

Cooper's Cave Permit Report

2010 – 2013

I. Permit Holder

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II. Cooper's Cave

A. Cooper's A

Limited excavations were conducted at Cooper's A. We removed 56 specimens from decalcified sediments from one field season in 2011. Most of the 56 specimens were craniodental and postcranial elements bellowing to bovid size classes II and III. A large canid maxilla with molars was also recovered. In addition, mining blocks were sorted around the deposit.

B. Cooper's B

At the entrance of Cooper's B, the first hominin was found in 1938 by Middleton-Shaw. C.K. Brain examined the cave for a few months between 1954 and 1955, concluding that the cave was sterile of fossils. I also held the same view until 2011 when a new deposit was discovered in the fine stratified clastic sediments in the north wall of the cave (Figure 1). An articulated bovid size class III is eroding out.

Cooper's B has been extensively mined by lime miners until the 1930's, but no palaeontological excavations have ever taken place here. Due to the lime mining, large blocks of mining rubble were obscuring the new deposit. In 2012, we moved some of the mining rubble away from the wall to see the extent of the deposit. This rubble was placed nearby within the cave. I would like to excavate this new deposit in 2014, but the roof needs to be stabilised before my team and I commence with excavations.

C. New deposit north of Cooper's D

In June 2013, a new deposit was discovered by the permit holder just north of Cooper's D deposit (Figure 1). Protection of new deposit is required. My recommendation is to use Gibon baskets to protect the new deposit from livestock and to put fire breaks around the area (see Issues below for more detail). The COH WHS MA has put in an application to SARHA for these structures. I will not be

excavating this new area for another three years. However, I would like to take geological samples for sedimentological analysis and for applying uranium series dating techniques.

D. Cooper's D

1. Excavations

Limited excavations at Cooper's D were conducted in 2011 and 2012. During these excavations, we recovered microfauna, bovids, canids, felids, *Orycteropus afer* (aardvark) and early stone tools. In order to establish a complete sequence of Cooper's D, we dug four test pits to find the floor of Cooper's D in June 2012. In addition, we have taken 18 samples of calcified sediments for chemical analysis using x-ray fluorescence (XRF) and to examine particle sizes (microstructures) within the sediments. The chemical analysis provides information that will be used to constrain the provenance of the sediments, and analyze sedimentary microstructures. This data will provide information on the relative flow and deposition regimes. These are used to correlate the different units in the deposits.

2. Closure of Cooper's D

The primary motivator for the decision to close down Cooper's D is that we have addressed many of the research questions that were outlined during the various phases of our excavations. And we are continuously developing new questions with the previously excavated material. Other reasons for this closure include: (1) a backlog of excavated material from Cooper's D that will take time to process (>60,000 specimens, >60 stone tools) and (2) we would like to expand excavations to other areas within the Cooper's Cave System.

I have initiated an honours project examining the protocols in the closing down a fossil hominin deposit within the COH. Angie Jones, an honours student from UNISA, is undertaking this project. Our intention is to provide a guideline that various stakeholders can use.

E. Three-dimensional scans of Cooper's Cave

Cooper's B and D localities and the surrounding landscape was 3D scanned. Data points are at most 2 cm apart and are associated with East, North and Height coordinates on the Gauss Conform System Lo27°. This data is stored on disk and an external hard drive at Evolutionary Studies Institute, University of the Witwatersrand. We are merging these data points with data points with the fauna to examine faunal distribution and deposition.

F. Samples for palaeomagnetic dating

Speleothem samples were taken from Cooper's Cave for Palaeomagnetic dating by Andy Herries at La Trobe University, Melbourne Campus, Australia. Dr. Herries gave a list of samples to SARHA this year.

III. Research at Cooper's Cave

1. *Publications*

- a. Folinsbee, KE, Reisz RR. 2013. New Craniodental Fossils of Papionin monkeys from Cooper's D, South Africa. *American Journal of Physical Anthropology*, 151:613–629.
- b. DeSilva JM, Steininger CM, Patel BA (accepted). Cercopithecoid primate postcranial fossils from Cooper's D, South Africa. *Geobios*.
- c. O'Regan HJ, Cohen BF, Steininger CM (in review). Mustelid and Viverrid remains from the early Pleistocene site of Cooper's D, Gauteng, South Africa. *Palaeontologica Africana*.

2. *Conference presentations*

- a. Val A, Steininger C, Cohen B. 2011. Carnivore domination over hominins in the early Pleistocene in South Africa: New taphonomic analysis of Cooper's D. *Hominid-Carnivore Interactions during the Pleistocene International Congress, Salou, Spain. 25-28 October. Program and Abstracts: 55.*
- b. Patel BA, DeSilva JM, Steininger CM. 2013. New Cercopithecoid primate postcranial fossils from Cooper's D, South Africa. *73rd Annual Meeting of the Society of Vertebrate Paleontology, Los Angeles, California, USA. 26 - 31 October.*
- c. Cohen BF, Steininger CM. 2010. Small mammal assemblage from Cooper's Cave. *Proceedings of the 16th Conference of the Palaeontological Society of Southern Africa, Howick, 5-10 August. Abstract: 20.*

3. *Thesis*

- a. Cohen BF. 2011. Description and interpretation of the small mammal assemblage of Cooper's Cave. *Bernard Price Institute for Palaeontology, School of Geosciences, University of the Witwatersrand, Honours thesis.*

IV. Updated Cooper's Cave Assemblage

Table #. Fauna recovered from Cooper's.

Order	Family	Tribe	Taxa	Common name		
Primates	Hominidae		<i>Paranthropus robustus</i>			
			<i>Hominidae gen. et sp. indet.</i>			
	Cercopithecidae		<i>Gorgopithecus sp.</i>			
			<i>Theropithecus oswaldi</i>	Extinct gelada		
			<i>Papio (hamadryas) angusticeps</i>			
			<i>Papio indet.</i>			
			<i>Colobinae gen. et sp. indet.</i>			
			<i>Cercopithecidae indet.</i>			
		Carnivora	Felidae		<i>Panthera pardus</i>	Leopard
					<i>Panthera leo</i>	Lion
	<i>Felis sp.</i>					
	<i>Felis caracal</i>			Caracal		
	<i>Felis lybica</i>			African wildcat		
	Small-sized <i>Felis</i>					
	<i>Dinofelis piveteai</i>					
	<i>Dinofelis (to be named)</i>					
	<i>Megantereon cultridens</i>					
	<i>Megantereon whitei</i>					
	Hyaenidae		<i>Acinonyx jubatus</i>	Cheetah		
			<i>Crocuta crocuta</i>	Spotted Hyena		
			<i>Parahyaena brunnea</i>	Brown Hyena		
			<i>Hyaena hyaena</i>	Striped Hyena		
			<i>Hyaena makapania</i>			
			<i>Chasmaporthetes nitidula</i>			
			<i>Proteles cristatus</i>	Aardwolf		
			<i>Lycaon sekowei n. sp.</i>	Extinct wild dog		
			Medium-sized <i>Canis</i>			
			<i>Canis mesomelas</i>	Black-backed Jackal		
	Herpestidae		<i>Herpestes ichneumon</i>	Egyptian Mongoose		
			<i>Suricata suricatta</i>	Suricata		
			<i>Cynictis penicillata</i>	Yellow Mongoose		
			<i>Cynictis sp.</i>			
			<i>Atilax paludinosus</i>	Marsh Mongoose		
			<i>Mungos mungo</i>	Banded Mongoose		
			<i>Paracynictis selousi</i>	Selous's Mongoose		
			<i>Ichneumia albicauda</i>	White-tail Mongoose		
			<i>Galerella sanguinea</i>	Slender Mongoose		
			<i>Galerella sp.</i>			
	Viverridae	<i>Civettictis sp.</i>	African Civet			
	Mustelidae	<i>Poecilogale sp.</i>	African striped weasel			
		<i>Mellivora capensis</i>	Honey Badger			
Hyracoidea	Procaviidae		<i>Procavia antiqua</i>			
			<i>Procavia transvaalensis</i>			
			<i>Procavia capensis</i>	Rock Hyrax		
Perissodactyla	Equidae		<i>Equus quagga</i>	Plains Zebra		
			<i>Equus capensis</i>			

Table # continued. Fauna recovered from Cooper's.

Order	Family	Tribe	Taxa	Common name		
Artiodactyla	Suidae		<i>Metridiochoerus andrewsi</i>			
			<i>Metridiochoerus modestus</i>			
		Giraffidae		<i>Sivatherium maurusium</i>		
		Bovidae	Neotragini	Neotragini sp. indet.		
				<i>Raphicerus campestris</i>	Steenbok	
			Alcelaphini	<i>Megalotragus</i> sp.		
				<i>Connochaetes</i> sp.	Wildebeest	
				Medium-sized Alcelaphines		
				<i>Damaliscus</i> cf. <i>pygargus</i>	Blesbok	
			Antilopini	<i>Antidorcas marsupialis</i>	Springbok	
				<i>Antidorcas recki</i>	Extinct springbok	
				<i>Gazella</i> sp.		
			Hippotragini	<i>Hippotragus</i> sp.		
			Reduncini	<i>Redunca</i> cf. <i>fulvorufula</i>	Mountain Reedbuck	
			Tragelaphini	<i>Tragelaphus strepsiceros</i>	Kudu	
				Small-sized <i>Tragelaphus</i>		
			Bovini	<i>Syncerus</i> sp.	African buffalo	
			Peleini	<i>Pelea capreolous</i>	Grey rhebok	
	Tubulidentata	Orycteropodidae		<i>Orycteropus afer</i>	Aardvark	
	Lagomorpha	Leporidae		<i>leporidae</i> sp.	Hare	
Rodentia	Hystricidae		<i>Hystrix africae australis</i>	Cape porcupine		
			<i>Hystrix makapanensis</i>	Extinct porcupine		
		Pedetidae		<i>Pedetes capensis</i>	Springhare	
		Muridae		<i>Acomys spinosissimus</i>	Common Spiny Mouse	
				<i>Aethomys chrysophilus</i>	Red Veld Rat	
				<i>Dendromus</i> sp.	Climbing Mice	
				<i>Mystromys albicaudatus</i>	White-tailed Rat	
				<i>Otomys irroratus</i>	Vlei Rat	
				<i>Otomys sloggetti</i>	Rock Karoo Rat	
				<i>Cryptomys hottentotus</i>	Common Molerat	
					<i>Elephantulus intufi</i>	Bushveld Elephant Shrew
					<i>Amblysomus</i> sp.	Golden Mole
				<i>Crocidura</i> sp.	Shrew	
Squamata	Chamaeleonidae			Chameleon		
	Cordylidae			medium sized lizards		
	Scincidae			lizards		
				Snake		
Testudines				Tortoise		
Psittaciformes	Psittacidae		<i>Agapornis</i> sp.	lovebird		
				parrot		
				owls		
Strigiformes				owls		
Falconiformes				falconiform		
Passeriformes				passerines		
Gruiformes	Turnicidae			buttonquail		

V. Potential threats to the site

- A. Because of the periodic nature of excavations at Cooper's Cave, there is potential for fossil damage at these exposed deposits. Stabilising loose sediment around the deposits required. The floors of excavated deposits need to be covered to limit contamination from the surface and to deter weeds from growing.
- B. Invasive plant species are found through Cooper's Cave and should be removed periodically. Weeds at the entrance gate need to be cut two times a year. Once a year, the grass within the fenced area needs to be cleared.
- C. The landowner wants to sell the land that Cooper's Cave is part off. This is due to the increase in theft of his livestock, fences being torn down, malicious fire outbreaks and the use of his land as a toilet. During our excavations, this June, we picked up toilet paper that was blowing into the deposits. Every year, malicious fires scorch Mr. Lotz land. In 2011, someone malicious set fire inside the fence that was protecting Cooper's A and D. The fence we put up to protect Mr. Lotz cattle from falling into the deposits is not longer intact. People break down the fence to access firewood, and cattle have broken through different areas of the fence. Someone has stolen one of our gate doors. The other gate door has a big hole cut out of it. In addition, there is litter that I routinely pick up.

VI. Funding

Cooper's Cave Research Projects has had support from government, non-profit organisations, business sectors and private donations. Applications and requests to these funding sources are ongoing.

VII. Curatorship

- A. All Cooper's excavated specimens from 2001 to present, field notes, excavation records, maps, CD's and photographs are archived at the Evolutionary Studies Institute, under Bernhard Zipfel, the University of the Witwatersrand Curator of Collections. Email: Bernhard.Zipfel@wits.ac.za
- B. The *ex situ* specimens collected from 1938 to 1955 along with the *in situ* specimens from Cooper's A 1999 excavations is housed at the Ditsong Museum of Natural History under Stephany Potze, Collections Manager. Email: potze@nfi.museum

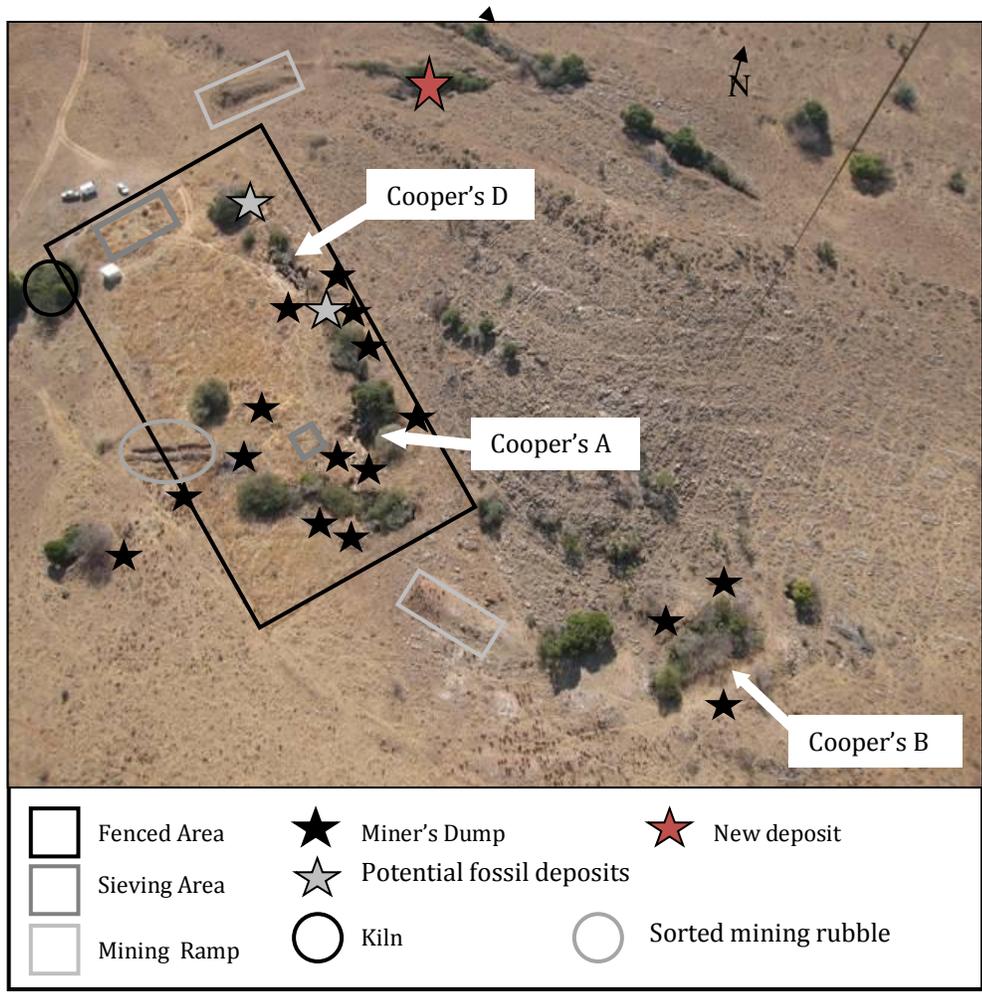


Figure 1. Aerial view and locality of various fossiliferous deposits at Cooper's Cave.