


AN ACTION PLAN FOR SOUTH AUSTRALIA'S EDIACARAN FOSSILS

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"THE EDIACARA FOSSILS OF SOUTH AUSTRALIA ARE ABSOLUTELY THE KEY TO OUR UNDERSTANDING OF HOW ANIMAL LIFE UNFOLDED ON PLANET EARTH."

*DR MARY DROSER,
UNIVERSITY OF CALIFORNIA*



The Flinders Ranges are one of Australia's great landscapes.

They are a window into deepest, almost unfathomable time. The stories at Wilpena Pound, Brachina Gorge and Arkaroola of hot rocks, inland seas, and mountain uplifts are intertwined with the timeless culture of the Adnyamathanha people.

Perhaps less known is the story they tell of the first animal life on Earth. This story recorded in stone, of the evolution of life from microbes to marine animals, is nowhere so well preserved as in the Flinders Ranges. They are internationally renowned; Sir David Attenborough visited their fossils for a documentary to explain the origins of life. They are in student text books around the world.

The fossils that were first discovered in the Ediacaran Hills south of Leigh Creek represent the earliest evidence of complex life on Earth. They have given us a new understanding of the early evolution of life, with the imprints of many types of strange and unusual creatures recorded in the ancient sea floor. South Australia has the double distinction of being where they were first discovered, and being home to one of the most diverse and intact Ediacaran fossil fields in the world at Nilpena Station.

On the strength of these fossils and their associated geology, in 2004 the first geological time period was created in 120 years – the Ediacaran Period – to encapsulate the period from 645 to 542 million years ago. The international reference point for this time period is in South Australia's Ikara-Flinders Ranges National Park.

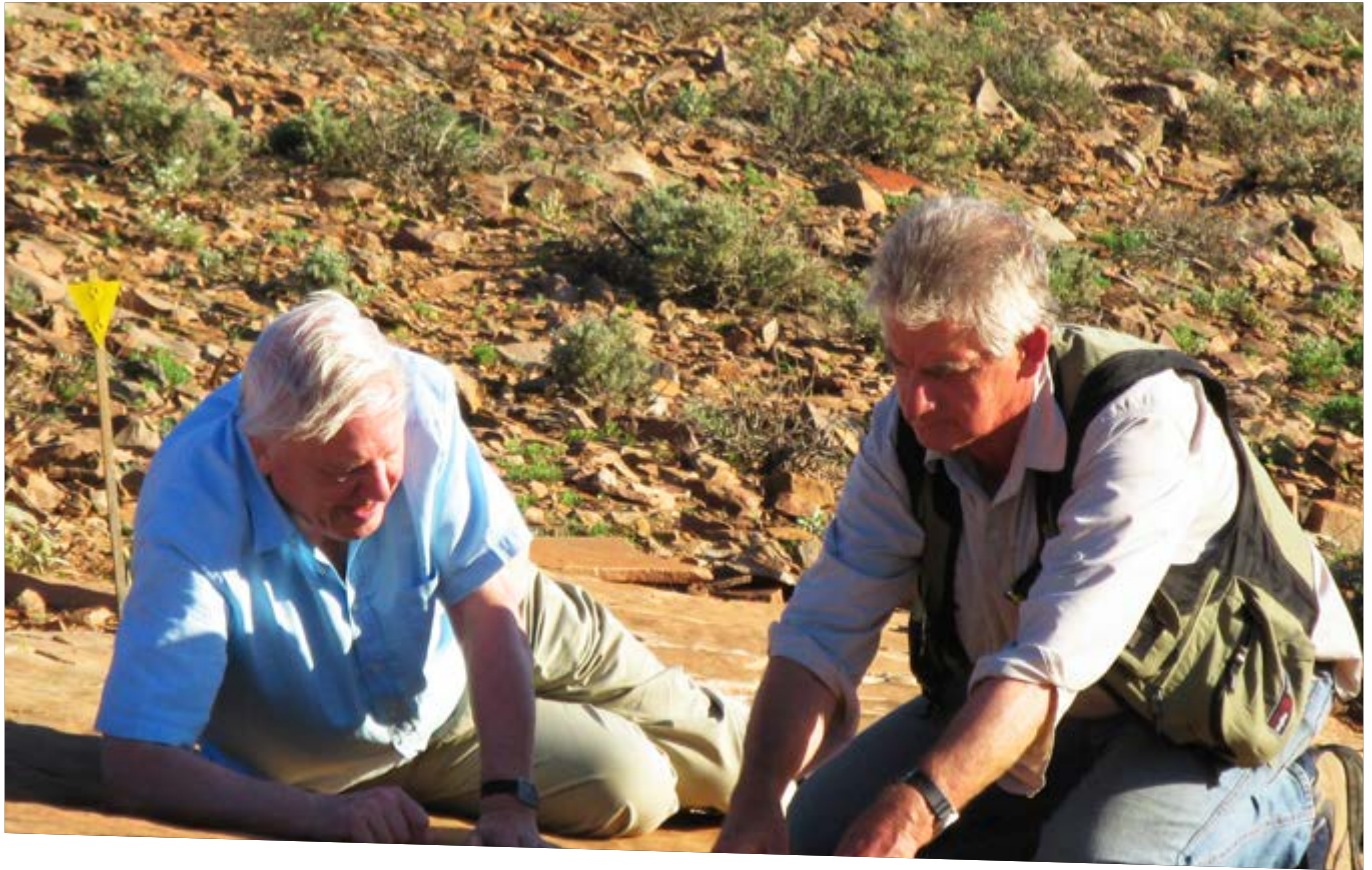
We have a prominent fossil heritage that also includes the Cambrian fossils of Emu Bay Shale on Kangaroo Island, which emerged after the Ediacaran period, and the Naracoorte Caves World Heritage Site, which preserves Australia's more recent megafauna – one of the world's greatest fossil deposits.

While this action plan will have broader relevance for how we think about our fossil heritage, in focussing on the Ediacaran fossils the Government has taken the opportunity to consider what it means to hold such a unique heritage of global significance.

This action plan provides a framework for how we will work together to ensure this legacy is protected, celebrated, and shared with the world.

ACTION PLAN

1. Conserving Nilpena's Ediacaran treasures



Nilpena Station, south of Leigh Creek, is host to one of the most important Ediacaran fossil sites internationally. It has a diversity of over 40 species recorded in the sediments of its ancient seafloors, and continuing international research is revealing how these strange and cryptic early lifeforms lived, reproduced, and even hunted. Nilpena is unique in having a whole ecosystem from which we can learn.

The fossil field at Nilpena was included on the National Heritage List in 2007 and the owners of the Station have been instrumental in managing the site and supporting research. This research has expanded the known distribution of fossils beyond those areas listed in 2007, and the site's significance continues to grow. While the national heritage listing provides some level of protection, this site is without doubt an asset that the State Government is committed to ensuring is protected and well managed for many years to come.

ACTIONS

- Investigate securing the best long-term management regime for the Nilpena fossil fields.
- Liaise with the Australian Government to ensure the national heritage values of the fossils are protected and effectively managed.



2. Securing the legacy of Ediacara Conservation Park



Just north of Nilpena is the Ediacara Conservation Park, which was created in 2007 and doubled in size to nearly 5,000 hectares in 2016. The site was entered on the South Australian Heritage Register in 1993.

While the fossils there suffered from decades of removal before the park was proclaimed, the site's importance is undisputed and renowned throughout the world: the park conserves the Ediacaran Hills, which are the location where geologist Reg Sprigg, the founder of the Arkaroola Wilderness Sanctuary,

first discovered and identified the fossils in 1946. Although there is a tightly controlled permitting and access arrangement in place, the remote location of the park presents challenges for management. There may be considerable benefit in integrating the management of the fossil fields at Nilpena and Ediacara.

ACTION

- Investigate models for improving the management of the fossils at Ediacara Conservation Park, including third-party stewardship arrangements.



3. Pursuing the World Heritage opportunity



The World Heritage List contains those places of outstanding universal value for their natural or cultural values. It is likely that the fossil heritage of the Flinders Ranges, together with its exceptional geological heritage at locations such as Arkaroola and Ikara-Flinders Ranges National Park, has the potential to meet the World Heritage criteria.

World Heritage could elevate research and management of the fossils, and could support regional employment and growth by turning an international spotlight on the Flinders Ranges. The Government is committed to investigating the World Heritage proposition and developing a nomination in partnership with the Flinders Ranges community and researchers.

ACTION

- Commence the process for nominating the Flinders Ranges for World Heritage listing, for its fossil and geological significance, in partnership with the community.



4. Creating a unique experience for visitors



The Ediacaran story adds to the richness of the visitor experience in the Flinders Ranges – together with the Adnyamathanha culture and pastoral heritage, it invites reflection on the layers of meaning within this stunning landscape.

There are trails through Brachina Gorge in the Ikara-Flinders Ranges National Park that interpret the geology, and visitors can view some fossils at the town of Parachilna, however there is no integrated story for visitors. The Government through its new nature-based tourism strategy, *Nature Like Nowhere Else*, is progressing new opportunities for South Australian tourism.

There is an exciting opportunity to capitalise on the tourism potential of the Ediacaran fossils. However, we need to understand the appeal of these fossils to visitors and consider the logistics of access. There are fossils across a range of properties in the Flinders Ranges and there will be opportunities to consider the role of towns such as Leigh Creek. In doing this, we need to work with the tourism community to define, develop and test the tourism product.

ACTIONS

- Investigate the potential for fossil tourism across the Flinders Ranges by:
 - Convening a workshop of tourism operators, local community and others to discuss the tourism opportunities of Ediacaran fossils.
 - Run a project to develop and test the tourism potential of the Ediacaran fossils, including marketing strategies.
- Scope options for communicating and interpreting the story of the Ediacaran fossils across the Flinders Ranges.



5. Celebrating our heritage through research and education



The South Australian Museum has the most important collection of Ediacaran fossils in the world and has an outstanding gallery for visitors. Without a long history of research by intrepid individuals and visionary institutions, South Australia's renown in Ediacaran fossils may not be what it is today.

We are only beginning to understand the Ediacaran fossils, and the research undertaken by the museum and our local universities, and the partnerships with other institutions the world over, continues to pose new questions and present exciting discoveries. It is worthwhile considering how we can

consolidate and enhance our leadership in this growing field of research given there are now some 30 Ediacaran fossil fields from Russia to Africa.

Building an awareness of fossils also starts with school children: to spark their imagination about the treasures that we hold and inspire them to study. We can explore how to raise awareness and create opportunities for children to see the fossils firsthand through tours that integrate the Flinders Ranges story of geology, Aboriginal culture, and environment.

ACTIONS

- Investigate how to position South Australia as the home of international research for Ediacaran fossils.
- As part of a proactive tourism strategy, design a package for school tours to the Flinders Ranges that tells an integrated story of fossils, culture and environment, in partnership with the local community, and test the package on a number of schools.



6. Improving the protection of fossils



There is no specific legislation that protects fossils. Except where they are found in a park, on Crown land, or protected as a State Heritage Place, there are limited means to control the removal of fossils. There has been significant damage to some sites where they have been exploited for financial gain.

This has led to much damage of some important sites over the years; the removal of fossils without scientific rigour means that as isolated specimens they lose their context and value for

study. In the Flinders Ranges, researchers revisiting the fossils is opening up new interpretations and understanding about how the Ediacaran fauna lived in their environment over time.

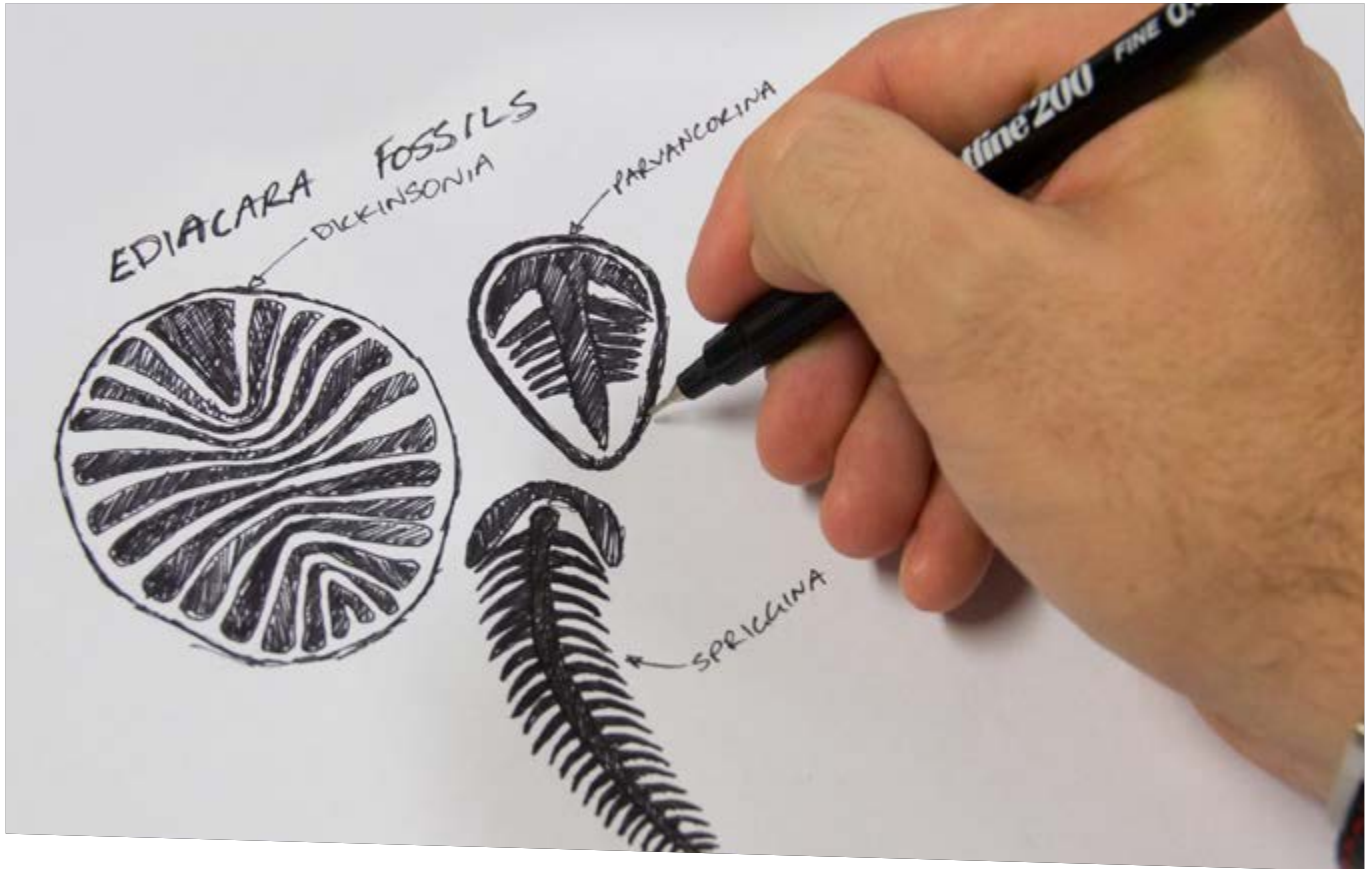
There are strong penalties for the illegal export of fossils from Australia, however there is a need to review the protections and penalties for significant classes or sites to reflect that these are assets of immense scientific and heritage value.

ACTION

- Review the legislative regime for the protection of significant classes or sites of fossils.



7. Creating a fossil emblem for South Australia



South Australia has a number of emblems, including the Sturt's Desert Pea and the Leafy Sea Dragon. There is merit in creating a fossil emblem to embody and celebrate the evolution of South Australia's natural history.

We have committed to create a fossil emblem and asked the South Australian Museum to run a community engagement process to select an emblem from one of

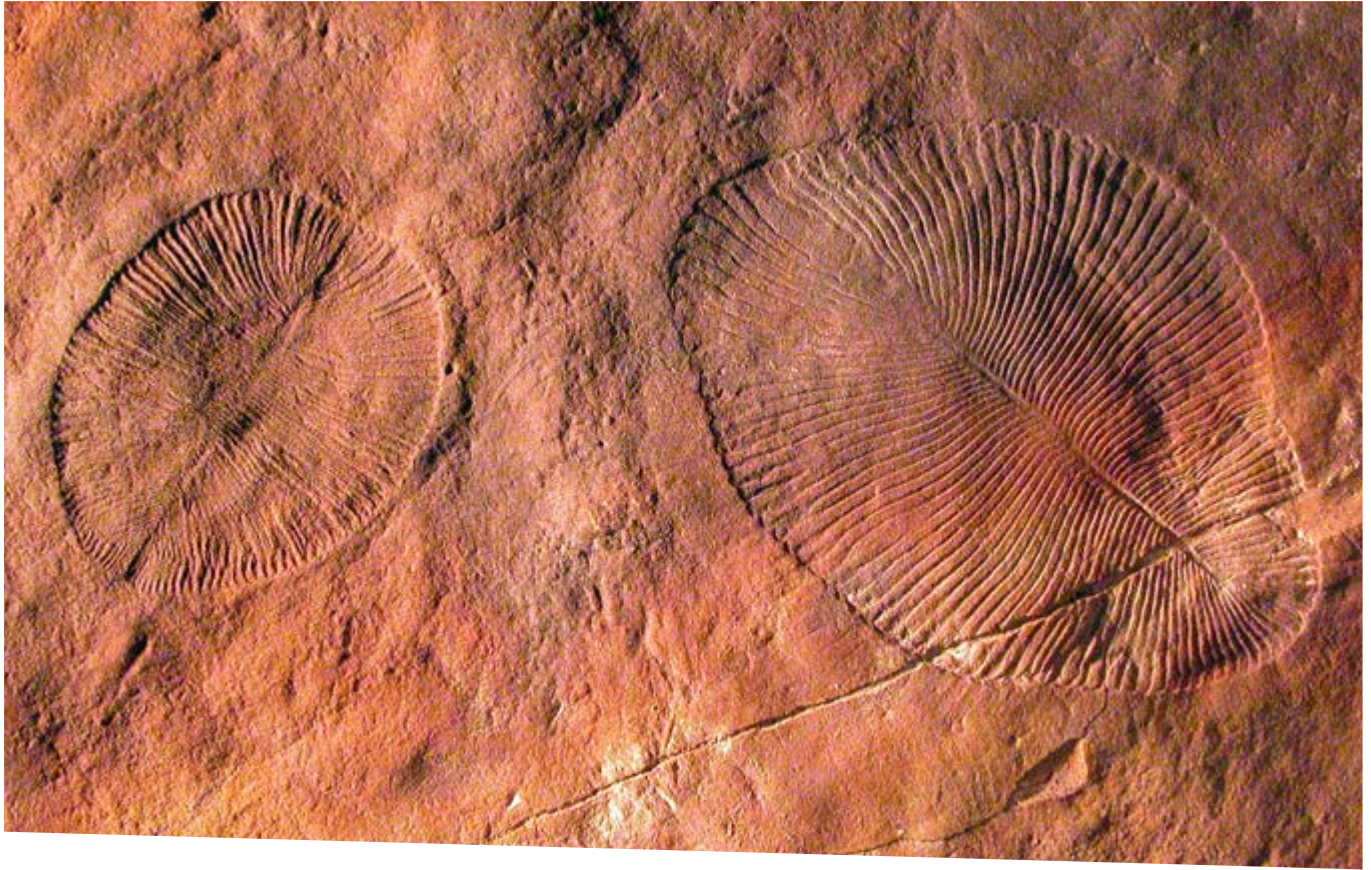
the iconic Ediacaran fossils. This process has started with advice from researchers about which fossils would be worth considering, and the community will soon be asked for its view on which would make the best fossil emblem.

ACTION

- Initiate a community engagement process to select a fossil emblem for South Australian from the Ediacaran biota.



8. Promoting engagement and partnerships



This action plan provides a framework for raising awareness about our Ediacaran fossil heritage. The community has benefited from the extensive research undertaken by dedicated individuals and institutions – through discovery, sharing of knowledge, and posing new ways of interpreting the fossils. This will continue to grow, and there is also great opportunity for sharing the Adnyamathanha stories and researchers' stories of how the Flinders Ranges were created. Co-management of the parks in the Flinders Ranges with the Adnyamathanha people is a powerful convening space for this opportunity.

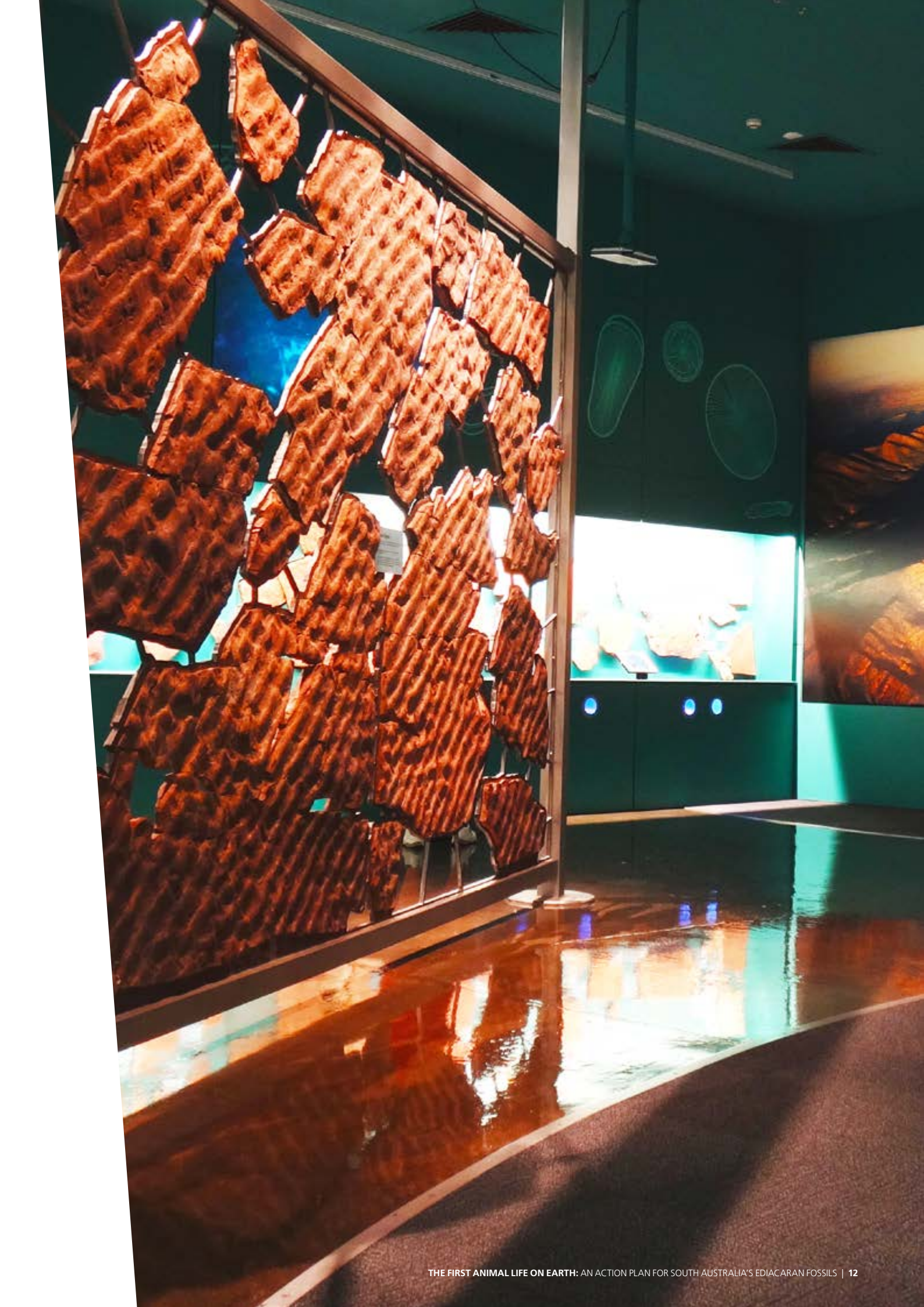
The fossils occur across a range of lands, from national parks to working pastoral leases and Aboriginal-owned land. How the fossils are best managed, made accessible and interpreted for visitors is something that can only be done through partnerships.

There will be numerous people and institutions interested in how this is done, ranging from the Adnyamathanha people, landowners and towns, to researchers, educators, and tourism operators. Delivering this action plan through an open dialogue and a willingness to work together will be instrumental if we are to protect and share this fossil heritage.

ACTIONS

- Maintain open communication with stakeholders about the implementation of the action plan, and foster the development of partnerships to progress the actions.
- Work actively with the Adnyamathanha people to build education and tourism experiences that engage the community in the stories of the Flinders Ranges.









Photos credits

Pages 3, 4, 5, 7, 11, 12, 13-14
South Australian Museum, Palaeontology

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Pages 1-2, 6, 8, 10
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