LANDSCOPE EXPEDITIONS
Working at the Frontier of Discovery

Expedition Briefing

(Main) *Calytrix strigosa*, one of many wildflowers that occur in the Murchison region. (Insets from left) Thundelarra Station Homestead; malleefowl (*Leipoa ocellata*); *Acacia grasbyi* exhibiting minirichie bark; and *Eremophila viscidat*, a declared rare plant in the Murchison region (photos – DEC).

A Brush with Nature

The Art of the Flower Hunters

Thundelarra

8–17 September 2008

Leaders:

Katrina Syme	Botanical Artist and Mycologist, Denmark
Daphne Edinger	Honorary Research Scientist, LANDSCOPE Expeditions, DEC, Perth
Bill Muir	Senior Technical Officer, DEC Science Division, Woodvale
Shane Heriot	Operations Officer Pastoral, DEC Midwest Region, Geraldton

This expedition is offered by LANDSCOPE, the Department of Environment and Conservation's (DEC's) quarterly magazine devoted to wildlife, conservation and environmental issues in Western Australia. LANDSCOPE Expeditions are run in association with UWA Extension, The University of Western Australia.

LANDSCOPE Expeditions - Working at the Frontier of Discovery

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Department of Environment and Conservation
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THE UNIVERSITY OF WESTERN AUSTRALIA

A Brush with Nature
The Art of the Flower Hunters

Thundelarra, Murchison Region, Western Australia
8 – 17 September 2008

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Gascoyne Murchison Strategy

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Mt Augustus NP
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Lands and Waters managed by the Department of Environment and Conservation, pre Gascoyne Murchison Strategy

Land acquired under the Gascoyne Murchison Strategy with financial assistance from the National Reserve System Program, up until May 2007

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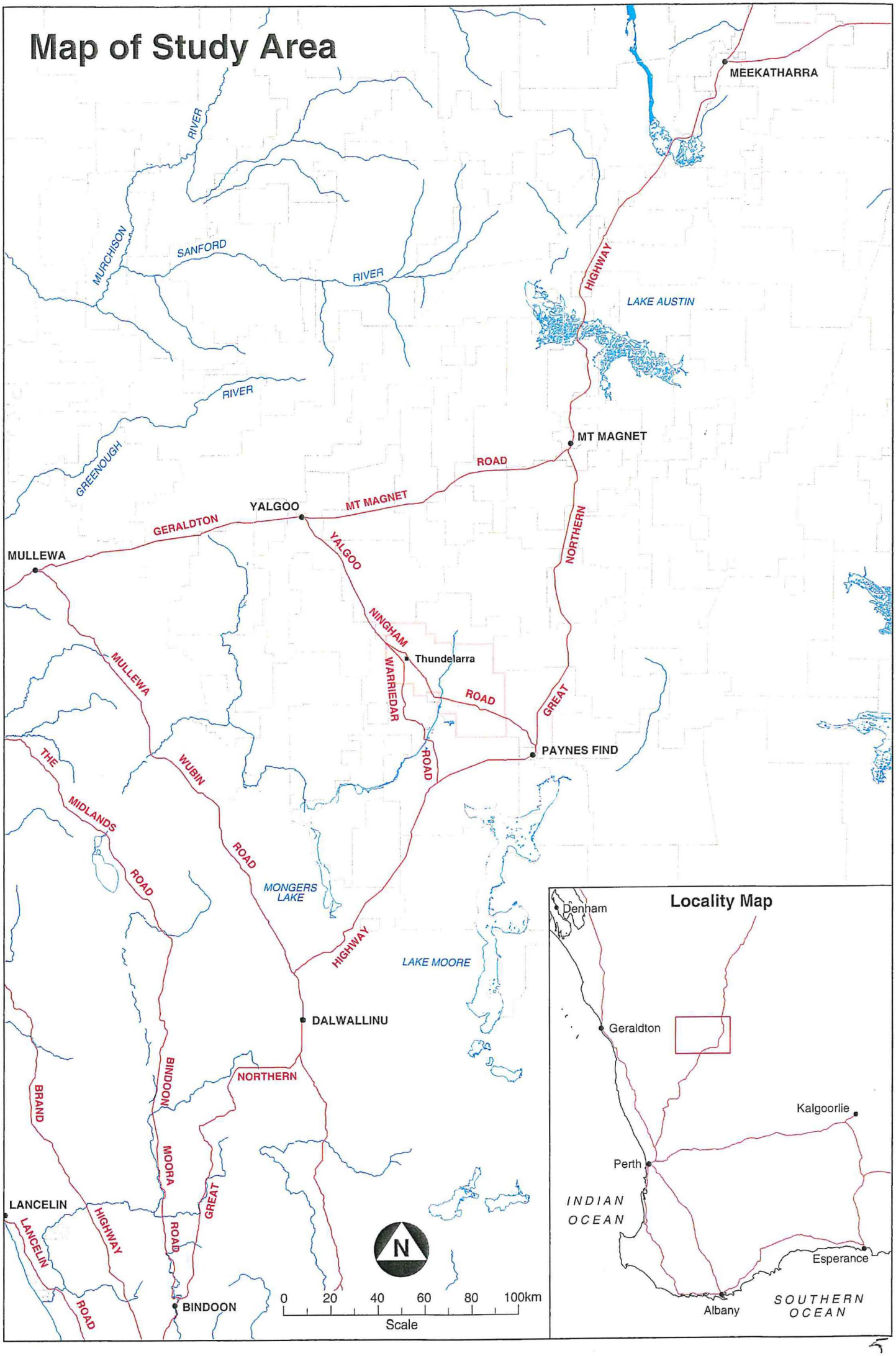
Map of Study Area
MEEKATHARRA
HIGHWAY
LAKE AUSTIN
MURCHISON
RIVER
SANFORD
RIVER
RIVER
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MT MAGNET
ROAD
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THE
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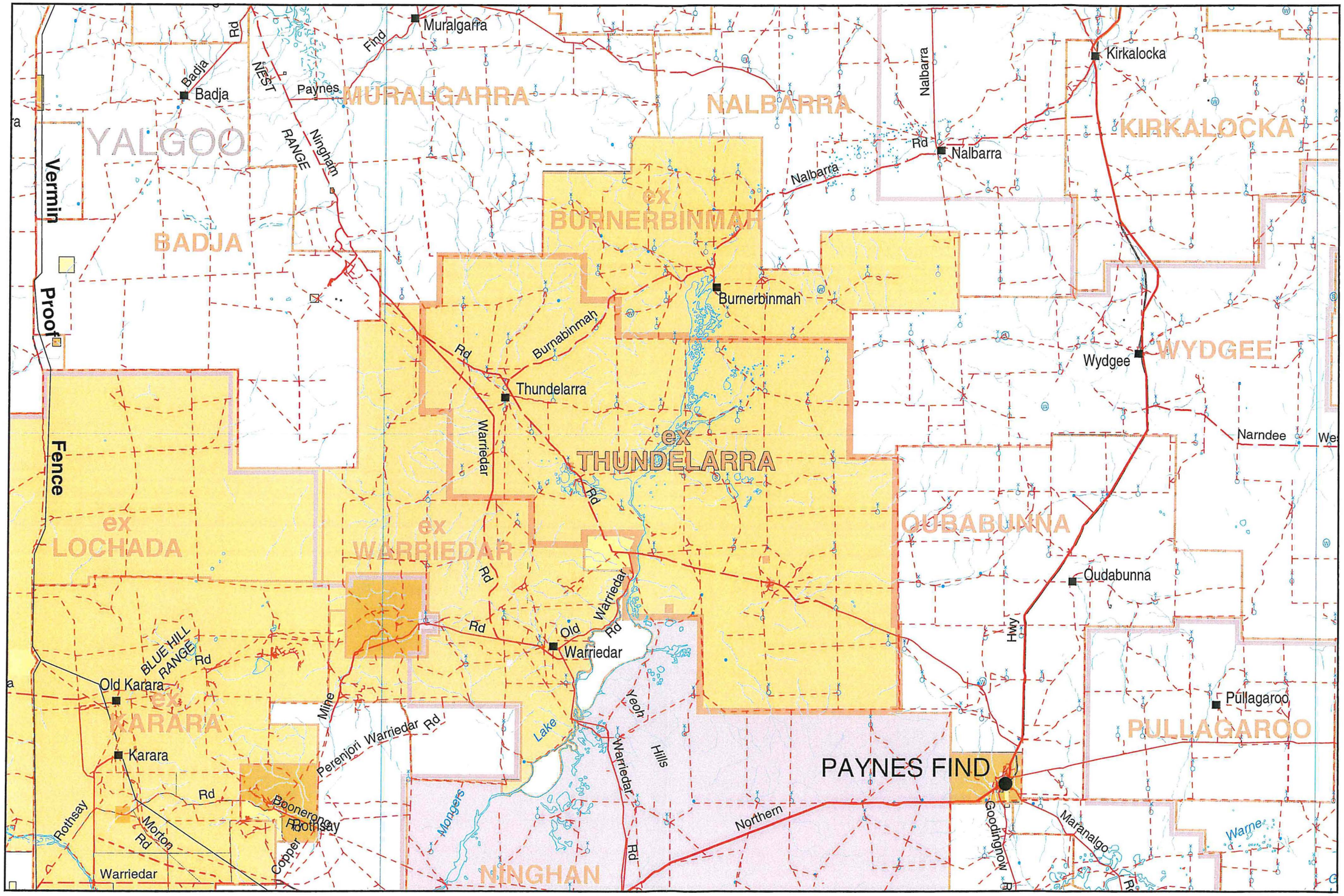
0 20 40 60 80 100km
Scale
Locality Map
Denham
Geraldton
Kalgoorlie
Perth
INDIAN
OCEAN
Esperance
Albany
SOUTHERN
OCEAN

Map of Thundelarra Station



Scale 1 : 400 000

0 20 40 100 km

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RESEARCH AREA

Thundelarra Station lies in the Yalgoo IBRA[1] region – a region that is a high priority for extending the conservation estate. Thundelarra is in the mid west region of Western Australian and is situated approximately 75 kilometres north west of Paynes Find (see map page 5). The 156 000 hectare ex-pastoral lease was purchased in 2007 as part of the Gascoyne Murchison Strategy (see appendix 4). It is an important parcel of land as it links the western and eastern section of a large conservation estate established by the purchase of several pastoral leases in the region by DEC since 1995.

The expedition will travel from Perth via The Great Northern Highway to Paynes Find and then via the Paynes Find – Thundelarra Rd to Thundelarra where the group will be accommodated in shared rooms in the visitor's quarters. The journey from Perth to Thundelarra is approximately 505 kilometres.

Adjoining the boundaries of Thundelarra are a number of stations which have also been purchased as part of the Gascoyne Murchison Strategy. Lochada, Warriedar, Karara and Burnabinmah pastoral leases are all now part of the conservation estate. Other pastoral stations that border the former Thundelarra pastoral lease are Badja, Muralgarra and Ninghan.

The property is divided in two by Mongers Lake, a 180 kilometre long salt lake chain that runs north east from near the town of Perenjori in the northern Western Australian wheatbelt. Thundelarra contains two significant upland areas; The Bullajungadeh Hills, or The Sisters as they are called locally, which rise from the western shores of Mongers Lake and Mount Pinyalling, which rises 500m above sea level and is visible from many kilometres away.

Vegetation

Thundelarra station lies in the Yalgoo sub-district of the Austin Botanical district in the Eremaean Botanical Province. The underlying geology influencing soils and vegetation is archean granite and gneiss with metamorphic rocks and dolerite intrusions. The surface is predominantly quaternary alluvial and aeolian sediments with granitic and lateritic outcrops.

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[1] **Interim Biogeographical Regionalisation for Australia (IBRA).** IBRA is a framework for conservation planning and sustainable resource management within a bioregional context. IBRA regions represent a landscape based approach to classifying the land surface from a range of continental data on environmental attributes. In 1999-2000, IBRA version 5 was developed. Eighty five (85) bioregions have been delineated, each reflecting a unifying set of major environmental influences which shape the occurrence of flora and fauna and their interaction with the physical environment. **The Value of IBRA as a Biogeographic Framework**. The National Reserve System for Australia is being developed through the use of IBRA as its planning framework. In 1997, a priority IBRA regions map was developed to assist organisations concerned with conservation planning and management issues. The IBRA regions were allocated a priority ranking of High, Medium or Low. These priority rankings relate to the potential value land reservation in those regions would add to the development of a comprehensive, adequate and representative Reserve System for Australia.

The main vegetation types supported by Thundelarra according to the vegetation mapping by J.S. Beard are all characterised by low scrub with scattered mulga. The dominant vegetation cover is *Acacia* and *Grevillia* species. The vegetation is in an average state which should improve due to de-stocking and the implementation of conservation initiatives.

Botanical research at Thundelarra has the following objectives;

- Undertake flora surveys to determine the occurrence, distribution and abundance of threatened flora, priority flora, or flora of regional significance.
- Protect areas on which threatened flora, priority flora, or flora of regional significance is known to exist.
- Map specific vegetation associations and recording of vegetation quality, to facilitate appropriate management and monitoring of the vegetation.
- Commence the establishment of a regional herbarium

The research undertaken by this LANDSCOPE Expedition will contribute to this ongoing process.

Native fauna

Little is known of the fauna of Thundelarra or surrounding areas as few systematic surveys have been conducted. Past surveys indicate that there are several priority native animal species in the Yalgoo IBRA regions, in which Thundelarra lies, that require habitat protection. These include the mulgara (*Dasycercus cristicauda*) and the western spiny tailed skink (*Egernia stokesii*) as well as several birds such as the mallee fowl (*Leipoa ocellata*), Carnaby's black cockatoo (*Calyptorhyncus latirostris*), Major Mitchell's cockatoo (*Cacutua leadbeateri*) and the peregrine falcon (*Falco peregrinus*).

THUNDELARRA HISTORY

In 1872, Donald McPherson registered the first pastoral lease in the area when he acquired 800 hectares of land near Pinyalling Springs, close to Mount Pinyalling. The following year, another lease was registered at Nangagetty Springs, about 15 kilometres to the east by the Cooke brothers, who had the local mail run and had a number of small land leases towards Geraldton which they used as camps whilst delivering the mail. The ruins of a very well built stone hut lies close to Nangagetty Springs. This may have been built for the Cookes or some years later for the Baron Rothchild Gold Mine.

The Eakins brothers then moved into the area, registering several leases surrounding the site of the current homestead. Thundelarra was doing extremely well under the management of Samuel Eakins, but in the late 1880's, a drought which lasted for many years forced Eakins out and the property came under the ownership of Frank Pearce. The property was not utilised and became deserted. Pearce later sold it to Alexander Beaton, who had made a fortune in gold in the Pilbara.

Beaton bought a great deal of land around Cue of which Thundelarra was a part. His son, John Beaton, settled there and the station thrived on the back of several favourable seasons and Beaton's money, reaching a peak of 28 500 head of sheep in 1928.

The Beatons retained the property until it was taken over by the Morrissey family in 1963. They upgraded the old homestead to its former glory with the assistance of an Italian stonemason who replaced the crumbling walls stone by stone. In latter years, the owners turned to the tourism industry to supplement the income of the station and began a venture into accommodation, where paying visitors could stay and experience station life.

In 2007, the lease was purchased by the Department of Environment and Conservation to be added to the conservation estate. Roxanne and Tom Morrissey, the current owners have the lease for another two years before it becomes fully managed by DEC. During that time the lease will be destocked and other conservation measures put into place to prepare the land for conservation initiatives.

Mining

Gold prospecting and mining has played a significant part in the history of this area with Cue, Mount Magnet and Yalgoo being major centres during the gold rush of the 1890's.

Thundelarra's mining history began in 1894 when a gold deposit near Mount Pinyalling was discovered by Varley, Tongue and Meyer. They left the area without pegging the find. When they returned later to do so, they were disappointed to find that James Field and his partner George Woodley had pegged it. This area was known as Field's Find and became a large mining centre which was worked up until 1954.

The best known mine within the current area of the Thundelarra Pastoral Lease is the Baron Rothschild mine which was active until 1939. Few remains are evident other than some concrete equipment bases, mine shafts and tailings.

There are still many gold mines that operate in the Mid West of Western Australia, but in recent times the focus has shifted to other minerals, in particular, iron ore. As mining technologies improve, this region has attracted significant interest from mining companies as they are now able to profitably mine areas such as the Banded Iron Formations whereas before this would have been unviable. There are also several areas in the region where old mine tailings areas are being 'reworked' as mining companies are better able to extract gold.

PROJECT BACKGROUND

There is a long tradition of botanical art in association with exploration and the expansion of scientific knowledge. Australia's floral bounty was first brought to the world's attention through the paintings of early botanical artists such as Ferdinand Bauer. One of the greatest botanical artists of all times, he undertook one of the most significant voyages ever made—with Matthew Flinders on his circumnavigation of Australia (1801 – 1803) on board the *Investigator*. His paintings and drawings are treasured in museums and libraries in Oxford, Vienna and London.

This intimate relationship between exploration and illustration has created a legacy of great botanical books, enriched with exquisite pictures of newly discovered exotic plants. Prior to the invention of the camera, visual diaries, and the publications that resulted from them,

were a principal means by which information about newly discovered biological specimens could be disseminated to the wider public. Katrina Syme and Daphne Edinger have both made significant contributions to this field of knowledge through publications featuring Western Australia's spectacular wildflowers.

There are many ways of viewing, documenting and appreciating nature – all of which can lead to a better understanding of the nature conservation values of a wide range of areas. This project will combine documentation of the flora through watercolour painting with the purely scientific collection and processing of plant specimens. Plant illustration ranges from the purely botanical to the purely artistic. Between these two extremes lie a vast body of drawings and paintings with combined scientific and aesthetic appeal – botanical records that are also works of art.

On this expedition you will participate in the tradition of botanical illustration as it continues into the twenty first century, with artist Katrina Syme.

LANDSCOPE Expeditions has been assisting DEC's regional offices in carrying out biological surveys on pastoral leases acquired as part of the Gascoyne Murchison Strategy. This strategy is part of the State's contribution to the creation of a national comprehensive, adequate and representative reserve system. To date, preliminary surveys have been undertaken at Burnerbinmah, Lake Mason/Black Range, Lorna Glen/Earaheedy, Muggon, Pimbee, Doolgunna and Woolgorong. At Thundelarra, some opportunistic botanical collecting has been carried out by Daphne Edinger and others. These ongoing surveys will assist in the development of a more intimate understanding of the health of the rangelands and in the design of large scale rehabilitation programs for the extensive areas of degraded ecosystems.

THE PROJECT

The objectives of this expedition are to:

- Determine areas of high botanical biodiversity and conservation value
- Conduct as near comprehensive (and) opportunistic search for all flora using a stratified approach based on land system maps
- Conduct a baseline monitoring program through the installation of permanent quadrats
- Review the populations of known priority plant species
- Make a collection of botanical specimens and commence the establishment of a field herbarium
- Make a photographic record of sites visited
- Initiate a collection of botanical paintings for this area of the Murchison
- Gather information to provide a baseline for strategies to monitor conservation management

Part of the regional strategy is to document the biological values of the conservation estate in the region. This expedition will provide participants (dependent on seasonal rainfall) with the opportunity to view and catalogue the wonderfully diverse flora occurring on Thundelarra.

Information gathered on the expedition will add significantly to our understanding of the conservation values of Thundelarra, as well as provide a sound baseline against which future changes can be compared. Participants on this expedition will assist in this valuable monitoring process.

Katrina and Daphne will be exploring and collecting in the mornings, with an eye to collecting suitable subjects for working on in the afternoons.

After lunch, using the collected specimens as subjects, Katrina and Daphne will demonstrate basic pressing techniques, diagnosing important features that will be recorded for making:

- drawings
- dissecting and drawing enlargements etc
- colour notes – analysing colour and mixing colour
- paintings

At the end of the expedition we would hope to have a field book with pressed and painted specimens with accompanying colour notes. Also an understanding of careful observation, not necessarily of just flowers but the whole plant and what grows with it and around it.

Please note: Katrina will only be supplying a 'basic' palette of paints and some cut paper.

Please bring the following items:

- your own paints if you have them
- Windsor and Newton or Raphael size 1 or 2 brush. Please bring any other brushes and spares. Spares are required, because if white gouache is used for mixing or painting, good quality brushes are ruined
- Hotpressed water colour paper
- white cotton gloves (available in packets at supermarkets)
- 1 x retractable Staedtler pencil. 0.3 or 0.35 size, with spare leads, HB or 2B
- eraser
- hand lens x 10 or similar eg. loupe (a magnifying glass used by jewellers)
- A3 spiral bound cartridge paper art book (visual diary) (300/400mm approx)
- mixing palettes
- water jars (2) one for painting and one for specimens
- secateurs
- fine tweezers, scissors or dissecting tools
- large resealable (snaplock) plastic bags
- tissues or blotting paper
- board to rest on – at least A3 size
- clips to hold down paper (if windy)
- sticky tape
- wet wipes

Most of this will pack into a lidded plastic box available from hardware store (eg Bunnings) – size about 25cm x 36cm x 15cm approximately. Ensure your name is on the box.

KATRINA'S NOTES ON BOTANICAL FIELD DRAWINGS AND PAINTINGS

Before the invention of photography, scientific illustration was used to depict natural history subjects and it has maintained its place in science even in the face of digital photography. I'm often asked if I paint from photographs, but I don't – the subject needs to be handled, touched, looked at through a lens and even smelled. These notes can be added to the field sketch and provide useful information for later identification. However, I have recently begun to use digital images taken in the field to act as reminders of growth habit when completing work begun in the field and am finding it really useful.

The best work is achieved with accurate observation and the best materials, so a sharp pencil and good quality paints, brushes and paper are essential.

I use pure, lightfast pigments (contents and light-fastness are noted on the paint's label) and because I have experimented a lot with colour mixing, find I don't need a large variety of paints. Winsor & Newton paints are the most widely available. The brushes I use are Raphael Kolinsky Sable sizes 2 & 4 and the paper is a smooth, Hot Pressed Arches aquarelle 300 GSM (refers to weight & indicates thickness). It would be best to fold and tear the paper into quarters & put them into a plastic sleeve in a folder before you come.

Please contact Katrina on (08) 9848 1293 if you have any questions regarding botanical art or any of the equipment required.

VOLUNTEER ASSIGNMENTS

The Department very much appreciates your work on its behalf and wishes each volunteer a very enjoyable and rewarding trip.

Conservation Volunteers: Being a volunteer enables people to find out at first hand what the Department is doing. You will be part of a force of 4000 people involved in a wide range of activities that include tree planting, trail building, interpretation and assisting with scientific projects. If you wish to be involved with future DEC Volunteer projects, please contact DEC's Community Involvement Coordinator, Margaret Buckland, on (08) 9334 0251, on your return. The Department relies very much on its volunteer work force. In 2006/2007 volunteers supplied 497,000 hours of effort. Volunteer assistance with remote area work, such as this expedition plans to carry out, is especially helpful.

LANDSCOPE volunteers will be primarily engaged in fieldwork at Thundelarra study sites, however, you may be required to assist with general tasks around camp.

Field Work

The expedition will generally spend the mornings undertaking botanical fieldwork and the afternoons undertaking botanical painting. Specifically the expedition will;

- undertake opportunistic plant collections
- assist with the establishment of vegetation quadrats
- assist with plotting of locations of specimens collected (using a GPS)

- assist with identification of specimens
- assist with collecting voucher specimens
- assist in taking of general field notes
- assist with pressing plant specimens
- drawing and painting
- photography
- writing up notes and the trip diary

There will be some free time each day for people to follow personal interests such as bird watching or photography. There will be plenty of photo opportunities throughout the day, and volunteers should be able to see and photograph a good variety of local wildflowers when carrying out botanical collecting.

Diary

An exercise book will be provided for volunteers to take turns recording the events of the expedition, in their own words. Anything goes! Each person takes a turn. Please include highlights of each day, interesting data, and anything of interest to you. Because the expedition breaks up into small working groups, the diary is a means by which all members of the expedition can learn what other groups did each day. Much information can be gleaned from 'Show and Tell' each evening when the leaders summarise the day's activities and plan the following day. So, if you have the diary for the day, please take it to 'Show and Tell' and record the day's events. The diary will be typed and a copy sent to each expedition member as a memento of the trip. However, the diary also provides valuable information for the expedition report which is produced after each trip.

FIELD TRAINING

On arrival at Thundelarra there will be an orientation session, as well as briefings on research procedures and objectives, camp procedures, and safety protocols. On a daily basis there will also be informal lectures, reviews of progress, sharing of participants' discoveries, and camp fire talks on the project, feral animal control, reserve management, and the local flora and fauna.

The identification of flora and fauna in the field is a skilled business; it requires patience, a good eye, and aids such as field guides, binoculars and hand lenses. Many plants look very similar to each other, and telling them apart can be a humbling process for even the most experienced botanists. However, identification is a basic skill in field biology and by the end of our expedition, you should have a good grasp of the basics

APPLICATION OF RESULTS

The finished artwork will help to raise the awareness of the diversity of arid zone plants. It will also provide an illustrated addition to the purely scientific data that will be collected.

The botanical data collected will assist the DEC Midwest region manage and protect the vegetation that occurs at Thundelarra as part of the conservation estate. It is fundamental in documenting and monitoring the biodiversity values of Western Australia. Importantly,

reference collections made here will be lodged with the WA Herbarium where they will contribute to our understanding of the biogeography throughout WA and Australia.

EXPEDITION PERSONNEL

The investigators working on this project have extensive experience in botanical art and the collection and identification of botanical specimens.

Daphne Edinger has worked as an honorary research scientist with DEC since 1982: her association with the Western Australian Herbarium commenced with her retirement from her career as a science teacher. Daphne has conducted numerous botanical field trips throughout the State and has been with the *LANDSCOPE* Expeditions program as a leader since its inception. She was a co-recipient of the 1996 CSIRO Medal for Research Achievement for the project and book *Broome and Beyond: Plants and People of the Dampier Peninsula.*

Shane Heriot is currently working for DEC as Rangelands Operational officer and has been in this role for the past 10 months. He has been working within the rangelands for the past five years and was previously employed with the Department of Water in the Gascoyne region undertaking surface water management and catchment planning throughout the pastoral region. Shane has spent several years establishing and running an Eco-tourism business and environmental consultancy business throughout the Midwest region of WA. Shane has spent the last 20 years undertaking vertebrate fauna studies throughout the Midwest and Gascoyne regions both as an amateur and professional and his strongest passion is for the diverse reptiles and amphibians of this region.

Katrina Syme is a botanical artist and mycologist who lives in the south coast town of Denmark. A founding member of the Botanical Artists' Group of WA, she conducted University Extension and Albany Summer School 'Art from Nature' classes for many years, until her fungi research became all-consuming. Although her particular passion is for fungi, she enjoys drawing and painting plants, shells and other natural objects. She co-authored and illustrated 'Fungi of Southern Australia' (published by UWA Press in 1998), has also co-authored three papers on new species of fungi from the south coast region and contributed more than 2,000 fully-documented collections of fungi to the Western Australian Herbarium. Katrina has just been appointed for a third term as Honorary Associate of the Royal Botanic Gardens, Melbourne and is vice-president of Fungimap (Inc.). She has conducted surveys and research on fungi of the south coast since 1991 and is currently working on a Federal and State funded survey of macrofungi of the South Coast Natural Resource Management Region as part of a Biodiversity Inventory Program.

Bill Muir is a Senior Technical Officer, Science Division, at DEC's Woodvale Research Centre. He has worked for over 14 years with the biological survey group. Bill has conducted extensive research into bats, and maintains some interest in this area. Originally from the Lake Muir farming district, Bill worked with the former Forestry Department and was involved in regional surveys in the Wheatbelt and Carnarvon Basin.

EXPEDITION DIARY AND REUNION

A copy of the expedition diary will be provided soon after the conclusion of the expedition.

A reunion for all 2008 expeditions will be held on the 28th November 2008 in Perth. An invitation will be issued with details of the venue and other arrangements approximately one month prior to the event. The reunion provides an opportunity to catch up with old friends, see other participants' photographs and records of their trips, and review the results of the LANDSCOPE Expeditions program.

FIELD LOGISTICS

RENDEZVOUS

Expedition members will meet at **0700 hours on Monday September 8, 2008** in the car park adjacent to the The University of Western Australia Nedlands Campus in Clifton Street, cnr Stirling Highway, Nedlands (see map enclosed in your briefing package). There is access to toilets if required.

Equipment will be loaded and the expedition will depart Nedlands at **0730 hours** sharp via The Great Northern Highway to Paynes Find. We then travel to Thundelarra along the Paynes Find – Thundelarra Road. Transport will be an air conditioned coach and 4WD vehicles. If you are delayed for any reason in the morning, please contact Rohan Swan on 0407 986 227. There will be regular stops during the journey and plenty of opportunity to get to know fellow travellers.

ITINERARY

Day 1	**8 Sept**	**Monday**	**Perth to Thundelarra** Depart Perth and travel via Paynes Find to reach Thundelarra in the late afternoon. Settle into accommodation and establish base camp. Dinner will be followed by a talk about the project, logistics, base camp, safety procedures and use of station facilities.
Day 2	**9 Sept**	**Tuesday** AM	**Thundelarra** Undertake botanical survey work, make plant collections
		PM	Drawing and painting of specimens. We will press and where possible identify plants collected as voucher specimens.
Day 3	**10 Sept**	**Wednesday**	**Thundelarra** Art and About
Day 4	**11 Sept**	**Thursday**	**Thundelarra** Art and About
Day 5	**12 Sept**	**Friday**	**Thundelarra** Art and About
Day 6	**13 Sept**	**Saturday**	**Thundelarra** Art and About
Day 7	**14 Sept**	**Sunday**	**Thundelarra** Art and About
Day 8	**15 Sept**	**Monday**	**Thundelarra** Art and About

Day 9 16 Sept Tuesday **Thundelarra**
Art and About

Day 10 17 Sept Wednesday **Thundelarra to Perth**
Depart camp mid morning after breakfast and travel to Perth, arriving at approximately 1600 hours.
End of expedition.

THIS ITINERARY IS PROVISIONAL AND MAY BE VARIED AT THE DISCRETION OF THE EXPEDITION LEADERS.

DAILY SCHEDULE

Research activities at Thundelarra include botanical survey, plant collecting and botanical art. Expedition members will be placed into groups; during the expedition tasks will be rotated between groups so that all expeditioners have the opportunity to experience the range of activities.

0600 hours Arise, have breakfast, and begin day's activities.

0700 hours **Commencement of Fieldwork.** Mornings will be spent exploring and collecting botanical specimens suitable for working on in the afternoon.

1200 hours **Return to campsite. Lunch, followed by afternoon activities.** We will use specimens collected in the morning as subjects for drawing and painting. We will press and where possible identify plants collected as voucher specimens.

1630 hours **Showers and preparation of evening meal.**

1800 hours **Dinner.**

1900 hours **'Show and tell'** and **'Meet the scientist'.**

2000 hours Time will be set aside for compilation of data at the end of the day. Bed!

TEAM DEVELOPMENT

LANDSCOPE Expeditions are research-oriented, nature-based experiences; working as a team is an important part of the overall experience. Team spirit will be enhanced and developed by having all meals together, sharing in preparation and clean-up, and reporting on the day's activities and results.

ACCOMMODATION

We will be accommodated in shared ex shearing quarters where you will need to bring your sleeping bag and a small pillow. Beds with mattresses will be provided.

Full fee paying volunteers should have four items of luggage – **your *LANDSCOPE* Expeditions duffel bag, daypack, small pillow and sleeping bag (lightweight, compact but warm – recommended rating 0°C)**. Bag labels are provided, however, as all the bags look the same, you may wish to mark your bag with a coloured ribbon, or something else that helps you spot your bag quickly. You may also wish to bring a large plastic heavy duty garden bag with ties to protect your bag from damp, dust, or rain.

Water, washing and ablutions: Facilities at Thundelarra include showers and flushing toilets. There are separate ablutions for males and females.

FOOD AND DRINKS

All meals from lunch on Day 1 to lunch on Day 10 will be covered by your contribution. You may be required to assist with meal preparation on a rotational basis. If any special diets are needed you must advise *LANDSCOPE* Expeditions administration to ascertain if these can be accommodated; please advise Cheryl Tonts **as soon as possible** via telephone (08 9334 0319), fax (08 9334 0498), or email (cheryl.tonts@dec.wa.gov.au).

Some cask wine will be supplied by the expedition for the evening meal. If you have a favourite beverage (beer, spirits, etc) you will need to bring a supply. You may also wish to bring a small stash of lollies, snacks or 'trail mix' to your liking.

PHYSICAL CONDITION

The expedition will not demand an elite level of fitness. However, some level of physical fitness is required. There will be as much walking, exploring and searching, as you want, so ensure that you have comfortable, solid boots. You will maximise your enjoyment of the activities by ensuring a reasonable level of fitness in the weeks leading up to the commencement of the expedition. Please advise the leaders if you do not wish to go into the field. It can be hot during the day. Please wear your hat in the field and carry water; although there are numbers of shady trees around, you will be in the sun for most of the day.

ENVIRONMENTAL CONDITIONS

Climate: In this location at this time of year, average daytime temperatures are 23.7°C, although you can experience much warmer temperatures (mid 30's). Average night time temperatures are around 8°C, but temperatures can drop to freezing. The lowest temperature recorded in this area at this time of year is 0°C. The average rainfall in September is 14.5 mm.

Terrain: The terrain is generally flat, and the work will not be too strenuous. Walking will be primarily through *Acacia* scrub over sandy soils with some rocky outcrops. There are no formal tracks and outback terrain can be rugged, and you should take care when clambering about and exploring.

SAFETY AND HEALTH

Your safety, health and comfort are of paramount importance.

Sunburn: Is possibly the greatest medical problem that arises. You must guard against it. Loose-fitting, long-sleeved shirts, full-brimmed hats, sunglasses, sunscreen lotion, and lip-block are all essential.

Dehydration: Is a significant issue particularly in high temperatures, even during the evenings. It is vital to always ensure you drink plenty of water. You must keep water bottles (minimum of 2 litres) with you in your daypack. **This is essential**.

Safety Mates: To improve volunteer safety in the field, expeditioners will be assigned a 'safety mate' for the duration of the expedition. At all times, you should know where your 'safety mate' is. If you cannot locate your mate and are concerned as to their whereabouts, please advise a leader. This system is designed to improve safety in the field. Leaders will explain the 'safety mates' protocol on Day 1. As a precaution, do not wander off on your own. Take your safety mate or another person with you and tell a leader where you are going and don't go far.

Snakes: Several highly venomous snakes are present in this region. The king brown or mulga snake, the western brown snake or gwardar and the desert death adder inhabit the region to which we are travelling. For safety reasons, volunteers are not to handle snakes. Two elastic pressure bandages should be carried with you at all times as a first aid treatment for snakebite. When moving around at night, a good head torch and a spare, small, back-up torch are recommended.

Clothing and footwear: Long pants and boots that protect your ankles are recommended. If you prefer wearing shorts, bring some Gore-Tex® gaiters or leggings. Shorts leave your legs susceptible to sunburn, insect bites and scratches. We recommend leather boots with ankle protection (well worn in to avoid blisters) as suitable footwear for walking around in the rugged conditions you may encounter. You will need comfortable light shoes to wear in camp and in the evenings and a pair of thongs for use during showers will be helpful. Warm clothing and a beanie for the evenings will be essential as the outback nights can be very cold. Canvas garden gloves may be used to protect the hands when in the field. It is also advisable to bring some form of rain protection (rain jacket, pants, plastic poncho).

Insect pests: Insects can be a problem in the outdoors. Repellents and creams are advised if you are particularly susceptible to insect bites. Your doctor can prescribe any necessary antihistamines. Make sure that you shake any clothing out before putting it on in the morning in case any insects or animals have taken up residence. Put you boots into a plastic bag at night time so that nothing crawls into them. *Please familiarise yourself with the enclosed brochures from the Health Department of Western Australia.*

Medications: Check that you have any required prescriptions filled beforehand and make sure that you bring an extra supply in case of damage or loss. If you think you may need antihistamines for possible allergic reactions, see your doctor and obtain appropriate medication.

Personal hygiene: Peter G's liquid soap is a good soap to use in hard water. Medicated soaps such as gamophen, or sandalwood, which is natural to the bush, are also good choices. Baby wipes can be used for washing in the absence of water.

Wilderness survival: Please familiarise yourself with the enclosed Wilderness Survival Card and carry with you at all times in your day pack along with water bottles, a whistle, compass, signal mirror, torch, matches and elastic bandages. It is very easy to become disoriented when walking away from tracks, vehicles and campsites in the bush. Take careful note of any landscape features to guide you back to the vehicle, campsite or study area. If you do become lost, follow the instructions on the wilderness survival card. Light a fire only as a last resort and be sure to clear an area to prevent a wildfire.

First Aid Kit: The expedition will carry a comprehensive first aid kit. Minor cuts and scratches should be attended to promptly as they can become infected in the outdoor environment. Please bring some of your own bandaids and small first aid supplies for your own convenience.

Avian Influenza: Wild birds in Australia pose a negligible avian influenza risk to humans at the present time, however, all birds, particularly water fowl (ducks, geese, swans) are potential carriers of the disease. As there may be some contact with birds on expeditions, volunteers are advised that they are not permitted to handle birds, especially those who appear sick or injured. For further information please refer to the following website on Avian Influenza.
http://www.health.gov.au/internet/wcms/publishing.nsf/content/health-avian_influenza-index.htm

Bats: Expedition members are not to handle bats due to the possible presence of lyssavirus, a potentially fatal rabies like virus. Should you come across a sick or injured bat, do not attempt to handle or 'rescue' it. Avoid it and advise expedition leaders.

Dingoes: Be alert to the presence of dingoes and do not encourage them in any way. Dingoes have been known to attack humans.

FIELD COMMUNICATIONS

The DEC vehicles are equipped with Royal Flying Doctor Service (VHF) radios. The Department's office in Geraldton will be in regular contact with the expedition, and can contact the leaders in an emergency. There is a telephone at Thundelarra that can be used in an emergency.

The expedition will carry a satellite phone for emergency use only.

Emergency messages can be relayed to expedition members via *LANDSCOPE* Expeditions on 9334 0401

EMERGENCY MANAGEMENT

The expedition, in consultation with the Royal Flying Doctors Service (RFDS) has developed a comprehensive crisis management plan in case a medical or other emergency should arise.

ADVANCE PREPARATION

FIELD SUPPLIES

Check each item carefully. Beds with mattresses will be provided, but you will need to bring your own small pillow and sleeping bag. We recommend that you bring everything you need with you from Perth. Although we will be stopping during our journey, the opportunity to restock supplies will be extremely limited and once we reach Thundelarra, there will be no chance to obtain supplies.

Check List
❑ sturdy, comfortable, worn-in walking boots or shoes with good tread
❑ light shoes for around camp
❑ thick walking socks
❑ underwear
❑ long trousers, loose and tough
❑ long-sleeved, loose-fitting shirts
❑ casual clothes for travelling and around camp
❑ t-shirts
❑ jumper, warm jacket, or 'polarfleece'
❑ warm beanie or cap to wear at night
❑ cord or scarf to anchor hat (if not using your volunteer's hat)
❑ lightweight rain jacket or plastic poncho
❑ sunglasses
❑ fly net (essential - drops over hat)
❑ gaiters – essential to protect legs from vegetation
❑ canvas garden gloves
❑ sleeping bag (recommended rating 0°C) + inner sheet / liner (protects the bag and adds warmth)
❑ mosquito net and plastic ground sheet if you plan on sleeping outside
❑ pillow
❑ 2 X 1-litre water bottles, leak-proof
❑ personal toiletries, including tissues
❑ towel
❑ moisturised wipes
❑ insect repellent and sunscreen
❑ 2 elastic pressure bandages (for snake bite first aid) - essential
❑ personal first aid, prescription medicine and spectacles
❑ matches or lighter
❑ head torch (leaves hands free) plus spare batteries and globe
❑ small robust torch as a back up, plus spare batteries and spare globe
❑ small daypack to carry camera, water bottle, snacks, etc
❑ camera, spare batteries, memory card (film if necessary)
❑ binoculars (field glasses), and field guides if you have an interest in the local bird life
❑ hand lens if you have an interest in botany
❑ notebook and pen
❑ Compass, whistle and signal mirror (available at camping stores)
❑ small clothesline and a few pegs
❑ pocket knife
❑ lots of enthusiasm and smiles

LANDSCOPE Expeditions will supply a canvas bag for your gear, a luggage tag, a wide brimmed volunteer's hat, a stubby holder and a thermal mug.

REFERENCE MAPS

The following maps will be useful if you wish to follow the route we travel:
StreetSmart Western Australian Touring Maps
1. The Greater South West
2. The Mid West

For more topographic detail:
The Yalgoo (SH50-2), Kirkalocka (SH50–3) and Ninghan (SH50-7), 1:250 000 Australian Topographic Map sheets cover the region in which Thundelarra is situated.

REFERENCE LIST

Ashwin, A.C. (2002) *Gold to Grass*. Hesperian Press, Perth, Western Australia.

Beard, J. S. (1980) *A new phytogeographic map for Western Australia.* Western Australian Herbarium Research Notes, 3: 37-58.

Beard, J. S. (1990) *Plant Life of Western Australia*. Kangaroo Press, New South Wales.

Bindon, P. (1996) *Useful Bush Plants*. Western Australian Museum, Perth.

Burnside, D., Holm, A., Payne, A. and Wilson, G. (1995*) Reading the Rangeland-A guide to the arid shrublands of Western Australia*. Dept Agriculture, Perth, Western Australia.

Carnegie, D. W. (1989) *Spinifex and Sand.* Hesperian Press, Perth, Western Australia.

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Jessop, J. (ed). (1985) *Flora of Central Australia*. Reed Publishing.

Mitchell, A.A. & Wilcox, D.G. (1994) *Arid Shrubland Plants of Western Australia.* UWA Press, Perth.

Muir, P. (1996) *Blue Peaks and Red Ridges: The 1965-66 Campfire Field Notes of Desert Exploration in W.A.* Western Desert Guides, Wembley Downs, Western Australia.

Palmer, A. (1985) *Yalgoo.* Lap Industries, Fremantle, Western Australia

Palmer, A. (1991) *Field's Gold: A Story of the Yalgoo Goldfields*. Lap Industries, North Lake, Western Australia.

Paczkowska, G. and Chapman, A.R. (2000) *The Western Australian Flora: A descriptive catalogue.* Western Australian Herbarium, DEC, Perth.

Thackway, R. and Cresswell, I. D. (Ed's). (1995) *An interim biogeographic regionalisation for Australia*: A framework for setting priorities in the national reserve system cooperative program. Version 4.0. Australian Nature Conservation Agency, Canberra.

Triggs, B. (1996) *Tracks, Scats and other Traces.* A Field Guide to Australian Mammals. Oxford University Press, Melbourne.

* *The expedition will carry some reference books. Please bring your own field guides.*

The following LANDSCOPE articles in chronological order are relevant to the Murchison region, wildflowers and the Gascoyne Murchison Strategy.

Thomson, C., Hopper, S., Keighery, G., Hussey, P. 'Wildflower Country', *LANDSCOPE*, Spring 1991

Marchant, N. 'The Wildflower State', *LANDSCOPE*, Summer 95/96

McNamara, K., Brandis, T., Hopkins, A. 'Filling the Gaps' *LANDSCOPE*, Winter 2000

Mitchell, S. 'Opening the Heart of the Gascoyne and Murchison' *LANDSCOPE*, Spring 2006

WEB SITES

The following websites may be of interest:

www.naturebase.net
Department of Environment and Conservation website

www.ea.gov.au/biodiversity/index.html
Commonwealth Department of Environment and Water Resources website on National Strategy for the Conservation of Australia's Biological Diversity

www.florabase.dec.wa.gov.au
Department of Environment and Conservation Florabase website

www.environment.gov.au/parks/nrs/ibra/index.html
Commonwealth Department of Environment and Water Resources website on the Interim Biogeographical Regionalisation of Australia

NOTES

APPENDICES

LANDSCOPE Expeditions 2008

Lend your body to research...

LANDSCOPE Expeditions are non-profit, self-supported study and research projects. Since their inception in 1992, the expeditions have been offered by the Department of Environment and Conservation's (DEC's) *LANDSCOPE* magazine, a quarterly publication devoted to wildlife, conservation and environmental issues in Western Australia. The expeditions are offered in association with UWA Extension, a department of The University of Western Australia (UWA).

DEC is responsible for the management and sustainable use of WA's 27 million hectares of national parks, conservation parks, marine parks, State forests and timber reserves, nature reserves and marine nature reserves. It is also responsible for conserving the State's rich diversity of plants and animals.

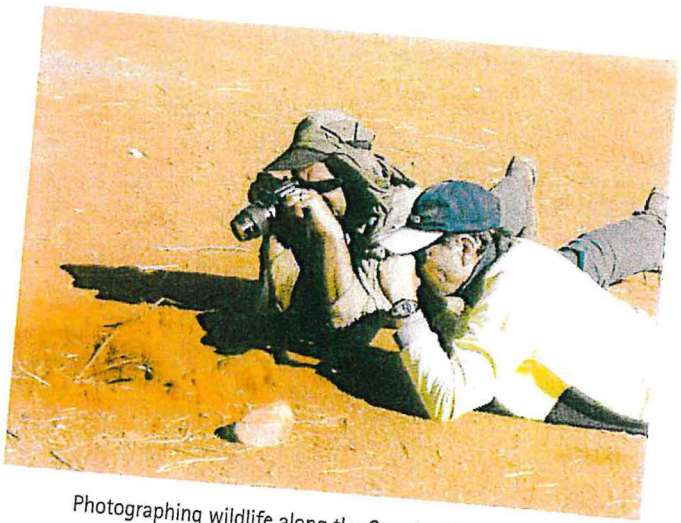
UWA Extension has been operating as a public outreach arm of UWA since 1913. It is a Centre for Continuing Education and promotes community awareness in a variety of ways, including educational travel.

Scientists and regional staff identify the research projects and lead the expeditions. DEC and UWA administer the expeditions. The private sector and local communities are contracted to provide logistical support.

LANDSCOPE Expeditions answer the need for research to protect the environment and respond to the demand for first-class interpretation by scientists and specialists. They provide paying volunteers with an opportunity to work alongside scientists and promote wider cooperation in addressing conservation and land management challenges in WA. Anyone can be involved subject to fitness and provided they are over 13 years of age.

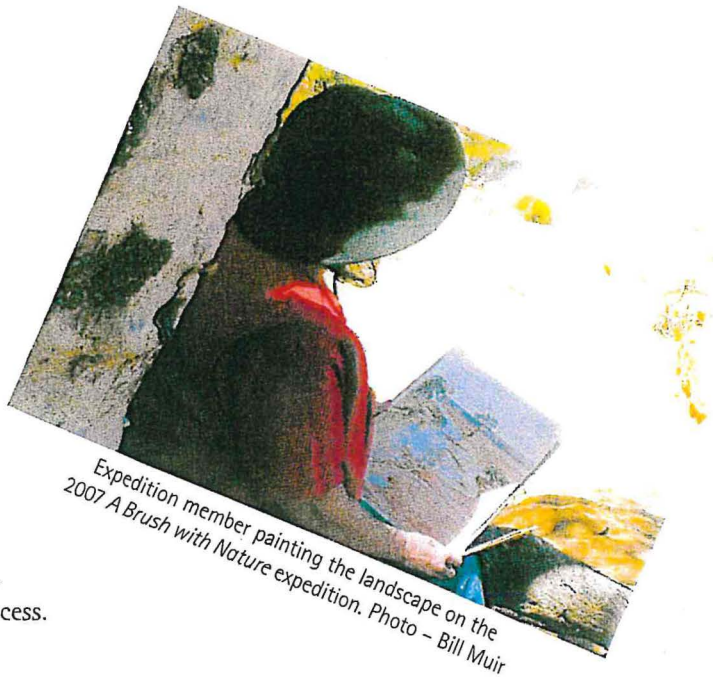
The expeditions give you the opportunity to visit and gain an understanding of remote places and natural ecosystems and take part in important wildlife recovery programs. You can have the satisfaction of knowing you have contributed to our knowledge of threatened environments and endangered species. Unique photo opportunities and close encounters with unusual animals are a bonus.

Participants are not the only ones who benefit. The community also profits from the enriched lives of its members and from the benefits that flow on from research findings and outcomes. Future generations benefit from the natural and cultural resources that volunteers help to identify and conserve. And, on a global scale, *LANDSCOPE* Expeditions help to perpetuate cultural and biological diversity.



Photographing wildlife along the Canning Stock Route.
Photo – Andrew Spiers

You can make a difference



Expedition member painting the landscape on the 2007 *A Brush with Nature* expedition. Photo – Bill Muir

When you travel with *LANDSCOPE* Expeditions, you help in a variety of ways:

Funding

You and your financial contribution make the research possible. This alone is a significant factor in making the expedition a success.

Scientific discovery

You can help by collecting key information. Although some interpretations will be made in the field, much of the synthesis takes place back in the laboratory, where final identifications and analyses are made and results prepared for publication. You will discover that field work can be repetitive and time consuming as it has to be done in a systematic way. Outcomes are not always obvious at first – but there's always the chance of that surprise discovery.

Extra pairs of hands and eyes are of great benefit in helping to achieve goals, as field work is very intensive. Leaders will maximise time spent on fieldwork but will provide instruction in techniques as time permits.

You may be asked to collect plant specimens and make animal sightings to increase our knowledge of the distribution of species. However, with plants, only representative specimens will be kept. Do not be disappointed if some are discarded as redundancy is often part of the scientific process. With bird observations, it is the collective experience that confirms the sighting and produces advances in our knowledge.

You don't need to be a scientist

Anyone can help – be assured that your assistance will make a contribution to nature conservation in WA. Remember scientists and leaders have spent many years developing their level of expertise – they welcome your questions and are there to guide you.

Your point of view or personal expertise may help in unexpected ways. Please feel free to share your ideas.

Expect to return home with a broader understanding of the natural world, the role of scientific methods, the value of nature conservation and the rewards of knowing you have contributed to pioneering studies in remote areas. *LANDSCOPE* Expeditions aim to whet your appetite for nature, give you a taste of scientific discovery, and provide an experience that may not otherwise be a part of your life.

It's not all science

Many elements combine to make an expedition successful, not just the scientific activities. An affinity for team work, a flexible approach and a willingness to help in whatever way you can, help to create the best results for nature conservation.

Plant list for Thundelarra Station

Abutilon oxycarpum subsp. prostratum R.M.Barker ms
Abutilon oxycarpum (F.Muell.) Benth.
Acacia ? aulacophylla

Acacia aneura var. alata
Acacia aneura var. argentea (narrow phyllode variant)
Acacia aneura var. argentea (short phyllode variant)
Acacia aneura var. cf. aneura
Acacia aneura var. cf. tenuis
Acacia aneura var. microcarpa (broad, incurved phyllode
Acacia aneura var. microcarpa (broad, recurved phyllode
Acacia aulacophylla R.S.Cowan & Maslin
Acacia burkittii Benth.
Acacia coolgardiensis subsp. effusa (Pedunculate variant)
Acacia exocarpoides W.Fitzg.
Acacia grasbyi Maiden
Acacia kalgoorliensis R.S.Cowan & Maslin
Acacia masliniana R.S.Cowan
Acacia subsessilis A.R.Chapman & Maslin (P3)
Acacia tysonii Luehm.
Acacia umbraculiformis Maslin & Buscumb ms
Acacia victoriae Benth. subsp. victoriae

Aluta aspera subsp. hesperia Rye & Trudgen
Amphipogon caricinus F.Muell. var. caricinus
Amyema fitzgeraldii (Blakely) Danser
Angianthus tomentosus J.C.Wendl.
Aristida contorta F.Muell.
Asteridea athrixioides (Sond. & F.Muell.) Kroner
Atriplex semilunaris Aellen
Austrodanthonia caespitosa (Gaudich.) H.P.Linder
Austrostipa eremophila (Reader) S.W.L.Jacobs & J.Everett
Austrostipa scabra (Lindl.) S.W.L.Jacobs & J.Everett

Bellida graminea Ewart
Borya sphaerocephala R.Br.
Brachyscome ciliaris (Labill.) Less.
Brachyscome pusilla Steetz
Brassica tournefortii Gouan
Bursaria occidentalis E.M.Benn.
Calandrinia creethae Morrison
Calandrinia eremaea Ewart
Calandrinia ptychosperma F.Muell.
Calandrinia sp. Blackberry (D.M. Porter 171) PN
Calandrinia sp. Bungalbin (G.J. Keighery & N. Gibson 1656) PN
Calotis multicaulis (Turcz.) Druce
Calytrix sp. Paynes Find (F. & J. Hort 1188) PN
Cephalipterum drummondii A.Gray
Cheilanthes adiantoides T.C.Chambers & P.A.Farrant
Cheiranthera simplicifolia (E.M.Benn.) L.Cayzer & Crisp
Chenopodium melanocarpum (J.M.Black) J.M.Black forma melanocarpum
Convolvulus angustissimus R.Br. subsp. angustissimus
Cyanicula fragrans Hopper & A.P.Br. (P3)
Dielitzia tysonii P.S.Short
Diploschistes sp.
Dodonaea inaequifolia Turcz.
Dodonaea petiolaris F.Muell.
Dodonaea viscosa subsp. mucronata J.G.West
Dodonaea viscosa subsp. spatulata (Sm.) J.G.West
Duperreya sericea Gaudich.
Dysphania glomulifera subsp. eremaea Paul G.Wilson
Elymus scaber (R.Br.) A.Love
Emex australis Steinh.
Eragrostis dielsii Pilg.

Eragrostis pergracilis S.T.Blake
Eragrostis sp.
Eremophila aff. flaccida
Eremophila clarkei A.F.Oldfield & F.Muell.
Eremophila fraseri subsp. galeata Chinnock ms
Eremophila glabra (R.Br.) Ostenf.
Eremophila glutinosa Chinnock
Eremophila pantonii F.Muell.
Eremophila platycalyx F.Muell. subsp. platycalyx
Eremophila serrulata (A.DC.) Druce
Eremophila sp. Blue Hills (A. Markey & S. Dillon 3338)
Eremophila spuria Chinnock
Eriachne pulchella Domin subsp. pulchella
Erodium aureum Carolin
Erymophyllum ramosum (A.Gray) Paul G.Wilson subsp. ramosum
Eucalyptus horistes L.A.S.Johnson & K.D.Hill
Eucalyptus striaticalyx W.Fitzg. subsp. striaticalyx
Exocarpos aphyllus R.Br.
Frankenia laxiflora Summerh.
Gomphrena sp. Belele (D.W. Goodall 3215) PN
Goodenia krauseana Carolin
Goodenia sp.
Grevillea deflexa F.Muell.
Grevillea extorris S.Moore
Grevillea hakeoides subsp. stenophylla (W.Fitzg.) McGill.
Grevillea obliquistigma C.A.Gardner subsp. obliquistigma
Grevillea pityophylla F.Muell.
Haloragis odontocarpa forma octoforma Orchard
Helipterum craspedioides W.Fitzg.
Hemigenia sp. Cue (K.F. Kenneally 47A) PN
Hemigenia sp. Yalgoo (A.M. Ashby 2624) PN

Hyalosperma glutinosum subsp. venustum (S.Moore) Paul G.Wilson
Hyalosperma glutinosum Steetz subsp. glutinosum
Hyalosperma zacchaeus (S.Moore) Paul G.Wilson
Isoetopsis graminifolia Turcz.
Lawrencella rosea Lindl.
Lobelia heterophylla Labill.
Lobelia winfridae Diels
Maireana convexa Paul G.Wilson
Maireana trichoptera (J.M.Black) Paul G.Wilson
Marsdenia australis (R.Br.) Druce
Micromyrtus clavata Rye
Micromyrtus sulphurea W.Fitzg.
Mirbelia bursarioides A.M.Monro & Crisp ms
Monachather paradoxus Steud.
Myriocephalus oldfieldii (F.Muell.) Paul G.Wilson
Nicotiana cavicola N.T.Burb.
Nicotiana rosulata (S.Moore) Domin subsp. rosulata
Olearia humilis Lander
Omphalolappula concava (F.Muell.) Brand
Paspalidium basicladum Hughes
Philotheca brucei (F.Muell.) Paul G.Wilson subsp. brucei
Phyllangium sulcatum Dunlop
Phyllanthus erwinii J.T.Hunter & J.J.Bruhl
Pittosporum angustifolium Lodd.
Plantago coronopus subsp. commutata (Guss.) Pilger
Podolepis canescens DC.
Podolepis capillaris (Steetz) Diels
Podolepis gardneri G.L.R.Davis
Podolepis lessonii (Cass.) Benth.
Podolepis sp.
Podotheca gnaphalioides Graham
Pogonolepis stricta Steetz
Prostanthera magnifica C.A.Gardner

Pterostylis sp. inland (A.C. Beauglehole 11880) PN
Ptilotus aervoides (F.Muell.) F.Muell.
Ptilotus chamaecladus Diels
Ptilotus drummondii (Moq.) F.Muell. var. drummondii
Ptilotus gaudichaudii var. parviflorus (Benth.) Benl
Ptilotus helipteroides (F.Muell.) F.Muell.
Ptilotus polystachyus (Gaudich.) F.Muell. var. polystachyus
Rhagodia drummondii Moq.
Rhagodia eremaea Paul G.Wilson
Rhagodia preissii Moq. subsp. preissii
Rhagodia sp.
Rhodanthe battii (F.Muell.) Paul G.Wilson
Rhodanthe chlorocephala subsp. splendida (Hemsl.) Paul G.Wilson
Rhodanthe collina Paul G.Wilson (P1)
Rhodanthe humboldtiana (Gaudich.) Paul G.Wilson
Rhodanthe maryonii (S.Moore) Paul G.Wilson
Rhodanthe propinqua (W.Fitzg.) Paul G.Wilson
Rostraria pumila (Desf.) Tzvelev
Santalum spicatum (R.Br.) A.DC.
Sclerolaena eurotioides (F.Muell.) A.J.Scott
Senna artemisioides subsp. filifolia Randell
Senna flexuosa (Randell) Randell
Senna glaucifolia (Randell) Randell
Senna glutinosa subsp. chatelainiana (Gaudich.) Randell
Sida ectogama W.R.Barker & R.M.Barker
Sida sp. Dark green fruits (S. van Leeuwen 2260) PN
Silene nocturna L.
Solanum lasiophyllum Poir.
Sonchus oleraceus L.
Sondottia connata (W.Fitzg.) P.S.Short
Stenopetalum anfractum E.A.Shaw
Stenopetalum filifolium Benth.
Tecticornia verrucosa Paul G.Wilson
Thryptomene costata Rye & Trudgen
Thysanotus pyramidalis Brittan
Trichanthodium exile (W.Fitzg.) P.S.Short
Urospermum picroides (L.) F.W.Schmidt
Waitzia acuminata Steetz var. acuminata
Wilsonia backhousei Hook.f.

Zygophyllum aff. fruticulosum
Zygophyllum aurantiacum (Lindl.) F.Muell. subsp. aurantiacum

3 Priority

List of bird species recorded for Thundelarra Station and surrounds

Emu
Musk Duck
Black Swan
Australian Shelduck
Australian Wood Duck
Pacific Black Duck
Grey Teal
Pink-eared Duck
Australasian Grebe
Hoary-headed Grebe
White-faced Heron
White-necked Heron
Australian White Ibis
Square-tailed Kite
Whistling Kite
Brown Goshawk
Collared Sparrowhawk
Wedge-tailed Eagle
Brown Falcon
Australian Hobby
Peregrine Falcon
Nankeen Kestrel
Black-tailed Native-hen
Eurasian Coot
Little Button-quail
Bush Stone-curlew
Black-fronted Dotterel
Red-kneed Dotterel
Banded Lapwing
Laughing Turtle-Dove
Common Bronzewing
Crested Pigeon
Red-tailed Black-Cockatoo
Galah
Little Corella
Cockatiel
Australian Ringneck
Mulga Parrot
Budgerigar
Bourke's Parrot
Pallid Cuckoo
Black-eared Cuckoo
Horsfield's Bronze-Cuckoo
Southern Boobook
Tawny Frogmouth
Spotted Nightjar
Australian Owlet-nightjar
Red-backed Kingfisher
Sacred Kingfisher
Rainbow Bee-eater
Splendid Fairy-wren
Variegated Fairy-wren
White-winged Fairy-wren
Striated Pardalote
Redthroat
Weebill
Western Gerygone
Inland Thornbill
Chestnut-rumped Thornbill
Slaty-backed Thornbill
Yellow-rumped Thornbill
Southern Whiteface
Red Wattlebird
Spiny-cheeked Honeyeater
Yellow-throated Miner
Singing Honeyeater
Grey-headed Honeyeater
White-plumed Honeyeater
Brown Honeyeater
White-fronted Honeyeater
Grey Honeyeater
Pied Honeyeater
Crimson Chat
White-fronted Chat
Red-capped Robin
Hooded Robin
Grey-crowned Babbler
White-browed Babbler
Chiming Wedgebill
Chestnut-breasted Quail-thrush
Crested Bellbird
Gilbert's Whistler
Rufous Whistler
Grey Shrike-thrush
Magpie-lark
Grey Fantail
Willie Wagtail
Black-faced Cuckoo-shrike
Ground Cuckoo-shrike
White-winged Triller
Masked Woodswallow
Black-faced Woodswallow
Little Woodswallow
Grey Butcherbird
Pied Butcherbird
Australian Magpie
Grey Currawong
Australian Raven
Little Crow
Torresian Crow
Western Bowerbird
Richard's Pipit
Zebra Finch
Mistletoebird
White-backed Swallow
Welcome Swallow
Tree Martin
Fairy Martin
Rufous Songlark
Corvid species

Source: Atlas of Australian Birds© Birds Australia 1998-2007

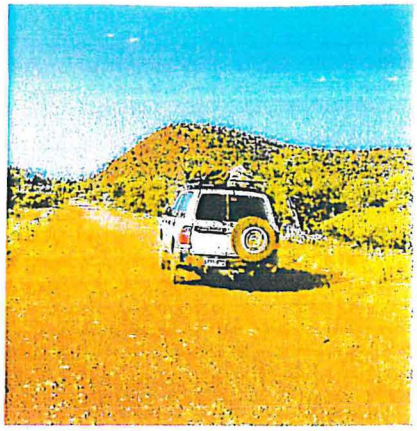
Stationed for conservation

by Samille Mitchell, Brett Fitzgerald and Tony Brandis

Appendix 4

Driving south of Mount Augustus National Park, in country once part of Waldburg Station that has been managed for pastoral production since about 1932, it's hard to imagine the land as it once was. Where native wildflowers and wildlife once thrived in their natural habitats, years of feral animal and human impacts have taken their toll. The country has been changed, in some places quite dramatically.

Mounds of earth bear testimony to some of the wildlife that once inhabited the land. Some of the bigger mounds once housed whole communities of burrowing bettongs. Scatters of smaller rocks were once home to pebble mound mice, which would carry rocks up to half their own weight in their mouth and arrange these in piles around the entrance to their burrows. Today the mounds are deserted—remnants of a time when the full suite of native mammals occurred in the area. However, it is hoped that the bettongs and native rodents will one day be back, as the Department of Conservation and Land Management (CALM) now manages considerable areas of land purchased across the Gascoyne and Murchison regions, through a project known as the Rangelands Pastoral Land Acquisition Program, in a bid to conserve their habitats.



The beginnings

Parts of the pastoral rangelands have always been poorly represented in conservation reserves due to early development of pastoral leases. An opportunity to expand the area within reserves came with the beginning of the Gascoyne Murchison Strategy (GMS). The strategy recognised problems besetting the pastoral industry, such as declining vegetation, soil loss, increasing terms of trade and declining economic returns. It also recognised the need to improve the natural resource on which the industry is based, and to address biodiversity conservation.

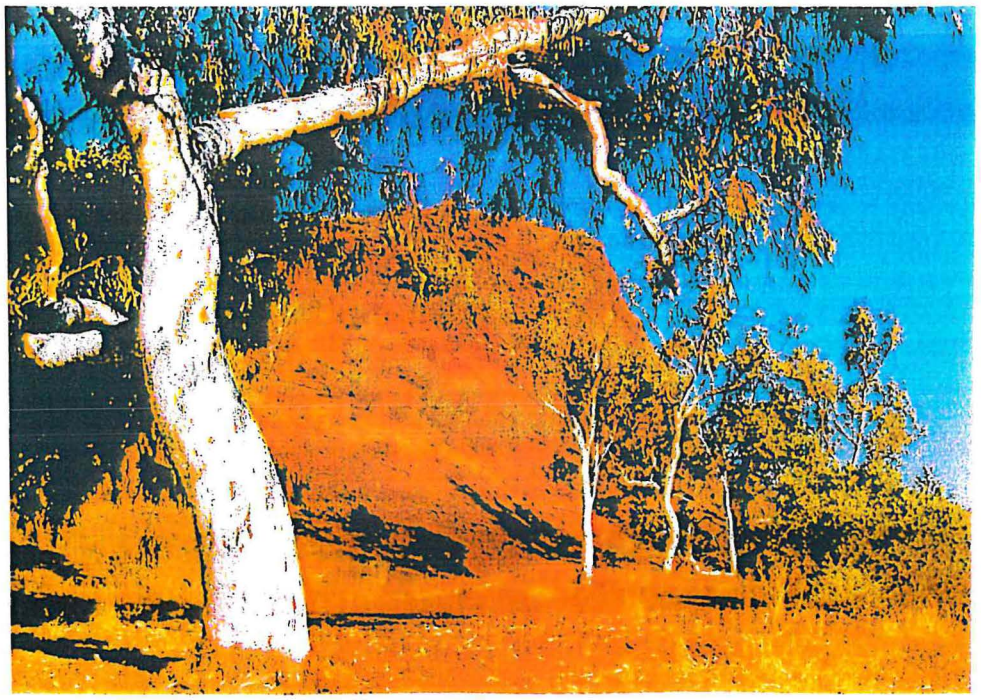
Four core programs—business and industry development; industry research and development; voluntary lease adjustment; and improved regional environmental management—were established within the GMS. The Pastoral Rangelands Acquisition Program was a component of the regional environmental management program that provided funding for CALM to purchase selected land systems within pastoral leases to add to the conservation reserve system. The GMS funding was strengthened by significant contributions from the Commonwealth Government's National Reserve System Program of the Natural Heritage Trust.

Some pastoralists accepted the opportunity to leave the industry and have their leases included in the conservation reserve system. Many were offered the chance to remain on the land as caretakers for CALM, while pursuing other economic endeavours. Eighteen pastoralists sold their entire properties, and another 19 sold part of their properties (see 'Wanna know a secret?', *LANDSCOPE*, Autumn 2005). Each property has its own unique history, individual collection of land systems and conservation values.

Selecting land

A systematic approach was used to identify stations which, when added to the current reserve system, would improve representation of the range of biodiversity within protected areas (see 'Filling the gaps', *LANDSCOPE*, Winter 2000).

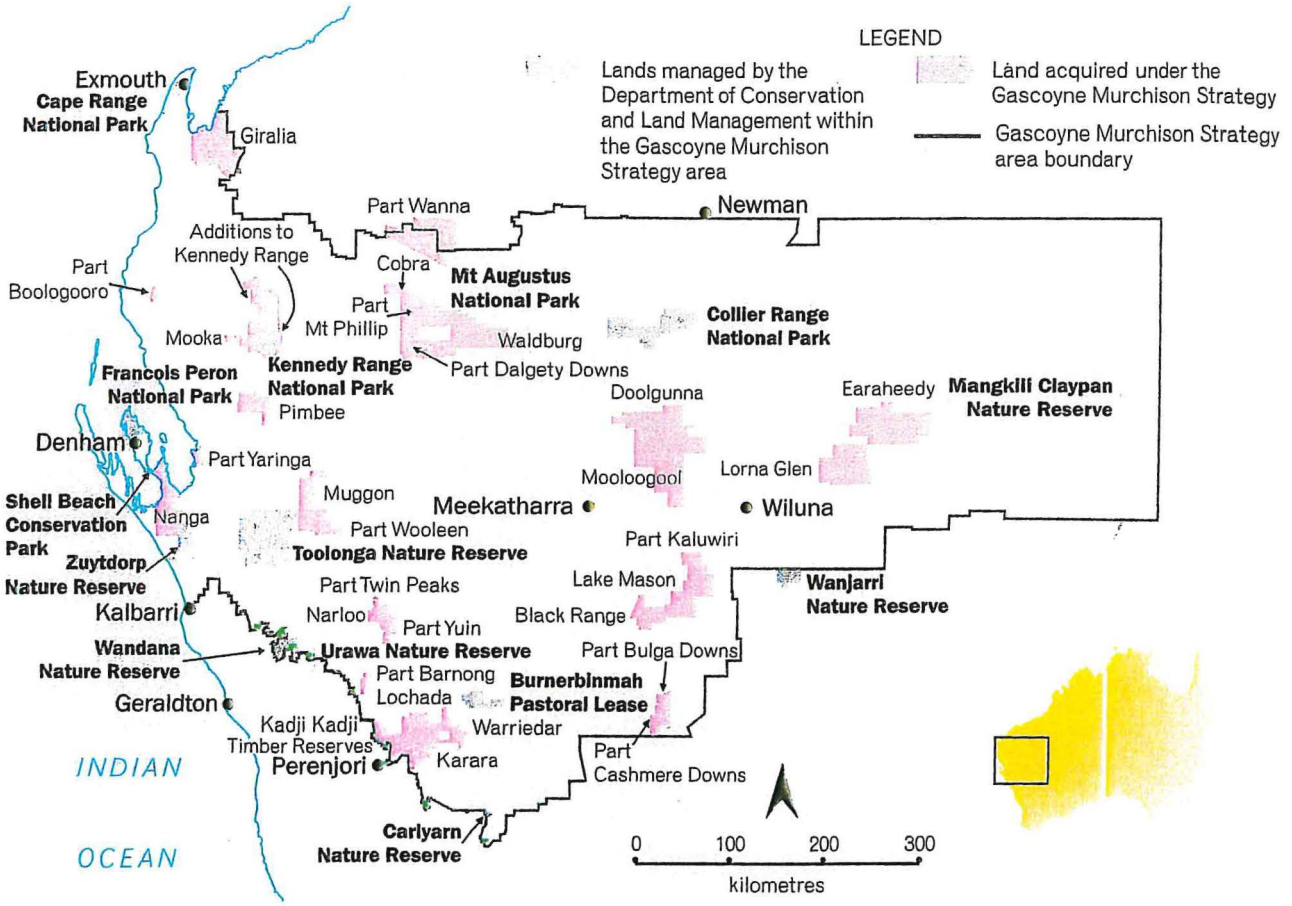
The selection process involves evaluating available land using a range



Previous page
Main Part of the Irregully Creek system now within the new reserve system in the Gascoyne.
Inset A dunnart, one of the marsupial species discovered on an inaugural biological survey at Waldburg Station in the Gascoyne.

Above Entering the section of Wanna Station purchased by CALM through Coodardo's Gap.

Left Giant gums provide important habitats for an incredible profusion of bird life in an area formerly on Wanna Station. Preservation of such places of biological significance is what the rangelands acquisition program is all about.
Photos – Samille Mitchell



of measures including vegetation associations, land systems, biological survey results, special features such as river systems, wilderness value, and the presence of significant flora, fauna or ecosystems. This information is then compared with the values protected in existing reserves, to determine how purchasing particular areas would improve the qualities of the reserve system. Ecosystems with less than 10 per cent of their original extent within the reserve system are targeted. Pastoral land with high biological diversity, in good condition, with relatively low levels of feral animals and weeds, and of adequate size is also prioritised for acquisition.

Prior to the GMS land acquisition project, just 1.4 million hectares representing about 2.4 per cent of the region were protected in conservation reserves. Following the purchase of 3,914,691 hectares of land under the project, that figure has leapt to 5.4 million hectares, representing nine per cent of the Gascoyne and Murchison regions.

While the purchase of an area more than half the size of Tasmania can be seen as a significant achievement, the increased land area in conservation reserves is not the project's most important outcome. Rather, the individual qualities of the areas purchased, and their contribution to the comprehensiveness, adequacy and representativeness (CAR) of the reserve system, is the most appropriate measure of its success. Through careful selection of land, all three CAR criteria have improved as a result of the acquisition program.

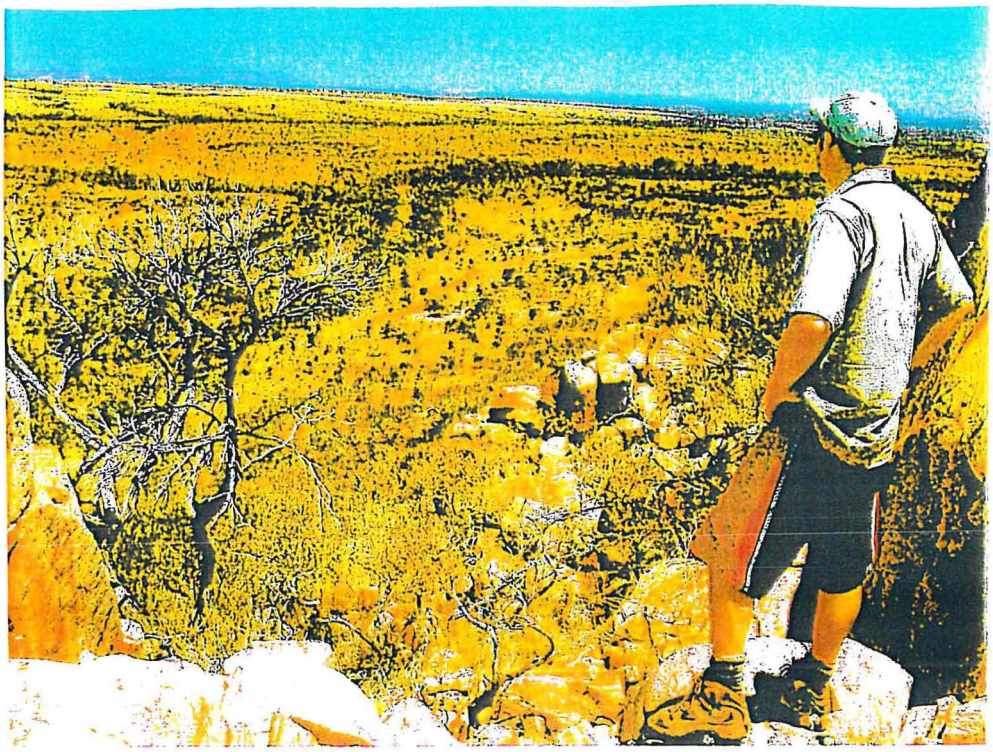
Restoring nature's balance

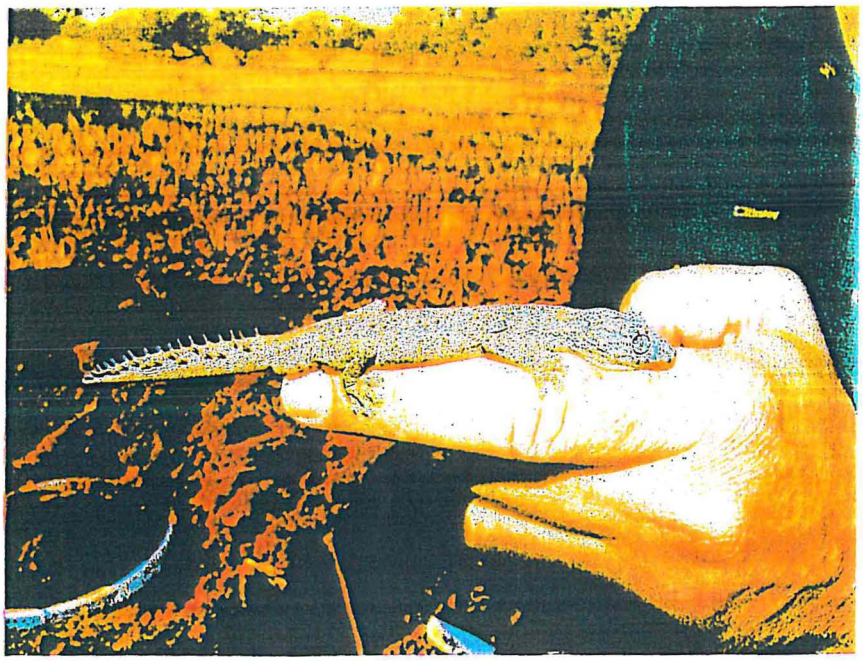
Once CALM assumes management of the land, stock is removed from the property and feral animal and weed control begins. Boundary fence maintenance, a task undertaken with neighbours, is an ongoing challenge, as domestic stock must be excluded from land managed for conservation of biodiversity. Man-made water sources are closed to discourage domestic and feral animals, and to counter unnaturally high numbers of some native species that have arisen from the provision of water. Water closures are carefully timed, to minimise impacts on native animals.

Plant and animal surveys are conducted, to provide benchmark information from which to monitor changes and improvements to populations. Biological surveys on former stations such as Muggon, Lorna Glen, Lake Mason, Black Range and Waldburg have revealed that a large variety of reptile, bird and mammal species remain, even in sometimes greatly altered habitats. In other places, there is evidence that animals, such as the malleefowl, have disappeared.

By removing one of the key threatening processes—the unsustainable total grazing pressure—the land will be able to return to somewhere near its natural state. Since Europeans arrived, the landscape has been altered dramatically as a result of pastoral management practices. Some parts of the landscape may take a long time to recover to something like their former composition and structure—and some highly impacted ecosystems may never recover to their former state.

Areas in which feral animals can be controlled may be earmarked for the reintroduction of native animals that are locally extinct, rare or patchily distributed, such as the malleefowl (*Leipoa ocellata*), boodie (*Bettongia*





lesueur), dalgyte or bilby (*Macrotis lagotis*), greater stick-nest rat (*Leporillus conditor*) and rufous hare-wallaby (*Lagorchestes hirsutus*).

CALM commences management planning by preparing interim management guidelines, which will eventually be developed into formal management plans. Interim management guidelines allow immediate action in the key areas of feral animal control, fire control, boundary fence maintenance or replacement, destocking, public safety, and management of activities such as tourism and recreation.

Wildlife and wildflowers

Flora and fauna surveys on the former stations have already turned up some interesting species. Threatened mulgaras (*Dasycercus cristicauda*) have been collected from Lake Mason. Long-tailed dunnarts (*Sminthopsis longicaudata*) have been found on Lorna Glen, Lake Mason, Muggon and Waldburg, showing this species to be more common than was previously thought. The Pilbara olive python (*Liasis olivaceus barroni*), another threatened species and the largest snake in Western Australia, has been confirmed on Wanna and a rock-wallaby species, probably Rothschild's rock-wallaby (*Petrogale rothschildi*), has also been seen on Wanna.

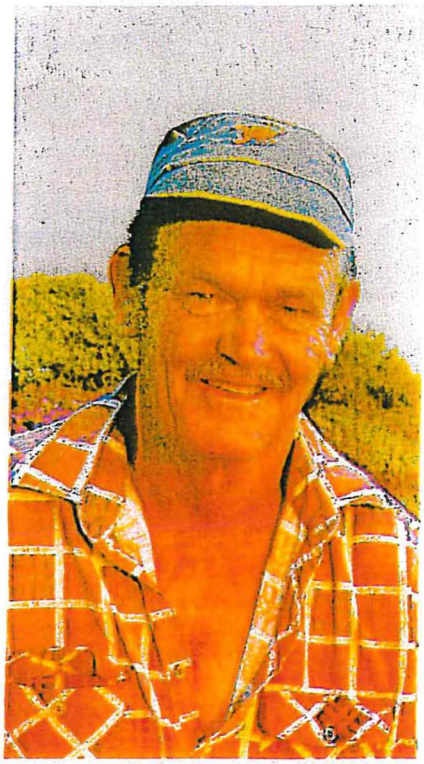
A new species of gecko (*Diplodactylus* sp.) has been found on Lorna Glen. It has long been suspected that species within this genus have been poorly described, and this likely new species is a good example of how surveys on the acquired properties are producing additional information to

Top left CALM senior operations officer Brett Fitzgerald looks to Mount Augustus in the distance from Gregory's Gap, once part of Wanna Station.

Centre left This spiny-tailed gecko was one of dozens of reptile species recorded on a CALM biological survey at the former Waldburg Station in the Gascoyne.

Left A breakaway on the former Lorna Glen Station.
Photos – Samille Mitchell

Cobra poised



Jim Millar had always longed to return to Cobra Station after first visiting 20 years ago. When CALM bought the property near Mount Augustus National Park and invited expressions of interest to develop and manage the facility, Jim finally had his chance.

Today, Jim's busy revamping the station's accommodation and retail facilities, maintaining the gardens, remodelling the swimming pool and planning for the coming tourist season. He also plans to open licensed restaurant facilities, to build a bar and pool area and to construct walktrails and a viewing platform from which guests can watch the sunset turn nearby Mount Augustus brilliant hues of red. Jim also plans to reopen a shop and provide tyres for sale.

Jim hopes that, by revamping Cobra's tourism facilities, he'll breathe new life into the region by attracting more backpackers and self-drive tourists to marvel at the nearby Mount Augustus and experience the real Australian outback bush. He hopes the property will serve as a base for scientists and students studying the region's diverse geology, wildflowers and wildlife.

"I'd like to encourage people to come out of the city and enjoy nature, to relax and come back to the reality of why we're really in the world. People living in the city lose the beauty of nature. But after leaving here their stress will be gone and they'll have different ideas of where their life is going and what's really important," Jim said.

"The restaurant will also give local people the opportunity to go out to dinner, dress up and enjoy a three-course meal. When we get the restaurant licence back and the shop operating we'll also have somewhere for people to stop in for a quiet drink—a resting place in the middle of the bush."

allow scientists to review the status of some of these species. Collections of dunnarts, from Lorna Glen in particular, have led to scientists reviewing dunnart taxonomy.

Some fascinating plants have been collected from some of the properties during a number of *LANDSCOPE* Expeditions. In the order of 460 species have been collected from Lorna Glen, and 370 species at Lake Mason. Significant plants recorded from these areas include the priority species inconspicuous grevillea (*Grevillea inconspicua*), a new species of *Acacia* and *Anacampseros*, a new generic record for the State. The discovery of *Anacampseros* is of biogeographical nterest, as it is the only Australian epresentative of an otherwise African enus in the family Portulacaceae.

ccess

Although the primary reason for urchasing land is to increase the area anaged for biodiversity conservation, mpatible activities such as tourism e allowed. CALM is currently vestigating the feasibility and issues olved in establishing tourism on ne purchased properties. David Wood from Curtin University is identifying tourism and cultural values, from which to develop tourism opportunities, under a project funded by the Cooperative Research Centre for Sustainable Tourism. The next stage of this project will be to seek further information from key stakeholders (including local Indigenous groups, pastoralists, the local tourism industry and local naturalists) about how these opportunities can be developed further or integrated with existing tourism activities.

A tourism master plan has been completed for Kennedy Range National Park that includes all of the pastoral acquisitions surrounding the park (Mooka Station plus parts of seven other adjoining leases). CALM may undertake similar plans on other properties, where tourism is identified as a compatible use.

CALM staff have commenced discussions with traditional owners and Native Title claimant groups about their interest in the acquired land, in relation to opportunities for joint management, and is undertaking broadscale surveys of areas that are significant to Indigenous people. These areas will provide additional opportunities for traditional owners to more easily access traditional lands and contribute to their management.

Using local resources

Management actions such as biological surveys, road maintenance and rehabilitation works undertaken on former stations are the same as those required in existing rangelands reserves. However, activities such as fencing, mustering stray or feral stock, managing infrastructure such as windmills and maintaining station homesteads are new skills to many CALM staff. Where possible, CALM has retained previous owners and managers, along with their extensive knowledge and experience, as caretakers to help manage the former stations. Retaining them on the land also helps to ensure that government services to rangelands communities—such as road and communications networks, education and health—are maintained.

As a result of the acquisition program, CALM staff have an increased presence in the region, to deal with a range of conservation reserve

Above far left CALM senior operations officer Brett Fitzgerald examines the slate rock formation at Pretty Pool, formerly in Wanna Station.

Above left CALM fauna officer Kathy Himbeck shows off one of the reptile species found at Waldburg Station during a biological survey.

Above Pinyuru (*Eremophila cuneifolia)* on Waldburg Station.
Photos – Samille Mitchell

management matters, community liaison, and contact with neighbours. Increased interest from the tourism industry is likely to result in greater numbers of visitors requiring fuel, accommodation and food. Other services required by CALM, such as boundary fence and access road maintenance, will be sought from local contractors if possible. In some cases, the caretakers themselves are also bringing more people to the regions. Jim Millar, on the former Cobra Station near Mount Augustus National Park (see box), is revamping its accommodation facilities and hopes to attract more visitors to the region.

Peter Woodhead, the former manager of Karara Station, 60 kilometres east of Perenjori, has been contracted as caretaker to continue to provide services, now aimed at conservation outcomes, similar to those he used when he ran the station as a pastoral business. CALM has encouraged many more people to stay on the land, in a bid to maintain rangelands communities.

CALM is working closely with rangelands communities, neighbours, Indigenous people and industries on a range of land management issues such as feral animal control, tourism, and the provision of contract-for-service opportunities.

Moving forward

Thanks to the land acquisition program, the additional 3.9 million hectares of land added to the conservation reserve system in the rangelands of WA contains a far greater representation of ecosystems than ever before. At the beginning of the program, 259 vegetation types were mapped within the region, of which only 74 (28.6 per cent) were protected in existing conservation reserves. Only 19 (7.3 per cent) of these had more than 10 per cent of their area within the reserve system. Hence, 92.7 per cent of the vegetation types within the strategy region were either not represented or under-represented. Today, 144 vegetation types (about a third of which have more than 10 per cent of their area represented) are found within the region's existing and proposed conservation reserves—almost double the previous figure.

A number of smaller ecosystems considered restricted in their distribution, and hence vulnerable to the effects of climate change, overgrazing or regular burning, are now represented in the conservation reserve system. Most of these ecosystems have more than 10 per cent of their original area protected, and some very small but unique ecosystems are now totally within the protected area system.

Despite these achievements, the reserve system still does not contain all of the different ecosystems, and some are not adequately represented. More land needs to be acquired to achieve the strategy's goal of having 10 to 15 per cent of all ecosystems within reserves managed for biodiversity conservation. Continued support from industry and government will be necessary if we are to establish and manage a truly comprehensive reserve system in the Gascoyne-Murchison rangelands.

There is also more work to do on restoring former pastoral lands. With ongoing management, and consultation with all stakeholders, these areas may eventually return to their former state. One day, the bettongs and pebble mound mice may return to their underground homes, and the barren warrens of these animals may once again house healthy populations of native mammals.

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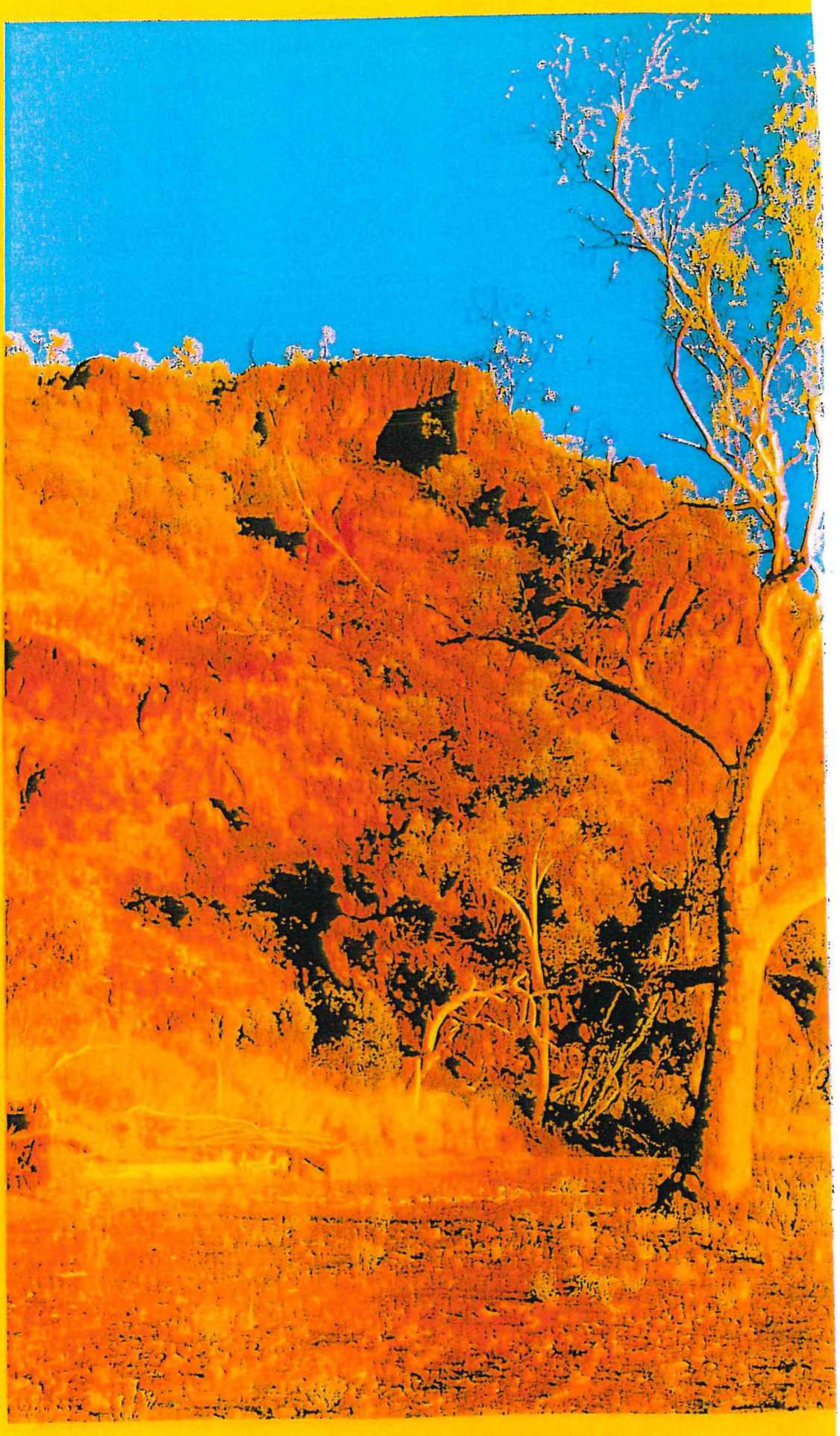
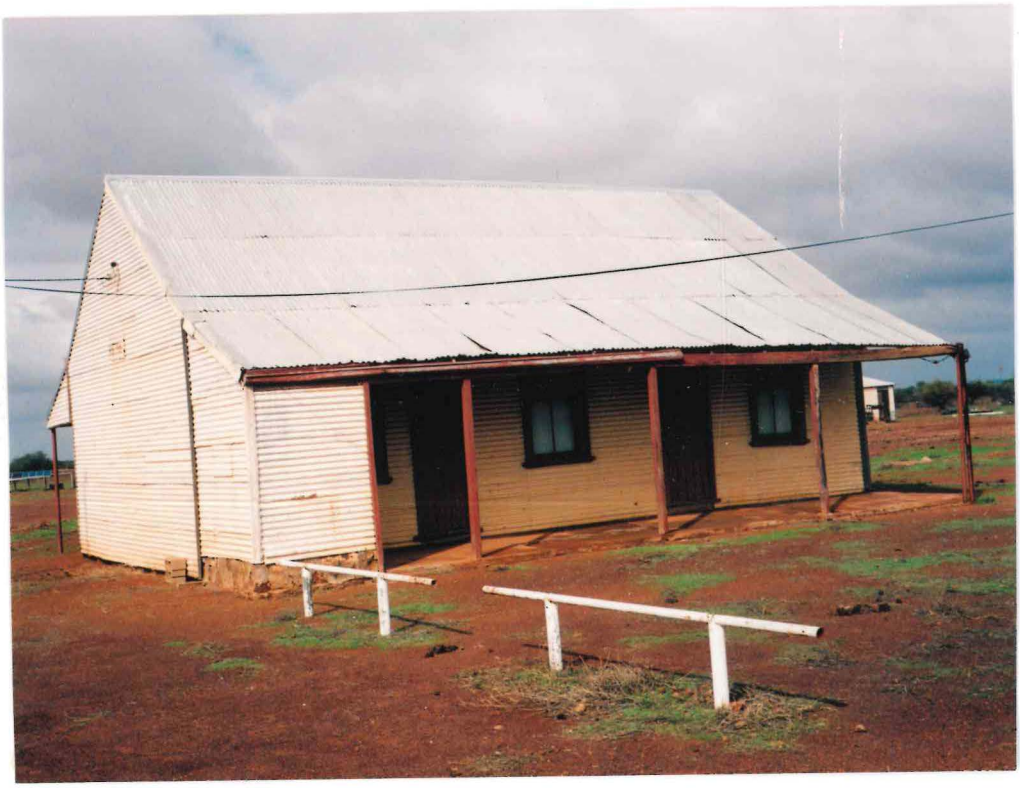
A major long-term program to acquire conservation lands in important wildflower and wildlife habitats, formerly within pastoral stations in the **Gascoyne and Murchison** regions, is breathing new life to the land. Areas once used exclusively for pastoralism will instead be managed primarily for conservation, and attract more visitors to the region.



Thundelarra Stn.

Shearer's Qtrs.
3 rooms, 3 beds. each
2 toilets + 2 showers &
" " " of
under same roof.

Kitchen + Dining Rm.
built 1918.
Large wood stove +
gas + large fridge
plenty of seating.



The station house
in distance.