Newsletter

SUMMER 2023 | ISSUE 11

The latest news from the Great Victoria Desert.

Welcome to the 2023 edition of the Great Victoria Desert Biodiversity Trust (GVDBT) Newsletter.

2023 has once again been a great year for the GVDBT. Ongoing and new projects are coming on board allowing for a greater understanding of the Great Victoria Desert and the incredible biodiversity of this landscape.

On pages 2 and 3 you can read about the project to model fine scale high resolution habitat suitability for the Sandhill Dunnart. This enables the Trust to pin point suitable habitat throughout the Great Victoria Desert and hopefully extend the range of the this endangered marsupial.

The Remote Sensing and Spatial Analysis program with the Department of Biodiversity Conservation and Attractions (DBCA) is conducting an evaluation of Landgate Sentinel-2 based automated fire scar mapping and existing fire scar mapping based on annual Landsat imagery over the Great Victoria Desert. Page 4 outlines the project which should be running by 2024.

The Trust has entered into an agreement with the Pila Nguru Aboriginal Corporation (PNAC) for a Spinifex Biodiversity Project. The key components are to undertake a project based on the aspirations of the Spinifex Rangers and Elders to survey remote country with the aim of researching and managing biodiversity in the GVD. Page 5 and 6 gives you an insight into this exciting project.

Page 7 updates our ongoing partnership with the Indigenous Desert Alliance (IDA). This project has been a great success facilitating on-country burning programs by empowering indigenous rangers to continue traditional burning practices while building the capacity of desert ranger teams to implement landscape scale fire management.

A field trip to the two GVDBT Landscape Conservation Initiative (LCI) areas took place in August 2023 as a collaborative program with DBCA Goldfields Region. The primary goal was to service and change out the fauna monitoring cameras and service the weather stations within these areas. Thank you to the staff who participated and provided equipment and logistics to make the trip a great success.

Finally, on page 8, there has been staffing changes within the the Trust.

We hope you enjoy reading this edition of our newsletter. If you have any comments or questions on the articles or you would like further information about the Great Victoria Desert Biodiversity Trust, please contact the Operations Manager, Ian Anderson.

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IN THIS ISSUE

A Spatial Approach Leading to a Greater Understanding of Sandhill Dunnart Habitat.

High resolution habitat suitability estimates of a range-restricted marsupial

Alinytjara Wilurara Landscape Board: https://www.landscape.sa.gov.au/aw/projects/sandhill-dunnarts

Sean Tomlinson, who was previously with the GVDBT in the Technical Biodiversity position has been working on a paper titled "High resolution habitat suitability estimates of a range restricted marsupial. The role of vegetation, geomorphology, and fire."

Australia has undergone substantial loss of mammal species, and for many of the remaining species these declines have happened so rapidly, and so remotely from human populations, that we do not have a strong idea of how to combat them. Principal drivers are predation by introduced species, habitat loss or modification by rangelands agriculture, and changed fire regimes.

Marsupial carnivores (Dasuryidae) are a distinctive component of the unique fauna of Australia, heavily represented by the Smithopsinae, which diversified rapidly in the mid-Miocene, and now represent 30 species.

While there are several broadly distributed, common species of dunnart and ningaui (*Sminthopsis* and *Ningaui* spp. respectively), the majority of these species are restricted to narrow distributions, for which there are very few records.

Consequently, there is only a coarse understanding of where these species' strongholds are, and where to focus the substantial conservation efforts required to mitigate their declines.

The Sandhill Dunnart (*S. psammophila*) is a small dayurid (approx. 35-45 g) that exclusively occupies the semi-arid and arid centre of Australia. of central Australia. Originally discovered in the Northern Territory, observations and collections of the species were made infrequently, and across substantial disjunctions of central Australia.

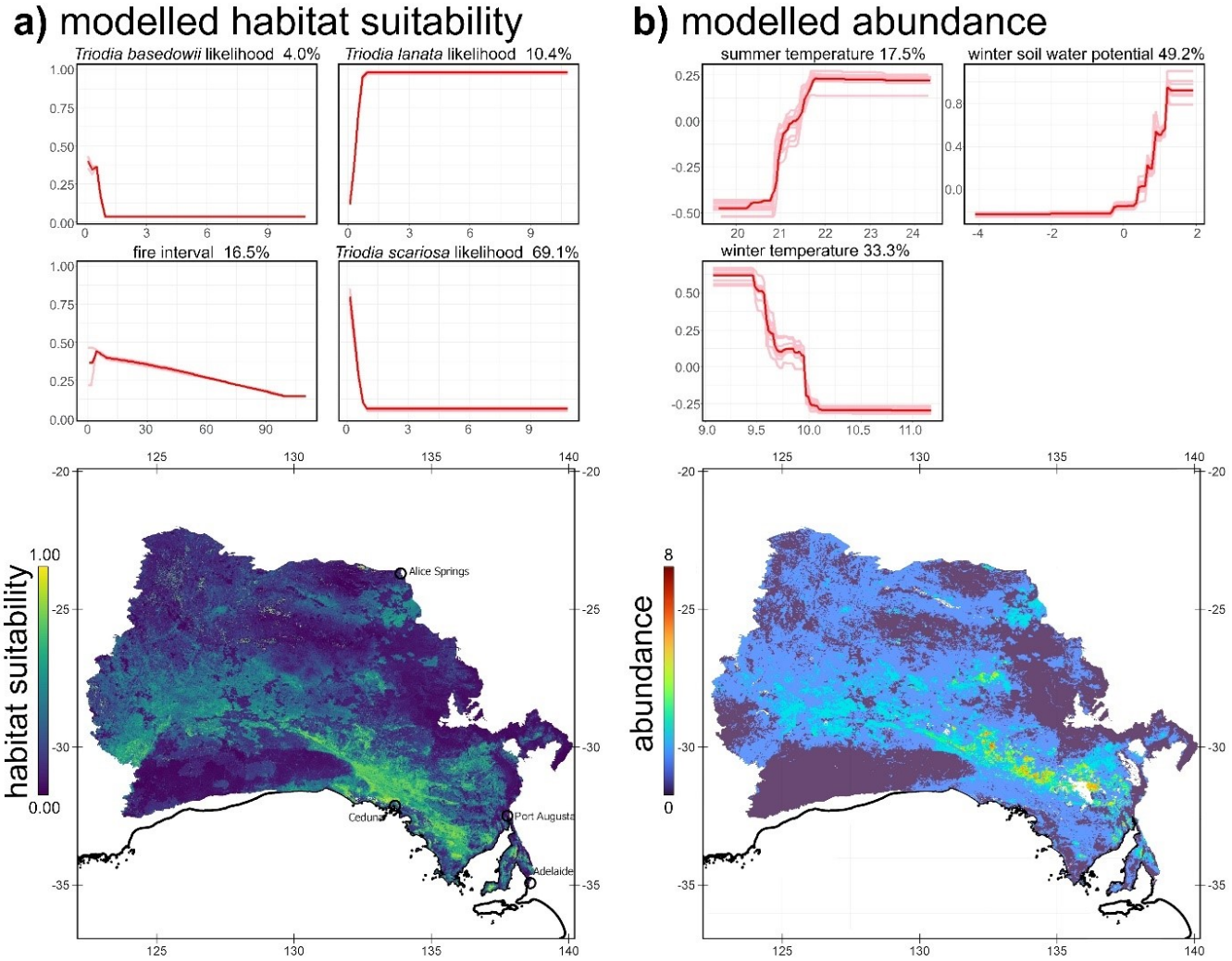
Currently, the Sandhill Dunnart is understood to occupy three core populations in the Eyre Peninsula (South Australia), Great Victoria Desert (South Australia) and south-western Great Victoria Desert (Western Australia), separated by hundreds of kilometres of habitat that appears to be otherwise suitable for the species.

The species is recognised under several conservation covenants in Australia and is classified on the IUCN Red List as Endangered. Essentially, this category recognises species with small and declining distributions, for which there is depauperate understanding of the drivers of range collapse and species biology.

As the name suggests, the Sandhill Dunnart is associated with sand dune habitats, where spinifex (*Triodia* spp,) represents the majority of the ground cover. The affinity of *S. psammophila* with spinifex grasslands, and the susceptibility of this habitat to fire, has led to the conclusion that changing fire frequency may be a particular threatening process to the Sandhill Dunnart.

Given that wildfire kills spinifex hummocks, removing all understory cover area, and can take between 20 and 30 years to recover, a fire frequency between five and 20 years has been estimated as a defining feature of habitat quality for Sandhill Dunnarts.

However, there is currently no quantification of the species' habitat requirements at high spatial scales, and no integration of fire frequency into models of distribution and abundance of the Sandhill Dunnart, nor any understanding of how patterns of variable climate parameters might interact with this to drive patterns of abundance.



Model performance and projection of MaxEnt distributions models for Sandhill Dunnart (*Sminthopsis psammophila*). a) Weighted ensemble average projection and model performance under contemporary fire frequency. The top panel shows the partial response plots of the parameters contributing to the model, values further up the y-axis indicate the parameter range where suitability increases. The lower panel indicates the patterns of occurrence projected using the ensemble average model of each species. b) Estimated population density. The top panel shows the partial response plots of the parameters contributing to the model, values further up the y-axis indicate the parameter range where population density is higher. The lower panel indicates the patterns of abundance projected using the ensemble habitat suitability as a template.

By integrating high resolution drivers of habitat preference and threatening processes to identify regions of high habitat suitability for the endangered Sandhill Dunnart (*S. psammophila)*, Sean's research has revealed fine-resolution patterns in the role of dominant vegetation types in defining suitable habitat for the species, and the heretofore unquantified importance of fire frequency in filtering the species' realised niche. He has also been able to estimate likely patterns of abundance across Australia, which suggest that they may be more widespread than currently thought, but at much lower densities than currently reported.

The final paper is due in December 2023 and an analysis of suitable habitat for Sandhill Dunnarts will be assessed and ground truthed.

This fine scale analysis of the GVD will hopefully increase the known areas of the SHD and provide greater insight in the range and population of *Sminthopsis psammophila.*

Information for this article has been reproduced from Sean's research paper for the GVDBT. He can be contacted at DBCA.
sean.tomlinson@dbca.wa.gov.au

Suitable Spinifex Habitat
Photo Courtesy of the GVDBT

Fire Mapping Update from DBCA Remote Sensing Program

In previous years the Remote Sensing & Spatial Analysis Program in Biodiversity and Conservation Science at DBCA has undertaken annual fire scar mapping over the Great Victoria Desert (GVD), funded by the Great Victoria Desert Biodiversity Trust (GVDBT), utilising Landsat imagery.

An assessment of the semi-automated mapping method accuracy found that the Landsat based mapping method had a lower average omission and commission error (3.4% and 8%) compared to MODIS (42.2% and 19.9%).

At a scale of 500 m by 500 m, Landsat was found to accurately map burn percentage, but the accuracy was lower at a plot scale of 120 m by 120 m.

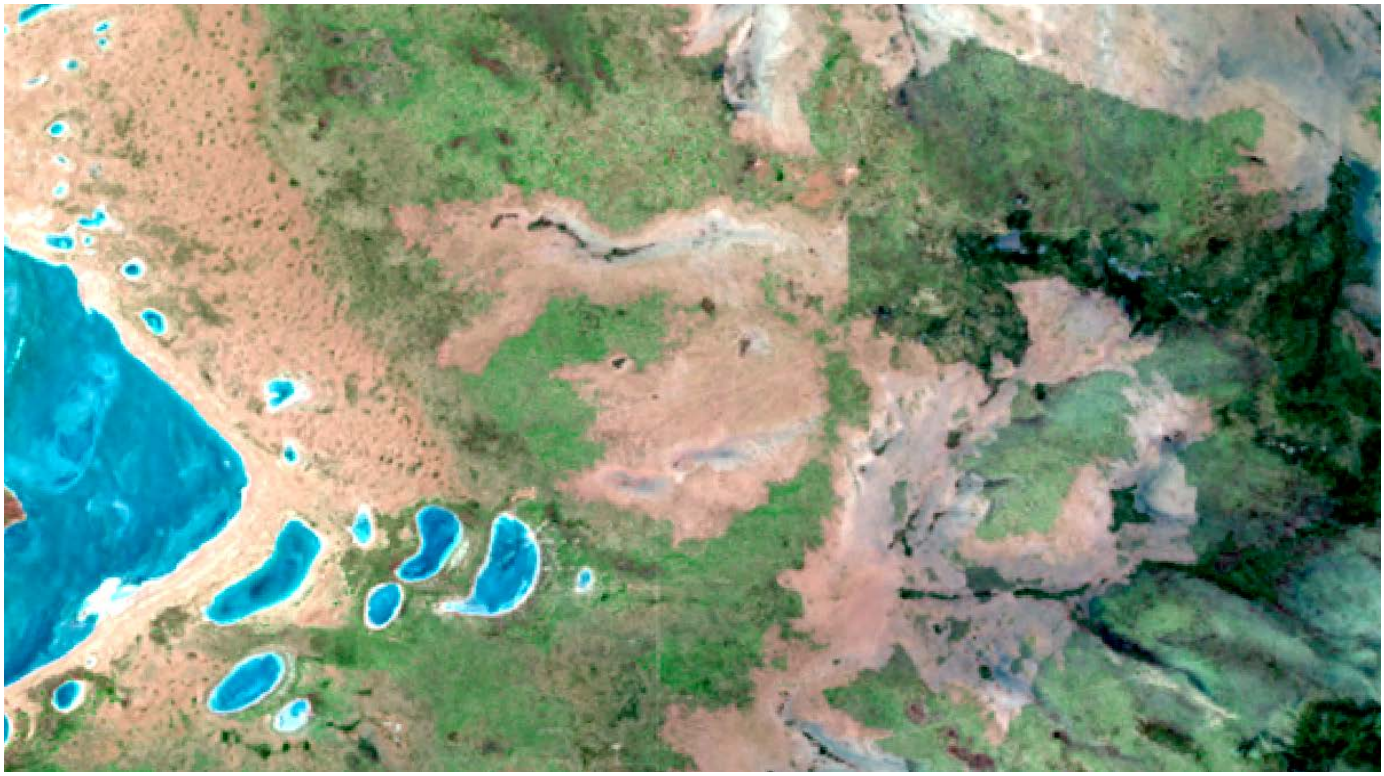
The fire mapping covers a period of 1995 to 2020, and the GVDBT continued to update the mapping until April 2022. Keeping the fire scar mapping data current is essential for planning and evaluating prescribed burn activities in the GVD.

Over the last 10 years Landgate has been developing the methodology and capacity to process every Landsat and Sentinel-2 image and have these available for fire scar mapping. The method requires calibration to the various vegetation types and soil backgrounds across Western Australia.

Testing the application of this method to a study area in the GVD was proposed by DBCA in March 2023. An agreement to test the application of the method over 4 Sentinel-2 tiles was agreed to April 2023.

The outcome of the testing is a comparison of the existing fire scar mapping with the Landgate Sentinel-2 based method and an evaluation by the GVDBT if the outputs are of sufficient quality to provide vital information for their burn planning and reporting purposes.

Thanks to Katherine Zdunic, Program Leader with DBCA Remote Sensing and Spatial Analysis Program for providing the update.
Katherine can be contacted at DBCA.
katherine.zdunic@dbca.wa.gov.au



The image was captured by the Landsat 8 satellite on the 19/12/2021, this view is centered on longitude 123.375E and latitude 29.424S. It is a false colour display (this means it uses part of the light spectrum humans cannot see) to enhance the landscape and highlight differences such as burnt areas.

Spinifex Biodiversity Project an Initiative of the Pila Nguru Aboriginal Corporation

Spinifex | Pila Nguru
(Aboriginal Corporation) RNTBC
ABN: 86 789 767 972 ICN: 3731

In August 2022, Acting General Manager of Pila Nguru, Adam Pennington, asked the GVDBT to support a novel, 5-year biodiversity survey strategy that combines traditional knowledge of the faunal assemblage of the Great Victoria Desert (GVD) with modern biodiversity survey techniques and a helicopter to build a picture of the current and previous faunal assemblages of the GVD.

The GVD supports some of Australia's most pristine landscapes, however the regions flora and fauna are poorly documented, and little understood by contemporary science. The Spinifex People are the Traditional Owners of over 10 million hectares of the most remote part of the GVD in far east Western Australia – Spinifex Country. The Spinifex People have lived in the GVD for over 600 generations have an intimate knowledge of the desert's biodiversity.

The last Spinifex family "came in from the bush" in 1986, making them the last known Aboriginal People to have contact with Europeans in Australia. A large group of senior Traditional Owners living on-country in Tjuntjuntjara retain knowledge about species in the region, including those thought extinct by western science, and still have the ability to undertake on-country trips to areas where they know these species previously existed.

Camera establishment with Spinifex Rangers

The central components of the Spinifex Biodiversity Project are:

- Working with Traditional Owners to document their knowledge of threatened species in the region.
- Conduct surveys for species Tradional Owners know previously existed within Anangu Tjutaku (Spinifex, Pilki, Untiri Pulka) Indigenous Protected Area, particularly the remote parts of the Spinifex Native Title Determination.
- Conduct surveys for Sandhill Dunnart and Nganamara utilising the specialised knowledge of an ecologist and the tradional knowledge of Traditional Owners.
- Collate and analyse fauna data collected by Spinifex Land Management over the last 10 years.

Inactive Mallefowl mound

A wide range of fauna has been recorded throughout the region. Several threatened species were located, and feral animals noted, particularly camels. Anangu also gained experience in the use of field equipment and familiarity in the habitats supporting threatened fauna. Three species of conservation significance were recorded on camera, including Mallefowl (Nganamara), Brush Tailed Mulgara (Murtja) and the Striated Grasswren.

Opportunistic records were taken for a range of fauna, including birds, reptiles, and mammals. Several feral cat scats were collected from a remote part of the northern Spinifex area and since this area has not been surveyed before, the scats are proposed to be sent to a specialist to identify the prey remains within the scats (likely to detect a range of locally occurring fauna).

Spinifex Rangers also located several old nests constructed by the Lesser Stick-nest Rat (Tjualpi) and old scats attributable to the Black-footed Rock Wallaby (Warru) both currently presumed extinct from the GVD. The discovery of Warru scats, some of which looked quite "fresh", is particularly exciting as it indicates they have been there recently. How long ago we don't know yet but stay tuned for the next newsletter to find out.

Striated Grass Wren
Photo courtesy of Ebird

Brush Tailed Mulgara

The Spinifex Biodiversity Project has been set up to improve the understanding of biodiversity in the Great Victoria Desert by integrating Anangu traditional knowledge and scientific techniques. In the Spinifex Biodiversity Projects' initial six months, various field ecology activities were conducted; including community field surveys, camera deployments, training sessions, and feral animal control.

Lesser Stick Nest Rat Nest

Cave floor with Warru scats

As the project progresses, we are confident that key species central to the Trust are identified and documented leading to a greater understanding of the faunal complexities of the Great Victoria Desert.

Thanks to Adam Pennington for providing an update on this unique and important project.

Adam can be contacted through PNAC. gm@spinifex.org

Spinifex Land Management
Pila Nguru Aboriginal Corporation

Indigenous Desert Alliance Updates on the Great Victoria Desert Fire Project

The Trust has continued to support Indigenous-led fire management in 2023 through its partnership with the Indigenous Desert Alliance (IDA), who represents desert based Indigenous Land Management Organisations (ILMOs) and assists them with specialised operational support. This year, the partnership's GVD Indigenous Fire Project facilitated on-country fire management activities with three ILMOs in the region, including:

- Yilka Heritage and Land Care (representing Yilka Traditional owners)
- Spinifex Land Management (representing Spinifex and Pilki Traditional Owners) and;
- Ngaanyatjarra Council (representing Ngaanyatjarra Traditional Owners).

This support saw IDA conduct two pilots of an in-development ground burning training course with the Spinifex and Yilka ranger teams. The training events provided an opportunity for rangers to develop fine scale ground burning skills aimed at protecting important cultural and ecological assets.

The project also contributed to the coordination of multiple landscape scale burning activities in the region. With this targeted support, the Yilka rangers conducted their first aerial burning trip ever and the Ngaanyatjarra rangers did their first aerial burning since 2018.

The project also assisted Spinifex rangers to undertake cultural mapping work that is essential to realising desired fire outcomes for Anangu.

Ground burning training with Yilka Heritage and Land Care

Ngaanyatjarra TOs, Ernest Bennett and Brett Jennings, preparing for aerial burning at Milpiltjarra

The successful delivery of these important capacity building activities marks a significant step towards implementing a fire regime that produces positive outcomes for biodiversity, culture and communities in the GVD.

Dan Johanson is the Desert Programs Operations Manager with the IDA and can be contacted at danjohanson@indigenousdesertalliance.com

On-country burning
All photos courtesy of the IDA

Staff Updates Within the GVDBT and Management Panel

2023 has seen some major changes within the Trust with Kathryn Sinclair resigning after nine years as the Operations Manager.

Kathryn has been with the Trust since its inception and instrumental in defining and and guiding the direction of all operations and projects resulting in a greater understanding of the biodiversity and nuances of the Great Victoria Desert

We wish Kathryn all the best with her new ventures.

Sean Tomlinson has resigned from the Technical Biodiversity position and has accepted a role with the Remote Sensing and Spatial Analysis Program with DBCA based in Kensington.

Sean's knowledge and input into a greater understanding of Sandhill Dunnart habitat and conservation outcomes has been an invaluable asset for the Trust.

Mark Cowan has also resigned from DBCA and the Management Panel and has taken a role with Curtin University as a Senior Research Fellow with the Biodiversity and Environmental Science Program.

With the Trust's collaboration with Curtin University we look forward to ongoing partnerships with the program and Mark.

Ian Anderson has taken on the role of Operations Manager for the Trust since July 2023.

Ian was previously with DBCA for 22 years working throughout the state in operational roles ranging from Shark Bay, Exmouth, the mid west and the south west.

His experience throughout both marine and terrestrial conservation estate will allow him to guide the Trust into the future and contribute to the great work achieved by his predecessors and gain a greater understanding of the Great Victoria Desert.

Ian, looking at biodiversity projects in Indonesia.

Contact the Trust

If you have any GVD research, updates or stories, please forward them to the Trust to share with key stakeholders via the Trust website and newsletters. Thank you to everyone who has contributed so far. If you would like to donate to or partner with the Trust, please contact Ian Anderson on 0448 137 989 or ian.anderson@gvdbiodiversitytrust.org.au