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Lake McDermott BioBlitz Report



Lake McDermott Recreation Reserves
(AVON L 17715 & 31620)

September 2002

This report was prepared by: Mick Davis, Woodland Watch Project Officer, WWF-Australia

First published in August 2005 by:
WWF-Australia
GPO Box 528
Sydney NSW 2001
Tel: +612 9281 5515
Fax: +612 9281 1060
www.wwf.org.au

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For bibliographic purposes, this report should be cited as:
Davis, M. 2005, Lake McDermott BioBlitz Report 2002. WWF-Australia, Sydney.

IBSN: 1 921031 01 8

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Cover photo: Participants in the 2002 BioBlitz. Photo: Mick Davis/WWF-Australia. All other photos by Mick Davis/WWF Australia unless otherwise stated.

Acknowledgments

WWF-Australia would like to acknowledge the many individuals and groups who helped in the preparation, delivery and wrap-up of the 2002 Lake McDermott BioBlitz. Special thanks are extended to the following:

- The Shire of Mt Marshall - for hosting the inaugural BioBlitz, and for kindly providing permission for the collection of flora from their reserve;
- Paul Blechynden, Regional Manager of the Merredin Office of the Department of Conservation and Land Management - who provided invaluable support to the BioBlitz;
- Helen Pitman, our long-time and tireless volunteer, for collating the various species lists and preparing all tabulations;
- Further thanks are also extended to all of the BioBlitz Team Leaders.

Finally, a sincere thank-you to all of the volunteer participants who made the trip to Bencubbin, and the members of the local community, who contributed their time and expertise to help make the 2002 Lake McDermott BioBlitz such a great success.

Mick Davis
Woodland Watch Project Officer
WWF-Australia

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1. INTRODUCTION

1.1. Project Description

The 2002 Lake McDermott BioBlitz was a community-based, collaborative, 24-hour biological survey¹ of the Lake McDermott Reserve in the Shire of Mount Marshall. Professional and amateur biologists, ecologists and naturalists - working as volunteers for WWF-Australia (WWF) - conducted fieldwork with members of the Bencubbin and Beacon communities to document the biodiversity of one of the region's most significant local reserves. The data obtained during the BioBlitz is useful as an indicator of environmental quality, and provides baseline data for future monitoring and management of the Reserve.

1.2. Background

The 2002 Lake McDermott BioBlitz involved one of the largest, most comprehensive biodiversity survey teams put together for such an event in the Avon River Basin. The BioBlitz was organised by WWF in response to a request from the Shire of Mount Marshall and the North Eastern Wheatbelt Regional Organisation of Councils (NEWROC) - with which WWF-Australia has a partnership agreement. NEWROC previously approached WWF to seek assistance in obtaining information regarding the biodiversity values of the Lake McDermott Reserve.

1.3. Rationale

WWF conducted the 2002 Lake McDermott BioBlitz as a component of its Woodland Watch project, which aims to build community capacity and awareness of the natural values under threat in the highly diverse Avon Wheatbelt. In organising the BioBlitz, WWF assisted NEWROC and its community to learn more about biodiversity in the region and the value of remnant vegetation under its management. The BioBlitz concept is a cost-effective, volunteer-focused and community-based activity. It provides a rapid

assessment mechanism that produced rapidly acquired information on the biodiversity values of Lake McDermott for immediate use by the Shires in their bid to incorporate conservation concerns into land use planning.

The volunteer participants who participated in the 2002 Lake McDermott BioBlitz were predominantly scientists, amateur naturalists and biologists, and enthusiastic 'learners'.

1.4. Goals

The primary goals of the Lake McDermott BioBlitz were to:

- collect data on as many species, from as many taxonomic groups as possible, in a 24-hour time period;
- identify any rare and unique species that may be located in the Reserve; and
- document the species' occurrence.

Other (secondary) goals included to:

- bring specialists with considerable expertise to an isolated rural community for scientific endeavour, collaboration and advocacy;
- build links between scientists and lay community members, and between urban and rural residents;
- raise awareness of the biodiversity richness (and the natural value) of the fragile 'islands' of bush; and
- create a learning opportunity - one of the best ways to learn about biodiversity is to get out into the field side-by-side with experienced scientists and have fun while doing it.

¹ For more information on the BioBlitz process, please refer to the BioBlitz Organisational Guide (CMNH 1995) online at <http://web.uconn.edu/mnh/bioblitz/>

2. LIST OF PARTICIPANTS

About 90 individuals contributed to and/or participated in the inaugural 2002 Lake McDermott BioBlitz. The BioBlitz benefited from this impressive number of participants, from a variety of backgrounds and places-of-origin, who brought with them a broad array of knowledge and experience - both professional and amateur.

Without the efforts of the individuals listed below, and their ability to work collaboratively and generously share their knowledge of Western Australian flora and fauna, the 2002 Lake McDermott BioBlitz would not have been possible. A special thank you is extended to each of the team leaders, whose names appear in bold text below:

Alice McLellan	Dylan Korczynskyj	Meredith Korczynskyj
Alison Bigg	Eliza Wroth	Michelle Crow
Andrew Storey	Ella Peaty	Mick Davis
Andrew Webb	Greg Eckermann	Mike Bamford
Anne-Marie Hindinger	Heather Adamson	Mike Griffiths
Barry Pearson	Jane Warren	Mike McFarlane
Ben Carr	Jason Young	Myles Menz
Bevan Wooldridge	Jeff Richardson	Natalia Huang
Bill Price	Jelena May	Neville Marchant
Brad Degans	Jenny and Berwyn Walker	Nicole Hodgson
Brenden Metcalfe	Jenny Davis	Patricia Janssen
Bruce Greenop	Karen Hoddy	Paul Armstrong
Buddy Kent	Katherine McCann	Paul Leoni
Carla Miles	Chelsea	Paul Sache
Carole Elliot	Kelli McCreery	Peg Griffiths
Caroline Minton	Kenn Donohoe	Philippa Gillett
Cathy Ronalds	Kevn Griffiths	Pierre Horwitz
Cheryl Gole	Kristin Milton	Richard McLellan
Claire Hall	Leon Miller	Rob & Beth Boase
Claire McCamish	Linda Taman	Rob Davis
Colin Davis	Lisa and Paul Robertson	Ros Hegarty & daughter
Colin Walker	Lisa Mazzella	Rosemary Dougal
Dallas Lynch	Liz Fox	Rosalind Lewis
David Free	Marshall Gillett	Roy Theile
Dee Iriks	Melinda Zimmerman	Ryan Phillips
Doris Pederson	Melissa Mazzella	Sarah Robinson

Scott Tew
Sean Tomlinson
Shannon Reid
Sharna Murton
Simon Kilbane

Sonia Lance
Stephanie Degans
Steve Reynolds
Sue Graham
Tania Gordon

Tim Leary
Vanessa Harris
Vicki van Maanenburg
Yana Bolleter

3. SITE DESCRIPTION

3.1 Site Location

The Lake McDermott Reserve (AVON L 17715 & 31620) is located in the Shire of Mt Marshall, six kilometres east of the town of Bencubbin – about 273km north-east of Perth, on the Koorda- Southern Cross Road. Mt Marshall is one of 41 shires in the Avon River Basin, and is part of the Beacon River drainage system which drains into the Avon. The Avon River Basin is one of fifty-seven Natural Resource Management zones in Australia (Commonwealth of Australia 2002, 2004a). The Avon River collects water from the Yilgarn and Lockhart sub-catchments, which have their headwaters beyond the clearing line and rabbit-proof fence further to the east. Water flows intermittently, if at all, along the Avon River and its associated creek lines to meet the Swan River in the state's capital of Perth.



Figure 1 - Lake McDermott Recreation Reserve, September 1989. Intermittent flooding after heavy rain caused the playa system to fill. Water stood in these lakes for over 12 months, and interfered with infrastructure. Photo courtesy of the Shire of Mt Marshall

3.2 GPS and Map Co-ordinates

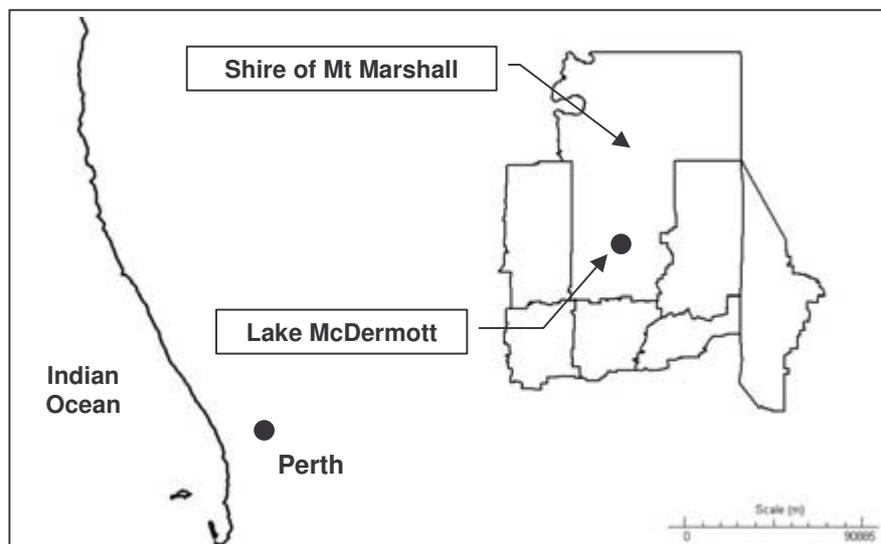


Figure 2 - Location of the Lake McDermott Reserve within the Shire of Mt Marshall. The distance from Perth is approximately 273km. Created using data from the *Avon Catchment Council's* Spatial Data Project.

Lake McDermott Reserve: Latitude **30.80°S** Longitude **117.95°E** (WGS84)
Sheet 2436 Bencubbin (1:100 000 scale)
National Topographic Map Series

3.3 Weather Conditions

The climatic conditions of the Mt Marshall area are typically those of Mediterranean warm, dry summers (December to February) and cool, wet winters (June to August) with unreliable rainfall. The Bencubbin area has been described as having an annual rainfall gradient ranging from 300mm in the southwest to 250mm in the northeast. It should be noted however, that the Lake McDermott BioBlitz was undertaken during a period of drought. Bencubbin experiences a wet season of three to four months during good rainfall years and occasionally floods (figure 1). Typical temperatures in the area range from 5.3°C to 17.3°C in the winter months; and from 16.2°C to 34.4°C during the summer months (Commonwealth of Australia 2004b). The dry climate and relatively flat

landscape means that water flows very intermittently into the Avon River and many of the drainage lines in the east have become incised. They flow for only part of the year and dry up in summer forming chains of salt lakes.

During the 2002 Lake McDermott BioBlitz, the weather varied considerably, ranging from fine, mild conditions in the mornings, to overnight rainstorms and high winds. There was even a violent dust storm on the Saturday afternoon. The temperatures recorded for the weekend were: Saturday 5.5°C to 22.8°C; and Sunday 6.8°C to 14.9°C. A total of 5.2mm of rain was recorded (CoA 2004b). Interestingly, the pioneering surveyor John Septimus Roe also made mention of a large dust storm in his recording during a pioneering exploration of the area many years ago. He had first thought it to be a large fire lit by “...a party of natives”. However, when he applied his “spy glasses” he soon found it to be a “...reeling pillar of red dusty soil, which was raised in the air by a whirlwind and carried with headlong fury to the south east...” (Broomhall 1983).

3.4 Geology and Soils

The Lake McDermott area is part of the Yilgarn Block, an ancient rigid “shield” composed mainly of Archaean granite and gneiss with some altered volcanic and sedimentary structures. These latter structures occur in what is known as greenstone belts, which are typical of the eastern goldfields. The Bencubbin area is unique in that it has two large lenses of mafic and ultramafic volcanic rocks running north-northwest to south-southeast situated between Bencubbin and Lake Wallambin (approximately 15 kilometres southwest of Lake McDermott). This is unusual as the lenses are not expressed on the surface and do not seem to affect the vegetation.

Usually these lenses are associated with harder strata, like banded limestone and quartzites that form prominent hills. The dominant landform in the Bencubbin area is granite rocks covered by alluvial material in the valleys. The granite rocks in the Bencubbin area range from 2200 to 3100 million years.

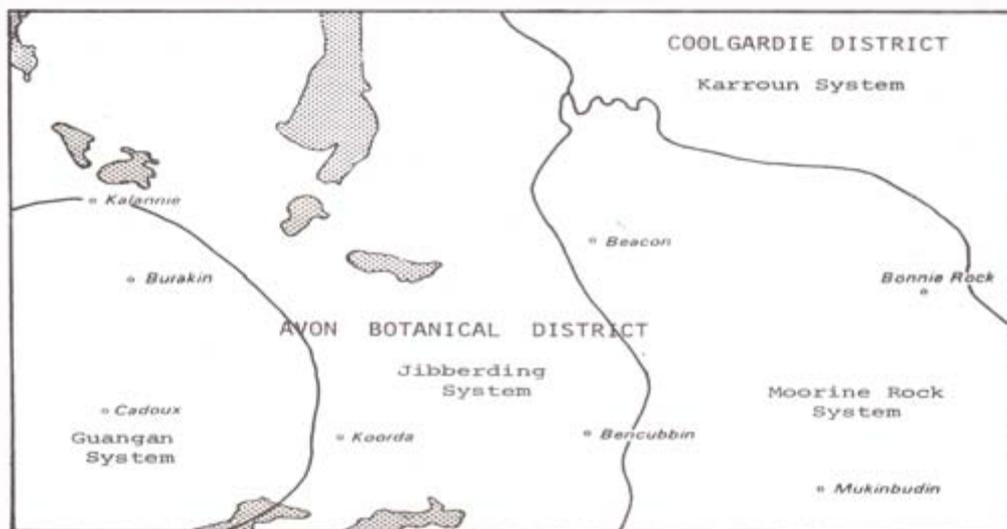


Figure 3 - Botanical Districts and Vegetation Systems of the Bencubbin region as defined by Beard (Anon 2002). The Lake McDermott System approximates the border of the Moorine Rock and Jibberding system, east of Bencubbin.

The soils of the Bencubbin area are generally 'yellow gravelly' and 'sandy' soils. On the eroded ridges and slopes these are classed as ironstone gravels or sands. Lake McDermott sits between what has been termed the Jibberding and Moorine Rock Systems (figure 3).

Here the major valleys containing salt lake systems (like Lake McDermott) are gypseous and saline loams, underlain by clayey or sandy strata at about a depth of 30cm. In the Moorine Rock system, which contains the bulk of the Lake McDermott system, there are more complex elements that come into play.

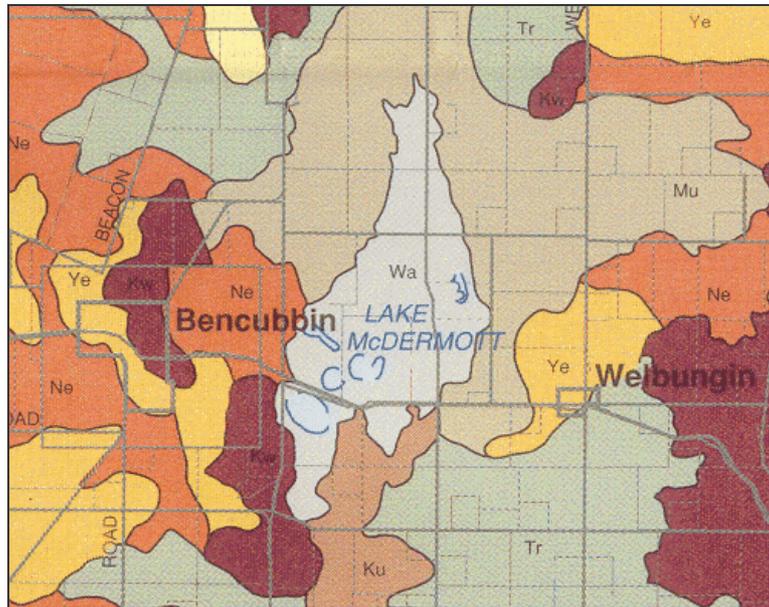


Figure 4 - Extract from landscape map of the Bencubbin area (Grealish & Wagnon 1995) showing localized soil types around Bencubbin. Lake McDermott Reserve is located on the Salt Flats.

The sandy-gravelly yellow soils form small sandplain remnants on the higher ground with frequent large granite outcrops such as Marshall Rock, surrounded by shallow stony and gritty sandy soils (figure 4).

3.5 Regional Significance of Lake McDermott

The Shire of Mt Marshall covers an area of approximately 1,034,000 hectares of which 61% is remnant vegetation (Safstrom 1999). 7.5% of this remnant vegetation cover is on private land. Almost a quarter of the Mt Marshall shire is taken up by pastoral lease, which accounts for its high percentage of remnant vegetation.

The Lake McDermott Recreation Reserve is recognised as one of the best patches of bush in the Shire of Mount Marshall, just northeast of the distinctive dome-shaped Marshall Rock granite outcrop. The 1833 hectare reserve, vested in the Shire of Mount Marshall, contains a number of natural wetlands - including Lake McDermott - which

range from being virtually freshwater - after being flushed by winter rains - to brackish, then saline - as they seasonally dry out to become dried-out playa lake systems. Predominantly red morrel (*Eucalyptus longicornis*), salmon gum (*E. salmonophloia*), white gum (*E. capillosa*) and gimlet (*E. salubris*) woodlands surround the lakes. Surrounding the wetlands are succulent steppes (chenopod shrublands) - predominantly of saltbush (*Atriplex* spp.) and samphire (*Halosarcia* spp.).

The local community primarily uses the Reserve as a ski-lake whenever it is in flood. When the floodwaters recede, locals and tourists alike visit the Reserve for bushwalking, bird watching and photography.

4. SURVEY METHODOLOGY

After extensive preparation and briefing, the BioBlitz team leaders were assigned a group of between four and six volunteers to work with during survey sessions. Each team operated independently, collecting data on their particular field, with the Team Leader responsible for returning the data at the end of each survey period.

The first survey period was conducted from 12pm to 5pm on Saturday September 14, with the second survey period running from 8am to 12pm on Sunday September 15. A couple of birding teams surveyed outside this timeframe to make the most of the dawn and dusk bird activity, as well as another group which looked for nocturnal activity on the Saturday evening as part of the 'Great Australian Marsupial Nightstalk'.

All data was collected by 12pm Sunday – within the 24hr period assigned - and was collated post-BioBlitz.

For more information on preparing your own BioBlitz please visit the Connecticut Museum of Natural History Website, <http://web.uconn.edu/mnh/bioblitz/>

5.0 RESULTS

Overall, 284 species were identified during the 24-hour period between noon on Saturday September 14 and noon Sunday September 15, 2004. These comprised 7 mammals, 15 reptiles, 52 birds, 75 invertebrates and 135 plant species.

5.1 Fauna

Of the seven mammals, four were feral (introduced) species, including the feral cat (*Felis catus*), European fox (*Vulpes vulpes*), European rabbit (*Oryctolagus cuniculus*) and domestic dog (*Canidae* sp.). Of the three remaining native mammals recorded, the Western Grey Kangaroo (*Macropus fuliginosus*) and Short-beaked Echidna (*Tachyglossus aculeatus*) (figure 5) are locally common and often seen in large patches of bush in the area. The vesper bat was the only arboreal mammal recorded during the survey period, and although a species identity was not possible at the time, it is known that these bats are common in woodlands throughout the WA Wheatbelt (Churchill 1998).



Figure 5 – Short-beaked echidna (*Tachyglossus aculeatus*) foraging for food.



Figure 6 - Granite geckos (*Diplodactylus granariensis*) found during surveys.

The two herpetological teams recorded 15 reptile species. The reptiles included 2 snakes, 12 lizards and 1 frog. The 2 snakes identified were the gwardar (*Pseudonaja nuchalis*) and the dugite (*Pseudonaja affinis*) which are both common in the Wheatbelt. The lizards comprised 7 skinks, 3 geckos and 2 true lizards. The skinks included the fence skink (*Cryptoblepharus plagiocephalus*),

western bluetongue (*Tiliqua occipitalis*), bobtail (*Tiliqua rugosa*), dwarf skink (*Menetia*

greyii) and 3 other skinks (*Hemiergis initialis*, *Morethia* sp. and *Scincidae* sp.). Bynoe's gecko (*Hererionotia bynoei*), the granite gecko (*Diplodactylus granariensis*) (figure 6) and the tree dtella (*Gehyra variegata*) were the only geckos reported. Both the true lizards were common species for the Wheatbelt, being a dragon (*Ctenophorus* sp.) and a legless lizard (*Pygopodidae* sp.). Only one species of frog was identified, being a kunapalari frog (*Neobatrachus kunapalari.*), found near one of the numerous claypans in the playa chain.

The four ornithological teams identified 52 bird species, most being passerines (song or perching birds). Of these, 23 are considered declining or remnant dependent in the Wheatbelt (pers. comm. Cheryl Gole). The declining species included: the Australian owlet-nightjar, brown falcon, brown goshawk, brown-headed honeyeater, chestnut-rumped thornbill, crested bellbird, grey butcherbird, grey fantail, grey shrike thrush, inland thornbill, red-capped robin, rufous whistler, spiny-cheeked honeyeater, square-tailed kite, striated pardalote, weebill, western gerygone, western yellow robin, white-browed



Figure 7 - Typical nest of western yellow robin (*Eopsaltria griseogularis*) in the fork of a branch in dense scrub.



Figure 8 - Robberflies (*Blepharotes* sp.) mating on a dead branch at the carpark overlooking Lake McDermott.

babbler, white-eared honeyeater, white-winged fairy wren, white-winged triller and yellow-rumped thornbill.

Although some teams also sampled for invertebrates, it was clear the surveys did not exhaustively identify the range of invertebrates in the Reserve. Only 75 species of invertebrates were collected, including spiders, cockroaches, centipedes, beetles, slaters, ants, termites, mantids, moths/butterflies, dragonflies, grasshoppers and scorpions. A more comprehensive survey would have realized a much higher number of invertebrate species.

5.2 Flora

The Lake McDermott Reserve is comprised of four main vegetation types, being:

- (a) Salt Lake (Playa) communities, including *Halosarcia* spp.
- (b) Fringing shrublands of (i) *Acacia* sp. and (ii) *Callitris* sp.
- (c) *Melaleuca* spp. thickets
- (d) Tall *Eucalyptus* sp. woodlands

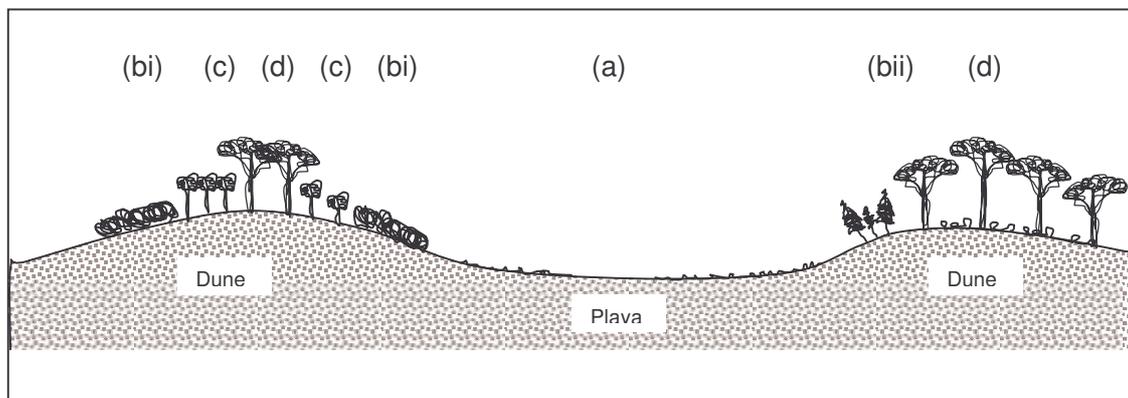


Figure 9 - Stylized cross-section of a typical playa at Lake McDermott, showing dune vegetation.

The vegetation composition was fairly uniform throughout the Reserve, with the majority of the vegetation being on the sides and crests of the numerous lake-fringing dunes (see



Figure 10 - Wilson's grevillea (*Grevillea wilsonii*) in flower. This low bush was common below *Melaleuca* spp. thickets

Figure 9). There was high variation in the vegetation structure of each dune, compared to other dunes, which resulted in a greater diversity of flora than in the surrounding landscape, which is generally fairly uniform.

The three BioBlitz botanical teams identified a total of 132 species of flora in the Reserve (see Appendix I). Several of these species were weeds (indicated by an asterisk *), including red brome grass (*Bromus rubens**), cape weed (*Arctotheca calendula**), false hairgrass (*Pentaschistis airoides**), Patterson's Curse (*Echium plantagineum**) and wild oats

(*Avena barbata**). No declared rare or threatened flora was recorded from the Reserve, nor any declared weed or pest species.

A full list of the species recorded during the Lake McDermott BioBlitz is provided in Appendix I.

5.3 Outputs

As stated in the Introduction, the primary goals of the 2002 Lake McDermott BioBlitz were to collect data, identify rare species and document the species' occurrence. Other (secondary) goals were to attract specialists to a rural environment, build links between scientists and the general community and to create an enjoyable learning experience in which to raise awareness of the importance of biodiversity in a local reserve.



Figure 11 - Volunteers getting into the action during a flora survey

to achieve the primary goals.

By attracting a variety of volunteers (figure 11), from such diverse backgrounds and with so much experience, a 'city - rural' link was developed for conservation, which brought together urban scientists and the rural landholders. Furthermore, during the course of the weekend, there were numerous instances where volunteers benefited from the extensive knowledge and experience of

The production of this report meets the primary goal of making available a list of species that occurs within the Lake McDermott Recreation Reserve, even though no known declared rare or priority species or threatened ecological communities were identified during the survey period. Of course, without achieving the secondary goals, it would not have been possible



Figure 12 - Volunteers and team leaders gathering for the opening ceremony on Saturday morning

Team Leaders, with many people showing a keenness to be involved in future BioBlitzes. Certainly, this was only possible because the event was designed to be engaging, enjoyable and community orientated (figure 12).

WWF believes that this kind of 'grassroots' community engagement and involvement is essential to obtaining the conservation outcomes that the Avon River Basin Natural Resource Management Strategy aims to achieve. Through such on-ground events the community can identify and understand the role and importance of biodiversity and the conservation of the ecosystems that contain it, now and into the future.

6. RECOMMENDATIONS

The Lake McDermott Recreation Reserve is a highly diverse playa system with significant conservation values. It harbours regionally important populations of the western yellow robin, as well as 23 other bird species that are declining or remnant dependant in the Wheatbelt. At least 284 species of flora and fauna occur in the Reserve, with the actual number likely to be much higher.

In wetter years, when the lakes would be flooded and full of water, it is anticipated that a higher proportion of non-passerine birds (non-perching birds) would have been identified. Further surveys during flood years may yield more bird species to add to those that were recorded in the 2002 Lake McDermott BioBlitz. Furthermore, a comprehensive study of the invertebrates within the bush and inhabiting the flooded lakes would also be expected to yield more than the current 75 invertebrates that were identified during the 2002 Lake McDermott BioBlitz.

Apart from its very high conservation value, the Reserve is extensively used by the local community and tourists for various forms of recreation. Currently there are no controls on its usage, however the shire of Mt Marshall is developing a management plan that will outline the threats and management requirements of the Reserve. With ongoing support from the Shire, it is anticipated that the conservation values of the Lake McDermott Recreation Reserve will be maintained, if not improved.

The data collected during the 2002 Lake McDermott BioBlitz will serve as a baseline for future monitoring of the Reserve, and provide community and conservation groups with an indication of the diversity of life that occurs in similar Playa systems throughout Wheatbelt.

The following recommendations are made:

- 1 That the Shire of Mt Marshall develops a management plan for the Lake McDermott Recreation Reserve, including a long-term monitoring

component designed to outline seasonal changes in the Reserves' wetland;

- 2 That the Shire of Mt Marshall investigates changing the status/purpose of the Reserve to include for the purpose of Flora and Fauna Conservation (in addition to its current vested purpose as a Recreation Reserve);
- 3 That the Shire of Mt Marshall investigates the implementation of a Shire of Mt Marshall Conservation Policy to protect this and other reserves of high conservation value in the Shire (similar to the Policy recently adopted by the Shire of Beverley);
- 4 That the Shire of Mt Marshall promote the Reserve as being of high conservation value, and a representative playa system unique to the northeastern Wheatbelt;
- 5 That the Shire of Mt Marshall forwards a copy of the Lake McDermott BioBlitz Report to the Avon Catchment Council with a request that the information collected from the 2002 BioBlitz be incorporated in their regional planning process.

7. REFERENCES

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APPENDIX I

Full species list recorded at Lake McDermott, 14th & 15th September 2002

Scientific Name	Common Name
Mammals (7)	
<i>Canidae sp.</i>	Dog
<i>Felis catus</i>	Feral Cat
<i>Macropus fuliginosus</i>	Western Grey Kangaroo
<i>Oryctolagus cuniculus</i>	Rabbit
<i>Tachyglossus aculeatus</i>	Echidna
<i>Vespertilionidae sp.</i>	Vesper bat
<i>Vulpes vulpes</i>	European Red Fox
Reptiles / Amphibians (15)	
Snakes	
<i>Pseudonaja sp. (?P. affinis)</i>	Dugite
<i>Pseudonaja sp. (?P. nuchalis)</i>	Gwardar
Lizards	
<i>Cryptoblepharus sp (? C. plagiocephalus)</i>	Fence Skink
<i>Ctenophorus sp.</i>	Dragon Lizard
<i>Diplodactylus granariensis</i>	Gecko
<i>Gehyra variegata</i>	Tree Dtella (gecko)
<i>Hemiergus initialis</i>	Skink
<i>Heteronotia binoei</i>	Bynoe's gecko
<i>Menetia greyii</i>	Dwarf Skink
<i>Morethia sp.</i>	Skink
<i>Pygopodidae sp.</i>	Legless Lizard
<i>Scincidae sp.</i>	Skink
<i>Tiliqua occipitalis</i>	Western Bluetongue
<i>Tiliqua rugosa</i>	Bobtail
Frogs	
<i>Neobatrachus kunapalari</i>	Kunapalari Frog
Birds (56)	
<i>Acanthagenys rufogularis</i>	Spiny-cheeked Honeyeater
<i>Acanthiza apicais</i>	Inland Thornbill
<i>Acanthiza chrysorrhoa</i>	Yellow-rumped Thornbill
<i>Acanthiza uropygialis</i>	Chestnut-rumped Thornbill
<i>Accipiter fasciatus</i>	Brown Goshawk
<i>Aegotheles cristatus</i>	Australian Owlet-nightjar
<i>Anthus novaeseelandiae</i>	Australian Pippit
<i>Aphelocephala leucopsis</i>	Southern White-face
<i>Aquila audax</i>	Wedge-tailed Eagle
<i>Artamus cinereus</i>	Black-faced Woodswallow
<i>Barnardius zonarius</i>	Australian Ringneck
<i>Cacatua roseicapilla</i>	Galah (Pink and Grey Cockatoo)
<i>Colluricincla harmonica</i>	Grey Shrike Thrush

<i>Coracina novaehollandiae</i>	Black-faced Cuckoo Shrike
<i>Corvus bennetti</i>	Little Crow
<i>Corvus coronioide</i>	Australian Raven
<i>Cracticus nigrogularis</i>	Pied Butcherbird
<i>Cracticus torquatus</i>	Grey Butcherbird
<i>Dicaeum hirundinaceum</i>	Mistletoebird
<i>Eopsaltria griseogularis</i>	Western Yellow Robin
<i>Falco berigora</i>	Brown Falcon
<i>Falco cenchroides</i>	Nankeen Kestrel
<i>Falco longipennis</i>	Australian Hobby
<i>Gerygone fusca</i>	Western Gerygone
<i>Grallina cyanoleuca</i>	Magpie-lark
<i>Gymnorhina tibicen</i>	Australian Magpie
<i>Haliastur sphenurus</i>	Whistling Kite
<i>Hirundo neoxena</i>	Welcome Swallow
<i>Hirundo nigricans</i>	Tree Martin
<i>Lalage sueurii</i>	Red-capped Robin
<i>Lalage sueurii</i>	White-winged Triller
<i>Lichenostomus virescens</i>	Singing Honeyeater
<i>Lichmera indistincta</i>	Brown Honeyeater
<i>Lophocittinia isura</i>	Square-tailed Kite
<i>Malurus leucopterus</i>	White-winged Fairy Wren
<i>Manorina flavigula</i>	Yellow-throated Miner
<i>Melanodryas cucullata</i>	Hooded Robin
<i>Meliphaga leucotis</i>	White-eared Honeyeater
<i>Melithreptus brevirostris</i>	Brown-Headed Honeyeater
<i>Melopsittacus undulatus</i>	Budgerigar
<i>Neophema elegans</i>	Elegant Parrot
<i>Ninox novaeseelandiae</i>	Southern Boobook
<i>Ocyphaps lophotes</i>	Crested Pigeon
<i>Oreoica gutturalis</i>	Crested Bellbird
<i>Pachycephala pectoralis</i>	Golden Whistler
<i>Pachycephala rufiventris</i>	Rufous Whistler
<i>Pardalotus striatus</i>	Striated Pardalote
<i>Phaps chalcoptera</i>	Bronze-winged Pigeon
<i>Pomatastomus superciliosus</i>	White-browed Babbler
<i>Rhipidura leucophrys</i>	Willy Wagtail
<i>Rhipidura fuliginosa</i>	Grey Fantail
<i>Smicrornis brevirostris</i>	Weebill
<i>Todirhamphus pyrrhopygia</i>	Red-backed Kingfisher
Invertebrates (75)	
<i>Araneae spp.</i>	Spiders (x15)
<i>Blattodea spp.</i>	Cockroaches (x7)
<i>Cherax sp.</i>	Gilgie
<i>Chilopoda spp.</i>	Centipedes (x3)
<i>Coleoptera spp.</i>	Beetles (x11)
<i>Diptera sp.</i>	Blowfly (x1)
<i>Diptera sp.</i>	Bushfly (x1)

<i>Diptera sp. (Blepharotes sp.?)</i>	Robberfly (x1)*
<i>Hemiptera sp.</i>	Bug (x1)
<i>Hymenoptera spp.</i>	Ants (x5)
<i>Hymenoptera sp.</i>	Wasp (x1)
<i>Hymenoptera sp.</i>	Wingless Wasp (x1)
<i>Isopoda sp.</i>	Slater (x1)
<i>Isoptera sp.</i>	Termite (x1)
<i>Lepidoptera spp.</i>	Moths/Butterflies (x6)
<i>Mantodea sp.</i>	Mantids (x1)
<i>Odonota spp.</i>	Dragonfly (x2)
<i>Orthoptera spp.</i>	Crickets (x4)
<i>Orthoptera spp.</i>	Grasshoppers (x9)
<i>Scorpionidae sp.</i>	Scorpion (x1)
<i>Thysanura spp.</i>	Bristletails (x3)
FLORA (135)	
<i>Acacia acuaria</i>	
<i>Acacia acuminata</i>	Jam Wattle
<i>Acacia burkittii</i>	Sandhill Wattle
<i>Acacia colletioides</i>	Wait-a-While
<i>Acacia coolgardiensis</i>	Spinifex Wattle
<i>Acacia hemiteles</i>	Tan Wattle
<i>Acacia ligulata</i>	
<i>Acacia merallii</i>	Merrall's Wattle
<i>Acacia restiacea</i>	
<i>Acacia sp.</i>	
<i>Acacia prainii</i>	Prain's wattle
<i>Acacia sp. erinacea</i>	Spiny Wattle
<i>Acacia yorkkrakinensis</i>	
<i>Allocasuarina acutivalvis</i>	Black Tammar
<i>Alyxia buxifolia</i>	Dysentery Bush
<i>Arctotheca calandula*</i>	Cape Weed
<i>Aristida contorta</i>	Bunched Kerosene Grass
<i>Asteraceae sp.</i>	
<i>Asteraceae sp.</i>	
<i>Astroloma sp.</i>	
<i>Atriplex bunburyana</i>	Silver saltbush
<i>Atriplex sp.</i>	
<i>Austrodanthonia sp.</i>	Wallaby Grass
<i>Austrodanthonia sp. (caespitosa?)</i>	Wallaby Grass
<i>Austrostipa elegantissima</i>	Elegant Feathergrass
<i>Austrostipa sp. (scabra?)</i>	
<i>Avena barbata*</i>	Wild Oats
<i>Borya sphaerocephala</i>	Pincushions
<i>Bossiaea walkerii</i>	
<i>Brachyscome sp.</i>	
<i>Bromus rubens</i>	Red Brome Grass
<i>Callitris glaucophylla</i>	
<i>Cassytha sp.</i>	

<i>Casuarina obesa</i>	Swamp Sheoak
<i>Cephalopterum drummondii</i>	PomPom Head
<i>Comesperma integerrimum</i>	
<i>Condonocarpus cotinifolius</i>	Native poplar
<i>Conostephium sp (pendulum?)</i>	
<i>Cryptandra sp.</i>	
<i>Darwinia halophila</i>	
<i>Daucus glochidiatus</i>	Australian Carrot
<i>Daviesia nematophylla</i>	
<i>Daviesia sp (aphylla?)</i>	
<i>Disphyma crassifolium</i>	Round-leaved Pigface
<i>Dodonaea sp. (inaquifolia)</i>	
<i>Dubosia hopwoodii</i>	Pituri
<i>Echium plantagineum*</i>	Patterson's Curse
<i>Eremophila decipiens</i>	
<i>Eremophila desertii</i>	
<i>Eremophila drummondii</i>	
<i>Eremophila ionantha</i>	Violet-flowered Eremophila
<i>Eremophila maculata</i>	Native Fuchsia
<i>Eremophila oldfieldii</i>	Pixie Bush
<i>Eremophila oppositifolia</i>	Weeooka
<i>Ermophyllum sp. (tenellum?)</i>	
<i>Eucalyptus brachycorys</i>	Cowcowing Mallee
<i>Eucalyptus capillosa</i>	Inland White Gum
<i>Eucalyptus salicola</i>	Salt Gum
<i>Eucalyptus salubris</i>	Gimlet
<i>Eucalyptus loxophleba ssp. lissophloia</i>	York Gum
<i>Eucalyptus yilgarnensis</i>	Yorrell
<i>Exocarpus aphyllus</i>	Leafless Ballart
<i>Frankenia sp.</i>	
<i>Glischrocaryon aureum</i>	Common Popflower
<i>Goodenia sp.</i>	
<i>Grevillea acuaria</i>	
<i>Grevillea hakeoides ssp. stenophylla</i>	
<i>Grevillea huegellii</i>	
<i>Grevillea paradoxa</i>	Bottlebrush Grevillea
<i>Grevillea sp. (levis?)</i>	
<i>Hakea invaginata</i>	
<i>Hakea preissii</i>	Needle Tree
<i>Hakea recurva</i>	Stand Back
<i>Hakea sp.</i>	
<i>Halosarcia halocnemoides</i>	Shrubby Samphire
<i>Halosarcia sp.</i>	
<i>Halosarcia sp.</i>	
<i>Hyalosperma glutinosum</i>	
<i>Jacksonia sp. (acicularis?)</i>	
<i>Keraudrenia integrifolia</i>	Common Firebush
<i>Kunzea pulchella</i>	Granite Kunzea

<i>Lawrencella rosea</i>	
<i>Leptospermum sp. (roei?)</i>	
<i>Leptospermum spinescens</i>	Roadside Tea Tree
<i>Lomandra effusa</i>	Lemon Scented Mat-Rush
<i>Lomandra sp.</i>	Mat-Rush
<i>Lycium australe</i>	(Waterbush)
<i>Maireana brevifolia</i>	Small Leaf Bluebush
<i>Maireana georgii</i>	Satiny Bluebush
<i>Maireana trichoptera</i>	Downy Bluebush
<i>Maireana carnosa</i>	Cottony Bluebush
<i>Melaleuca hamulosa</i>	
<i>Melaleuca lanceolata</i>	Rottnest Teatree
<i>Melaleuca lateriflora</i>	Gorada
<i>Melaleuca sp.</i>	
<i>Melaleuca uncinata</i>	Broom Bush
<i>Melaleuca uncinata 'terete'</i>	Broom Bush
<i>Mesembryanthemum nodiflorum</i>	Slender Iceplant
<i>Micromyrtus sp.</i>	
<i>Olearia dampieri ssp. erimicola</i>	
<i>Olearia muelleri</i>	Goldfields Daisy
<i>Olearia pimelioides</i>	Pimelea Daisybush
<i>Pentaschistis airoides*</i>	False Hairgrass
<i>Persoonia helix</i>	
<i>Persoonia sp. (saundersiana?)</i>	
<i>Phebalium sp. (tuberculosum)</i>	
<i>Podolepis canescens</i>	Grey Podolepis
<i>Podolepis capillaris</i>	Wiry Podolepis
<i>Podotheca gnaphalioides</i>	Golden Long-heads
<i>Ptilotus divaricatus</i>	Climbing Mulla Mulla
<i>Ptilotus exaltatus</i>	Purple/Tall Mulla Mulla
<i>Ptilotus gaudichaudii</i>	
<i>Ptilotus holosericeus</i>	
<i>Ptilotus obovatus</i>	Cotton Bush
<i>Rhagodia drummondii</i>	
<i>Santalum acuminatum</i>	Quondong
<i>Scaevola spinescens</i>	Currant Bush
<i>Schoenia cassineana</i>	Schoenia
<i>Sclerolaena sp (diacantha?)</i>	Grey Copperburr
<i>Sclerostegia disarticulata</i>	
<i>Senna sp. (cardiophylla / glutinus)</i>	
<i>Spinifex sp.</i>	
<i>Stackhousia monogyna</i>	White Candles
<i>Stenopetalum sp. (filifolia?)</i>	
<i>Templetonia sp (sulcata/smithiana?)</i>	Centipede Bush
<i>Thysanotus sp. (manglesianus?)</i>	
<i>Trachymene cyanopetala</i>	
<i>Trachymene ornata</i>	Spongefruit
<i>Velleia cyanopotamica</i>	

<i>Waitzia acuminata</i>	Orange Immortelle
<i>Waitzia capitata</i>	
<i>Waitzia sp (white flower)</i>	
<i>Westringia cephalantha</i>	
<i>Westringia rigida</i>	Stiff Westringia
<i>* indicates weed/introduced species</i>	

APPENDIX II

Miscellaneous photographs from the 2002 BioBlitz



Figure 13: Volunteer Karen Hoddy identifying insects on Saturday evening at the Bencubbin Sporting complex.



Figure 14: Kunapalari Frog (*Neobatrachus kunapalari*) released after identification.