roberts, R.G., Galbraith, R.F., Deacon, H.J., Grün, R., Mackay, A., Mitchell, P.J., Vogelsang, R., Wadley, L. 2008b. Ages for the Middle Stone Age of southern Africa: Implications for human behavior and dispersal. *Science* 322(31): 733–735.

Jacobs, Z., Wintle, A.G., Duller, G.A.T., Roberts, R.G., Wadley, L. 2008a. New ages for the post-Howiesons Poort, late and final Middle Stone Age at Sibhudu Cave, South Africa. *Journal of Archaeological Science* 35: 1790–1807.

Jerardino, A. 2016. On the origins and significance of Pleistocene coastal resource use in southern Africa with particular reference to shellfish gathering. *Journal of Anthropological Archaeology* 41: 213–230.

Jerardino, A. and Marean, C.W. 2010. Shellfish gathering, marine paleoecology and modern human behavior: Perspectives from cave PP13B, Pinnacle Point, South Africa. *Journal of Human Evolution* 59: 412–424.

Kandel, A.W., Bolus, M., Bretzke, K., Bruch, A.A., Haidle, M.N., Hertler, C., Märker, M. 2016. Increasing behavioral flexibility? An integrative macro-scale approach to understanding the Middle Stone Age of southern Africa. *Journal of Archaeological Method and Theory* 23: 623–668. https://doi.org/10.1007/s10816-015-9254-y

Kaplan, J. 1990. The Umhlatuzana rock shelter sequence: 100 000 years of Stone Age history. *Southern African Humanities* 2: 1-94.

Kaplan, J. 1997. Archaeological study: Proposed Pinnacle Point Development. Unpublished report. Agency for Cultural Resource Management, Riebeek West, South Africa.

Klein, R.G. 1972. The late Quaternary mammalian fauna of Nelson Bay Cave (Cape Province, South Africa): Its implications for mega faunal extinctions and environmental and cultural change. *Quaternary Research* 2: 135–42.

Klein, R.G. 2000. The Earlier Stone Age of southern Africa. *South African Archaeological Bulletin* 55: 107–122.

Kraaij, T., Engelbrecht, F., Franklin, J., Cowling, R.M. 2020. A fiery past: A comparison of glacial and contemporary fire regimes on the Palaeo-Agulhas Plain, Cape Floristic Region. *Quaternary Science Reviews* 235: a106059. https://doi.org/10.1016/j.quascirev.2019.106059

KwaDukuza Municipality 2007. KwaDukuza Integrated Human Settlement Development Plan 2007 – 2012.

KwaDukuza Municipality 2020. KwaDukuza Municipality Final 2020/2021 Integrated Development Plan (IDP) https://www.kwadukuza.gov.za/index.php/idp/final2020-21. Accessed on 8 May 2021.

KwaZulu-Natal Tourism Authority 2019. Annual Report 2018/2019. Available at: http://www.zulu.org.za/files/images/files/TKZN%20Ann%20Rpt%20201819%20web.pdf. Accessed on 1 February 2021.

Kyriacou, K., Blackhurst, D., Parkington, J., Marais, D. 2016. Marine and terrestrial foods as a source of brain-selective nutrients for early modern humans in the southwestern Cape, South Africa. *Journal of Human Evolution* 97: 86–96.

Langejans, G.H.J. 2012. Middle Stone Age *pièces esquillées* from Sibudu Cave, South Africa: An initial micro-residue study. *Journal of Archaeological Science* 39(6): 1694–1704.

Lennox, S.J. and Wadley, L. 2019. A charcoal study from the Middle Stone Age, 77,000 to 65,000 years ago, at Sibudu, KwaZulu-Natal. *Transactions of the Royal Society of South Africa* 74(1): 38–54.

Liberty-Shalev, R., Weinstein-Evron, M., Kaufman, D., Rosenberg, D., Bracha, M. 2011. Sites of Human Evolution at Mount Carmel: The Nahal Ma'arot/ Wadi el-Mughara Caves. Nomination dossier submitted to the World Heritage Centre – UNESCO by the State of Israel. https://whc.unesco.org/uploads/nominations/1393.pdf

Lombard, M. 2004. Distribution patterns of organic residues on Middle Stone Age points from Sibudu Cave, KwaZulu-Natal, South Africa. *South African Archaeological Bulletin* 59: 37–44.

Lombard, M. 2005. Evidence for hunting and hafting during the Middle Stone Age at Sibhudu Cave, KwaZulu-Natal, South Africa: A multianalytical approach. *Journal of Human Evolution* 48: 279–300.

Lombard, M. 2006a. Direct evidence for the use of ochre in the hafting technology of Middle Stone Age tools from Sibudu Cave, KwaZulu-Natal. *Southern African Humanities* 18(1): 57–67.

Lombard, M. 2006b. First impressions of the functions and hafting technology of Still Bay pointed artefacts from Sibudu Cave. *Southern African Humanities* 18(1): 27–41.

Lombard, M. 2008. Finding resolution for the Howiesons Poort through the microscope: Micro-residue analysis of segments from Sibudu Cave, South Africa. *Journal of Archaeological Science* 35: 26–41.

Lombard, M. 2012. Thinking through the Middle Stone Age of sub-Saharan Africa. *Quaternary International* 270: 140–155.

Lombard, M. and Phillipson, L. 2010. Indications of bow and stone-tipped arrow use 64 000 years ago in KwaZulu-Natal, South Africa. *Antiquity* 84(325): 635–648.

Lombard, M., Parsons, I., van der Ryst, M.M. 2004. Middle Stone Age lithic point experimentation for macro-fracture and residue analyses: The process and preliminary results with reference to Sibudu Cave points. *South African Journal of Science* 100: 159–166.

Mackay A. and Welz, A. 2008. Engraved ochre from a Middle Stone Age context at Klein Kliphuis in the Western Cape of South Africa. *Journal of Archaeological Science* 35(6): 1521–1532.

Mackay, A., 2011. Nature and significance of the Howiesons Poort to post-Howiesons Poort transition at Klein Kliphuis rockshelter, South Africa. *Journal of Archaeological Science* 38: 1430–1440.

Maguire, J. and Klapwijk, M. 2004. Nomination Dossier for Inclusion on the World Heritage List: The Taung Skull Fossil Site - An Extension of the Fossil Hominid Sites of Sterkfontein, Swartkrans, Kromdraai and Environs. Nomination dossier submitted to the World Heritage Centre – UNESCO by the State of South Africa.

Marean, C.W. 2010a. Pinnacle Point Cave 13B (Western Cape Province, South Africa) in context: The Cape floral kingdom, shellfish, and modern human origins. *Journal of Human Evolution* 59: 425–443.

Marean, C.W. 2010b. When the sea saved humanity. *Scientific American* August 2010: 55–61.

Marean, C.W. 2010c. Introduction to the Special Issue--The Middle Stone Age at Pinnacle Point Site 13B, a Coastal Cave near Mossel Bay (Western Cape Province, South Africa). *Journal of Human Evolution* 59: 231-233.

Marean, C.W. 2011. Coastal South Africa and the co-evolution of the modern human lineage and coastal adaptations. In N. Bicho, J.A. Haws, L.G. Davis (eds.), *Trekking the shore: Changing coastlines and the antiquity of coastal settlement*. Springer, New York: 421–440.

Marean, C.W. 2015. An Evolutionary Anthropological Perspective on Modern Human Origins. Annual Review of Anthropology 44: 533-556.

Marean, C.W. 2018. Unlocking Pinnacle Point: From tape measure to tripod. *Quest 14*(1): 6–9. https://research.assaf.org.za/handle/20.500.11911/96

Marean, C.W. and Assefa, Z. 2004. The Middle and Upper Pleistocene African record for the biological and behavioral origins of modern humans. In A.B. Stahl (ed.), *African archaeology: A critical introduction*. Wiley-Blackwell, New Jersey: 93–129.

Marean, C.W., Bar-Matthews, M., Bernatchez, J., Fischer, E., Goldberg, P., Herries, A., Jacobs, Z., Jerardino, A., Karkanas, P., Minichillo, T., Nilssen, P., Thompson, E., Watts, I., Williams, H. 2007. Early human use of marine resources and pigment in South Africa during the Middle Pleistocene. *Nature* 449(7164): 905–908.

Marean, C.W., Bar-Matthews, M., Fisher, E., Goldberg, P., Herries, A., Karkanas, P., Nilssen, P.J., Thompson, E. 2010. The stratigraphy of the Middle Stone Age sediments at Pinnacle Point Cave 13B (Mossel Bay, Western Cape Province, South Africa). *Journal of Human Evolution* 59: 234–255.

Marean, C.W., Cowling, R.M., Franklin, J. 2020. The Palaeo-Agulhas Plain: Temporal and spatial variation in an extraordinary extinct ecosystem of the Pleistocene of the Cape Floristic Region. *Quaternary Science Reviews* 235: 106-161.

Marean, C.W., Cowling, R.M., Franklin, J. 2020. The Palaeo-Agulhas Plain: Temporal and spatial variation in an extraordinary extinct ecosystem of the Pleistocene of the Cape Floristic Region. *Quaternary Science Reviews* 235: a106161. https://doi.org/10.1016/j.quascirev.2019.106161

Marean, C.W., Nilssen, P.J., Brown, K., Jerardino, A., Stynder, D. 2004. Paleoanthropological investigations of Middle Stone Age sites at Pinnacle Point, Mossel Bay (South Africa): Archaeology and hominid remains from the 2000 Field Season. *Paleoanthropology* 1: 14–83.

Marks, A.E. and Conard, N. 2008. Technology vs. typology: The case for and against a transition from the MSA to the LSA at Mumba Cave, Tanzania. In T. Aubry, F. Almeida, A.C. Araújo, M. Tiffagom (ed.), Space and time: Which diachronies, which synchronies, which scales? / Typology vs technology. V.21, International Union for Prehistoric and Protohistoric Sciences. Proceedings of the XV World Congress (Lisbon, 4–9 September 2006). Session C64 and C65. BAR International Series S1831. BAR Publishing, Oxford: 123–131.

Matthews, T., Marean, C.W., Cleghorn, N. 2020. Past and present distributions and community evolution of Muridae and Soricidae from MIS 9 to MIS 1 on the edge of the

Palaeo-Agulhas Plain (south coast, South Africa). *Quaternary Science Reviews* 235: a105774. https://doi.org/10.1016/j.quascirev.2019.05.026

Matthews, T., Marean, C.W., Nilssen, P.J. 2009. Micromammals from the Middle Stone Age (92 - 167 ka) at Cave PP13B, Pinnacle Point, south coast, South Africa. *Paleontologia Africana* 44: 112-120.

Matthews, T., Rector, A., Jacobs, Z., Herries, A.I.R., Marean, C.W. 2011. Environmental implications of micromammals accumulated close to the MIS 6 to MIS 5 transition at Pinnacle Point Cave 9 (Mossel Bay, Western Cape Province, South Africa). *Palaeogeography, Palaeoclimatology, Palaeoecology* 302: 213-229.

Mcbrearty, S. and Brooks, A.S. 2000. The revolution that wasn't: A new interpretation of the origin of modern human behavior. *Journal of Human Evolution* 39(5): 453–563.

McBurney, C.B.M. 1953. The Haua Fteah fossil jaw. *Journal of the Royal Anthropological Institute of Great Britain and Ireland* 83: 71–84.

McBurney, C.B.M. 1960. *The Stone Age of Northern Africa*. Penguin Books, London.

McBurney, C.B.M. 1967. *The Haua Fteah in Cyrenaica and the Stone Age of the South-East Mediterranean*. Cambridge University Press, Cambridge.

McDougall, I., Brown, F.H. and Fleagle, J.G. 2005. Stratigraphic placement and age of modern humans from Kibish, Ethiopia. *Nature* 433: 733–6.

Mehlman, M.J. 1989. Later Quaternary archaeological sequences in Northern Tanzania. Unpublished PhD thesis, University of Illinois at Urbana-Champaign.

Mellars, P. 2006. Why did modern human populations disperse from Africa ca. 60,000 years ago? A new model. *Proceedings of the National Academy Science* 103: 9381–9386.

Mellars, P.A., Boyle, K.V., Stringer, C., Bar-Yosef, O. 2007. *Rethinking the human revolution: New behavioural and biological perspectives on the origin and dispersal of modern humans*. McDonald Institute for Archaeological Research, Cambridge.

Mercier, N., Valladas, H., Bar-Yosef, O., Vandermeersch, B., Stringer, C., Joron, J.-L. 1993. Thermoluminescence date for the Mousterian burial site of Es-Skhul, Mt. Carmel. *Journal of Archaeological Science* 20: 169–174.

Miller, C.E., Goldberg, P., Berna, F. 2013. Geoarchaeological investigations at Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40(9): 3432–3452.

Mohapi, M. 2012. Point morphology and the Middle Stone Age cultural sequence of Sibudu Cave, KwaZulu-Natal, South Africa. *South African Archaeological Bulletin* 67(195): 5–15.

Mourre, V., Villa, P., Henshilwood, C. 2010. Early use of pressure flaking on lithic artefacts at Blombos Cave, South Africa. *Science* 330: 659–662.

Mucina, L. and Rutherford, M.C. (Eds) Reprint 2006. *The vegetation of South Africa, Lesotho and Swaziland*. South African National Biodiversity Institute, Pretoria.

Murungi, M.L. 2017. Phytoliths at Sibudu (South Africa): Implications for vegetation, climate and human occupation during the MSA. Unpublished PhD thesis, University of the Witwatersrand, Johannesburg.

Nilssen, P., Marean, C., Yates, R. 2009. Archaeological Conservation Management Plan (ACMP). Centre for Heritage and Archaeological Resource Management cc (CHARM). Great Brak River, Mossel Bay, South Africa.

Oestmo, S., Janssen, M.A., Cawthra, H.C. 2020. Applying Brantingham's neutral model of stone raw material procurement to the Pinnacle Point Middle Stone Age record, Western Cape, South Africa. *Quaternary Science Reviews* 235: https://doi.org/10.1016/j.quascirev.2019.105901

Pargeter, J. and Schmidt, P. 2020. Simple' surface-fire heat treatment significantly improves silcrete flake quality and flaking efficiency. *Journal of Archaeological Science: Reports* 30: 102203.

Pargeter, J., Loftus, E., MacKay, A., Mitchell, P., Stewart, B. 2018. New ages from Boomplaas Cave, South Africa, provide increased resolution on late/terminal Pleistocene human behavioural variability. *Azania: Archaeological Research in Africa* 53(2): 156–184.

Parkington, J. 2006. *Shorelines, strandlopers and shell middens: Archaeology of the Cape Coast*. Southern Cross Ventures, Cape Town.

Parkington, J. and Poggenpoel, C. 1987. Diepkloof Rock Shelter. In J. Parkington and M. Hall (eds.), *Papers in prehistory of the Western Cape, South Africa. BAR International Series 332*. British Archaeological Reports, Oxford: 269–293.

Parkington, J.E., Rigau, J.P., Poggenpoel, C., Porraz, G., Texier, P.-J. 2013. Introduction to the project and excavation of Diepkloof Rock Shelter (Western Cape, South Africa): A view on the Middle Stone Age. *Journal of Archaeological Science* 40(9): 3369–3375.

Pearson, O., Grine, F., Barham, L., Stringer, C. 2000. Human postcranial remains from the Middle and Later Stone Age of Mumbwa Caves. In L. Barham (ed.). *The Middle Stone*

Age of Zambia, South Central Africa. Western Academic and Specialist Press, Bristol: 149–164.

Pederson, A. 2002. *Managing tourism at World Heritage Sites: A practical manual for World Heritage Site managers*. UNESCO World Heritage Centre. http://whc.unesco.org/uploads/activities/documents/activity-113-2.pdf

Pickering, R. 2006. Regional geology, setting and sedimentology of Sibudu Cave. *Southern African Humanities* 18 (1): 123-129

Pickering, R., Jacobs, Z., Herries, A.I.R., Karkanas, P., Bar-Matthews, M., Woodhead J.D., Kappen, P., Fisher, E., Marean, C.W. 2013. Paleoanthropologically significant South African sea caves dated to 1.1–1.0 million years using a combination of U–Pb, TT-OSL and palaeomagnetism. *Quaternary Science Reviews* 65: 39–52.

Piperno, M. 2001. The prehistory of Melka Kunture (Ethiopia). *Bulletin du Centre de recherche français à Jérusalem* 8: 135–145.

Plug, I. 2004. Resource exploitation: Animal use during the Middle Stone Age at Sibhudu Cave, KwaZulu-Natal. *South African Journal of Science* 100: 151–158.

Point of Human Origins. n.d. Point of Human Origins Tours. https://www.humanorigin.co.za/collections/human-origins-tours/

Porraz, G., Parkington, J., Rigaud, J.P., Miller, C.E., Poggenpoel, C., Tribolo, C., Archer, W., Cartwright, C.R., Charrié-Duhaut, A., Dayet, L., Igreja, M., Mercier, N., Schmidt, P. Verna, C., Texier, P.-J. 2013b. The MSA sequence of Diepkloof and the history of southern African Late Pleistocene Populations. *Journal of Archaeological Science* 40: 3542–3552.

Porraz, G., Parkington, J., Schmidt, P., Gérald, B., Brugal, J.-P., Laure, D., Igreja, M., Miller, C., Schmid, V., Tribolo, C., Aurore, V., Christine, V., Texier, P.-J. 2020. Experimentation preceding innovation in a MIS5 Pre-Still Bay layer from Diepkloof Rock Shelter (South Africa): Emerging technologies and symbols. https://doi.org/10.32942/osf.io/ch53r.

Porraz, G., Texier, P.-J, Archer, W., Piboule, M., Rigaud, J.P. and Tribolo, C. 2013a. Technological successions in the Middle Stone Age sequence of Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40: 3376–3400.

Potts, R. and Faith, J.T. 2015. Alternating high and low climate variability: The context of natural selection and speciation in Plio-Pleistocene hominin evolution. *Journal of Human Evolution* 87: 5–20.

Potts, R., Behrensmeyer, A.K., Faith, J.T., Tryon, C.A., Brooks, A.S., Yellen, J.E., Deino, A.L., Kinyanjui, R., Clark, J.B., Haradon, C.M., Levin, N.E., Meijer, H.J.M., Veatch, E.G., Owen,

R.B., Renaut, R.W. 2018. Environmental dynamics during the onset of the Middle Stone Age in eastern Africa. *Science* 360(6384): 86–89.

Prendergast M.E., Luque L., Domínguez-Rodrigo M., Diez-Martin F., Mabulla A.Z.P., Barba R. 2007. New excavations at Mumba Rockshelter, Tanzania. *Journal of African Archaeology* 5: 217–243.

Protsch, R.R.R. 1977. Mumbwa: Its absolute chronology and archaeology. *Zeitschrift Für Morphologie Und Anthropologie* 68(1): 1–7.

Rector, A.L., Reed, K.E. 2010. Middle and late Pleistocene faunas of Pinnacle Point and their paleoecological implications. *Journal of Human Evolution* 59: 340-357.

Republic of South Africa. 1998. National Environmental Management Act, No. 107 of 1998, as amended. Government Gazette No. 19519, Cape Town, 27 November 1998.

Republic of South Africa. 1999. National Heritage Resources Act, No. 25 of 1999. Government Gazette No. 19974, Cape Town, 28 April 1999.

Republic of South Africa. 1999. World Heritage Convention Act, No. 49 of 1999. Government Gazette No. 20717, Cape Town, 9 December 1999.

Republic of South Africa. 2000. Promotion of Access to Information Act, No. 2 of 2000. Government Gazette No. 20852, Cape Town, 3 February 2000.

Republic of South Africa. 2000. Promotion of Administrative Justice Act, No. 3 of 2000. Government Gazette No. 20853, Cape Town, 3 February 2000.

Republic of South Africa. 2003. National Environmental Management: Protected Areas Act, No. 57 of 2003. Government Gazette No. 26025, Cape Town, 18 February 2004.

Republic of South Africa. 2012. National Heritage and Cultural Tourism Strategy. National Department of Tourism.

Republic of South Africa. 2013. Spatial Planning and Land Use Management Act, No. 16 of 2013. Government Gazette No. 36730, Cape Town, 5 August 2013.

Reynolds, S.C. 2006. Temporal changes in vegetation and mammalian communities during Oxygen Isotope Stage 3 at Sibudu Cave. *Southern African Humanities* 18(1): 301–314.

Richter, D., Grun, R., Joannes-Boyau, R. 2017. The age of the hominin fossils from Jebel Irhoud, Morocco, and the origins of the Middle Stone Age. *Nature 546*: 293–296.

Riga**,** A., Oxilia**,** G., Panetta, D., Salvadori, P.A., Benazzi, S., Wadley, L., Moggi-Cecchi, J. 2018. Human deciduous teeth from the Middle Stone Age layers of Sibudu Cave (South Africa). *Journal of Anthropological Sciences* 96: 1–14.

Rigaud J.P., Texier, P.-J., Parkington, J., Poggenpoel, C. 2006. Diepkloof rock shelter Still Bay and Howiesons Poort stone tools techno-complexes: The South African Middle Stone Age chronology and its implications. *Comptes Rendus Palevol* 5: 839–849.

Rishworth, G.M., Cawthra, H.C., Dodd, C., Perissinotto, R. 2020. Peritidal stromatolites as indicators of stepping-stone freshwater resources on the Palaeo-Agulhas Plain landscape. *Quaternary Science Reviews* 235: https://doi.org/10.1016/j.quascirev.2019.03.026.

Rito, T., Vieira, D., Silva, M., Conde-Sousa, E., Pereira, L., Mellars, P., Richards, M.B., Soares, P. 2019. A dispersal of *Homo sapiens* from southern to eastern Africa immediately preceded the out-of-Africa migration. *Nature* 9: 4728-4738.

Robben Island Museum. 2017. Integrated Carrying Capacity Study.

Roberts, D.L., Karkanas, P., Jacobs, Z., Marean, C.W., Roberts, R.G. 2012. Melting ice sheets 400,000 yr ago raised sea level by 13 m: Past analogue for future trends. *Earth* and *Planetary Science Letters* 357-358: 226-237.

Robinson, J.R. and Wadley, L. 2018. Stable isotope evidence for (mostly) stable local environments. *Journal of Archaeological Science* 100: 32–44.

Rots, V., Lentfer, C., Schmid, V.C., Porraz, G., Conard, N.J. 2017. Pressure flaking to serrate bifacial points for the hunt during the MIS5 at Sibudu Cave (South Africa). *PLoS ONE* 12(4): e0175151. https://doi.org/10.1371/journal.pone.0175151

Sample, I. 2017. Oldest Homo sapiens bones ever found shake foundations of the human story. *The Guardian*, 7 June 2017. https://www.theguardian.com/science/2017/jun/07/oldest-homo-sapiens-bones-ever-found-shake-foundations-of-the-human-story

Sampson, C.G. 1974. *The Stone Age archaeology of southern Africa*. Academic Press, New York.

Sanz, N. (ed.) 2012a. Human Evolution: Adaptations, Dispersals and Social Developments (HEADS) 2: Human origin sites and the World Heritage Convention in Africa. *World Heritage Papers* 33. https://unesdoc.unesco.org/ark:/48223/pf0000217748

Sanz, N. 2012b. Africa: the origins of humankind. Towards a better representation of human evolution in the framework of the World Heritage Convention. In N. Sanz, 2012a.

Sanz, N. and Keenan, P. (ed.) 2011. Human Evolution: Adaptations, Dispersals and Social Developments (HEADS) 1: World Heritage Thematic Programme. *World Heritage Papers* 29. https://unesdoc.unesco.org/ark:/48223/pf0000212716

Scerri, E. M. L., Thomas, M.G., Manica, A., Gunz, P., Stock, J.T., Stringer, C., Grove, M., Groucutt, H.S., Timmermann, A., Rightmire, G. P., d'Errico, F., Tryon, C.A., Drake, A.N., Brooks, A.S., Dennell, R.W., Durbin, R., Henn, B.M., Lee-Thorp, J., de Menocal, P., Petraglia, M.D., Thompson, J.C., Scally, A., Chikhi, L. 2018. Did our Species Evolve in Subdivided Populations across Africa, and Why Does it Matter? *Trends in Ecology and Evolution* 33(8): 582-594

Schiegl, S., Stockhammer, P., Scott, C., Wadley, L. 2004. A mineralogical and phytolith study of the Middle Stone Age hearths in Sibhudu Cave, KwaZulu-Natal, South Africa. *South African Journal of Science* 100: 185–194.

Schlebusch Carina, M., Malmström, H., Günther, T., Sjödin, P., Coutinho, A., Edlund, H., Munters Arielle, R., Vicente, M., Steyn, M., Soodyall, H., Lombard, M., Jakobsson, M. 2017. Southern African ancient genomes estimate modern human divergence to 350,000 to 260,000 years ago. *Science* 358: 652-655.

Schmid, V., Porraz, G., Zeidi, M., Conard, N. 2019. Blade technology characterizing the MIS 5 D-A layers of Sibudu Cave, South Africa. *Lithic Technology* 44(4): 199–236. https://doi.org/10.1080/01977261.2019.1637627

Schmidt, P., Porraz, G., Slodczykc, A., Archer, W., Miller, C.E. 2013. Heat treatment in the South African Middle Stone Age: Temperature induced transformations of silcrete and their technological implications. *Journal of Archaeological Science* 40(9): 3519–3531.

Sealy, J., Naidoo, N., Hare, V.J., Brunton, S., Faith, J.T. 2020. Climate and ecology of the palaeo-Agulhas Plain from stable carbon and oxygen isotopes in bovid tooth enamel from Nelson Bay Cave, South Africa. *Quaternary Science Reviews* 235: a105974. https://doi.org/10.1016/j.quascirev.2019.105974.

Shea, J.J. 2008. The Middle Stone Age archaeology of the Lower Omo Valley Kibish Formation: Excavations, lithic assemblages, and inferred patterns of early Homo sapiens behavior. *Journal of Human Evolution* 55: 448–485.

Shea, J.J., Fleagle, J.G., Assefa, Z. 2007. Context and chronology of early *Homo sapiens* fossils from the Omo Kibish Formation, Ethiopia. In P. Mellars, C. Stringer, O. Bar-Yosef, K. Boyle (eds.), *Rethinking the human revolution*. McDonald Institute for Archaeological Research Monographs, Cambridge: 153–162.

Sievers, C. 2006. Seeds from the Middle Stone Age layers at Sibudu Cave. *Southern African Humanities* 18(1): 203–222.

Smith, E.I., Jacobs, Z., Johnsen, R., Ren, M., Fisher, E.C., Oestmo, S., Wilkins, J., Harris, J.A., Karkanas, P., Fitch, S., Ciravolo, A., Keenan, D., Cleghorn, N., Lane, C.S., Matthews, T.,

Marean, C.W. 2018. Humans thrived in South Africa through the Toba eruption about 74 000 years ago. *Nature* 555: 511–515.

Soares P., Rito T., Pereira L., Richards M. B. 2016. A genetic perspective on African prehistory. In: Africa from MIS 6-2: Population dynamics and paleoenvironments (eds Jones, S. C. & Stewart, B. A.). Springer Netherlands.

Soriano, S., Villa, P., Delagnes, A., Degano, I., Pollarolo, L., Lucejko, J.J., Henshilwood, C., Wadley, L. 2015. The Still Bay and Howiesons Poort at Sibudu and Blombos: Understanding Middle Stone Age technologies. *PLoS ONE* 10(7): e0131127. https://doi.org/10.1371/journal.pone.0131127

Soriano, S., Villa, P., Wadley, L. 2007. Blade technology and tool form in the Middle Stone Age of South Africa: The Howiesons Poort and post-Howiesons Poort at Rose Cottage Cave. *Journal of Archaeological Science* 34: 681–703.

South African Tourism 2017. *Tourism Performance Highlights Quarter 3 2017*. https://live.southafrica.net/media/202370/q3-2017-consolidated-tourism-report-28022018.pdf?downloadId=223396

Square One Landscape Architects 2020. Pinnacle Point Site Complex Pinnacle Point Estate, Erf 15391 and Erf 15390, Mossel Bay. Visual Impact Assessment prepared for the Western Cape Government via Heritage Western Cape. Unpublished report.

Statistics South Africa 2017. Tourism Satellite Account for South Africa, final 2017 and provisional 2018 and 2019 (Dec 2017). Statistics South Africa, Pretoria: 16.

Steele, T. and Klein, R.G. 2013. The Middle and Later Stone Age faunal remains from Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40: 3453–3462.

Steele, T., Álvarez-Fernández, E., Hallett-Desguez, E. 2019. A review of shells as personal ornamentation during the African Middle Stone Age. *PaleoAnthropology* 2019: 24–51. doi:10.4207/PA.2019.ART122

Stringer, C. 2016. The origin and evolution of *Homo sapiens*. *Philosophical Transactions of the Royal Society of London* B Biological Sciences 371. 20150237. http://dx.doi.org/10.1098/rstb.2015.0237

Stringer, C.B., Grün, R., Schwarcz, H.P., Goldberg, P. 1989. ESR dates for the hominid burial site of Es Skhul in Israel. *Nature* 338: 756–758.

Texier, P.-J., Porraz, G., Parkington, J., Rigaud, J.-P., Poggenpoel, C., Tribolo, C. 2013. The context, form and significance of the MSA engraved ostrich eggshell collection

from Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science* 40(9): 3412–3431.

Texier, P.-J., Porraz, G., Parkington, J., Rigaud, J.P., Poggenpoel, C., Miller, C., Tribolo, C., Cartwright, C., Coudenneau, A., Klein, R., Steele, T., Verna, C. 2010. A Howiesons Poort tradition of engraving ostrich eggshell containers dated to 60 000 years ago at Diepkloof Rock Shelter, South Africa. *Proceedings of the National Academy of Sciences of the United States of America* 107(14): 6180–6185.

Thompson, E., Williams, H.M., Minichillo, T. 2010. Middle and late Pleistocene Middle Stone Age lithic technology from Pinnacle Point 13B (Mossel Bay, Western Cape Province, South Africa). *Journal of Human Evolution* 59: 358-377.

Thompson, J.C. 2010. Taphonomic analysis of the Middle Stone Age faunal assemblage from Pinnacle Point Cave 13B, Western Cape, South Africa. *Journal of Human Evolution* 59: 321-339.

Tillier, A.M. 1999. *Les enfants moustériens de Qafzeh: Interprétation phylogénétique et paléoauxologique*. Cahiers de paléoanthropologie. CNRS Editions, Paris.

Tribolo, C., Mercier, N., Douville, E., Joron, J.-L., Reyss, J.-L., Rufer, D., Cantin, N., Lefrais, Y., Miller, C.E., Parkington, J., Porraz, G., Rigaud, J.-P., Texier, P.-J. 2013. OSL and TL dating of the Middle Stone Age sequence of Diepkloof Rock Shelter (Western Cape, South Africa): A clarification. *Journal of Archaeological Science* 40: 3401–3411.

Tribolo, C., Mercier, N., Selo, M., Valladas, H., Joron, J.-L., Reyss, J.L., Henshilwood, C.S., Sealy, J., Yates, R. 2006. TL dating of burnt lithics from Blombos Cave (South Africa) and the antiquity of modern behaviour. *Archaeometry* 48: 341–357.

Tribolo, C., Mercier, N., Valladas, H., Joron, J., Guibert, P., Lefrais, Y., Selo, M., Texier, P.-J., Rigaud, J.Ph., Porraz, G., Poggenpoel, C., Parkington, J., Lenoble, A. 2009. Thermoluminescence dating of a Still Bay-Howiesons Poort sequence at Diepkloof Rock Shelter (Western Cape, South Africa). *Journal of Archaeological Science* 36(3): 730–739.

Tripadvisor. n.d. Outdoor activities in Mossel Bay. https://www.tripadvisor.co.za/Attractions-g317080-Activities-c61-Mossel_Bay_Western_Cape.html

United Nations Education, Scientific and Cultural Organization (UNESCO). n.d. Lower Valley of the Omo. https://whc.unesco.org/en/list/17/

Val, A. 2016. New data on the avifauna from the Middle Stone Age layers of Sibudu Cave, South Africa: Taphonomic and palaeoenvironmental implications. *Quaternary International* 421: 173–189.

Val, A. 2019. New data on avifaunal remains associated with the Middle Stone Age layers from Diepkloof Rock Shelter, Western Cape, South Africa. *Journal of Archaeological Science: Reports* 26: a101880. https://doi.org/10.1016/j.jasrep.2019.101880

Val, A., Porraz, G., Texier, P.-J., Fisher, J.W., Parkington, J. 2020. Human exploitation of nocturnal felines at Diepkloof Rock Shelter provides further evidence for symbolic behaviours during the Middle Stone Age. *Scientific Reports* 10: a6424. https://doi.org/10.1038/s41598-020-63250-x

Val, A., de la Peña, P., Wadley, L. 2016. Direct evidence for human exploitation of birds in the Middle Stone Age of South Africa: The example of Sibudu Cave, KwaZulu-Natal. *Journal of Human Evolution* 99: 107–123.

Valladas H., Reyss J.L., Joron J.L., Valladas G., Bar Yosef O., Vandermeersch B. 1988. Thermoluminescence dates for the Mousterian Proto-Cro-Magnons from Qafzeh Cave (Israel). *Nature* 331: 614–616.

Van Zyl, L. 2014. Operational Environmental Management Programme (OEMP) Pinnacle Point Estate Mossel Bay. https://pinnaclepointestate.co.za/wp-content/uploads/2019/02/OEMP-Pinnacle-Point-Final2019.pdf

Vandermeersch, B. 1970. Une sépulture moustérienne avec offrandes découverte dans la grotte de Qafzeh. *Comptes rendus de l'Académie des Sciences* 268: 298–301.

Vandermeersch, B. 1981. Les hommes fossiles de Qafzeh (Israel). CNRS Editions, Paris.

Vanhaeren, M., Wadley, L., d'Errico, F. 2019. Variability in Middle Stone Age symbolic traditions: The marine shell beads from Sibudu Cave, South Africa. *Journal of Archaeological Science: Reports* 27: 101893. https://doi.org/10.1016/j.jasrep.2019.101893.

Venter, J.A., Brooke, C.F., Marean, C.W., Fritz, H., Helm, C.W. 2020. Large mammals of the Palaeo-Agulhas Plain showed resilience to extreme climate change but vulnerability to modern human impacts. *Quaternary Science Reviews 235*: a106050. https://doi.org/10.1016/j.quascirev.2019.106050

Verna, C., Texier, P.-J., Rigau, J.P., Poggenpoel, C. 2013. The Middle Stone Age human remains from Diepkloof Rock Shelter (Western Cape, South Africa). *Journal of Archaeological Science* 40(9): 3532–3541.

Viljoen, J. and Unathi, S.H. 2017. Growing heritage tourism and social cohesion in South Africa. *African Journal of Hospitality, Tourism and Leisure* 6(4): 1–15.

Volman, T.P. 1984. Early prehistory of southern Africa. In R.G. Klein (ed.), *Southern African prehistory and palaeoenvironments*. Balkema, Rotterdam: 169–220.

Wadley, L. 2001. Preliminary report on excavations at Sibhudu Cave, KwaZulu-Natal. *Southern African Humanities* 13: 1–17.

Wadley, L. 2004. Vegetation changes between 61 500 and 26 000 years ago the evidence from seeds in Sibudu Cave, KwaZulu-Natal. *South African Journal of Science* 100: 167–173.

Wadley, L. 2010a. Compound-adhesive manufacture as a behavioral proxy for complex cognition in the Middle Stone Age. *Current Anthropology* 51(S1): S111–S119.

Wadley, L. 2010b. Were snares and traps used in the Middle Stone Age and does it matter? A review and a case study from Sibudu, South Africa. *Journal of Human Evolution* 58: 179–192.

Wadley, L. 2011. Submission to SAHRA nomination and grading committee: Nomination of site for Grade 1 status as a first step in the process of nomination as a National Heritage Site under section 27(3) of the National Heritage Resources Act (Act no. 25 of 1999): Sibudu Cave. https://sahris.sahra.org.za/sites/default/files/additionaldocs/Wadley%20submission%20SAHRA%20Additional%20NominationMotivationFORMATForUseWith%20Archaeological%26PalaeontolgicalSites2.pdf

Wadley, L. 2012. Two 'moments in time' during Middle Stone Age occupations of Sibudu, South Africa. *Southern African Humanities* 24: 79–97.

Wadley, L. 2013a. Recognizing complex cognition through innovative technology in Stone Age and Palaeolithic sites. *Cambridge Archaeological Journal* 23:163–183. https://doi.org/10.1017/S0959774313000309

Wadley, L. 2013b. MIS 4 and MIS 3 occupations in Sibudu, KwaZulu-Natal, South Africa. *South African Archaeological Bulletin* 68(197): 41–51.

Wadley, L. 2015. Those marvellous millennia: The Middle Stone Age of southern Africa. *Azania: Archaeological Research in Africa* 50(2): 155–226.

Wadley, L. and Jacobs, Z. 2004. Sibudu Cave, KwaZulu-Natal: Background to the excavations of the Middle Stone Age and Iron Age occupations. *South Africa Journal of Science* 100(3–4): 145–151.

Wadley, L. and Jacobs, Z. 2006. Sibudu Cave: Background to the excavations, stratigraphy and dating. *Southern African Humanities* 18: 1–26.

Wadley, L. and Langejans, G. 2014. Preliminary study of scrapers around combustion features In Layer SS, Sibudu, 58 000 years ago. *South African Archaeological Bulletin* 69(199): 19–33.

Wadley, L., Sievers, C., Bamford, M., Goldberg, P., Berna, F., Miller, C. 2011. Middle Stone Age bedding construction and settlement patterns at Sibudu, South Africa. *Science* 334: 1388–1391.

Walter, R.C., Buffler, R.C., Bruggemann, J.H., Guillaume, M.M.M., Berhe, S.M., Negassi, B., Libsekal, Y., Cheng, H., Edwards, R. L., von Cosel, R., Néraudeau, D., Gagnon, M. 2000. Early human occupation of the Red Sea coast of Eritrea during the last interglacial. *Nature* 405: 65–69.

Watts, I. 2010. The pigments from Pinnacle Point Cave 13B, Western Cape, South Africa. *Journal of Human Evolution* 59: 392–411.

Weinstein-Evron, M., Kaufman, D., Bachrach, N., Bar-Yosef, D., Chaim, S., Druck, D., Groman-Yaroslavski, I., Hershkovitz, I., Liber, N., Rosenberg, D., Tsatskin, A., Weissbrod, L. 2007. After 70 years: New excavations at the el-Wad Terrace, Mt. Carmel, Israel. *Journal of the Israel Prehistoric Society* 37: 37–134.

Western Cape Government. 2018. December 2017 'peak season': 11.5% increase in international arrivals. https://www.westerncape.gov.za/gc-news/411/48426

Wilkins, J., Brown, K.S., Oestmo, S., Pereira, T., Ranhorn, K.L., Schoville, B.J., Marean, C.W. 2017. Lithic technological responses to Late Pleistocene glacial cycling at Pinnacle Point Site 5-6, South Africa. *PLoS ONE* 12(3): e0174051.

Will, M. and Conard, N.J. 2016. Assemblage variability and bifacial points in the lowermost Sibudan layers at Sibudu, South Africa. *Archaeological and Anthropological Science* 10: 389–414.

Will, M., El-Zaatari, S., Harvati, K., Conard, N.J. 2019. Human teeth from securely stratified Middle Stone Age contexts at Sibudu, South Africa. *Archaeological and Anthropological Sciences* 11: 3491–3501.

Williams, H.M., Lee-Thorp, J.A., Matthews, T., Marean, C.W. 2020. Micromammal and macromammal stable isotopes from a MIS 6 fossil hyena den (Pinnacle Point site 30, south coast, South Africa) reveal differences in relative contribution of C4 grasses to local and regional palaeovegetation on the Palaeo-Agulhas Plain. *Quaternary Science Reviews 235*: a106201. https://doi.org/10.1016/j.quascirev.2020.106201

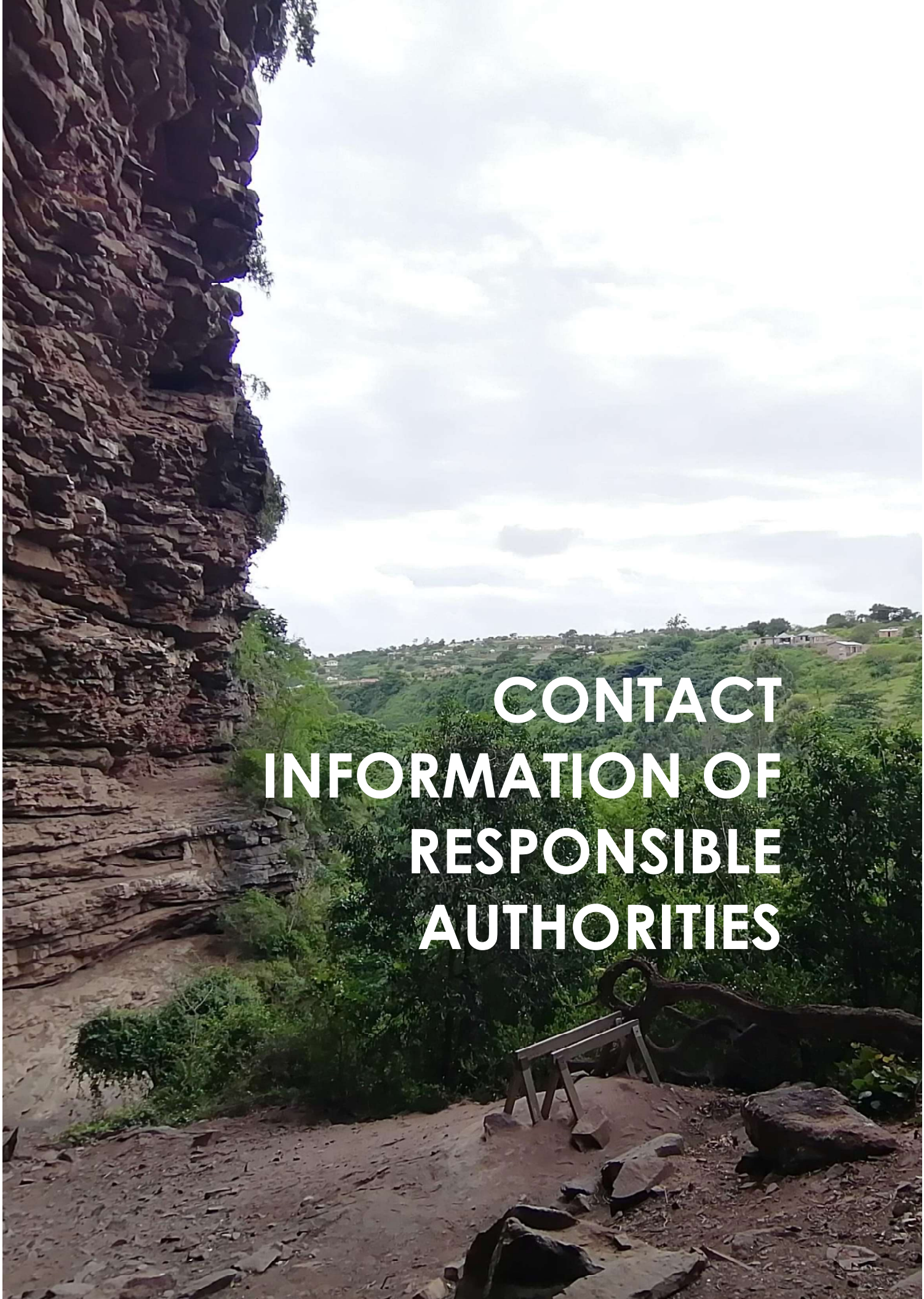
Williamson, B.S. 2004. Middle Stone Age tool function from residue analysis at Sibudu Cave. *South African Journal of Science* 100: 174–178.

Wojcieszak, M. and Wadley, L. 2019. A Raman micro-spectroscopy study of 77,000 to 71,000 year old ochre processing tools from Sibudu, KwaZulu-Natal, South Africa. *Heritage Science* 7: a24. https://doi.org/10.1186/s40494-019-0267-9

Wren, C.D., Botha, S., De Vynck, J., Janssen, M.A., Hill, K., Shook, E., Harris, J.A., Wood, B.M., Venter, J., Cowling, R., Franklin, J., Fisher, E.C., Marean, C.W. 2020. The foraging potential of the Holocene Cape south coast of South Africa without the Palaeo-Agulhas Plain. *Quaternary Science Reviews* 235: a105789. https://doi.org/10.1016/j.quascirev.2019.06.012

Yeshurun, R., Bar-Oz, G., Weinstein-Evron, M. (2007). Modern hunting behavior in the early Middle Paleolithic: Faunal remains from Misliya Cave, Mount Carmel, Israel. *Journal of Human Evolution* 53(6): 656–677. https://doi.org/10.1016/j.jhevol.2007.05.008

Zwane, B. and Bamford, M. 2020. A reconstruction of woody vegetation, environment and wood use at Sibudu Cave, South Africa, based on charcoal that is dated between 73 and 72 ka. *Quaternary International*. In press. https://doi.org/10.1016/j.quaint.2020.10.026



CONTACT INFORMATION OF RESPONSIBLE AUTHORITIES

8. CONTACT INFORMATION OF RESPONSIBLE AUTHORITIES

8.a Preparers

Project Manager

Dr Mariagrazia Galimberti (Department of Cultural Affairs and Sport, Western Cape Government)

Lead Consultant

EcoAfrica Environmental Consultants

Name: Dr Francois Oddendaal; Dr Edward Matenga; Ms Olga van der Pol

Additional contributors:

- Prof. Janette Deacon
- Dr Mxolisi Dlamuka
- Prof. Curtis Marean
- Prof. John Parkington
- Dr Guillaume Porraz
- Prof. Lyn Wadley
- Mr Manuel Will

We thank you for their advice

- Prof. Nicholas Conard
- Prof. Herman Kiriama
- Dr Antonieta Jerardino
- Mr Guy Redman
- Ms Nuria Sanz

Name: Heritage Western Cape

Address: Protea Assurance Building, Greenmarket Square

City, Province/State, Country: Cape Town, Western Cape, Republic of South Africa

Tel: 021 483 9598

Fax: N/A

E-mail: ceoheritage@westerncape.gov.za

8.b Official local institution/agency

Department of Forestry, Fisheries and the Environment (DFFE)

Directorate: World Heritage Management

Address: Private Bag X447, Pretoria, 0001

Tel: +27 12 399 9535

8.c Other local institutions

Heritage Western Cape

Protea Building, 3rd Floor

Green Market Square

Cape Town

South Africa

Amafa and Research Institute

195 Langalibalele St

Pietermaritzburg

3200

South Africa

8.d Official Website

Department of Forestry, Fisheries and the Environment: https://www.environment.gov.za

Contact name: Ms. Thumeka Ntloko

E-mail: Tntloko@dffe.gov.za

SIGNATURE ON BEHALF OF THE STATE PARTY

9. SIGNATURE ON BEHALF OF THE STATE PARTY

Full Name:

Title:

Date:

Signature:

Glossary

Archaeology:	The study of human activity in the past, primarily through the recovery and analysis of the material culture and environmental data that they have left behind, which includes artefacts, architecture, and the archaeological record.
Conservation	All efforts to retain the cultural heritage and significance of a site. It includes maintenance and may include preservation, restoration, reconstruction and adaptation. It will usually be a combination of several of these strategies.
Cultural Landscape	A landscape designed, improved, or at least affected by human activity, whether deliberately or not. Cultural landscapes typically refer to areas where tangible heritage is associated with intangible values associated with the landscape, including memories, legends, songs, traditions and stories, and belief systems, all representing different layers in the landscape. Appreciation of the different layers and their interrelationships ultimately brings a deeper understanding and appreciation of the cultural landscape. The World Heritage Committee refers, inter alia, to 'associative cultural landscapes, which are particularly valued for their religious, artistic or cultural associations of the natural element'.
Cultural Significance	Historic, scientific, or social value of past, present or future generations.
Denticulates	A stone tool containing one or more edges that are worked into multiple notched shapes (or teeth), much like the toothed edge of a saw.
Heritage	Heritage is our legacy from the past. It includes those places, objects, languages, memories or cultural activities that have aesthetic, historic, scientific or social significance, or some other special memory and routine.

Integrated Management Plan	A management framework, consisting of a central Operational Management Plan and Specific Plans, all of which guide the conservation of a specific area, avoiding negative impacts on the resources of the area, and where avoidance is not possible, minimising the negative impacts through the implementation of mitigation measures
Intangible Heritage	Heritage associated with a place that is not expressed physically. It includes non-physical aspects (such as symbolic meaning, values, memory and routine, indigenous knowledge, local traditions, and activities like dancing, storytelling and music-making) passed from one generation to the next, mostly through oral traditions.
Khoekhoen	An indigenous ethnic group, one of the 'First Peoples' of southern Africa, who practised a pastoral economy with domesticated sheep and cattle.
Khoe-San, or Khoisan	A term used to refer collectively to the Khoekhoen (formerly spelled Khoikhoi) and the San hunter-gatherers, although the two groups had different histories, economies and cultures.
Landscape	A collection of natural and cultural features that characterise a particular place.
Local Economic Development (LED)	Local economic development aims to build up the economic capacity of a local area to improve its economic future and the quality of life for all. It is a process by which public, business and non-governmental sector partners work collectively to create better conditions for economic growth and employment generation.
Outstanding Universal Value	Outstanding universal value means cultural and/or natural significance which is so exceptional as to transcend national boundaries and to be of common importance for present and future generations of all humanity.
San	Also known as the 'Bushmen', this 'First Peoples' group of southern Africa were traditionally hunter-gatherers and formed part of the Khoe-San ethnic group.

Solutrean	The Solutrean industry is a relatively advanced flint tool-making style of the Upper Palaeolithic of the Final Gravettian, from around 22 000 to 17 000 years ago. Solutrean sites have been found in modern-day France, Spain and Portugal.
Tangible Heritage	The physical aspects of heritage such as the rock art, archaeological sites and resources, and the sense of place provided by the natural environment.