

PALAEONTOLOGICAL ASSESSMENT: RECOMMENDED EXEMPTION FROM FURTHER PALAEONTOLOGICAL STUDIES

Rectification of agricultural developments and associated infrastructure on Farm Arendsnes (Portion 30 of Farm Zeekoestek No. 09), Kai! Garib Municipality, Northern Cape

John E. Almond PhD (Cantab.)
Natura Viva cc,
PO Box 12410 Mill Street,
Cape Town 8010, RSA
naturaviva@universe.co.za

August 2020

Executive summary

Unauthorized vineyard developments have been undertaken on the Farm Arendsnes (Portion 30 of the Farm Zeekoestek No. 9), situated c. 40 km NW of Augrabies, Kai! Garib Municipality, Northern Cape Province. The development footprint is underlain at depth by (1) ancient Precambrian metamorphic bedrocks that do not contain fossils as well as (2) sparsely fossiliferous or unfossiliferous superficial sediments (principally sandy river and stream alluvium) of probable Quaternary to Recent age. Ancient alluvial terraces (potentially fossiliferous “High Level Gravels”) are not mapped or likely to be present in the study area. In view of the small, highly disturbed development footprint and the generally low palaeontological sensitivity of the study region, no further specialist studies or mitigation are considered necessary for this project, as far as fossil heritage is concerned. However, should significant fossil remains (e.g. vertebrate bones and teeth) be encountered during construction, the responsible ECO should inform SAHRA at the earliest opportunity to consider possible mitigation measures. A tabulated Chance Fossil Finds Procedure is appended to this report.

1. Project description

The present palaeontological assessment report forms part of a Section 24G Application process for unauthorized agricultural developments by Capespan Farms (Pty) Ltd on the Farm Arendsnes (Portion 30 of the Farm Zeekoestek No. 9), near Augrabies, Kai! Garib Municipality in the Northern Cape Province. The project area is located on the southern banks of the Gariep River, c. 40 km NW of Augrabies and c. 55 km NW of Kakamas. Several areas of vineyards, totalling about 104 ha in extent, were established between 1998 and 2016, without environmental authorisation.

The Section 24G Rectification process for this agricultural development is being co-ordinated by Groenbergenviro (Pty) Ltd (Contact details: Ms Elanie Kühn. GroenbergEnviro (Pty) Ltd, PO Box 1058 Wellington 7654. Cell: 0765840822. E-mail: Elaniem@iafrica.com). The present report contributes to the heritage component of the process under the aegis of Mr Jonathan Kaplan of ACRM (5 Stuart Road, Rondebosch, 7700. Ph/Fax: 021 685 7589. Cell: 082 321 0172. E-mail: acrm@wcaccess.co.za).



Figure 1. Google earth© satellite image showing the location of the unauthorised vineyard developments located on the southern side of the Gariep River on the Farm Arendsnes (Portion 30 of the Farm Zeekoesteek No. 9), near Augrabies, Kai! Garib Municipality in the Northern Cape Province. The development area is now highly disturbed.

2. Geological and palaeontological context

The agricultural project area on the Farm Arendsnes (Portion 30 of the Farm Zeekoesteek No. 9) comprises arid terrain on the southern banks of the Gariep River. The northern sector of the development footprint overlies the alluvial floodplain and comprises flattish terrain between c. 440 and 460 m amsl. The southern footprint area overlies stream alluvium within a context of WNW-ESE trending low rocky hills of basement rocks between 460 and 560 m amsl. Small streams drain the rocky ridges northwards into the Gariep and their northern slopes show fan-shaped colluvial mantles on satellite images (Fig. 1). The vineyard development area is extensively disturbed by previous agricultural activities, as shown by illustrations in the AIA report for this project by Kaplan (2020).

The geological context of the study area is shown on the 1: 250 000 geology sheet 2820 Upington (Fig. 2; Council for Geoscience, Pretoria) (Moen 2007). The underlying bedrocks are ancient Precambrian high-grade metamorphic rocks - principally the **Twakputs Gneiss** and **Witwater Gneiss** - assigned to the **Namaqua-Natal Province** that are some 1.5 billion years old and entirely unfossiliferous (Cornell *et al.* 2006, Almond & Pether 2008).

The study area lies close to the present course of the Gariep and is mantled, at least in part, by sandy alluvium from this river. Ancient (Tertiary - Quaternary), consolidated alluvial gravels of the Orange River system – which are known to be highly fossiliferous elsewhere along the Orange (*e.g.* Partridge *et al.* 2006) – are not mapped here and are not recorded in the AIA report for this project by Kaplan (2020). Superficial sediments away from sandy alluvium associated with the main drainage courses are likely to largely comprise surface gravels (mainly alluvial, colluvial, sheetwash and deflation deposits) as well, perhaps, as aeolian sands. The alluvial sediments

within the project area itself are probably of Quaternary age. Although fossil remains are occasionally encountered in these younger fluvial and terrestrial units – for example reworked mammalian bones and teeth, freshwater molluscs, calcretised root casts, termitaria, ostrich egg shells, land snail shells (Almond 2008, Almond & Pether 2008 and refs. therein) - they are sparsely distributed and occur over a very wide area, so the chances of serious impacts on unique fossil heritage resources here are only slight.

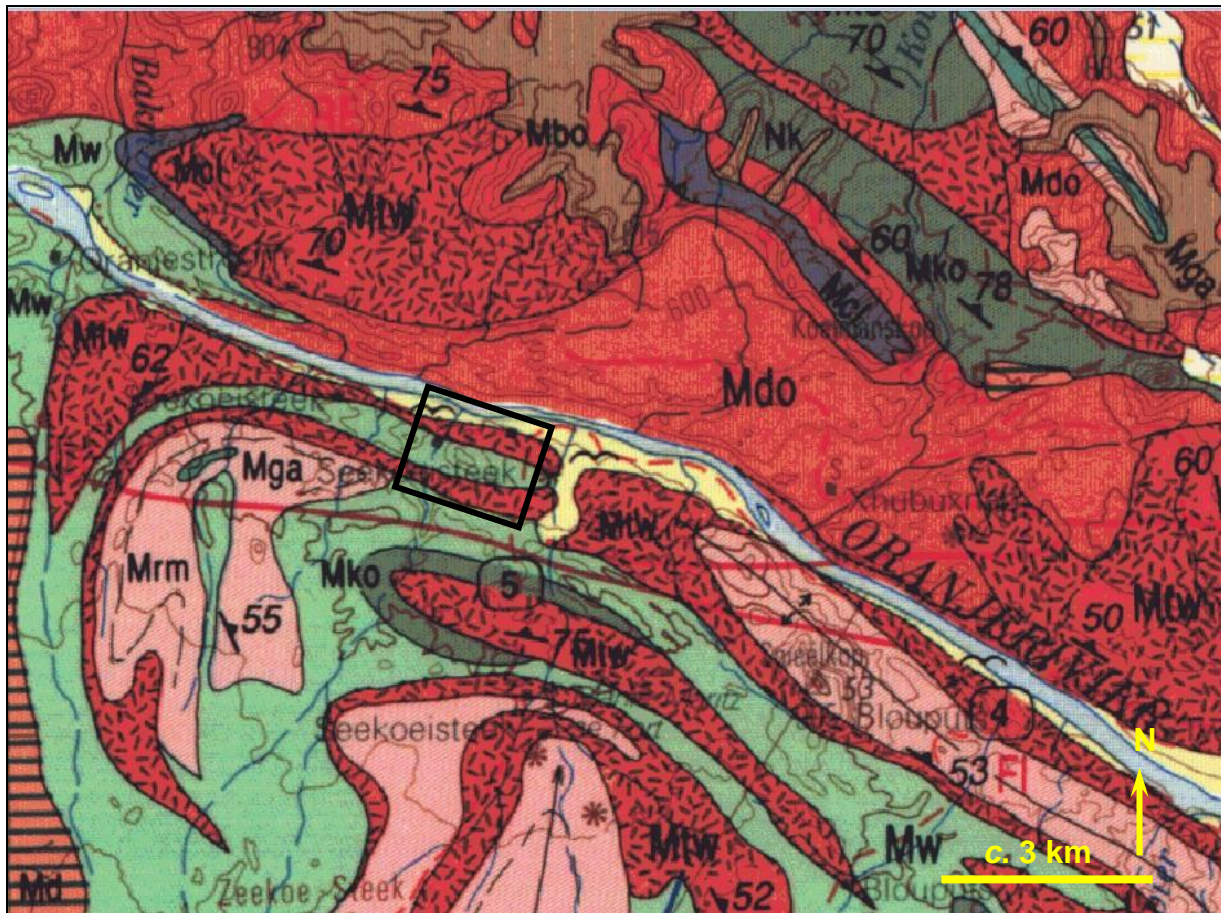


Figure 2. Extract from 1: 250 000 geology sheet 2820 Upington (Council for Geoscience, Pretoria) showing the *approximate* location of the agricultural project study area (black rectangle) on Farm Arendsnes (Portion 30 of the Farm Zeekoesteek No. 9), situated on the southern side of the Gariep (Orange) River and c. 40 km northwest of Augrabies, Northern Cape. The project area is underlain at depth by bedrocks of the Twakputs Gneiss (Mtw, red with dashes) and Witwater Gneiss (Mw, pale green) that form part of the Precambrian (Proterozoic) Namaqua-Natal Metamorphic Province. The northern sector of the project area is mantled near surface by alluvial sands (pale yellow) that are probably of Quaternary to Recent age, though older alluvium may be present at depth. Elevated older alluvial gravels (“High Level Gravels”) are not mapped along this sector of the Gariep River.

3. Conclusions & recommendations

In view of the negligible palaeontological sensitivity of the ancient Precambrian gneissoe bedrocks as well as the low sensitivity of the geologically recent superficial sediments along southern banks of the Gariep River here, the unauthorized vineyard developments are not considered to pose a significant threat to local palaeontological heritage. Substantial, potentially-fossiliferous older alluvial deposits of the Orange River are not mapped here.

Pending any significant new fossil discoveries in the area, no further specialist studies or mitigation are considered necessary for this agricultural project.

All South African fossil heritage is protected by the National Heritage Resources Act, 1999. Should substantial fossil remains - such as vertebrate bones and teeth, or petrified logs of fossil wood - be encountered at surface or exposed during construction, the ECO should safeguard these, preferably *in situ*. They should then alert the relevant provincial heritage management authority as soon as possible - *i.e.* SAHRA (Contact details: Dr Ragna Redelstorff, SAHRA, P.O. Box 4637, Cape Town 8000. Tel: 021 202 8651. Email: rredelstorff@sahra.org.za). This is to ensure that appropriate action (*i.e.* recording, sampling or collection of fossils, recording of relevant geological data) can be taken by a professional palaeontologist at the developer's expense. A tabulated Chance Fossil Finds Procedure is appended to this report.

Please note that:

- All South African fossil heritage is protected by law (South African Heritage Resources Act, 1999) and fossils cannot be collected, damaged or disturbed without a permit from SAHRA or the relevant Provincial Heritage Resources Agency;
- The palaeontologist concerned with potential mitigation work will need a valid fossil collection permit from SAHRA and any material collected would have to be curated in an approved depository (*e.g.* museum or university collection);
- All palaeontological specialist work should conform to international best practice for palaeontological fieldwork and the study (*e.g.* data recording fossil collection and curation, final report) should adhere as far as possible to the minimum standards for Phase 2 palaeontological studies developed by SAHRA (2013).

4. Key references

ALMOND, J.E. 2017. Proposed new vineyard development on Farm 1726 Renosterkop, Farm 1290 & Farm 1537 Augrabies, Northern Cape. Palaeontological assessment: recommended exemption from further palaeontological studies, 17 pp. Natura Viva cc, Cape Town.

ALMOND, J.E. & PETHER, J. 2008. Palaeontological heritage of the Northern Cape (August 2008 draft), 125 pp. Unpublished palaeotechnical report for SAHRA.

CORNELL, D.H., THOMAS, R.J., MOEN, H.F.G., REID, D.L., MOORE, J.M. & GIBSON, R.L. 2006. The Namaqua-Natal Province. *In*: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 461-499. Geological Society of South Africa, Marshalltown.

KAPLAN, J. 2020. S24G Application, Illegal vineyard development on Arendsnes (Portion 30 of the Farm Zeekoesteeck No. 9), near Augrabies, Kai! Garib Municipality, Northern Cape. Archaeological impact assessment, 15 pp. ACRM, Rondebosch.

McCARTHY, T. & RUBIDGE, B. 2005. The story of Earth and life: a southern African perspective on a 4.6-billion-year journey. 334pp. Struik, Cape Town.

MOEN, H.F.G. 2007. The geology of the Upington area. Explanation to 1: 250 000 geology Sheet 2820 Upington, 160 pp. Council for Geoscience, Pretoria.

MOEN, H.F.G. & TOOGOOD, D.J. 2007. The geology of the Onseepkans area. Explanation to 1: 250 000 geology Sheet 2818, 101 pp. Council for Geoscience, Pretoria.

PARTRIDGE, T.C., BOTHA, G.A. & HADDON, I.G. 2006. Cenozoic deposits of the interior. In: Johnson, M.R., Anhaeusser, C.R. & Thomas, R.J. (Eds.) The geology of South Africa, pp. 585-604. Geological Society of South Africa, Marshalltown.

SAHRA 2013. Minimum standards: palaeontological component of heritage impact assessment reports, 15 pp. South African Heritage Resources Agency, Cape Town.

5. Qualifications & experience of the author

Dr John Almond has an Honours Degree in Natural Sciences (Zoology) as well as a PhD in Palaeontology from the University of Cambridge, UK. He has been awarded post-doctoral research fellowships at Cambridge University and in Germany, and has carried out palaeontological research in Europe, North America, the Middle East as well as North and South Africa. For eight years he was a scientific officer (palaeontologist) for the Geological Survey / Council for Geoscience in the RSA. His current palaeontological research focuses on fossil record of the Precambrian - Cambrian boundary and the Cape Supergroup of South Africa. He has recently written palaeontological reviews for several 1: 250 000 geological maps published by the Council for Geoscience and has contributed educational material on fossils and evolution for new school textbooks in the RSA.

Since 2002 Dr Almond has also carried out palaeontological impact assessments for developments and conservation areas in the Western, Eastern and Northern Cape, Limpopo, Mpumalanga, Northwest, Free State and KwaZulu-Natal under the aegis of his Cape Town-based company *Natura Viva* cc. He was a long-standing member of the Archaeology, Palaeontology and Meteorites Committee for Heritage Western Cape (HWC) and an advisor on palaeontological conservation and management issues for the Palaeontological Society of South Africa (PSSA), HWC and SAHRA. He is currently compiling technical reports on the provincial palaeontological heritage of Western, Northern and Eastern Cape for SAHRA and HWC. Dr Almond is an accredited member of PSSA and APHP (Association of Professional Heritage Practitioners – Western Cape).

Declaration of Independence

I, John E. Almond, declare that I am an independent consultant and have no business, financial, personal or other interest in the proposed project, application or appeal in respect of which I was appointed other than fair remuneration for work performed in connection with the activity, application or appeal. There are no circumstances that compromise the objectivity of my performing such work.



Dr John E. Almond
Palaeontologist (*Natura Viva* cc)

CHANCE FOSSIL FINDS PROCEDURE: Agricultural developments on Farm Arendsnes (Portion 30 of the Farm Zeekoesteek No. 9) near Augrabies		
Province & region:	NORTHERN CAPE, Kai! Garib Municipality	
Responsible Heritage Resources Authority	SAHRA (Contact details: P.O. Box 4637, Cape Town 8000. Tel: 021 462 4502)	
Rock unit(s)	Late Caenozoic alluvium	
Potential fossils	Mammalian bones and teeth, freshwater molluscs, calcretised root casts, termitaria, ostrich egg shells, land snail shells	
ECO protocol	1. Once alerted to fossil occurrence(s): alert site foreman, stop work in area immediately (<i>N.B.</i> safety first!), safeguard site with security tape / fence / sand bags if necessary.	
	2. Record key data while fossil remains are still <i>in situ</i> : Accurate geographic location – describe and mark on site map / 1: 50 000 map / satellite image / aerial photo Context – describe position of fossils within stratigraphy (rock layering), depth below surface Photograph fossil(s) <i>in situ</i> with scale, from different angles, including images showing context (<i>e.g.</i> rock layering)	
	3. If feasible to leave fossils <i>in situ</i> : Alert Heritage Resources Authority and project palaeontologist (if any) who will advise on any necessary mitigation Ensure fossil site remains safeguarded until clearance is given by the Heritage Resources Authority for work to resume	3. If <i>not</i> feasible to leave fossils <i>in situ</i> (emergency procedure only): <i>Carefully</i> remove fossils, as far as possible still enclosed within the original sedimentary matrix (<i>e.g.</i> entire block of fossiliferous rock) Photograph fossils against a plain, level background, with scale Carefully wrap fossils in several layers of newspaper / tissue paper / plastic bags Safeguard fossils together with locality and collection data (including collector and date) in a box in a safe place for examination by a palaeontologist Alert Heritage Resources Authority and project palaeontologist (if any) who will advise on any necessary mitigation
	4. If required by Heritage Resources Authority, ensure that a suitably-qualified specialist palaeontologist is appointed as soon as possible by the developer.	
	5. Implement any further mitigation measures proposed by the palaeontologist and Heritage Resources Authority	
Specialist palaeontologist	Record, describe and judiciously sample fossil remains together with relevant contextual data (stratigraphy / sedimentology / taphonomy). Ensure that fossils are curated in an approved repository (<i>e.g.</i> museum / university / Council for Geoscience collection) together with full collection data. Submit Palaeontological Mitigation report to Heritage Resources Authority. Adhere to best international practice for palaeontological fieldwork and Heritage Resources Authority minimum standards.	