



GVD Landscape Conservation Initiative: Project Plan 2020-2025

Proponent: GVD Biodiversity Trust

1. EXECUTIVE SUMMARY

The Great Victoria Desert bioregion remains a remote area in Western Australia.

In 2014 the Great Victoria Desert (GVD) Biodiversity Trust was established. The purpose of the Trust is 'Conserving and increasing knowledge of biodiversity in the Great Victoria Desert'. A GVD Landscape Conservation Initiative (LCI) is proposed by the Trust. The LCI is one of a number of projects funded by the Trust to achieve this mission. Specifically, this LCI contributes to the GVDBT's mission by managing fire and reducing predation pressure by introduced predators. Fauna recovery will focus specifically on providing and protecting adequate sandhill dunnart (*Sminthopsis psammophila*) and malleefowl (*Leipoa ocellata*) habitat at appropriate temporal and spatial scales. These species are of special interest because they are threatened, extant in the project area, vulnerable to inappropriate fire regimes and predation, and are likely indicators of ecosystem health.

This document outlines a Project Plan to trial integrated landscape management in the south-west of the GVD focusing on prescribed 'right-way' burns and (contingent on available funding) introduced predator control. In addition it proposes to monitor the effectiveness of management by investigating the response of biodiversity (e.g. small mammals, including sandhill dunnarts, reptiles, malleefowl activity), and introduced predators including other feral species observed, before and after land management activities (fire/baiting) over an initial 5-year period. Monitoring will be compared between paired landscapes (one managed and one unmanaged/reference) in the GVD. The design of the management, and monitoring, will be incorporated into separate documents and are not part of this (strategic) Project Plan.

By implementing land management using fire and predator control, and collecting monitoring information, this trial will provide an evidence-base to understand and quantify the benefits of prescribed (small-scale) burning – later combined with introduced predator control - on biodiversity with a view to translate positive management benefits to biodiversity elsewhere in the GVD.

This Project Plan aligns to the direction of the GVD Adaptive Management Implementation Plan which was developed by community stakeholders across the GVD. The Trust is

particularly keen to partner with indigenous landholders in the region as well as operators with an expertise in undertaking the management and monitoring programs.

2. PROJECT OBJECTIVE AND QUESTIONS

The Landscape Conservation Initiative (LCI) objective is to reduce the extent and intensity of wildfires, and the impacts of invasive animals on threatened species, by monitoring the effectiveness of managed fire.

Key questions:

- 1) How effective is patch burning for protecting species with fire sensitive habitats from regular damaging, large, 'hot' bushfires over the short-term (e.g. 5 years)?
- 2) How effective is patch burning coupled with introduced predator control at benefiting the biodiversity over the short-term (e.g. 5 years)?
- 3) What will be the response of introduced predators to an annual control program?

4. HYPOTHESIS

The LCI is based on the premise, or hypothesis under test in this adaptive management program, that the combination of large fires that destroy habitat and expose animals to predation by introduced predators increases the risk of local extinction of fauna with late-seral habitat requirements such as sandhill dunnarts and malleefowl.

Therefore, good fire management - and a reduction in the density of introduced predators - should result in an increase in the density and distribution of native fauna.

Increased burns of smaller size (relative to the scale of current wildfires) - as was the practice of the Tradition Owners - together with a level of introduced predator control, should benefit the biodiversity in a landscape of the GVD by retaining structurally-diverse habitats and therefore improving refugia for fauna.

3. BACKGROUND

Altered fire regimes and predation by introduced predators (feral cats and foxes) have been implicated in the recent (post-European settlement) decline of arid zone fauna, with medium-size mammals and some bird and reptile species most severely affected. While predation by introduced predators is most likely the primary cause of declines, this has been exacerbated by highly altered fire regimes.

In 2019 the GVD Trust held presentations and workshop on two of the threatened species in the GVD: the sandhill dunnart and malleefowl. The Research and Management Plans (RAMP) developed for sandhill dunnarts and malleefowl recognised that fire and introduced predators (primarily feral cats) were important to manage to reduce the threats to these species. Intense spring and summer bushfires destroy habitat structure and diversity and temporarily removes vegetation cover over very large areas, exposing these and other fauna to predation.

This Project Plan builds on the findings of the RAMPS to scope and develop an approach to trial a landscape-scale initiative in the GVD that manages fire, and where resources allow, introduced predators (primarily feral cats) in the GVD.

A GVD Landscape Conservation Initiative (LCI) is therefore proposed by the GVD Trust. This Project Plan provides an overview of the LCI. However, the details of the design of programs associated with the LCI project location, including threat management plans, and a monitoring design and methodology, are planned as separate documents.

By planning for trialling management for fire and feral predator control at a landscape scale, the Trust has the ability to investigate whether prescribed burning followed by introduced predator control benefits sandhill dunnarts and malleefowl. Evidence that these management actions have positive benefits to these target species (including broader benefits to biodiversity) will support efforts to expand planned fire and introduced predator control elsewhere in the GVD.

5. PROJECT PLAN LINKS TO GVD BIODIVERSITY TRUST DOCUMENTS

This LCI trial supports:

1) Trust Deed Purpose

Facilitating and/or undertaking research and development, environmental education and on-ground conservation and rehabilitation work to benefit the Trust Area during and after the life of the Project.

2) Trust Deed Objective

- Facilitate and/or priority research and development identified in the Plan at the landscape level and into threatened species including species considered to be of National Environmental Significance (NES) under the EPBC Act.
- Fund on-ground environmental and conservation management at the landscape level, with emphasis on net conservation benefits to threatened species including those considered of NES under the EPBC Act.
- Facilitate Indigenous involvement in land management and conservation activities in support of the above objectives.

3) GVD Adaptive Management Implementation Plan (Part B-work plan, hereafter AIM) objectives for managing :

- a) Introduced predators and 'at risk' fauna and
- b) Waru (fire),

5. PROJECT PLAN SCOPE

The LCI focuses on three management actions: diversification of habitat by patch burning, introduced predator (feral cat) control, and feral herbivore (camel) control as required. The effectiveness of these management actions will be assessed by a monitoring program. Research will be implemented as required to address knowledge gaps as these arise.

The LCI management area would be paired with a near-equivalent reference (unmanaged) area in the GVD.

5. PROJECT MEASURES

Landscape Conservation Initiative measures	
Target	Maintain biodiversity across the landscape.
Outcome	• Reduce the likelihood of habitat loss for SHD and MF through habitat management. • Improve the conservation security of SHD and MF to persist in managed habitat.
Objective	• Demonstrate the effectiveness of managed fire to protect threatened species (MF, SHD). • TO and schools education/training/knowledge exchange.
Strategy	Two areas will be managed and monitored, each of approximately 100,000 ha 1) a management (treatment) area involving prescribed burns to reduce the scale and frequency of large wildfires, and introduced predator baiting to reduce the impact of introduced predators to threatened species including species considered to be of National Environmental Significance under the EPBC Act; 2) a reference area (no management). Targeted monitoring (landscape level, habitat level, targeted fauna, feral species) will assess the effectiveness of management over time compared to the reference area.
Actions	Fire management and (future) introduced predator/camel control are planned as the key management activities for the managed area.
Monitoring	Several components of the landscape sensitive to threats from fire and ferals are proposed to be used to evaluate the effectiveness of management: 1. the fire regime and history of the area 2. the condition of vegetation as habitat, including extent of vegetation cover 3. the diversity of fauna (including sandhill dunnarts) 4. the activity of malleefowl at mounds 5. the activity of predators
Indicators	Indicators will assess the condition of the environment and be used to compare the effectiveness of land management actions between the managed area relative to the unmanaged area: 1. Fire regime: scale, season, diversity of seral stages. 2. Sand hill dunnart (including other small mammal, reptile and birds) species richness, relative abundance and/or other index of activity. 3. Level of activity of malleefowl mounds. 4. Relative abundance and/or other index of activity of ferals.

Measures of success	The LCI will be successful on three focus areas: 1) Monitoring shows that prescribed burning diversifies landscape vegetation in the GVD. 2) Demonstration that prescribed burning reduces the severity (size and intensity) of bushfires in the landscape relative to unmanaged areas. 3) Monitoring shows that activity of malleefowl, and occurrence of sandhill dunnarts, are maintained or improved within the managed landscape compared to a reference landscape. 4) Control of feral animals is shown to have a sustained reduction in activity and/or abundance of feral cats and feral camels.
Timescale	The project aims to be conducted over an initial assessment period of 5 years with a 10-year plan in mind.

6. MANAGEMENT PROPOSED

6.1 FIRE MANAGEMENT

The intent of fire management is to interrupt the cycle of large, hot season bushfires, and to diversify the landscape and vegetation to accommodate a variety of fire ages, and reduce the risks of large bushfires across the landscape.

A Fire Management Plan (Burrows 2020) will provide the scope and context to implement an operational burn program.

6.2. FERAL ANIMAL CONTROL [CONTINGENT ON AVAILABLE FUNDING]

There is scientific evidence to suggest that fire opens the landscape up to increased predation by introduced predators on native fauna. Predation by feral cats and foxes has also been demonstrated to threaten the survival of many ground-dwelling native species persisting at low population densities. Predation is one of the major obstacles to the reconstruction of faunal communities. The suppression of introduced predators is therefore a critical component of successful land management for biodiversity, fauna recovery or the maintenance of populations of small to medium-sized native fauna.

The intent of introduced predator control in the management area is to deploy 1080 baits to primarily control feral cats soon after prescribed burning to reduce the predation pressure on native (and rare) fauna, such as sandhill dunnarts and malleefowl.

A Management Plan for Introduced Predators (Burrows 2020) will provide the scope and context to implement an operational monitoring and baiting program. The program will involve feral cat technical specialists and managers to advise, plan and implement (under approved permits, risk assessments, and registrations) a prescribed introduced predator monitoring and control program.

Feral camels also occur across the GVD. The AMIP for the GVD recognises the damage large mobs of camels do to waterholes, and their impacts to vegetation is likely to be high in times of drought when fresh growth is scarce. A camel control program, while in scope of

the LCI, will need to consider the scale of control required, if any, in context of the climatic conditions at the time.

7. MONITORING MANAGEMENT EFFECTIVENESS

The effectiveness of management (planned fire, in the first instance) will be assessed as an 'impact' on the landscape's biodiversity (fauna and vegetation).

Monitoring aims to assess the response of vegetation at the landscape and habitat scale on sustaining and encouraging fauna to the area, relative to an unmanaged landscape.

Monitoring will involve technical specialists with experience at monitoring vegetation change using remote sensing analyses, but also vegetation variables on the ground. Additional targeted monitoring will proceed for threatened fauna (sandhill dunnarts and other late-seral species) and malleefowl (using mound activity as an index of persistence) using standard protocols. Feral species (predators, herbivores) will be monitored in tandem to native species using suitable survey approaches.

7.1 Landscape monitoring

Remote sensing will be used to monitor broad and fine landscape-scale vegetation change over time. Its advantage is there is less need to over-sample the vegetation on the ground, and can observe broader-scale changes in the landscape following fire management.

To monitor the vegetation as habitat in the GVD the development of remote sensing methodologies is required to represent the variations in landscapes and vegetation cover present. Broadly this relates to monitoring mulga and spinifex communities to evaluate the effectiveness of the land management. To appropriately monitor these it is likely that different remote sensing algorithms will be required due to how different vegetation structures are observed by the satellite sensors, and the levels of acceptable change. The spinifex grasslands experience more dynamic changes to vegetation cover due to rainfall and fire and so require appropriate measures to monitor the range of seral states and vegetation cover density as compared to more stable locations of mulga.

Broad scale (Landsat) remote sensing analyses will be used for fire scar mapping, and for analysing broad fire attributes. However, fine scale (Sentinel-2? Other?) remote sensing analyses will be useful for analysing change in patterns and signatures such as cover and greenness of vegetation. Examples of variables to compare over time include: derived fire mosaic attributes (eg time since last fire, fire frequency, frequency of late hot season fires, diversity of post-fire ages in 3 km radius, spatial extent of recently burnt, intermediate and long unburnt habitat); Fuel age distribution graphs; Updated fire history mapping.

Climate variables (locally-installed rainfall and temp weather stations) will be installed to provide local weather conditions at both landscapes which can be useful to interpret changes observed to vegetation parameters over time.

7.2 Habitat monitoring

Monitoring habitat and its condition will have an emphasis on habitat attributes known to be affected by fire and large herbivores and/or which may influence sandhill dunnarts and malleefowl.

‘AusPlots’ and/or SLATS Rangelands protocols and plots (vegetation and soils, 1 ha plots) provide a scientifically-accepted protocol for collecting data to assess land cover change. Habitat will be stratified into four seral groups based on fire history gained from spatial mapping of fire history in the GVD:

- <6 yrs (recently burnt);
- 6-12 years since fire;
- >12 to <24 years since fire;
- 24 yrs since fire.

7.3 Focus monitoring –threatened species

Monitoring will have an emphasis on threatened species including species considered to be of National Environmental Significance under the EPBC Act which the Trust objectives target (ie sandhill dunnarts and malleefowl).

Targeted monitoring for sandhill dunnarts will identify suitable habitat and species occurrence. Sandhill dunnarts will be monitored using standard protocols for this species in the WA GVD. Monitoring will also provide broader information for other ground-dwelling fauna (mammals/reptiles/birds).

Malleefowl mounds will be identified in the landscape for location, and level of activity. Mounds will be monitored over time as a proxy for adult persistence using standard the protocols of the National Malleefowl Recovery Team.

7.4 Focus monitoring – feral species

The impacts of introduced predators, and particularly feral cats, on ground-dwelling fauna are recognised in Australia. Their impacts in the GVD remain unclear. However, both the Sandhill Dunnart Research and Management Plan (RAMP) and Malleefowl RAMP recognise feral cats as a key threat to these species. Furthermore, the AMIP also recognises that introduced predators are an important factor to manage in the GVD landscape.

In the GVD Bioregional Plan it is noted that ‘There is very little documentation of current populations or distributions of cats, foxes or dogs/dingos within the [GVD]. Most fauna surveys note evidence of feral predators, either as sightings or, more often, tracks and scats.’

Furthermore, the Plan notes that feral predators (cats/foxes) are a ‘very high’ threat to ‘at risk’ fauna, and that feral herbivores are a ‘high’ threat to ‘at risk’ fauna.

While predation by feral predators is a recognised threat, there is a lack of knowledge of (a) the level of threat they have on native fauna in the GVD and so the level of management required, and (b) the habitat/s used by introduced predators (in particular feral cats) in the GVD. Supporting strategic research in this area will optimise future baseline surveys and a management program for feral cats as part of this Landscape Conservation Initiative.

Specifically, research to provide evidence to understand the habitat/s (seral stages) of the landscape in the GVD that feral cats use, and the distances they travel, will go some way to optimise a design

for establishing a remote-camera array. Remote cameras can then be deployed at suitable distances apart to provide baseline data on feral cat abundance and/or densities. Feral cat management (baiting, trapping) can then be implemented focusing effort to those habitats used by feral cats, while monitoring using the camera array will determine the level of effectiveness of management of this species and its likely threat to 'at risk' fauna in the GVD.

8. PARTNERSHIPS

Traditional knowledge is an important aspect to manage fire in the GVD. The Trust recognises the opportunity the LCI proposal has for learning from, and training, Traditional Owners and Ranger teams including local schools to support on-country and two-way science involvement.

There is also scope to align monitoring programs with other national science programs (eg Adaptive Management Malleefowl Monitoring Program, AUSPLOTS Rangelands Protocol, BirdLife Protocol). These will help the Trust to understand national trends and to improve the interpretation of results of the GVD within a national context.

9. ASSUMPTIONS

1. This LCI is guided by advice from the GVD Biodiversity Technical Advisory Panel.
2. This LCI operational programs and associated budgets require endorsement from the GVD Biodiversity Management Panel.
3. On-ground activities will be progressed under contracts. It is envisaged that separate contracts be awarded for the following work scopes:
 - a. Fire management.
 - b. Feral cat management/control.
 - c. Monitoring (remote sensing).
 - d. Monitoring (habitat and targeted native fauna).
 - e. Research and Monitoring (feral cats).
4. Risks will be managed under contractor risk assessments approved by the GVD Biodiversity Trust.

10. SERVICE PROVIDERS

10.1 Management

1) Fire management

The Trust acknowledges the specific nature of infrastructure and specialists required to undertake prescribed burning. This work scope will be sole-sourced to the DBCA (Parks and Wildlife Branch in Kalgoorlie) with support from Traditional Owners and Custodians of the area where the trials occur. Fire technical specialists and managers from DBCA will – under contract - advise, plan and implement a prescribed patch burn program of predefined areas based on a Trust Fire Management Plan.

2) Introduced predator (Feral cat) management

Introduced predator control requires integrated actions: permits and approvals to use suitable poison baits, licenced personnel to handle the 1080 baits, suitable infrastructure to

store and manage the baits, potential for a dedicated fixed-winged aircraft to deploy baits at the correct frequency and distribution, and technical specialists who understand, have experience in, and exposure to, monitoring feral cats (among other predators such as wild dogs).

The Trust envisages that the baiting work scope be sole-sourced to DBCA (Biodiversity and Conservation Science) who hold the licences for the baits, have the expertise to deploy the baits, and can manage the necessary approvals.

10.2 Monitoring

a) Monitoring (remote sensing).

The Trust recommends a single contractor with remote sensing interpretation and spatial imagery expertise manages this monitoring annually as a desktop scope of work.

b) Monitoring (native fauna).

The Trust envisages that monitoring native fauna, with expertise sought for monitoring sandhill dunnarts and malleefowl mounds, be undertaken as a tendered scope of work.

c) Monitoring (feral cats).

Introduced predator monitoring requires technical specialists who understand, have experience in, and exposure to, monitoring introduced predators (particularly feral cats and foxes), and who can work with the necessary permits, welfare and trapping, to undertake the work. The Trust recommends a single contractor manages both the baiting and monitoring work scopes.