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The latest news from the Great Victoria Desert...

Welcome to the 2020 edition of the Great Victoria Desert Biodiversity Trust (GVDBT) Newsletter.

What a year 2020 has been so far. There's no over stating how turbulent it has been, resulting in many changes. Despite the challenges the Trust has completed three major projects and another two have commenced.

Firstly, an update to the Sandhill Dunnart survey and monitoring guidelines (first produced in 2016) now includes new records and information as a standard operating procedure that can be useful for surveys to detect this cryptic species. More information on the guidelines can be found on page 2.

Another key project was the ground-truthing of Malleefowl mounds detected from the LIDAR survey (page 3). The results have important implications for the understanding of Malleefowl in arid areas such as the GVD as well as understanding the effectiveness of LiDAR in detecting mounds.

The Trust also funded DBCA to use Landsat to spatially map the fire scar history of the Shield and Central subregions of the GVD. This information offers a higher resolution accuracy to previously-available (coarser resolution) NAFI data and can be used to produce a variety of fire attribute statistics. It can be accessed online by practitioners to assist with their ground operations when planning prescribed burns. Read more about this exciting project on page 4.

Wildfire and predation by feral animals are the two biggest contributors to the loss of biodiversity in the GVD. The Trust is currently planning to undertake a 'Landscape Conservation Initiative' to determine how the management of these threats can improve biodiversity. As the first stage of this project, the 'Fire and Introduced Predator Management Plan' was developed. This Plan sets the context and parameters to undertake prescribed patch burns in a management area as a way of creating a mosaic pattern in the landscape. Read more about the Landscape

Conservation Initiative on page 5. On ground work commenced as part of this project, including undertaking road side burns on the intended management area (page 6).

Finally, the Trust has undergone some changes in its key personnel. The Trust welcomed a new board member to the Management Panel, Mark Cowan, and Stephen van Leeuwen became a member of the Technical Advisory Panel. Most recently the Trust has welcomed Jaume Rusalleda Alvarez to the team, who brings in GIS and Remote Sensing skills and will be providing assistance across several projects (meet Jaume on page 7). Finally the Trust would like to thank Dr Dorian Moro who covered the Operations Manager role for Kathryn Sinclair whilst she was on maternity leave. Thanks for all your hard work Dorian and good luck in the exciting new role you've undertaken

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 Trust, please contact the Operations Manager, Kathryn Sinclair on kathryn.sinclair@gvdbiodiversitytrust.org.au.

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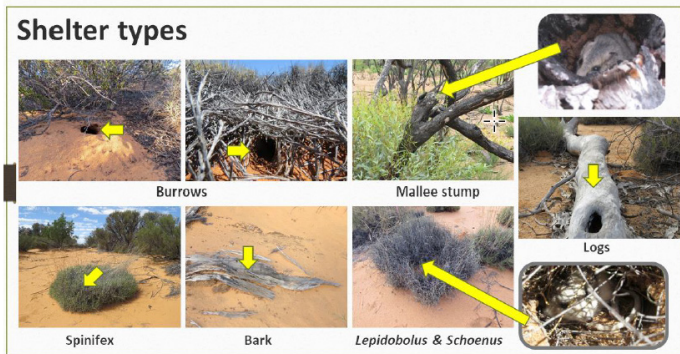


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Jaume Rusalleda Alvarez - Technical Biodiversity Officer



Sandhill Dunnart surey and monitoring guidelines - update

Since the 2016 Sandhill Dunnart survey and monitoring guidelines were developed, there has been considerable research and surveys into the Sandhill Dunnart in the GVD.



Sandhill Dunnart shelter types, Riley & Turpin, 2019.



Sandhill Dunnarts next to lure. Markings on the lure help determine the size of detected animals.

This has resulted in a substantial increase in records for the species and knowledge of the species' ecology and detection approaches.

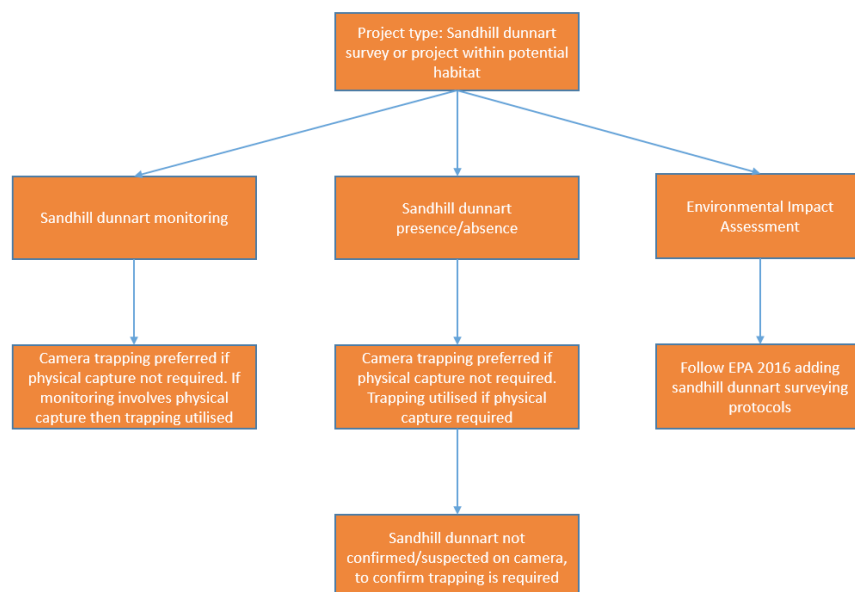
In January 2020 GHD completed a review of the guidelines, the number of SHD records between 2016 and 2020 increased from 63 to 138 captures.

These guidelines include additional research and operational methods for targeted surveys and monitoring of Sandhill Dunnarts. One of the key updates was related to camera usage to detect the species. The Trust

currently has 64 Reconyx cameras and the update in the revised guidelines provide a high level of detail on camera establishment and set up for Sandhill Dunnarts.

A flow chart summarises decision making on what technique is required under different circumstances.

The Trust will continue to ensure that all fauna trapping surveys we conduct in the GVD use the guidelines as a basis for pitfall trapping and camera trapping. This will give us the best opportunity to detect Sandhill Dunnarts, if they are present in an area.



Malleefowl mound ground-truthing

In July 2020 the Trust commissioned the national Malleefowl Recovery Group to ground truth the results of a Light Detection and Ranging (LiDAR) survey undertaken in 2019.

The LiDAR of the GVD had detected over 124 mounds ranked as 1 and 2 and over 23,500 ranked as category 3 or 4. These classifications suggest that categories 1 and 2 are highly likely to be Malleefowl mounds, whereas categories 3 and 4 have some resemblance to a mound but are less likely to be a mound. A small team, led by Joe Benshemesh and Graeme Tonkin, examined mounds across all four categories with a focus on category 1 and 2 mounds. Overall 165 LiDAR points were assessed including 71 category 1 points, 10 category 2 points, 24 category 3 points and 60 category 4 points.

The accuracy of these categories is described in the table below.

Category Type	Number searched	Mounds confirmed
1	71	99%
2	10	80%
3	24	4%
4	60	2%

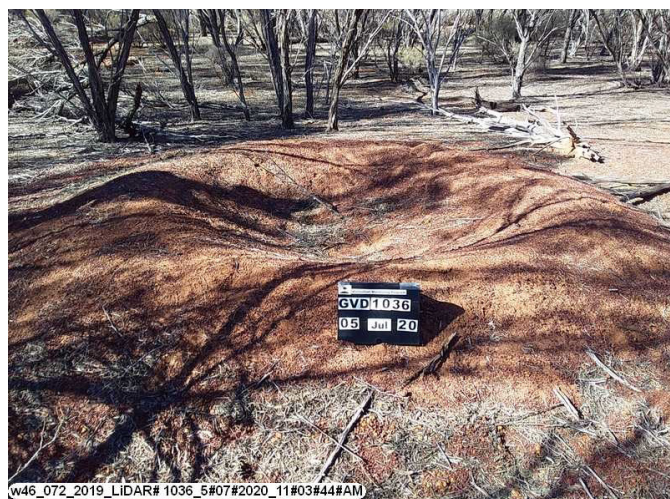
The National Malleefowl Recovery Group (NMRG) also detected an additional two mounds that were within the LiDAR corridors, that had not been detected through LiDAR. These mounds were both small and lower in height than many of the other mounds detected through the LiDAR process.

A total of 82 Malleefowl mounds were detected and one Malleefowl was seen. None of the mounds were 'active' in terms of containing eggs however 10 mounds, 12%, showed fresh or recent (within the past year) evidence

of Malleefowl. It was estimated that an additional 14 mounds were regarded as having been used by Malleefowl within the past 2-5 years. The NMRG found that the most common cause for the false positive was naturally occurring elevations in substrate caused by tree roots or shrubs.

Whilst no active mounds were detected in this project, the project outcomes have resulted in some significant knowledge gains about Malleefowl in the region. Firstly, the accuracy of LiDAR has been confirmed. This ground truthing project has demonstrated that mounds categorised as 1 and 2 have a very high likelihood of being mounds. This project has also demonstrated that LiDAR will fail to detect some mounds in a search area, primarily if the mounds have a low height. Malleefowl typically re-use higher mounds, so potentially the failure of LiDAR to detect low mounds is less significant in terms of monitoring.

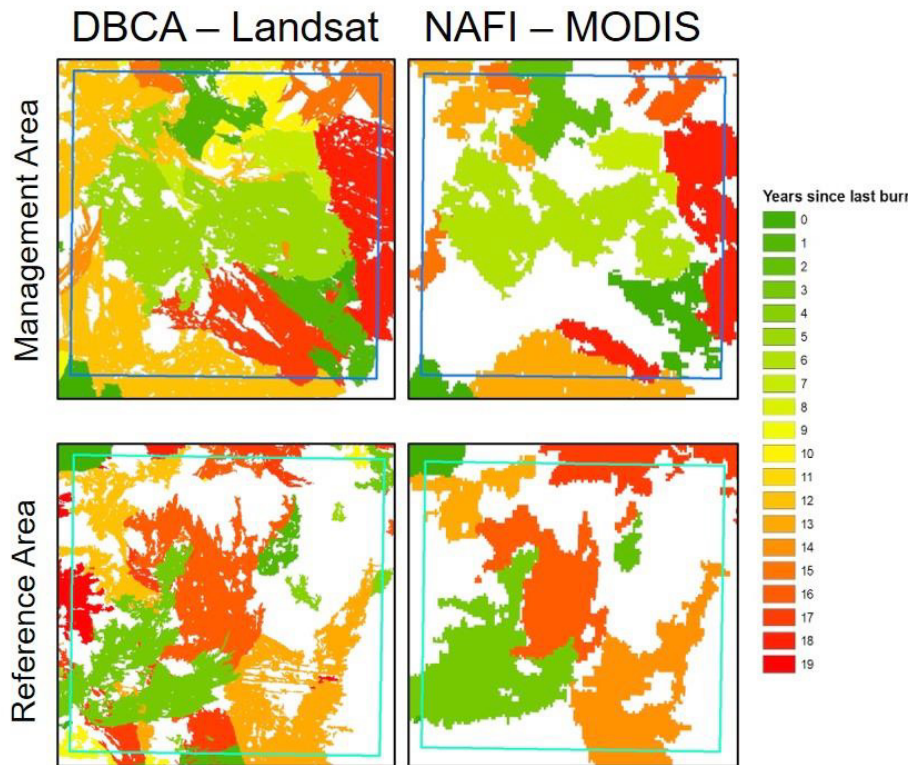
Another significant outcome of this project is the number of mounds with some level of Malleefowl activity. The last few years have been very dry in the GVD and the NMRG reported that mounds were often found in areas with a hard crust which is not suitable for tracking Malleefowl. In addition, the limited rainfall has resulted in the almost complete absence of herbs or fresh plant germination, which are the primary food for Malleefowl. Despite these conditions, the evidence of Malleefowl indicates that the species is persisting and may increase during better rainfall periods.



The likely Malleefowl mound.

Fire scar mapping

In the GVD, the only fire mapping available is from the Northern Australian Fire Information (NAFI) remote sensing service. Whilst this data is extremely useful for information related to the timing of fires and broad scale information on fire size, it tends to miss some fires, which affects the accuracy of fire history maps, and could have a detrimental effect on fire management operations on the ground.



Differences between Landsat & NAFI (Modis) across areas in the GVD.

To address this issue, the Trust commissioned the DBCA remote sensing team to conduct fire scar spatial mapping of the Western Australian part of the GVD for the years 1995 to 2019 using Landsat imagery (see difference image above). This would give the Trust, and anyone operating in the GVD, access to high level (30 metre accuracy) information including much greater accuracy on long unburnt areas of the GVD.

Fire mapping was carried out using a methodology developed by DBCA using the eCognition software program. Fire scar maps derived from the Landsat data allow a number of statistics to be calculated. For example:

- Average burnt patch size for each IBRA region.
- Years since last burn for each IBRA region.
- Proportion of vegetation age classes according to years since last burn.

- Frequency distribution of fire size classes.
- Proportion of studied area burnt in different fire size classes.
- Mean, median, minimum and maximum fire areas.
- Fire frequency for each IBRA region.
- Fire interval for each IBRA region (Figures 4a, 4b).

Having this baseline information was vital in the designing of the Management area and reference area for the Landscape Conservation Initiative (see next story). The Trust intends to continue to fund this fire mapping for 2020 to keep up-to-date information on fire scars in the region.



Landscape Conservation Initiative

The Trust is undertaking an exciting initiative to determine the impacts of fire on biodiversity - the Landscape Conservation Initiative.



Edging the management area. Photo by Chris Curtis.

This project will compare two areas, a managed area and a reference area. Both areas will be monitored for baseline statistics including a pitfall trapping fauna survey, camera survey and Malleefowl long walks.

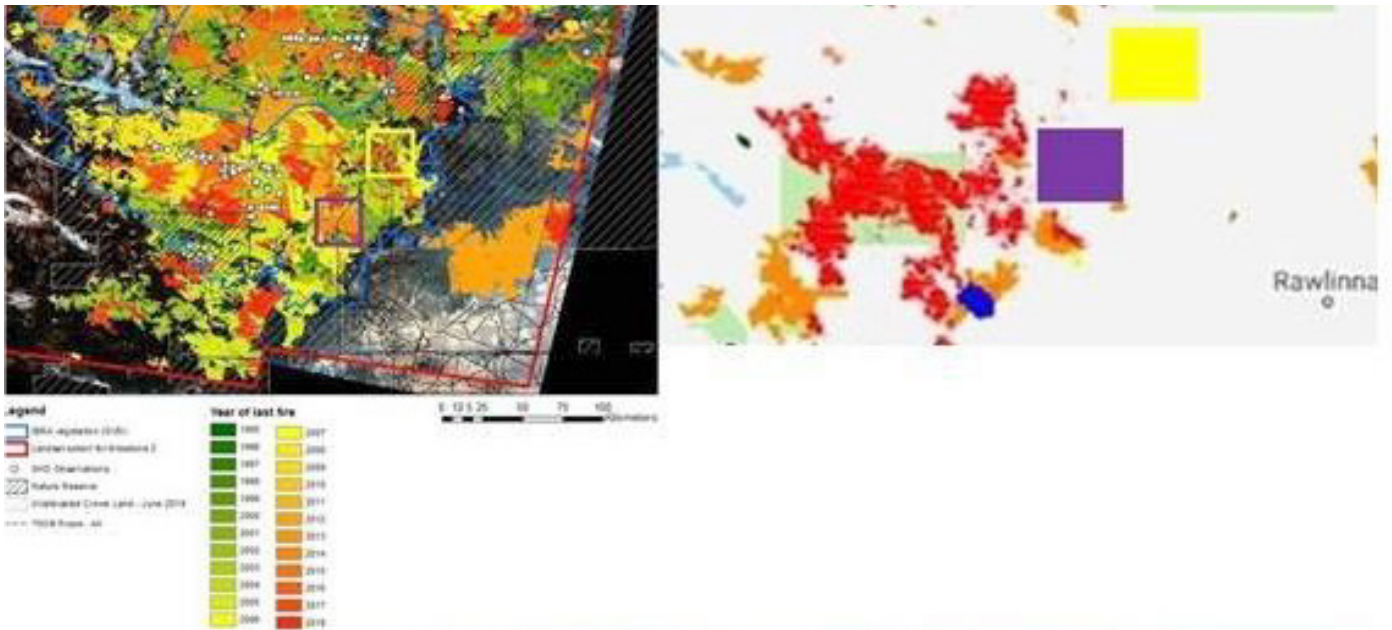
Additionally, fire in these two areas, as well as three other reference areas, will be monitored with Landsat imagery through the method developed by DBCA.

The fire management activities will then take place across the management area, over a period of time, with the aim of emulating traditional cultural burn practices and creating a mosaic fire scar pattern which will both limit the capacity of wildfire to destroy the entire landscape and create diverse vegetation age and structure to encourage rich biodiversity.

To ensure this burning is conducted in a logical and appropriate manner, the Trust commissioned Neil Burrows to create Fire and Feral Predator management plan. This plan lays out, very thoroughly, how burns should be conducted and the percentage of area that should be burnt each year to create the mosaic effect. Neil also selected the management and reference area, based on a large number of parameters including the current fire ages of the landscapes and the broad scale vegetation cover.

The aim is to work with the Traditional Owners to conduct cultural burns which will encourage biodiversity and will respect cultural traditions and areas of cultural significance.

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Proposed project areas (yellow=Reference area; purple=Management area) with fire history as at December 2018. Proposed project areas in relation to summer 2019 bushfires. (Bottom) Proposed 32 km x 32 km project areas location map.

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In July 2020 the Goldfields Regional DBCA team undertook some initial burns, to establish some road breaks within the management area. It is hoped that these initial burns may help reduce the scale of some of the summer wildfires which otherwise may impact the area over the 2020/2021 summer period.

Before a burning program is designed, the Trust has commissioned GHD to undertake baseline fauna surveys in the management and reference areas. These surveys will take place in Spring 2020 and Autumn 2021 and provide a baseline of species at each site. For more information contact Kathryn at:

Kathryn.sinclair@gvdbiodiversitytrust.org.au

Meet new Technical Biodiversity Officer - Jaume Rusalleda Alvarez



1. What's your background/qualifications/employment history?

I am a Conservation Biologist with a background in GIS and Remote Sensing. I have a BSc in Biology, an MSc in Biodiversity Evolution and Conservation, an MSc in GIS and Remote Sensing, and I am currently in the 3rd year of my PhD degree at UWA (Near-surface remote sensing of plant condition in a restored mine site).

2. What have been some of the most rewarding aspects of your career?

I have a 5 year experience in the non-profit sector (2011-2016) in an NGO in Belize (Central America), focusing on forest conservation through protected area management and community development work. Recently, I have also worked as a research officer in the Remote Sensing and Spatial Analysis program at the Department of Biodiversity, Conservation and Attractions, looking at forest health assessments in the Northern Jarrah Forest and generating the fire scar history for the Great Victoria Desert (1995-2019), in collaboration with the GVDBT.

3. What made you decide to move to Perth?

My family and I moved to Perth 4 years ago, when my wife got a scholarship to pursue a PhD in Marine Biology at Curtin University. I didn't know much about this part of the world before coming here, but through our experiences visiting different parts of the state and through my studies at UWA, I have gotten to know WA's amazing natural environment a bit better. I hope to contribute to protect it through my new role with the

GVDBT.

4. What's your interest in the GVD?

The GVD is a dynamic landscape in which fire plays a major role. I am interested in applying GIS and remote sensing tools to contribute to improved fire management in the GVD to conserve this region's flora and fauna.

5. What do you think is the biggest challenge facing the GVD or arid environments and what do you think the Trust can do to help combat this?

The combination of increased temperatures and sporadic but intense rainfall patterns predicted for the GVD in the coming decades, together with a lack of fire management, set the perfect conditions for very extensive and very hot fires. Through the GVDBT's Landscape Conservation Initiative, and in close collaboration with Traditional Owners in the region, we aim to resume managed burn activities in the GVD to create a mosaic-like landscape in terms of vegetation age that will prevent the spread of fires. This should help to protect long-unburnt vegetation patches (which are important to species such as the Sandhill Dunnart and the malleefowl) and to create a diverse habitat that can sustain high levels of biodiversity.

6. Any quirky interest or interesting facts about yourself that you'd be happy to share with the world, or GVD newsletter readers at least?

As a child, my dad and I would very often go fishing in the Mediterranean Sea and collecting wild mushrooms in the oak forests of Catalonia (north-eastern Spain), where I grew up. I think those experiences were the seeds of my interest in nature and in conserving it for future generations.

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's 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 the Trust's Kathryn Sinclair on 0407 143893 or kathryn.sinclair@gvdbiodiversitytrust.org.au