PERTH WILDLIFE WATCH

PERTH WILDLIFE WATCH PROJECT 134

A community education project of
the World-Wide Fund for Nature.
Final Report by co-ordinator
Dr Boyd Wykes,
Enviro-Ed Services
December 1991.

WWF World Wide Fund
For Nature

Acknowledgements

The Perth Wildlife Watch was inspired by earlier community wildlife surveys sponsored by World-Wide Fund for Nature (WWF) in other Australian cities. Dr Ray Nias of WWF responded enthusiastically to my initial approach to conduct a similar project in Perth and supported me throughout the two-year project. My thanks also to many other WWF staff for their administrative contributions.

The Kings Park Board was a major contributor to the project, providing free of charge beautiful accommodation in the education centre over-looking Perth. It was surprising that any work got done with such a view.

The Roadside Conservation Committee provided the funds to purchase pit-fall trapping equipment to conduct the ground fauna study in Kings Park. The Department of Conservation and Land Management provided support through a number of officers - Gordon Friend with the ground fauna study, Robert Powell with gardens for wildlife, Norm McKenzie with the bat survey and Gil Field with Earth Caretakers. Perth City Council gave permission for the Mt Claremont Bush area to be used for the bird banding study. Nedlands City Council provided access to Hollywood Reserve for the Earth Caretakers programme. The Australian Bird Banding Scheme provided the facilities to conduct bird banding and W.A. regional co-ordinator Perry de Rebiera helped train the novice banders. A number of support staff and teachers of the Ministry for Education helped bring the programme to schools.

The Perth Wildlife Watch was based on community involvement and I thank for its success the many members of the public who were involved, too many to mention all here by name. Participants and supporters included members of the W.A. Naturalists Club, with thanks to Tanya Thies and John Dell in particular for their assistance; the W.A. Gould League, with thanks to Kevin Keneally; and the Royal Australasian Ornithologists Union, with thanks to Doug Watkins, Mike Bamford and Steve Ambrose.

Volunteer assistance with the mailing list was contributed by Kris Stevens, a visiting American environmental educator, with the ground-fauna project by Otto and Barbara Gleich, visiting German researchers at the University of Western Australia, and with computer analysis of the ground-fauna data by Paul Downes of the CSIRO. Terri Turner drew the attractive White-tailed Black Cockatoo logo.

This final report was edited by Karen Majer. Desk-top publishing of the newsletters and final report was by Michelle and Glen of Scribe D.T.P.

I am especially grateful to my wife Karen Majer and to my family for supporting me during a project which involved much evening and weekend work.

Summary

Purpose
The Perth Wildlife Watch was a two-year community education project, conducted from May 1989 to May 1991, funded by the World-Wide Fund for Nature (WWF), Australia. The Watch was designed to promote community awareness of, and encourage involvement in, urban conservation of wildlife and wildlife habitats. Community involvement in urban conservation is important if the majority of Western Australians, who live in Perth's suburbs, are to retain a high quality environment. Such involvement also forms a sound basis for understanding and support of the wider Australian and global conservation goals of organisations such as WWF.

Scope
A range of educational components was chosen to involve participants at a variety of levels from awareness raising activities through to assisting with biological research projects and involvement in urban conservation projects. The components were also designed and promoted to reach a wide cross-section of the urban community, including families and conservation novices, primary and secondary school students and members of natural history organisations. Activities included: wildlife diary, wildlife research, school programmes and adult education. The field activities were carried out in western suburbs of Perth.

Co-ordination and funding
The WWF grant for the Watch funded a half-time co-ordinator for the two-years, Dr Boyd Wykes, and covered operating costs such as administration, vehicle and equipment. The Kings Park Board provided the Kings Park Education Centre as a base for the project. Some activities were offered on a user-pays basis to enable the Watch to offer a wider range of activities than would otherwise have been possible. The project was assisted by several volunteers who put in considerable efforts to help co-ordinate particular activities.

Wildlife diary
The central component was a "wildlife diary" which involved people keeping diaries of local wildlife observations for personal satisfaction and for submission to the Watch. The submissions were analysed and collated into articles for a Watch newsletter which reported observations of special interest, seasonal patterns of events, conservation suggestions for gardens and school activities. Over one hundred individuals/families contributed to the diary, over thirty of them regularly. Participants included families and novice wildlife watchers from the general public, and primary school classes. As a lasting product from the Perth Wildlife Watch, it is hoped to publish a perpetual diary for recording personal wildlife observations, with hints of what to look for in each season based on contributions to the Watch.

Wildlife research
Members of the community who wanted more direct experiences with urban wildlife were able to participate in four projects, described below, to survey different groups of animals in a variety of habitats. These projects had useful research objectives but were primarily means to demonstrate that valuable and exciting wildlife survive in the suburbs and that conservation measures are needed to ensure their preservation. The research project findings provided news-worthy material for the Watch newsletters and for publicising the Watch and its objectives to the general community through press items.

(i) Ground fauna survey
The ground fauna of Kings Park, Perth's best known bush reserve, was surveyed using pit-traps with drift-fencing. Sixty-four traps, purchased with a grant from the Roadside Conservation Committee, were established by volunteer participants to survey four one-hectare blocks of bushland. The project included research on the effects of wildfire on ground-dwelling animals of urban bushland remnants and the effectiveness of adding 400 logs (by volunteer labour) to provide habitat for wildlife. Ten five-day trapping periods were conducted over two years, involving 36 individuals/families on weekends, many of these being regular participants, and 10 school classes on the weekdays. The survey recorded twelve lizard, three snake and two frog species. The only ground-dwelling mammal in the Park was the house mouse. The participants removed a total of 645 individual vertebrates from the traps, which were identified, measured and released. Clear differences were shown between the communities of the burnt and unburnt bush, but changing from one year to the next. The effects of adding logs were less apparent. Funding has been provided by the Kings Park Board for a co-ordinator to continue the project for at least the 1991-92 summer. When completed, a full scientific report on the project will be published.

(ii) Perth bird-banding project
A bird-banding project was conducted in a coastal suburban bush remnant, Mt Claremont Bush, which is recommended for conservation by the Environmental Protection Authority but is being considered for housing by the owners, the Perth City Council. The research, using mist-nets to capture bush birds for individual colour-banding, determined the species and numbers of birds that occur at the site and how the site is used by resident, locally mobile and migratory species. Banding was conducted on twenty-three Saturday mornings over the two years, involving 34 individuals/families, many regularly. Four participants completed the rigorous training required by the Australian Bird Banding scheme to qualify as B-class banders, able to initiate their own banding projects.

Six hundred and sixteen birds of twenty-two species were banded. Sixty-seven birds were recaptured at the site and several were recorded in nearby suburbs and reserves. The site was found to have unique conservation values. It supports a wide variety of bush birds which seldom survive in the suburbs, including three fairy-wren species, and massive influxes of honeyeaters for summer nectar. The plant, bird and reptile community of Mt Claremont Bush is not well represented in other reserves of the region and the site links together neighbouring reserves.

(iii) Australian Bird Count
The Australian Bird Count (ABC), a project of the Royal Australasian Ornithologists Union to survey bush bird communities, commenced during the time of the Perth Wildlife Watch. The ABC was promoted through the Watch newsletters as another way in which the public could learn about urban wildlife while contributing to worthwhile conservation research. Thirty-six information packages were distributed on the ABC in response to queries to the Watch and demonstrations of the ABC method were held for the Ornithologists Union, University Extension course students and school classes. Suburban residents were encouraged to adopt urban reserve and garden sites for their ABC surveys.

(iv) Urban bat survey
The study of urban bats by community volunteers was to be conducted as part of the Watch in a western suburbs bush reserve. Twenty-five expressions of interest were received for this project but a small team of experienced natural historians with guidance from bat experts was unable to find bats at eight apparently suitable localities. The Watch publicised this finding that urban bat populations may have experienced an unheralded crash and sought public observations of bats. Twenty definite records were received, mainly of bats found dead or roosting in house roofs. The distribution of the records supported the fear that bats are gone from inner, western suburbs. This should be further investigated and a high degree of public participation would be expected.

School programmes
(i) School ecology excursions
The public research projects of the Watch were the basis of school education components. Seven secondary school classes from biology and geography courses in years 8, 9, 10 and 11 conducted excursions which used the Watch activities such as the ground fauna survey to achieve course objectives. Two western school district Primary Extension and Challenge (PEAC) courses were also based around the Watch studies. A fee of $4 per head was charged for these courses to enable the co-ordinator to include them in the Watch commitments.

(ii) School revegetation programme
Several schools approached the Watch for advice on undertaking urban revegetation projects for wildlife. St Hilda's Girls School was assisted with a scheme to revegetate a stormwater compensation basin close to the school, using funds from a "tree tax" collected by a local businessman. City Beach Primary School was assisted to develop a native school garden that recreates the former bushland of the site. This project won an award for conservation education and represented WA schools in the National Tree Awards.

Using these projects as models, a revegetation for wildlife education proposal was submitted by the Watch to Greening Australia for additional funding. Funding was not available but the Watch co-ordinator was invited onto the GA education committee to help devise a Schools Greening Programme. This has been established, with a full-time education officer. The first of a series of "Greening Centres" has been established in the western suburbs as a base for school plant education and revegetation projects. The Watch co-ordinator spoke on habitat requirements for urban wildlife at the first teacher induction for the Greening Centre.

(iii) Earth Caretakers primary school programme
An upper primary school programme called "Earth Caretakers" was conducted by the Watch. This programme, developed by the Institute for Earth Education, was considered particularly appropriate to the aims of the Watch. It consists of a prepatory activity in the classroom through which the class decides to apply to train as earth caretakers, a day's excursion to an urban bush reserve where the children's senses are opened to the bush environment and where they learn how the bush community functions in terms of energy flow, and follow-up conservation activities supervised by parents and teachers by which the students qualify as earth caretakers. The excursion activities are conducted in small groups, supervised by two trained leaders and a teacher and parent who have attended a half-day induction. A cost of $6 per head was charged to cover leader costs.

Earth Caretakers was conducted at Hollywood Reserve in the City of Nedlands. A total of thirty teachers, parents and trainee leaders and a class of student teachers attended three inductions. Ten primary school classes trained as earth caretakers during 1990. Further classes from suburban and country schools were trained in 1991 through sponsorship from the Department of Conservation and Land Management, and the programme is to be continued in 1992.

Adult education
Structured Watch education courses were offered to adults through the University Extension programmes. One of these involved all of the wildlife research activities of the Watch and another taught how to promote wildlife in urban gardens. Many talks, lectures and workshops as well as displays at appropriate functions were conducted to publicise the Watch and communicate its objectives to the general public, teachers and members of special interest organisations.

Review
Within its two-year time frame and limited geographical scope, the Watch achieved its objectives of raising community awareness of urban wildlife issues and encouraging community involvement in learning about urban wildlife. The activities of the Watch were varied and offered "something for everyone" in terms of age and levels of experience of participants and in terms of the degree of interaction people wished to undertake, from garden diary observations through handling scorpions and snakes to wading in swamps at night to net bats. The Watch stimulated people to take measures in gardens and reserves to maintain and improve habitat for wildlife.

Many of these projects are carrying on beyond the Watch. Those involved and many others who became interested through publicity surrounding the Watch, are now more likely to support organisations such as WWF in tackling the wider national and global conservation issues.

A healthy number of people participated in the Watch but there was obviously scope for greater community involvement, particularly in the Wildlife Diary. Matching sponsorship for the WWF grant to enable employment of the co-ordinator for more than part-time would have helped, but the State government rejected a WWF approach at the outset of the project and private sector support was becoming increasingly difficult to obtain during the period in which the project was conducted. This lack of additional support also meant that the project was not based within an appropriate organisation. This was in contrast, for instance, to the Victorian Wildlife Watch which was conducted through the Department of Conservation, Forests and Lands. A co-ordinator of a project such as the Watch would benefit greatly from being amongst colleagues, particularly given the distance between WWF headquarters and Perth.

Much of the credit for the success achieved within the constraints of budget must go to the community volunteer assistants, who contributed particularly to administration of the diary and to co-ordination and data analysis for the ground fauna project. Success of the project was also due to the enthusiasm of the Perth community, who greatly appreciate the values of their still rich urban environment.

The future of WWF in Perth

Community awareness of and involvement in urban wildlife conservation in Perth is now well established. The timing may be right for WWF to be represented in Perth to further WWF's wider goals, perhaps supported through a volunteer group formed around the participants in the Perth Wildlife Watch.

Contents

1. Introduction

1.1 Background
The Perth Wildlife Watch (PWW) was a two year community education project conducted from May 1989 to May 1991. Its aim was to raise community awareness of and involvement in wildlife conservation issues in Perth. The project was inspired by previous WWF supported urban wildlife projects in other States - Brisbane, N.S.W. and Melbourne. However, PWW was funded on a smaller scale, achieved by restricting field education activities to the western suburbs of Perth.

The Watch was based at the Kings Park Education Centre and co-ordinated by Dr Boyd Wykes in a half-time position of 20 hours per week, funded by WWF. However, more hours were added by a charge to participants for some suitable components ofthe Watch. Assistance was provided by community volunteers, in particular from the W.A. Naturalists, W.A. Gould League and by officers of government departments, particularly the Kings Park Board, Department of Conservation and Land Management, W.A. Museum and Education Department (see acknowledgements).

1.2 Objectives
The objectives of the Watch were to:
- raise community awareness of wildlife in "the suburbs" and issues affecting its survival,
- encourage residents to preserve and improve garden habitat for wildlife,
- increase community support for establishment and good management of urban wildlife reserves,
- build on urban conservation awareness to promote the wider goals of the World-Wide Fund for Nature and of conservation in general.

The education philosophy for the Watch was that positive change in people's attitudes and behaviour concerning the natural environment must be fostered through good experiences in that environment. Educators can then effectively teach knowledge, values and skills to give people the ability to put the caring into effective action.

The components of the Watch were therefore chosen to:
- involve people in discovering for themselves the wildlife of the suburbs and relationships between habitat and wildlife communities,
- include some scientific survey activities with public participation to provide special opportunities for people to interact with wildlife and to contribute to our overall knowledge of urban wildlife,
- include schools programmes to assist teachers in enrich the conservation components of various subjects with field studies of urban wildlife.

1.3 Components
The central component of the Watch was a community diary. Diaries of wildlife observations in the suburbs were kept and copies submitted to the Watch as a means of raising public awaress of and involvement with urban wildlife and habitats. This component was aimed at a large audience of the general public, particularly families, people with a developing interest in wildlife and school children.

Opportunities for greater involvement with urban wildlife, for development of wildlife study skills and for making a contribution to urban wildlife conservation were offered through field survey programmes. The Watch co-ordinated a bird-banding project in a threatened urban bush remnant, a ground-fauna trapping survey in Kings Park and a survey of urban bat distributions. These components were available to fewer participants than the diary but including general public and school groups as wellas natural history enthusiasts. The Australian Bird Count was supported by the Watch as another avenue for extending the involvement of the general public once interest and confidence were raised through keeping diaries.

More structured education programmes were also offered in order to extend from interest in urban wildlife to the knowledge, skills and action required for actual conservation. These programmes were:
- secondary school excursions - teachers tailored their excursions around Watch components such as the ground fauna project to meet curriculum objectives;
- "Islands for Wildlife" - a programme devised to encourage schools to undertake revegetation projects, assisted by skilled local volunteers;
- University Extension - holiday courses on urban wildlife for adults, based on the other components of the Watch;
- "Earth Caretakers" - a programme from the "Institute for Earth Education" for upper primary school students, involving a day's excursion to an urban nature reserve during which the students develop their awareness and understanding of wildlife and undertake tasks to help conserve the natural environment.

The relationships between the components and the target audiences are shown in the matrix below.

	General public	School children	"Naturalists"	Teachers/leaders
Wildlife diary	•	•	•	
Ground-fauna survey		•	•	
Bird-banding project		•	•	
Aust. Bird Count	•		•	
Urban bat project			•	
Islands for wildlife		•		
University Extension	•			•
Earth Caretakers		•		

1.4 Implementation

Preparation for the Watch commenced in May 1989 and the public was involved in its activities from spring 1989 until summer 1991. The various components were wound-up or converted into continuing programmes under other sponsors in 1991.

1.5 This report

This final report of the Perth Widlife Watch provides detailed summaries of the various components of the project. It begins with some general comments on the regional context of the project - an overview of major urban wildlife habitats in the western suburbs of Perth, pressures on wildlife habitat as Perth's population expands, other urban wildlife studies being undertaken and the growing public interest in conservation.

For each of the chapters on the components, there is a statement of objectives, description of methodology and implementation and an assessment of the degree of success in meeting the objectives. Each chapter concludes with a reviewof the component covering difficulties encountered, any work to be completed, any aspects which will be continued through additional sponsorship, and any advice to others who may develop similar projects in the future.

Relevent material for each chapter that could not be included in the main report has been compiled as an appendix to the WWF master copy. This has not been reproduced with bound copies of the report.

There's a nature zoo in our backyard

POST, May 30, 1989

Dr Boyd Wykes with a friendly creature that was once common throughout the POST's distribution area. This Gould's monitor is one of only a few in Bold Park. But there are still plenty of other native birds and animals that survive in our suburban environment and you can get involved in helping to preserve them. "There's a nature zoo in our backyard" - page 11.

2. The Regional Context

2.1 Conservation reserves
Map 1 shows the many reserves for wildlife habitat in the focal area of the Watch, the western suburbs.

The two principal bush reserves are Kings Park, of 400ha (two-thirds bush), and Bold Park, of over 300ha. These are separated by suburbs but including a number of small parks such as Hollywood Reserve, attached to Karrakatta Cemetry, and as yet undeveloped blocks such as CSIRO land in Wembley Downs.

To the north, Herdsmans Lake is the major wetland of the region, with reed and open water habitats supporting a rich aquatic community with a large variety of birds. Other wetlands include Perry Lakes, set in parkland adjacent to Bold Park and Lake Claremont, south of Bold Park. Several golf courses are strategically located as wildlife corridors between the reserves and lakes. Only small areas have been reserved in the western suburbs north of Herdsmans Lake, such as Star Swamp in North Beach.

The western suburbs are bounded to the south by the Swan River Estuary and to the west by the Indian Ocean, both of which are lined by strips of remnant natural vegetation, important for supporting particular wildlife communities and as corridors for movement.

2.2 Perth's development debate
The upsurge of interest in Perth's wildlife, including through the Perth Wildlife Watch, has come at a critical time in Perth's development.

Perth suburbia has been expanded dramatically in recent years, with consequent conflict between development and conservation interests. For instance, suburbia now stretches 27km from Perth to the north of PWW's activity area, with little habitat reserved for conservation. A bitter confrontation continues between the community and government over whether hundreds of hectares of bush ear-marked for subdivision at Hepburn Heights should be retained as another "Kings Park".

Those areas that have been set aside for conservation are deteriorating in the many ways to which small urban reserves are susceptible. The Kings Park bushland, for instance, has degenerated from eucalypt forest to a woodland of banksia and sheoak through inappropriate fire regimes and weed invasion. However, the reserves have not suffered as much from isolation as might be expected because large tracts of unreserved land have remained undeveloped and because Perth home blocks have been large enough to retain natural vegetation, particularly tall trees.

This is now changing with moves to slow down the urban sprawl by consolidation of existing suburbs. In the western suburbs, land that formed bush 'corridors' between Kings Park and Bold Park is being developed, housing is surrounding wetlands such as Herdsmans Lake, and suburban councils are allowing strata splitting of previous house lots.

The Watch became fully involved in this urban planning debate through the bird banding project at Mt Claremont (Chapter 6).

The hope of the Perth Wildlife Watch was to make a significant contribution through a high profile community project to urban conservation at this critical time in Perth's planning.

2.3 Information base
Despite the variety of important wildlife habitats remaining in the Perth metropolitan region, surprisingly little was known until recently of the natural communities. The recent upsurge of interest can be partly attributed to the poor economic climate forcing researchers to stay closer to home.

The flora of the Perth region has recently been compiled (Marchant *et al*, 1987) and Robert Powell (1990) has written an excellent book on Perth's tall shrubs and trees which contains fascinating items on wildlife associations. Robert assisted with a Watch summer school course for adults on encouraging wildlife in gardens (Chapter 12).

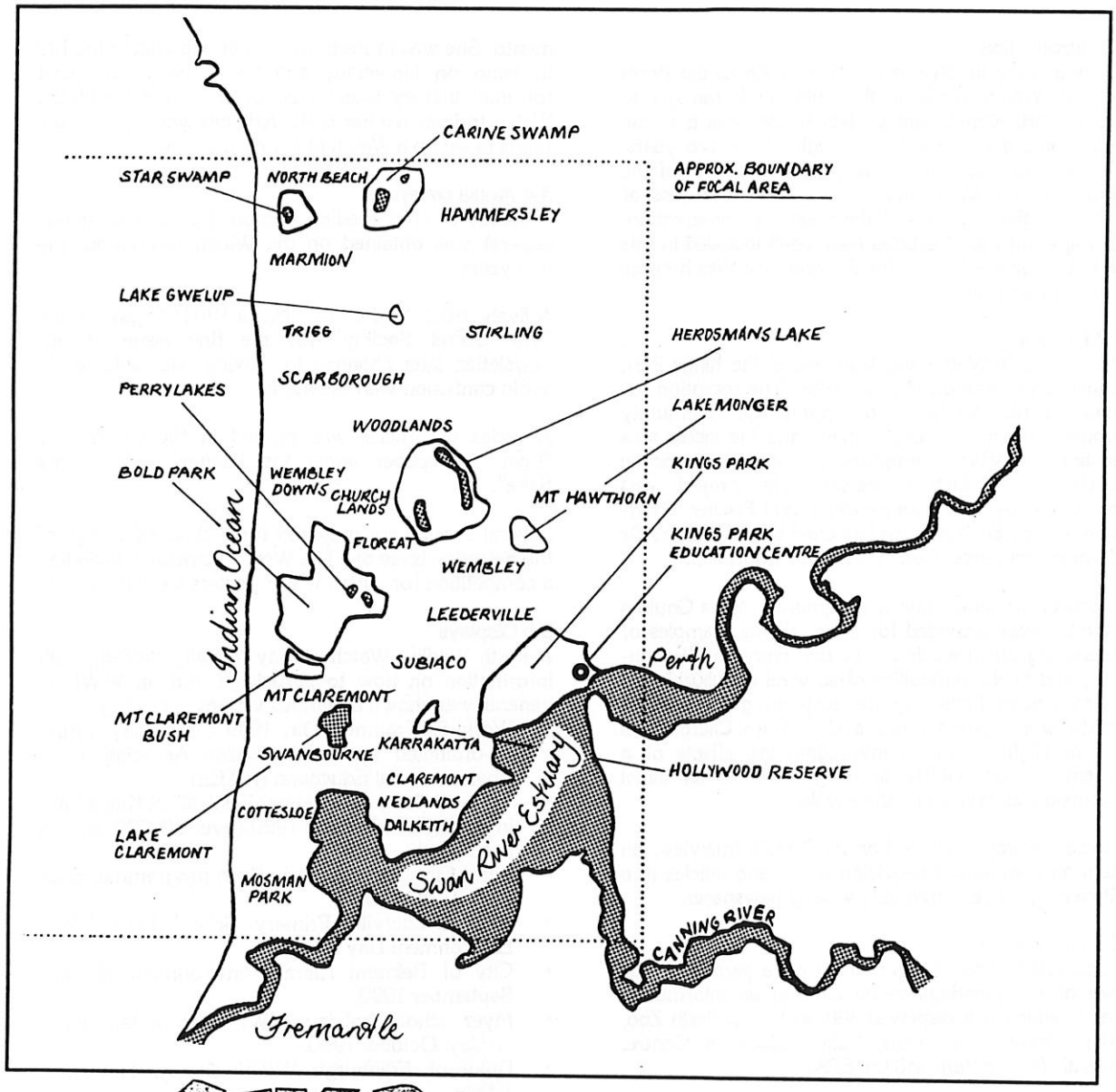
Bird species lists have improved greatly with the RAOU Metropolitan Bird project, involving 130 volunteers (Van Delft 1988). The Australian Bird Count (ABC) began during the time of the Perth Wildlife Watch and is gathering the additional vital information on avian population sizes, habitat and dispersal (Chapter 7).

Reptile knowledge was extremely poor until the WA Museum began a ground fauna study of three sites, including Bold Park in the western suburbs, in 1988. A reptile-frog list of over 25 species for Bold Park came as a welcome surprise. The Watch provided an opportunity to conduct similar sampling at the other major western suburbs reserve, Kings Park, which has never been formally surveyed for wildlife or managed on a wildlife basis (Chapter 5).

Few native mammal species survive in Perth, particularly in older suburbs. Only the Brush-tailed Possum and some bats remain in the western suburbs. Norm McKenzie, bat researcher with the Department of Conservation and Land Management (CALM), advised that several bat species should occur and that they should have healthy populations. However, no research had been conducted until the Watch (Chapter 8).

2.4 Community interest in conservation
The Watch was conducted at a time when the Perth community along with most of the world was showing unprecedented interest in the environment and conservation. For many people, activities such as recycling rubbish had been the major way they could make a direct contribution to environmental problems. The Watch was an opportunity to extend people's actions into nature conservation.

Map 1. The Western Suburbs Focal Area of the P.W.W.



WESTKIDS

THE WEST AUSTRALIAN
SATURDAY OCTOBER 14, 1989

Wildlife watch

Compiled by Dr Boyd Wykes, Perth Co-ordinator, World Wildlife Fund.

KIDS! If you'd like to be a Wildlife Watcher, get an exercise book and rule it up like this (I've included some examples from my diary).

Name.....Age.....
Address.....
.....

Animal	Place	Suburb	Date
Tawny Frogmouth	Bush	Bold Park	July 13

Notes: It was sitting on a dead branch right out in the open, it stretched out pretending to be a branch when I got close.

Animal	Place	Suburb	Date
Magpie	Lawn	Kings Park	July 30

Notes: One magpie in family at the War Memorial had bands on its legs — green over silver on its right leg and black over orange on its left one.

Try to keep some notes each day. Send me a photocopy of your diary at the end of this month and I'll send you some more information about the 'Watch' and a Wildlife Watcher Badge.

Mail your diary observations to: **Perth Wildlife Watch, Kings Park Education Centre, West Perth, WA 6005.**

3. Promotion

3.1 Introduction
A community involvement project such as the Perth Wildlife Watch needs all the publicity it can get to attract participants. The project began with a public launch and was promoted throughout the two years. The best publicity serves the greater objectives of the project at the same time - increasing awareness of urban wildlife values and the need for conservation. Examples of media articles have been included in this report to give a feeling for the way the Watch came across to the public.

3.2 Launch
Perth Wildlife Watch was launched at the Kings Park Education Centre on May 25 1989. The reception for over 50 representatives of appropriate community groups, government departments and the media was hosted by WWF committee member Prof. Bruce Davis of Murdoch University. The project was introduced by WWF Patron Mr David Fischer, Chairman of the R&I Bank, and launched by the Premier Dr Carmen Lawrence, then Minister for Education.

A pair of orphaned Tawny Frogmouths and a Gould's Monitor were provided for the media as examples of interesting urban wildlife to be discovered by "Watchers', and of the difficulties of survival in suburbia for many species. Following the reception, guests and the media were invited tojoin a class from Churchlands Senior High School to investigate the effects of a recent fire on wildlife in Kings Park as an initial excursion supervised by the PWW.

Media coverage included an ABC radio interview, an item on commercial television news, and articles in a State daily and a community weekly newspaper.

3.3 Information
Local artist Susan Tingay kindly gave permission for two of her paintings to be used in an information panel, which was displayed with leaflets at Perth Zoo, Kings Park, Herdsmans Lake Education Centre, Atlantis Marine Park and the EPA.

A series of leaflets was produced to explain what the Watch was about and the various ways everyone could be involved, from keeping a diary through to conducting a school excursion or banding bush birds. Over 400 information/instruction packages were mailed out in response to requests.

A computer file was established to record names and addresses of all people who inquired for further information.Those who participated in the diary or any of the other projects were then upgraded accordingly to receive an "I'm a wildlife watcher" badge (designed for the Victorian Wildlife Watch) and Watch newsletters. Volunteer Kris Stevens established and maintained the computer files. Kris is interpretation supervisor of the Effie Yeaw Nature Centre in Sacramento. She was in Perth for a year accompanying her husband on University sabbatical. We were most fortunate that she took a bus-person's holiday with the Watch to improve her skills. Kris has since gained the funds to set up a Watch at her own centre.

3.4 Media coverage
A steady level of media exposure (radio, T.V., newspapers) was obtained on the Watch throughout the two years.

A lively article in the Daily News 10/11/89 gave a title "The Secret Society" for the first issue of our newsletter, later changed to "Living with wildlife" to avoid confusion with the mafia!

A series of articles was printed in the community "Post" newspaper under the banner "For Earth's Sake".

Several items were prepared for a children's page of the Saturday issue of "The West Australian", including a competition for which WWF posters were the prize.

3.5 Displays
A Perth Wildlife Watch display (usually staffed), with information on how to participate and on WWF in general, was shown at various venues, including:

- World Environment Day 1989 community forum, co-ordinated by the Australian Association for Environmental Education (AAEE),
- the week-long "Wildflower Festival" at Kings Park in Spring of 1989 and 1990 (over 30 000 visitors each year),
- Perth City Council's Bold Bush programme, Bold Park April 1990,
- West Leederville Primary School Fete, World Environment Day 1990,
- City of Belmont Library environment display, September 1990,
- Myer school holiday WWF feature talk and display, October 1990,
- Duke of Edinburgh WWF display, November 1990.

3.6 Talks
Talks were given on the PWW to a variety of audiences including Kings Park Staff (May 89), Ornithological Union (May 89), Friends of Star Swamp (June 89), Friends of Bold Park (July 89), WA Wildflower Society (July 89), Kings Park Volunteer Guides (August 89), Perth City Council environment awareness meeting (Nov. 89), Library Educators meeting (March 90), Perth Wildlife Watchers (May 91), "Groundwork" local action group (June 90), Kings Park Guides (March 91).

The talks were often enlivened with splendid slides of urban wildlife taken by volunteer Otto Gliech.

"THE SECRET SOCIETY"

Newsletter of the Perth Wildlife Watch

Spring 1989

"Wow, I didn't realise you were down here fella!"

Secret Society Exposed by Peter Hancock, Daily News, 10/11/89.

WHILE we go about out daily routine a secret society flourishes around us.

A furtive movement, a frantic flurry of wings or a sudden call may give one of its members away.

We might even surprise one lurking in our back garden and gaze into eyes that view the world in an entirely different way.

For within the apparently ordered surrounds of the suburbs, wildlife abounds.

Unlike the bush, the urban sprawl is almost impossible for naturalists to penetrate.

Obstacles such as walls, fences and guard dogs hamper the kind of surveys needed to construct an accurate picture of what goes on in the gardens of the metropolitan area.

Nevertheless, it is vital that we find out what creatures have adopted the suburbs as their home, how they have adapted and what we can do to ensure their survival.

With the support of the World Wildlife Fund, the WA Gould League, the WA Naturalists Club and the Kings Park Board, Dr Boyd Wykes of Perth Wildlife Watch has set out to do just that.

Based on the concept that each of us has a responsibility to the animals that share our blocks of land and frequent the surrounding suburbs, Dr Wykes has launched a simple campaign that involves the entire community.

All you need is a sheet of paper, a pen or pencil and a pair of sharp eyes.

4. Wildlife Diary

4.1 Introduction

A wildlife diary was considered the best way to involve a large number of the general public in wildlife watching in the suburbs. Through becoming aware of the wildlife still to be found in gardens and nearby bush remnants, people are likely to value and preserve the remaining habitat and improve their gardens and neighbourhoods for wildlife. This awareness through personal experience and local action can then be extended to awareness and action on broader conservation issues.

The diary was a project for everyone, whether youngster, family, school group, novice or experienced naturalist. To achieve this goal, it was decided to make the diary a personal record of interesting wildlife observations rather than a scientific survey that would require training of participants and vetting of the records.

4.2 How the diary was established

The diary project was supported by the W.A. Naturalists and the W.A. Gould League, with advisory assistance from John Dell and Kevin Keneally. A broad-sheet on "Keeping track with a wildlife diary" was distributed with all handouts on the Watch, so that everyone would be encouraged to participate even if they chose not to make further enquiries about other activities. Several thousand flyers were distributed from dispensers at various appropriate localities such as the Perth Zoo. The flier suggested several ways to record observations and a master sheet was included for those wanting a simple format. Articles on the diary were published in newspapers and school and natural history club magazines. In addition, some school districts published the master sheet in district circulars so that schools could begin immediately.

4.3 The participants

Over 100 individuals/groups made contributions and of these over 30 individuals and families became monthly diarists for at least a year of the project. Most of these "regulars" were relative novices to natural history - parents encouraging children, individuals taking up a hobby and glad of encouragement. Few experienced naturalists, such as members of the W.A. Naturalists and the R.A.O.U., contributed. They have their own newsletters in which to publish observations of interest and seemed to see the diary as more appropriate for novices. Teachers found the diary a useful tool during units covering wildlife and conservation but were unable to make a continuing commitment. The diary was also considered by specialist teachers as a good approach for encouraging written expression, particularly in remedial classes where writing could be inspired by excursions and be presented in note form.

4.4 Newsletters - feed back to participants

The diary contributions were not in a form that could be readily analysed. Instead, theme subjects were identified from summary notes made on all of a season's contributions. These subjects were then expanded into newsletter articles, combining diary contributions with other reference material and posing challenges to encourage further watching. For instance, "Night Life Of Perth" appeared in the first newsletter (Spring 1989), bringing together some reports of owls and frog mouths and calling for records of bats and possums. Copies of all newsletters are attached in the Appendix.

Regular columns of diary observations were included in later newsletters - "Stories of the seasons" with expanded items for each month, "Diary highlights" with short interesting snippets allowing many contributors to gain a mention, "Gardens for wildlife" on sightings and hints for homes and "School's out and about" for school contributions.

4.5 Perpetual diary

A perpetual diary is planned for publication as a lasting product of the Watch (funding permitting). For each week of the year, the diary will have space for several year's entries and some snippets of likely seasonal wildlife happenings based on findings of the PWW. Appendices will provide guides to common animals and plants of Perth. Drawings were solicited from participants in the PWW, some of which could illustrate the publication, but professional illustrations will also be needed.

4.6 Review

The diary was successful in its objective of gaining many participants who were not experienced natural historians. This was a major achievement considering that many conservation initiatives seem to mainly reach the "converted". Positive responses were received from the regular participants on their enjoyment of the activity, their satisfaction in contributing to the newsletter reports and their growing confidence in being able to interpret urban wildlife observations.

An improvement for any future programme of this sort might be to predetermine the diary subjects for each season. This would enable reference material to be prepared as the project progresses and for participants to better build up their knowledge and observation skills. For instance, winter in the first year might be a time for only frog records, preceded by distribution of identification material and a talk and field trip. Spring could be for bush birds and flowers, summer for reptiles and autumn for fungi. Different topics could be added the second year, such as waterbirds in the second winter, while observations on groups already covered could be continued.

5. Ground Fauna Survey

5.1 Introduction

There are many attractions to the public in being involved in conservation research in this age of environmental interest. Equally, our research efforts can be greatly enhanced by direct public assistance.

This two-way benefit was well demonstrated in the ground fauna survey at Kings Park. King's Park is Perth's best known reserve. The 400ha of bush and parkland was reserved in 1890. The Kings Park Board is responsible for managing the Park but has never surveyed the wildlife. There is therefore little basis for wildlife to be considered in management.

However, we do have some wildlife information. Bird surveys were conducted by Harry Recher in 1986 using the same methods employed by Dom Serventy for counts between 1928 and 1937 and 1952 to 1955 (Recher and Serventy 1991). Many of the original woodland bird species have become locally extinct, mainly it appears as a result of past burning policies.

The aim of the survey at Kings Park was to find out whether fire is causing similar problems for ground fauna, particularly for the vertebrates. This was done using pit-traps sunk into the ground - a method which has seldom been used in community involvement studies but one that seems appropriate given the unskilled but arduous labour required to set up the traps and the ease with which captured animals are handled. The timing of the Watch project was opportune because an arsonist's fire had burnt out half of the bushland at the beginning of that year, followed by heated public debate about the consequences for plants and animals.

The research results of the ground fauna project will be published as a separate report. The results presented here cover the community involvement/education aspects of the project without detailed habitat descriptions, statistical analysis of data and scientific discussion.

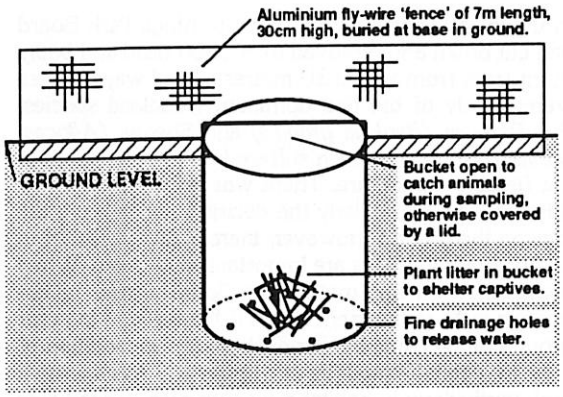
4.2 Research description

Advice

Permission to conduct a pit-fall trapping study in Kings Park was obtained from the Kings Park Board and CALM. Dr Bob Dixon, botanist at Kings Park was appointed liaison officer. Two zoologists experienced in ground-fauna research were approached to advise on methods and help train participants in handling, identifying and measuring the animals. These were John Dell of the W.A. Museum and Dr Gordon Friend of CALM. Application was successfully made to the Roadside Conservation Committee of the State Government for a $1300.00 grant to purchase the traps.

Pit-trap method

The trapping method was based on the research technique being employed elsewhere in WA by CALM and the Museum so that results will be comparable. The traps were plastic buckets set flush into the easily dug sand, with fencing to direct animals into the traps.



Between trapping periods, the traps were sealed with tightly fitting lids. Labels were placed on the lids and inside the traps to tell any concerned public that this was a conservation research project. There was no intentional vandalism during the two year period but a few drift fences were pulled up, probably inadvertently by dogs.

Four adjacent one hectare blocks were marked out in the bushland of Kings Park in early spring of 1989. Sixteen pit-fall traps were established within each one hectare block, at 20 metre intervals, giving 64 traps in total.

Measuring affects of fire

Two of the 1ha blocks were in the half of the park burnt six months earlier on January 4th 1989. The other two were in woodland not burnt for at least six years. Comparison of captures for the next two years gave an indication of what populations of ground fauna were affected by fire and how populations altered as the vegetation re-established.

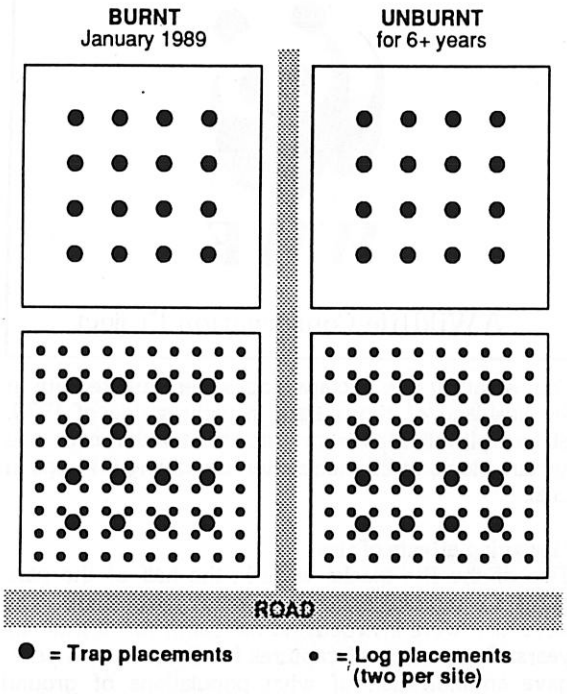
Measuring the value of logs

An additional level of comparison was enabled by the availability of hundreds of logs which could be returned to the bush as cover for wildlife.

In the interests of public safety, the Kings Park Board had cut down and removed over 1000 dead and badly burnt trees from within 30 metres of pathways. These were mainly of the two dominant woodland species, Bull Banksia *(Banksia grandis)* and Sheoak *(Allocasuarina fraseriana)* which suffered up to 70% death in the fierce summer fire. There was public criticism of this removal, particularly the decision not to leave the logs on the ground. However, there is little research to demonstrate that logs are important for wildlife. When approached on this matter, the Board agreed to co-operate in an experiment to see if the value of logs for ground fauna could be demonstrated. If so, addition of logs to habitat could be an important management tool, particularly in habitat remnants such as road-side verges and urban reserves.

Logs were returned to one of the burnt 1ha blocks and to one of the unburnt blocks in early August 1989. The other two blocks were left without addition of logs as 'control' comparisons. The logs, which had been sawn up for removal, were about 1 metre long and 0.3 metre diameter. Pairs of logs were placed at 10 metre intervals, 200 logs per block, 400 logs in total.

Lay-out of the four 1ha survey blocks in Kings Park bushland.



Trapping timetable
Ten trapping periods were conducted between October 1989 and December 1990.

The traps were opened for five-day periods, beginning on a Friday morning for each period. Traps were cleared of animals early on each of the five mornings. The lids were replaced at the last clearance.

Measurements
Animals were detected by stirring the litter in a trap with a stick to check for dangerous species. Each animal was then scooped up in a plastic cup and transferred to a carrying bucket, each trap having an equivalently numbered carry bucket. Some species such as large lizards were held in clothbags. The carry buckets were taken to a central measuring station where the animals from each trap were recorded. Invertebrates were identified to the level of order and vertebrates to species. The only measurement taken on invertebrates was length. Total length, snout-vent length and weight were taken for vertebrates. Some of the larger species of lizard were individually marked by clipping the last joints of toes but this practice was discontinued in the second year because it distressed participants. All records were transferred to a 'D-base' on computer.

5.3 Community participation
Participants
Volunteers were attracted through the general Watch fliers, with more detailed information available on request, and through newsletter items and talks for appropriate organisations such as Kings Park Volunteer Guides, the W.A. Naturalists and Education Department Districts. Newspaper coverage was sought once the project was underway. Participants were kept in touch by a regular feature in the Watch newsletter, covering results and future survey dates.

Beginning at 8.00am on the Saturday and Sunday of each of the ten trapping periods, members of the general public rolled up to help clear the traps and identify and measure their contents. General public were also welcome on the Monday, Tuesday and Wednesday mornings but special effort was made to involve school classes on these days (Chapter 9). An average of about four adults and four children attended on weekend days, and two or three adults on week-days either assisting the co-ordinator clear the traps or helping supervise the school groups. Thirty-six individuals/families participated in the project, many regularly, and ten school classes attended.

Setting up the logs and traps
Community participation began with a working-bee, systematically placing 280 of the necessary 400 logs through the survey area on a Saturday in August 1989. The hard-working team of a dozen volunteers was guided by officers of the Kings Park Board, CALM and the W.A. Museum.

The remaining 120 logs were placed by a group of three boys and their leaders on a Department of Community Services programme. The idea of working raised a few complaints from the boys but they soon began to take pride in their contribution to the project and returned later to help sample animals. The pit-traps and drift-fences were installed on a second weekend working-bee.

Surveying
Once instructed and supervised for a few traps, participants were co-ordinated to clear lines of traps. Everyone was involved in seeing the catches and helping identify, using vertebrate and invertebrate keys, measure and record. Animals were returned to the bush close to their capture points.

For school classes of up to 30 students, all of the traps in the burnt blocks were cleared prior to the class arriving and the students helped process these catches while hearing about the project aims and methods. They then helped clear the unburnt blocks. Through a past Kings Park Board activity, the unburnt blocks had a series of paths enabling a class to walk through while an instructor and student attended traps. While waiting their turns, the other students helped those with captives in their carry buckets to make preliminary identifications.

5.4 Co-ordination and training
Firstly, a permit to conduct such an educational/scientific project was obtained from the Department of Conservation and Land Management.

Co-ordinating community participants for pit-trapping needed careful planning, particularly as many had not handled wildlife before. Some species are poisonous and the Kings Park Board had expressed fears about damage to vegetation.

For establishing the project, instructions were given on how to place logs and install traps to minimise damage to mature vegetation in the unburnt blocks and the new shoots in the burnt blocks. Instructions were also given for self-care, particularly to avoid back injuries. Unfortunately, Kings Park has an unapprehended rapist and strict guidelines were needed on working in pairs and plain-clothed police were regular visitors to our activities.

Our expert advisors attended on the first sampling weekend to help train recruits to handle and identify captured fauna. Novice participants on all occasions were shown how to tread carefully in the bush, how to avoid unearthing the drift-line fence, and how to stir the contents of the traps to check for dangerous captives such as scorpions. One University student ignored this last instruction as she became more confident and gave us a rare confirmed record of the effects of a bite from the large scorpion Urodacus novaehollandiae - locally painful then a headache.

Volunteer co-ordinators
Early in the programme we were most fortunate to have two visiting academics join the project and take on the task of co-ordinating volunteers . Barbara and Otto Gleich were undertaking physiological auditory studies on bob-tailed skinks at the University of Western Australia and embraced the opportunity to see these and other reptiles in their habitat. As well as participating in virtually every day's activities for their year's stay, the Gleich's wrote up newsletter items and activity notices on the Ground Fauna Survey, took close-up slides of many of the animals and began the tedious task of transferring the records to computer.

5.5 Results of the fauna study
Vertebrate species and abundance
The only native mammal remaining in Kings Park is the Brushtail Possum (*Trichosurus vulpecula*) and the only mammal we trapped was the introduced mouse. Nor were any bats recorded (Chapter 8).

However, a rich array of reptiles and frogs was recorded in the study area - 12 species of lizard, three species of snake and two species of frog. There were 645 captures of vertebrates in total. These are listed below, showing the numbers of each species caught for each survey period. Also shown are capture numbers for the species recorded in the only previous known study in Kings Park, an unpublished report by Robert Browne-Cooper. He ran three 28m lines each of 11 pits in the period September to December 1985.

Invertebrate community
It was beyond the scope of this project to identify many of the invertebrates to a level that would make the results particularly useful for detailed interpretation. However, the data do give some indication of changes in food supply for many of the vertebrates with season and habitat alteration.

Effects of fire and returned logs
The graphs on the following pages of total vertebrate and invertebrate captures over the two years show numbers caught in the four treatment blocks.

Some examples for individual species show that populations in the four treatments appeared to differ for many species and some distribution patterns appear to change from year 1 to year 2. Responses to fire are the most obvious. Many species had very low numbers after fire, such as the striped skink *(Ctenotis fallens)*. Others appreciated the post-fire conditions of open ground layer and vigorous regrowth, such as the wall skink *(Cryptoblepharus plagiocephalus)*. Some populations which were reduced after the fire recovered in year 2 such as *(Menetia greyii)*. The turtle frog *(Myobatrachus gouldii)* did not seem affected by the line at all. Differences in population due to return of logs were less apparent. Nothing definite can be concluded as to whether return of logs is a demonstratable benefit to the ground fauna until a full statistical analysis is completed. The greatest benefit may not occur until the logs provide refuge during the next fire.

A scientific report on the ground fauna project is being prepared for publication and for the Roadside Conservation Committee, which provided equipment funds. Computer storing and statistical analysis of the results are being undertaken with the assistance of a volunteer on the project, Paul Downes of the CSIRO (also see note below on continuation of the study). Copies of the scientific report will be submitted to WWF on completion.

Ground fauna project - Kings Park vertebrate pit-fall captures

	Browne-Cooper 1985	1. 7-12 Oct 1989	2. 18-22 Nov 1989	3. 16-20 Dec 1989	4. 17-21 Feb 1990	5. 24-28 Mar 1990	6. 19-23 May 1990	7. 30 June-4July 1990	8. 22-26 Sept 1990	9. 3- 7 Nov 1990	10. 1-5 Dec 1990	TOTAL
Mammals												
Mus musculus House Mouse		2						4	1	3	1	11
Lizards												
Cryptoblepharus plagiocephalus Wall Skink	18	6	4	18	6	3	4		1	5	2	49
Ctenotus fallens (a striped skink)	19	1	8	18	5	30				16	20	98
Ctenotus lesuerii (a striped skink)	3		3	4		3				2	3	15
Hemiergis quadrilineata Yellow-bellied Skink	104	9	28	110	4		4		2	4	11	172
Menetia greyii (a small grey skink)	12	25	13	22	6	5	6	2	5	27	12	123
Morethia obscura (small grey skink)	2	1									1	2
Omolepida branchialis (large pale skink)			2									2
Pogona minor Western Bearded Dragon	2	6	5	8	1	1			1			22
Tiliqua rugosa Bob-tailed Skink		2	1	2			1		3	3	1	13
Aprasia repens (small legless lizard)	10		8							2		10
Lialis burtonis Burton's Legless Lizard	4		1	4						2		7
Phyllodactylus marmovatus Marbled Gecko			2									2
Diplodactylus polyophthalmus Wood Gecko	1											
Snakes												
Pseudonaja affinis Dugite *1			1									1
Ramphotyphlops australis (blind snake)	6		1							1		2
Vermicella bimaculata Black-naped Snake											1	1
Vermicella bertholdi Jan's Banded Snake *2												
Frogs												
Limnodynastes dorsalis Banjo Frog		2		2							2	6
Myobatrachus gouldii Turle Frog	9	3	1	34		9	3		15		48	113
TOTAL		57	78	222	22	51	18	6	28	65	98	649

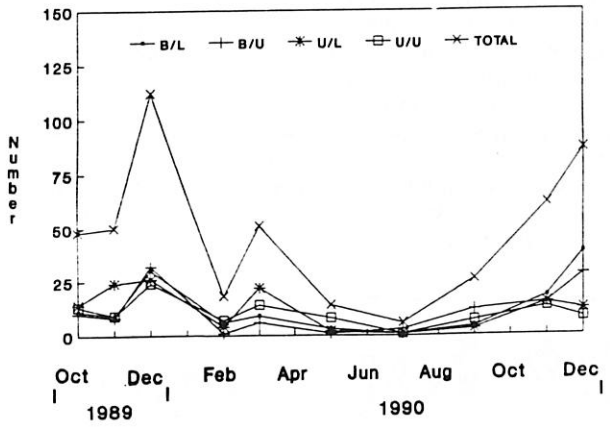
* 1. The one metre dugite was disturbed when attacking a Bearded Dragon in the trap and fled rather than being a true capture; the dragon was kept for observation as it was sluggish and died twelve hours later.

* 2. Jan's Banded Snake was observed by a Board Officer elsewhere in the park during the study.

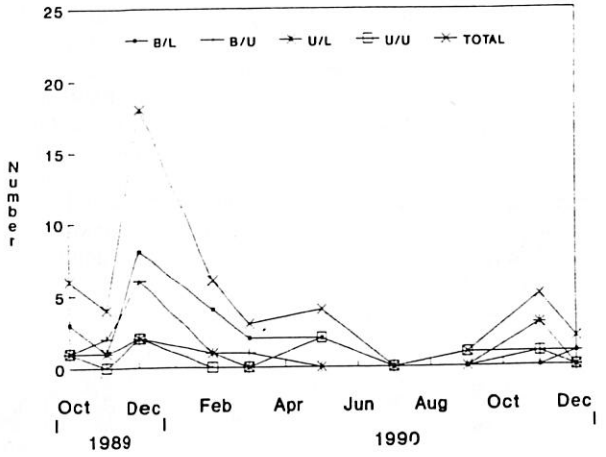
KINGS PARK GROUND FAUNA

B/L burnt, logs returned; B/U burnt, logs not returned
U/L unburnt, logs returned: U/U unburnt, logs not returned

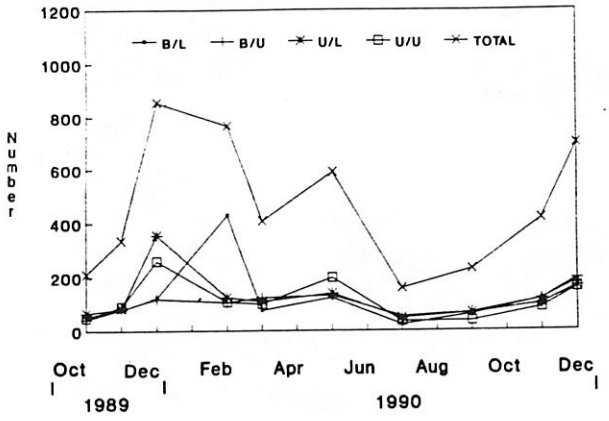
VERTEBRATES



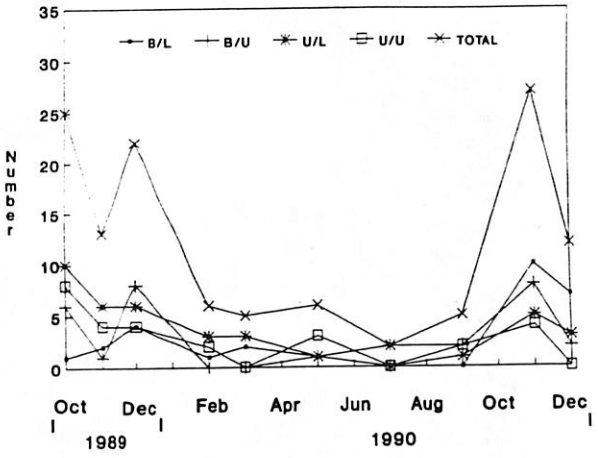
Cryptoblepharus plagiocephalus



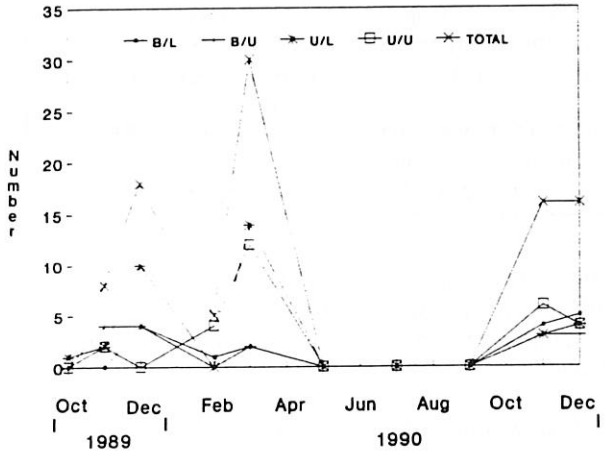
KINGS PARK GROUND FAUNA INVERTEBRATES



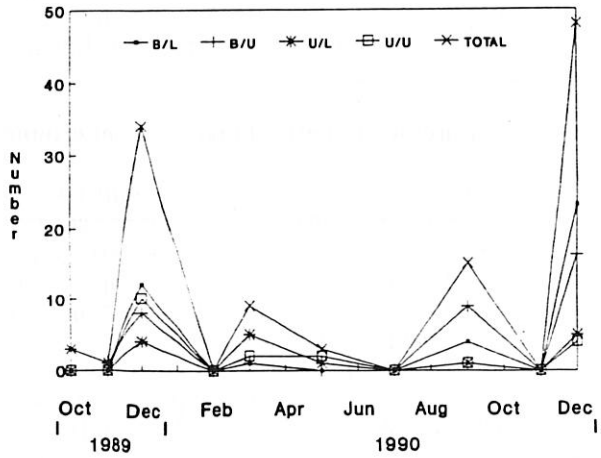
Menetia greyii



Ctenotus fallens



Myobatrachus gouldii

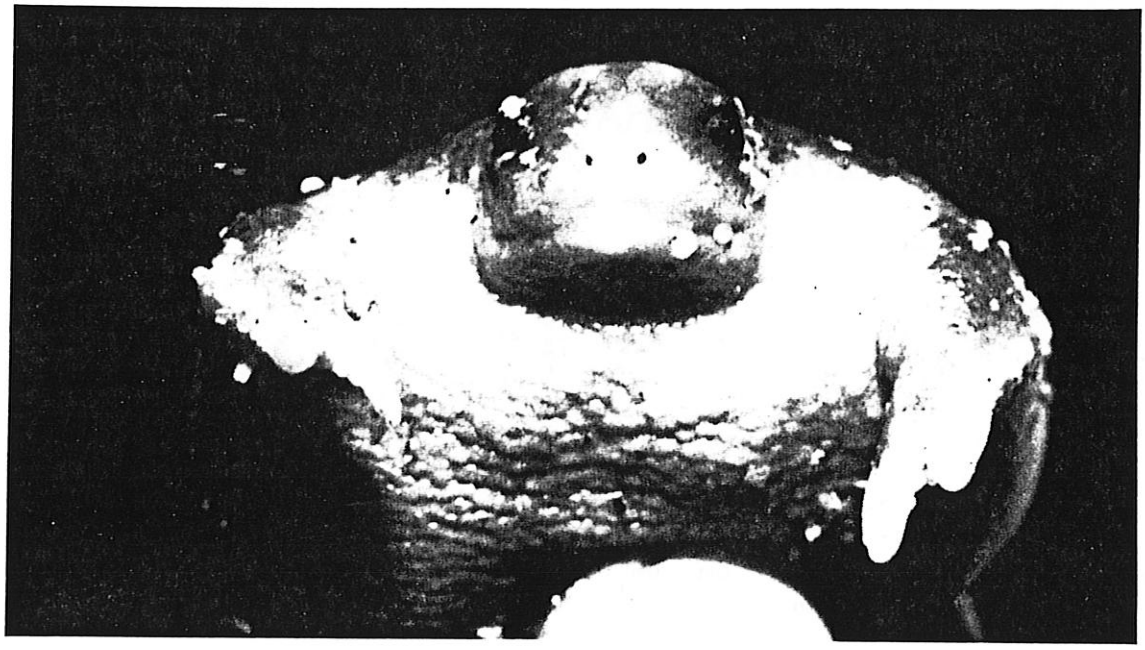


5.6 Review

The ground fauna adults, survey successfully involved families and schools from a wide-range of levels of expertise. The participants gained rich experiences interacting with the wildlife, many skills in handling, recognising and measuring invertebrate and vertebrate ground fauna, knowledge of the habitat requirements of many seldom seen bush animals and how the habitat can best be managed. The greatest satisfaction for participants was knowing that they were making a significant contribution to maintaining the wildlife in Perth's most important urban reserve.

This project has been so successful that the Kings Park Board has been seeking funds to continue for at least a further year despite the present restraints on budget. This first study in one hundred years on fauna recovery after a fire in Kings Park is important for management and an opportunity for a similar future study is unlikely. The Board was unable to make a commitment until late October 1991 when $2000 was set aside. This will enable a supervising researcher to work with volunteers for three sampling periods over the 1991/92 summer.

Fire no fright for frog



A bushfire-proof turtle frog

Which creature survived the Kings Park bushfire best?

Answer: the turtle frog.

Hundreds of them were snug and safe, underground, where they spend much of their lives.

This discovery has been the happiest finding of perhaps the world's first attempt by community volunteers to determine the faunal population of a major park by setting traps.

Dr Boyd Wykes, of the World-Wide Fund for Nature, released the last little turtle frog last week from the mixed haul of creatures caught in 64 traps set around the park.

He would like to have the traps set again for the next two years to check the population, but the project has run out of money.

It needs $4000 to hire a properly trained co-ordinator for the operation.

"The turtle frog is a very special frog," he enthused. "It feeds on termites and much of the time it lives underground like a mole. It doesn't need surface water for breeding."

Some creatures have retreated to the unburnt areas of the park, but others are back in among the ashes.

Dr Wykes said that the results were encouraging overall.

The park needed fire, but at intervals of about 10 years, not two years.

Volunteers had helped to set the traps and tally the catch.

If the census project gets money to continue next year, they would help again.

SUBIACO POST,
December 11, 1990

6. Perth Bird-Banding Project

6.1 Introduction

Colour banding is useful for finding out about numbers, survival and movements in bird communities. This information is needed for planning and managing habitat reserves for birds. Colour banding projects to investigate bird communities of Perth are needed for several reasons:

- Perth is not only a rapidly expanding population centre but is also consolidating, with high density developments eliminating many wildlife refuges and movement corridors within the established suburbs;
- little is known about our suburban bird communities, how they survive, disperse, migrate and recruit in suburbia, what mix of garden and natural habitat reserves different species need for residence in suburbia, or how populations of species are changing;
- banding of urban birds has not been taken up by Perth's amateur natural historians, in contrast to the well-established banding networks of other capital cities.

The Perth Wildlife Watch was an excellent opportunity to encourage community interest in studying urban bird populations through banding. The project allowed a small group of dedicated participants to train as banders and carry on with further projects after the Watch, while a wider circle of occasional participants were enriched by the experience. This direct action component of the Watch, along with the ground fauna survey, proved particularly valuable as a means of providing new and reliable discoveries for newsletters and publicity, to flesh out the less solid information sent in by participants to the Diary component.

5.2 How the project was established

The banding site was obtained through an approach to Perth City Council. Peter Luff, Controller of Parks and Gardens, gave permission to operate in a near-coastal bush remnant in the western suburb of Mt Claremont which we named the Mt Claremont Bush. The site, tucked away amongst sand dunes and housing, was little visited by the public and liable to be developed by the Council at some future date - a perfect opportunity for conducting banding without undue interference and with the possibility that the results would be of use in planning decisions.

A project proposal was submitted to the Australian Bird Banding Scheme (ABBS) and an A-Class Banding Licence was applied for by the co-ordinator. The first banding session was run under the supervision of Perry de Rebiera of the CSIRO Wildlife Division, who is the Western Australian Regional Co-ordinator for the ABBS and a skilled banding trainer.

Banding was conducted once a month, on Saturday mornings from first light, with cancellation in unsuitable weather. Twenty-three Saturday morning sessions were conducted between July 1989 and May 1991. Six to eight mist-nets were erected at sites amongst vegetation where sun and wind did not make them obvious to birds. The nets were checked at 15 minute intervals. Any captives were extracted under supervision and taken in carry bags to a central station where all participants could observe the banding.

6.3 Community participation

Participants were recruited through newsletter items, talks to the W.A. Naturalists and the Royal Australasian Ornithologists Union, and through a general invitation in publicity for the Watch. All Watch participants were kept informed of progress and banding dates through regular articles in "Living With Wildlife", the Watch newsletter.

Thirty-four people/families participated in the bird-banding project with an average of eight people at each of the 23 sessions. The maximum attendance was 14, which was about the desirable upper limit for this activity. Most participants came once only to see banding in action and be shown the unique urban bird community of the site. They ranged in age from primary school students to retirees.

Four of the regular participants have now qualified as B-class banders with the Australian Bird Banding Scheme (ABBS), able to operate on their own and able to obtain A-class permits when they wish to undertake projects of their own. To qualify, the trainee banders also needed to band with other supervisors to meet the rigorous requirements of the ABBS. Two trainees and the Watch co-ordinator joined the Honeyeater Banding Expedition to the Nullarbor in January 1990, sharing Dr Stephen Davies' station with adult University Extension students from Perth. The Watch expedition team banded 271 birds, mainly honeyeaters. The four trainees and the co-ordinator assisted Frank Doyle of the RAOU to band bush birds around the AMC Mineral Sands wetlands at Capel for a weekend in December 1990. Some also assisted Perry De Rebiera with his banding projects, and participated in night-time wader banding on the Swan Estuary with Mike and Mandy Bamford.

6.4 Results of the banding study

A total of 49 species of birds were recorded at the site, with an average of 20 per survey. This is an unusually varied community for a small bush reserve without surface water in an urban region.

Six hundred and sixteen individuals of 22 bird species were banded over the two years. A further 67 recaptures were made of previously banded birds. A number of sightings were reported of colour-banded birds in the surrounding western suburbs. The furthest was about 10km away - an adult, male White-cheeked Honeyeater caught by a cat in February 1991, having been banded three months earlier.

Analysis of the banding data (measurements, ageing, moult, resightings in the study area) has not yet been conducted and will be more fruitful when further data have been obtained. Any reports will be forwarded to the WWF.

6.5 Conservation of the study site

Plans to develop the Mt Claremont Bush site were announced by the owners, the Perth City Council,

Bird-banding study - Mt Claremont Bush sightings & captures

SPECIES	29/7/89	19/8/89	16/9/89	14/10/89	28/10/89	11/11/89	9/12/89	6/1/90	24/2/90	31/3/90	28/4/90	31/5/90
Australian Shelduck												X
Black-shouldered Kite			X		X	X			X		X	X
Little Eagle											X	
Whistling Kite			X									
Brown Goshawk			X		X		X				X	X
Australian Hobby							X					
Australian Kestrel	X									X		
Feral Pigeon												
Spotted Turtle-Dove						X						
Laughing Turtle-Dove			X		X	X	X	X		X	X	
White-tailed Black Cockatoo											X	
Galah					X	X	X	X	X	X	X	
Rainbow Lorikeet							X			X	X	
Port Lincoln Ringneck			X		X	X	X	X	X	X	X	X
Fan-tailed Cuckoo											X	X
Shining Bronze-Cuckoo						X	X					
Southern Boobook		X										
Tawny Frogmouth							X					
Sacred Kingfisher												
Laughing Kookaburra			X			X	X	X		X	X	
Rainbow Bee-eater					X	X		X	X			
Fork-tailed Swift										X		
Welcome Swallow					X						X	X
Tree Martin		X								X		
Black-faced Cuckoo-shrike			X		X	X	X		X	X	X	
Rufous Whistler		2	3		1	X	X	1	1	1	X	X
Grey Fantail			X			X		X	X	X	X	X
Willie Wagtail			X		X	X						X
Splendid Fairy-wren					1	(1)						
Variegated Fairy-wren						3		4	X	X		X
White-winged Fairy-wren			X		X			2	X			
White-browed Scrub-wren									2	X	2	X
Weebill									X			X
Western Gerygone			X		X	X	X	X	X	1	X	X
Inland Thornbill			1			X			2	1		X
Yellow-rumped Thornbill			X								2	X
Varied Sittella												X
Red Wattlebird						1	X	X		X	X	X
Singing Honeyeater	1	2	2		X	2(1)	2	5(1)	2(1)	8	X	3
Brown Honeyeater	1	11	9	2(1)	7	8(1)	26(1)	19(1)	1		4	2
New Holland Honeyeater									1			
White-cheeked Honeyeater			4		5	1	14	20(1)	1	X	X	
Tawny-crowned Honeyeater							1					
Western Spinebill									X			
Striated Pardalote							X		X			
Silvereye	3	7	1		1(1)	X	34	9	2(2)	3	3	X
Grey Butcherbird			1		X	X			X	X	X	X
Australian Magpie			X							X	X	
Australian Raven					X				X	X	X	
TOTAL BANDED	5	22	21	2(1)	15(1)	14(3)	77(1)	60(3)	12(3)	14	11	5
No. of Participants	7	6	4	8	7	6	9	9	10	14	*	*

X = Sighted Only No. = Number Banded (No.) = Number Retraps * = Av. 8 people/session

Bird-banding study - Mt Claremont Bush sightings & captures

SPECIES	7/7/90	11/8/90	8/9/90	30/10/90	17/11/90	15/12/90	5/1/91	25/1/91	2/3/91	27/4/91	18/5/91	Species Total
Australian Shelduck												
Black-shouldered Kite	X	X						X	X		X	
Little Eagle	X										X	
Whistling Kite			X									
Brown Goshawk	X	X				X		X			X	
Australian Hobby												
Australian Kestrel			X			X	X					
Feral Pigeon							X					
Spotted Turtle-Dove												
Laughing Turtle-Dove			X	X	X	X	X	X	X		X	
White-tailed Black Cockatoo	X		X		X	X				X		
Galah	X		X						X			
Rainbow Lorikeet									X			
Port Lincoln Ringneck	X	X	X	X	X	X	X	X	X	X	X	
Fan-tailed Cuckoo	X		X								1	1
Shining Bronze-Cuckoo			1		X							1
Southern Boobook												
Tawny Frogmouth												
Sacred Kingfisher						X	X					
Laughing Kookaburra			X	X	X				X	X	X	
Rainbow Bee-eater					X			X	1			1
Fork-tailed Swift												
Welcome Swallow	X	X					X	X		X		
Tree Martin							X			X		
Black-faced Cuckoo-shrike		X	X		X		X	X	X	X		
Rufous Whistler	2	(1)	2(4)	(2)	1(1)	(1)	2(3)	(2)	2(1)	X	X	18(15)
Grey Fantail	X	X	1						X	X	X	1
Willie Wagtail	X		X	X	X	X		X	X	X		
Splendid Fairy-wren			X	X						(1)		1(2)
Variegated Fairy-wren			X							3	1(1)	11(1)
White-winged Fairy-wren	X	X	X	X	1		X	X		1(1)	X	4(1)
White-browed Scrub-wren				X				1				5
Weebill		X			X		X			1		1
Western Gerygone	X	X	X					X	X	X	X	1
Inland Thornbill	X	1	X		X		X				X	5
Yellow-rumped Thornbill											X	2
Varied Sittella												-
Red Wattlebird	X	X	X	X	X	X		X	X	X	X	1
Singing Honeyeater	3	X	5(3)	1	1(1)	8	2(1)	X	1	3(1)	1	52(9)
Brown Honeyeater	4	4	15(6)	2(2)	31(3)	70(3)	17(1)	X	(1)	10(3)	1	244(23)
New Holland Honeyeater												1
White-cheeked Honeyeater	3	X	2	5	15(1)	23	22	X	2(2)	4	X	121(4)
Tawny-crowned Honeyeater							1					2
Western Spinebill												
Striated Pardalote			X	X			2	X	1	X	X	3
Silvereye	4	X	9(2)	(1)	3(1)	41(3)	X	1	2(1)	12	4(1)	139(12)
Grey Butcherbird	X		X	X	X	X		X	X	X	X	1
Australian Magpie	X	X				X		X	X	X	X	-
Australian Raven	X	X	X					X	X	X	X	-
TOTAL BANDED	16	5(1)	35(15)	8(5)	51(7)	142(7)	46(5)	2(2)	9(5)	34(6)	8(2)	616(67)
No. of Participants	*	*	*	*	*	*	*	*	*	*	*	

X = Sighted Only No. = Number Banded (No.) = Number Retraps * = Av. 8 people/session

during the period of the project. As a consequence of the findings of the banding project, the banding team decided that a case for conserving the area should be made to the authorities and the public. Advice was sought from the Chairman of the Environmental Protection Authority, Barry Carbon, since the area had been recommended for conservation by the Department of Conservation and Environment (1983) in the "System 6 Study". Termed the M46, the area was identified as of regional conservation significance for its flora and fauna values. However, Mr Carbon confirmed that few details of the area were available and that there would be difficulty gaining reservation because it was not known to the public. He recommended that our information should be sent to all relevant authorities.

A report on the results of the bird-banding was immediately prepared for the Perth City Council and the EPA. A more detailed report was then compiled and submitted to Council, relevant government departments, the Minister for Environment and the media (see Appendix). Articles were published by local newspapers and a television station filmed the bird-banding for an evening news items. Talks were presented to the conservation group "Friends of Bold Park", and to the RAOU, which subsequently held a site visit attended by over 50 people.

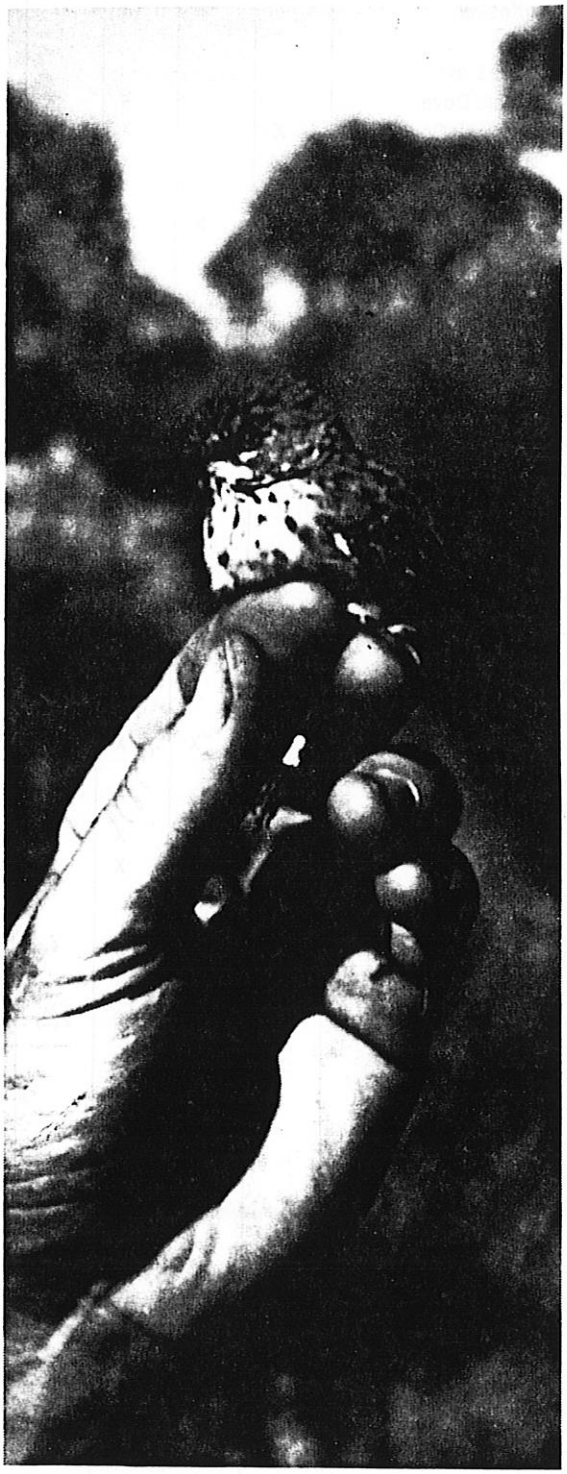
6.6 Review

The bird-banding component of the PWW was successful in achieving its objectives of involving the public in hands-on study of urban wildlife, in using the study to interest a wider audience of the values and conservation requirements of urban wildlife habitats, and in training a small band of enthusiasts who will hopefully establish their own projects to increase our knowledge of Perth birds.

More than could have been anticipated, the project has also made a very direct contribution to establishing an important conservation reserve in the western suburbs. In line with the Watch recommendations, the EPA has required that the Perth City Council prepare a "Public Environmental Review" (PER) of options for the development and management of all of their land in the Mt Claremont region. The terms of reference for the PER are based upon the System 6 Report of 1984 which proposed that the M46 area of the Mt Claremont Bush as well as the M47 (better known as Bold Park) be incorporated into a western suburbs Regional Park.

The bird banding group is hopeful that the recognition of an unusually rich avifauna in the M47 area will ensure that only a conservation option will be acceptable to the environmental consultants employed by the PCC, and by the EPA and the final arbitrator, the State Government. The banding group has offered its assistance to the study. Banding and survey activities could be extended to Bold Park and other areas adjacent to the Mt Claremont Bush to establish how much movement of banded birds has occured around the district. Seldom would such direct knowledge of the bird community be available for a planning study.

The bird banding team will continue its monthly banding sessions at the Mt Claremont Bush while the habitat remains and while Perth City Council continues permission. If the site can be conserved, the team would like to see the study evolve into research on means of monitoring and managing a sanctuary for bush birds within the heart of Perth's suburbia.



A White-browed Scrub-Wren banded, before being released

7. Australian Bird Count

7.1 Introduction

The Australian Bird Count (ABC) is a community-based project of the Royal Australasian Ornithologists Union which began at about the same time as the Perth Wildlife Watch. The aim ofthe ABC is to measure changes in the relative abundance of land birds, from year to year and seasonally, at many selected sites and habitats throughout Australia. The monthly, if possible, surveys are carried out by members of the public who apply a simple survey method in a chosen area of vegetation. The method involves criss-cross traversing of a measured block of vegetation for a specified time, then repeating the count in two neighbouring blocks of similar vegetation.

ABC co-ordinator, Stephen Ambrose, visited Perth in 1989 to involve the local RAOU branch. The ABC was an excellent activity for members of the PWW to undertake once they gained sufficient bird identification skills. When a W.A. regional co-ordination team was formed, PWW joined Mike and Mandy Bamford and Doug Watkins to distribute information, answer local queries and run training activities.

7.2 Perth Wildlife Watch contribution

PWW contributed to the ABC by including information in all promotional material, responding to enquiries by distributing detailed information on how to get involved, including articles in the newsletter "Living With Wildlife" and conducting demonstrations at urban sites when opportunities arose.

Participants in the ABC choose a local area of land, not necessarily in a natural state, in which they conduct regular counts of birds. Each count takes an hour, spent traversing three blocks of about one hectare, with 20 minutes spent in each. Ideally, the counts are conducted at monthly intervals so that, for the first time, a picture will be built up of bird numbers in various bushland habitats throughout Australia and of how the numbers change over time.

Thirty-six information fliers on the ABC were mailed out in response to requests. The fliers described the ABC objectives and approach and directed people to write to the ABC. They also encouraged people to choose urban ABC sites such as parks and gardens as well as those in better preserved habitats further afield. ABC demonstration counts were conducted at Kings Park with participants from the RAOU, a University Extension course, a Year 11 Biology course and a PEAC primary school course.

7.3 Review

Western Australia is now well represented in the ABC, some of those involved having been introduced through the PWW, and some known to have graduated to bird counting after gaining their confidence in keeping wildlife diaries. The ABC, with major sponsorship dollars and computers, looks to have a long and bright future.

SUBIACO POST February 12, 1991

Suburban search for honey-eaters

Are the birds in your garden sporting fancy red leg-bands lately?

If so, they have moved there from Mt Claremont and Dr Boyd Wykes, co-ordinator of the Perth Wildlife Watch, would like to hear from you.

Bird-banders with the watch have banded over 600 birds in the past 18 months at a pocket of bush in Mt Claremont.

They hope to find out how small bush birds such as honey-eaters and wrens survive in suburbs.

Dr Wykes says late summer is the time birds leave the bush to find nectar, water and insects in gardens.

"We banded over 200 honey-eaters this summer but now they've disappeared. They must be out there somewhere," said Dr Wykes.

Each bird from Mt Claremont has a bright red band on the left leg that can be seen from a few metres.

There is also a metal band with a number that can be read if a bird is found injured or dead.

Some special birds also have coloured bands on the right leg.

There has been one sighting in January of a singing honey-eater at the Cottesloe Tennis Club, 5km from where it was banded at Mt Claremont.

If anyone sees a "red-legged" bird, phone Dr Wykes at Kings Park on 321 2513.

8. Urban Bat Survey

8.1 Introduction
Bats are a special component of our urban wildlife.and are one of the few groups of native mammals likely to cope with the encroachments of surburbia. A community study to net, tag and survey urban bats was proposed as an exciting component of the Perth Wildlife Watch. All age groups would be interested in participating as one-off observers or through becoming team members and the newsletter and wider publicity for the Watch could focus on these fascinating creatures. Furthermore, biologists know little of Perth's bat community other than opportunistic museum records.

8.2 How the project was established
The first step was to find a suitable site at which to operate. We were after a water source such as a lake, where bats could be caught in mist-nets as they came down to drink on summer nights, amongst urban bush where bats could be observed and caught as they flew along pathways. A bat "detector" was obtained from Norman McKenzie, a bat researcher with CALM. This converts bat calls into sound audible to the human ear, useful for detecting the presence of bats and with the potential for identifying species by matching calls with animals caught. We also hoped to discover roosting sites in hollows and house roofs by watching at dusk.

Twenty-five participants in the Watch expressed an interest in the bat study. A small group of experienced mist-netters was invited to help find a site before bringing in others. Doug Watkins, a biologist and licensed bat bander, provided his expertise to find a suitable site, intending to then train others to supervise the project.

8.3 A bat black hole
No bats were caught on the eight occasions that the team operated over the summer of 1989-90. The eight sites, shown on Map 2, were on the coastal plain west of the city, in bush reserves and parks in older suburbs. The sites included the large Kings Park and Bold Park.

With no luck to that date, twenty children in the CSIRO Double Helix Club had been booked to join the project for March 23, 1990. We chose Perry Lakes adjacent to Bold Park as the most likely site for success. Norm McKenzie, surprised at our lack of success, joined us on this last attempt together with Mike Bamford, another experienced bat bander.

No bats were caught and the bat detector gave only one record. This was the White-striped Mastiff Bat *(Tadarida australis)* which is a high-flying species with a very large home range. It is the only Perth species with a harmonic of its call that is audible to human ears. We already knew the White-striped Bat was in the suburbs from widespread reports of its call, although its density remains unknown. Norm had been confident that populations of another five or so smaller species would be doing well in the suburbs. As a result of our efforts and his joining the hunt, Norm agreed with our fears that they may have suffered the same urban decline as other native mammals.

8.4 Reports from the public
Representatives of the media were invited to the Double-Helix Club evening at Bold Park to use the occasion to enlist the public of Perth in reporting present and past bat records for all of Perth.

The publicity consisted of a radio interview, a news paper article for which a picture with an injured bat was obtained, and articles in the Watch newsletter. Twenty-one recent records of bats smaller than the White-striped Bat were received. The locations of these sightings are shown on Map 2. There were six sightings around street and recreation ground lights, eight dead and two injured bats (including two cat captures), one report of bats in the roof of a house, four of bats inside buildings, and one of the dead bats near a suspected colony in a tree hollow. Four more records were of bats seen frequently around lights five or more years ago but no longer.

The only two certain identifications were of one from Mosman Park and the one featured in the newspaper, a lactating female from Thornlie, both Gould's Wattled Bat *(Chalinolobus gouldii)*. Four of the other people who reported captured or dead specimens were confident that they were this same species, as shown in the newspaper photograph. Gould's Wattled Bat is well known for roosting in buildings and many other urban situations as well as in tree hollows.

The records lend some support to the bat-netting conclusion that bats are scarce in Perth's western suburbs. Only two of the records were from the western suburbs - an injured dehydrated Gould's Wattled Bat from Mosman Park, which soon died, and another found dead in a fishing basket in Palmyra. Three records of bats once but apparently no longer present were from the western suburbs, including a report from the Director of Kings Park of bats frequently around Kings Park lights up until about 1980.

8.5 Causes of urban bat decline
Thoughts on the cause or causes of a possible urban bat decline can only be speculation at this stage.

Suitable roosting sites are not likely to be limiting for the several species which have regularly used buildings in the past.

Cat predation is likely to take its toll. Not surprisingly, the reported cat kills were in the outer suburbs where houses and pet cats are fewer and bats more plentiful. There may be a critical density of suburban cats past which the bat populations crash. There were also reports that birds such as butcher birds, magpies and ravens learn to wait outside bat roosts to catch bats as they emerge at dusk. These predators are increasing in the suburbs. Furthermore, roost sites maybe more readily detected by predators as suitable sites become scarce.

Pesticides in insect prey may have poisoned bats. Spraying of long life chemicals reportedly reached a peak in Perth in the 1970's with a campaign to eradicate the introduced Argentine Ant. Lawn feeding

birds such as the magpie and Willie Wagtail were almost certainly eliminated from most suburbs at this time (see newsletter articles). Populations of these birds are still recovering and perhaps bat populations will also revive.

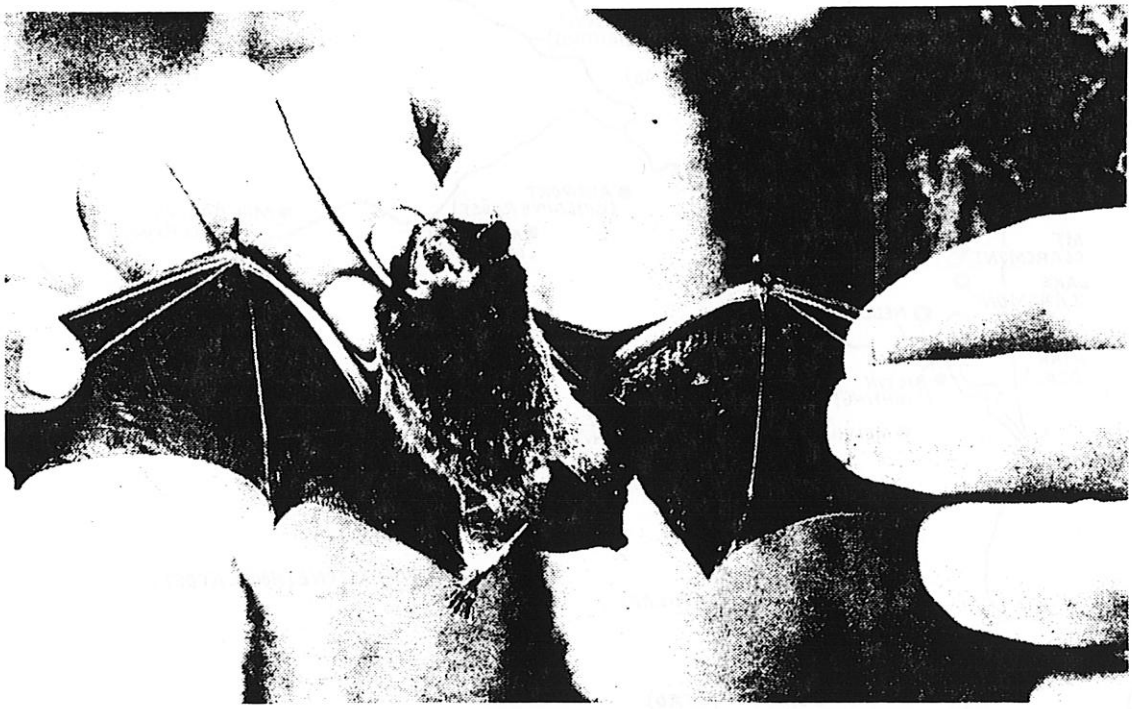
Whether elimination of food supply is a major impact of pesticides on fauna, instead of or as well as direct poisoning, is debatable In the case of the bats, a remarkable feature of our netting exercises around coastal plain lakes was the virtual absence of insects attracted to our gas lamps. We also saw none of the swarms of midges and larger insects around nearby street lamps which would be expected on warm summer nights. The well documented disruption to suburban wetland food chains from spraying for pest insects may be another factor in bat decline.

8.6 Review

The potential for bat banding as a component of the PWW was not fully developed but the search for a site with a healthy bat population raised serious questions about bat conservation in Perth. Research is needed to investigate this situation. Bat studies in Perth and elsewhere have great potential for community involvement, as demonstrated by the interest shown by potential participants, by the dedication of the team which conducted the fruitless searches and by the good media response.

Hurt bat offers ray of hope

THE WEST AUSTRALIAN, Tuesday April 10, 1990



THIS female Gould's wattled bat represents a ray of hope for Dr Boyd Wykes, co-ordinator of the Perth Wildlife Watch.

Found in Thornlie, the bat is the only one caught in the inner metropolitan area this year despite extensive searches by the wildlife group during the past summer.

It is recovering from an injured wing at the Native Bird Hospital for sick, injured and orphaned wildlife.

It was thought the bat had probably been attacked by a bird.

Dr Wykes, who initiated the searches, said the absence of bat sightings in the inner suburbs was worrying.

"Ten to 20 years ago people used to always find them – now we go out and look for them and they're not here anymore," he said.

"We want to try to see if there's any reason for the absence of bats in the inner suburbs."

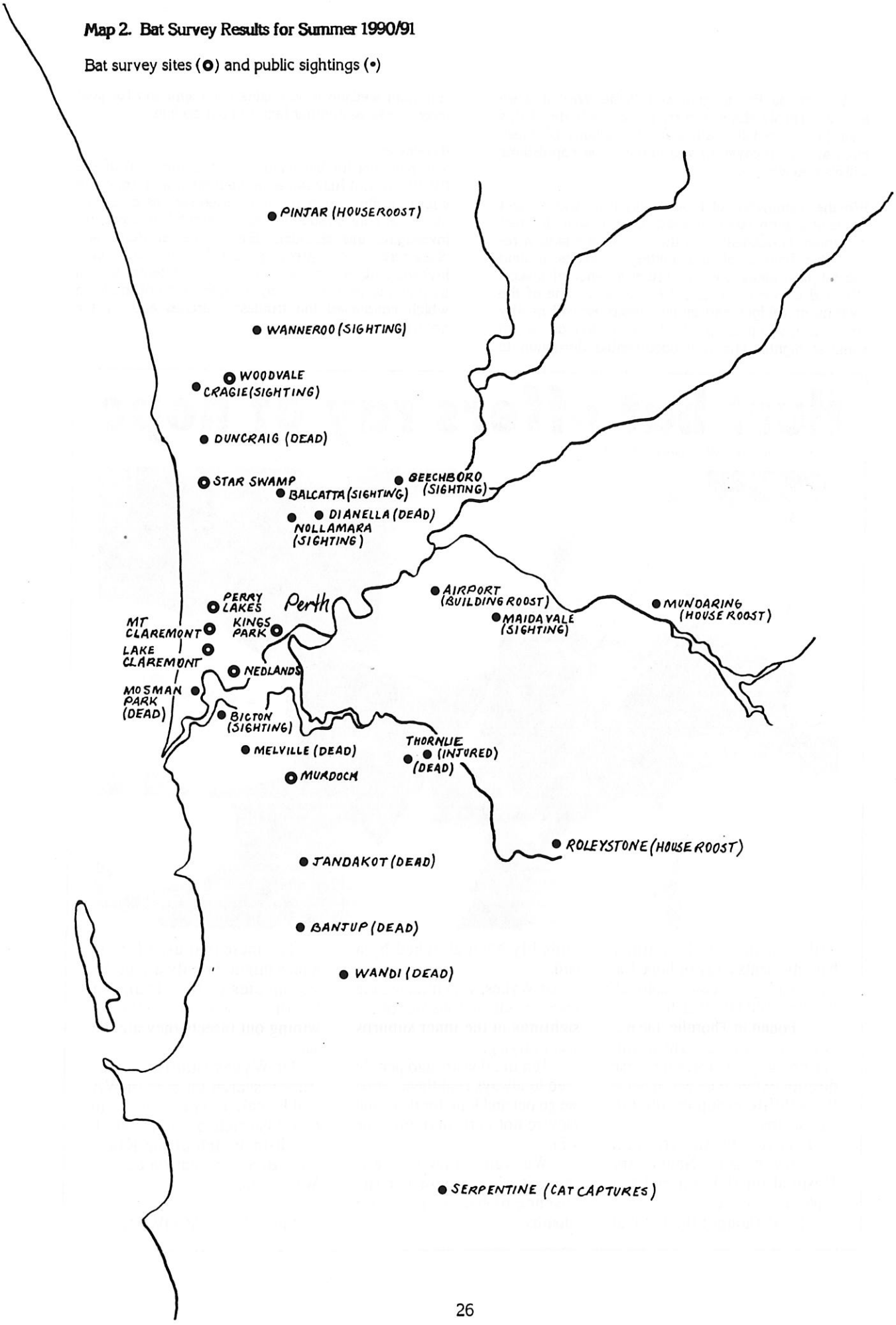
The increased use of pesticides might directly affect the six species of bats found in Perth but was more likely wiping out insects they ate, he said.

Dr Wykes said there was little research on bats in WA and he called on the public to report bat sightings to the Perth Wildlife Watch at the Kings Park Board education centre, West Perth.

Picture: GUY MAGOWAN

Map 2. Bat Survey Results for Summer 1990/91

Bat survey sites (⊙) and public sightings (•)



9. School Ecology Excursions

9.1 Introduction
The Perth Wildlife Watch offered teachers, particularly of relevant secondary school subjects, special opportunities for their students to become involved with urban wildlife study. Rather than develop a special excursion programme, the Watch invited teachers to tailor their own programmes around the bird-banding and ground fauna projects, or have the co-ordinator lead an excursion to urban bush close to a school. A charge of $4 per student was requested to cover contact time for the co-ordinator to enable these excursions to be added to the PWW commitment. Community volunteers with the Watch assisted the co-ordinator in handling the classes of 15 to 30 students.

9.2 Secondary schools
The first excursion was conducted for Year 9 Ecology students of Churchlands Senior High School. The class was invited to study the bush at Kings Park on 26 May 1989 to provide a photo opportunity for the launch of the Perth Wildlife Watch. The objective of the excursion was to survey how well the bush was recovering five months after a fire.

Similar programmes were arranged for classes from six other secondary schools over the two year period. The studies were for Year 8 Science, Year 9 Ecology, Year 10 Field Study Methods, Year 11 Biology and Year 11 Geography.

9.3 Primary schools
Western Australia has an upper primary school programme for advanced students, Primary Extension and Challenge (PEAC), run by specialist teachers from district offices. Many PEAC programmes in recent years have focussed on the environment and field studies. Perth Wildlife Watch was well placed to support the PEAC teachers with expertise and hands-on opportunities.

City Beach PEAC ran an "Australian Fauna Course" associated with the PWW on Tuesday mornings for Term 1 in 1990. The students kept a daily wildlife diary over the term and participated in bird-banding, an Australian Bird Count, the ground fauna survey and food-supply sampling. The students each received an "I'm a Wildlife Watcher" badge and junior membership of WWF on completing their diaries.

Deanmore PEAC ran a "Munch-line Monitors" (food chains) programme in last Term 1990. The course started with the munch-line monitor activity of the Institute for Earth Education, and then further investigated urban munch-lines through bird-banding, the ground fauna survey, and visits to Perth Zoo and the Herdsman's Lake Wildlife Centre.

9.4 Review
The education system in Western Australia is becoming increasingly obstructive to field studies, which particularly effects environmental curriculum objectives. This is despite an unprecedented concern about the environment by the community. The main prohibitive factors are withdrawal of Education Department staff from field study centres such as Kings Park; devolution from the central office and district offices to the schools of support and development staff and funds; and short, highly structured programmes in the secondary curriculum ("unit curriculum") which make field excursions difficult to time-table. There is a departmental requirement that environment objectives be incorporated into all subject areas but the Ministry did not fulfill a 1990 commitment to fund environment as a "priority" area in order for schools to meet this requirement. The final obstacle to field studies in recent years has been the economic downturn which has made parents reluctant to fund even the travel costs of excursions.

In this climate it was not surprising that the PWW offer of excursion opportunities was only taken up by a relatively small number of schools, and that many of these were private schools. More would probably have been interested if a fee had not been levied. This was not possible given the financial constraints of the Watch and the many other components that were developed. More needs to be done from within the education system to redress the loss of opportunity for effective environmental studies. Out-side organisations, particularly community financed ones such as WWF, should not need to battle to have their offers of support effectively utilsed by schools, as is presently the case, but should be encouraged and supported by the education system as vital benefactors.

SWANBOURNE DISTRICT NEWSLETTER

Escape to the Wilderness

Do you ever dream of escaping the confines of the suburban classroom, of being totally surrounded by wilderness, of sharing the wonders of nature with your students? To many, the feasibility of leaving the time table to travel to the country may seem impractical but it need not be at all, for on our very doorstep is the thriving and magnificent Kings Park. Not only is this wonderland within easy reach of all of us but it is 'home' to a unique specimen of wildlife; the bright-eyed, swift-footed, enviro-enthusiast, otherwise known as Dr Boyd Wykes. Boyd, the co-ordinator of the Kings Park Wildlife Watch will enthral your students with his skill and enthusiasm in seeking out all forms of animal life in the park. Boyd has a number of fascinating programmes which range in suitability from senior biology and ecology to primary science studies. Boyd is interested in hearing from educators in the district who would like more information.

10. Schools Revegetation Programme

10.1 Introduction
An "Islands For Wildlife" habitat regeneration project for schools was conceived as an education through conservation action component of the Wildlife Watch. Revegetation was to be conducted by school students in conjunction with or following on from keeping a wildlife diary. It was felt that students, having learnt of the values of urban wildlife and the conservation needs of many species, should have the opportunity to learn some conservation skills and to take some action that might make a demonstrable improvement to their local environment. Indeed, schools were requesting assistance for such projects early in the Watch.

10.2 Criteria for a school planting project
Small and achievable
As a starting point for those teachers and students who lack confidence and skills, the projects needed to be small and achievable. Small stormware drainage "compensation basins" are located throughout Perth's coastal plain suburbs. These basins, about a house block in size, contain flood water which then soaks into the sandy ground. They are usually barren, although some have interesting remnants of natural vegetation. They are well suited to initial revegetation projects for schools because they are small, there are always some in walking distance from schools, they are fenced and therefore protected from vandals, and they are maintained by local councils which can help with preparation works such as carting away rubbish and with providing school holiday watering during the first summer after planting.

Local advisors
Schools need a readily available advisor to help make decisions, assist with excursions etc. The W.A. Wildflower Society responded positively to the suggestion that advisors be found from their membership, particularly people living near the schools involved.

Fund raising
Funds are needed to purchase propagation equipment, seedlings and planting equipment. There are many benefits to the students raising some of their own funds. An additional method which gave much promise was devised by a local businessman. Greg Manzie of Glyde Gallery in Mosman Park requests a "tree tax" from each customer who purchases wooden picture frames. He donates this to schools prepared to get at least one tree into the ground and established for each dollar received.

Student initiative
Projects such as revegetation reap the greatest benefits when initiated and co-ordinated by the students as much as possible, and when integrated into school life through curriculum, recreation and parent activities. Nedlands Primary School for instance has formed a student-teacher conservation group with the catchy name HOPE Club - Help Our Planet Earth.

10.3 A trial school project
A trial revegetation project was undertaken by the PWW with an environment club at St Hilda's Anglican Girls School. The club drew up a contract of responsibilities to gain finance from Glyde Gallery and the Watch liaised with the Mosman Park Town Council to focus on a compensation basin close to the school. Fifty local plants suitable to the site were purchased in late-winter 1989 from a nearby community nursery run by a group called APACE. A nursery staff member met the club on site to help choose suitable species, accompanied them to the nursery to pick up the plants, and then instructed them on-site in locating and planting. An officer of the Mosman Park Council was also on hand to organise a key for access and to make sure that plants were not wasted in the part of the flood basin that is regularly dredged.

After this first taste of action, the club met with the Watch co-ordinator to draw up an action programme. This included delegating responsibilities and planning for purchasing reference literature and equipment, keeping records of progress suitable for purposes such as entering conservation awards, surveying the locality for further suitable plant species, mapping the first planting and plans for further planting, organising a summer seed collecting programme in local bush remnants, gaining access to the school green house for propagating from seeds and maintaining seedlings, undertaking administrative tasks of writing letters of invitation, thanks and requests, arranging visiting speakers, organising signs and approaching neighbours of the site to enlist community support. Teachers were approached to involve classes of appropriate subjects in these tasks such as recording through language and arts, mapping through maths, seed collecting through biology,

10.4 Greening Australia involvement
To expand the project for the many schools of the district, a joint application from the Perth Wildlife Watch and the Australian Trust for Conservation Volunteers for co-ordinator funds was submitted to Greening Australia (GA). The application was not successful because a halt was put on funding for metropolitan school projects while GA established an integrated education programme. Instead, the Watch co-ordinator was invited onto the education committee of Greening Australia to assist with establishing a "Schools Community Greening Programme". The committee helped appoint an education officer and the programme was in part based on the Watch proposal.

"Greening Centres" are to be established, strategically located around the suburbs, run by community groups and financially assisted by G.A. They will grow local plants for school projects and involve schools at any or all levels of commitment from seed collecting through propagating to revegetation projects.

The idea of centres was favoured over past practice of greenhouses at each school because experience showed that this would be more efficient, enable people skilled in plants and children to supervise, be more hygienic for the plants and prevent the wastage from poor plant and greenhouse care during holidays and failure of projects when interested teachers are transferred.

The first Greening Centre was established at a community nursery (APACE) in North Fremantle in 1990. With this underway in the western suburbs region, an Islands for Wildlife programme through the Watch was no longer needed. Instead, the Watch contributed through its representation on the Greening Australia committee and through covering wildlife aspects at a teacher in-service for the Greening Centre "Grow Us A Home" programme. The next Greening Centre is now being established and the programme looks set to make a long - term contribution to conservation education in Perth.

10.5 Publications

Two publications also arose out of the revegetation aspect of the Watch. The co-ordinator was approached by Robert Powell of CALM, a prominent author on growing and retaining local plants, to give educational advice on a Resource Note "Mapping Plants along a Transect" for schools. This has been published by CALM with acknowledgement to the PWW and WWF.

The other product, also produced by CALM with PWW input, was an activity poster in a 1990 Arbour Day Booklet. This will make a very useful educational item on its own if printing can be funded.

10.6 Awards

The PWW can take some of the credit for City Beach Primary School winning the 1990 educational section of the JohnTonkin Tree Awards. This State-wide award from Greening Australia was announced at a reception at Government House and presented to the school by the Minister for the Environment. The school then represented W.A. in the National Tree Awards, with a trip to Canberra for the Principal Alan Keane and a parent Christine Lake.

Alan and Chris approached the Watch in August 1989 for advice on setting up a native garden in the school grounds. As is often the case, the obvious had been overlooked and the intention was for parents to undertake the project with students only involved in putting seedlings in the ground. The school committee was pursuaded to make the project an integral component of the school programme and it quickly gathered momentum. The experience of City Beach Primary has been produced as a "Bush Re-establishment Project Management Plan" available to inspire other schools.

The steps taken by the school included the following : employ botanist Robert Powell as advisor; involve parents and students in preparing small, manageable plots for replanting each year; survey nearby house blocks and reserves with student help to compile a plant species list; obtain historical aerial photos of original vegetation; obtain collecting permits from CALM and landholders; collect seeds and cuttings in summer and seedlings from soon-to-be-cleared bush through class and weekend excursions; involve classes in propagating at the APACE Greening Centre; incorporate the project in all curriculum areas such as mapping in maths, records in English, observation in art, natural history in science (PWW was involved here supervising excursions to nearby bush reserves); further knowledge and skills education through inviting experts to address school assemblies and be interviewed on the school radio station; gain community support and school pride through media publicity and entry in the John Tonkin Tree Awards.

Wildlife is being monitored through diaries as the bush becomes established. Students are also watching at home and school for colour banded birds to visit from the nearby Mt Claremont Bush PWW banding site.

10.7 Review

The objective of the revegetation programme, to involve schools in direct positive action programmes for conservation, is a most important requirement of conservation education in this era of world-wide pessimism for the environment. Fortunately, Greening Australia is a very active organisation in Western Australia and has taken up the challenge for the Decade of Landcare. A "Ribbons of Blue" monitoring of wetland water quality through the Waterways Commission is another recent programme of this type which is proving very successful.

11. Earth Caretakers Primary School Programme

11.1 Introduction
Some of the best education programmes for introducing young students to conservation have been devised by the Institute for Earth Education. Programmes such as "Sunship Earth" are based on field activities which cover sensory awareness and appreciation of the natural world and major ecological concepts such as food chains, air-soil-water cycles and communities. The programmes lead into commitment to change behaviour with the assistance of parents and teachers.

Earth Education programmes have been running for many years in South Australia, Victoria and the Australian Capitol Territory, through education departments and other organisations such as the Melbourne Botanic Gardens. No organisation with the resources such as a camp school has established a continuing programme in W.A. It was hoped that the example of PWW conducting the one-day Earth Care takers programme would inspire and support organisations in Perth to develop Earth Education on a larger scale.

The Earth Caretakers programme is for upper primary science and social studies students The programme involves a pre-excursion activity on endangered plants and animals. The students then apply to train as Earth Caretakers to do something about the problems. During their day excursion to a local bush reserve, they get in touch with the environment and learn about the energy flow aspects of how the community works - photosynthesis, food chains and food pyramids. They end the day making a pledge to correct one environmental bad habit in their lives and follow-up on this and other conservation action with the help of parents and teacher. When the teacher is satisfied with the follow-up, the students receive certificates as Earth Caretakers. The teachers were encouraged to have their classes participate in the Perth Wildlife Watch diary as part of the follow-up.

11.2 How the programme was established
A base for the programme was provided by the City of Nedlands at the small but attractive Hollywood Reserve, attached to Karrakatta Cemetery (see Map 1). The site included a storage shed and toilets, a nearby hall for wet weather, a picnic area of lawn and a semi-natural bush remnant with many meandering paths.

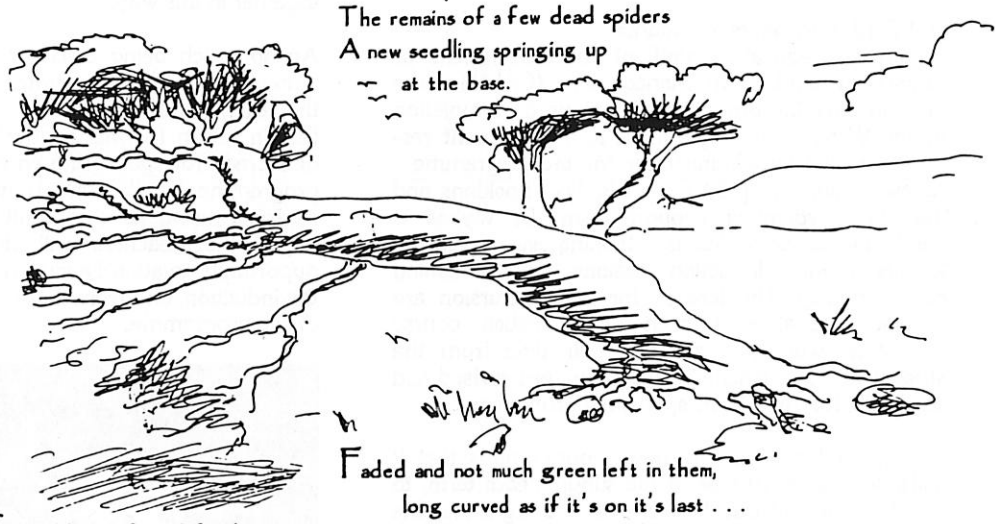
The programme is prop-intensive and it took some months to purchase copyright from the Institute for Earth Education, modify the written materials for the PWW requirements, print booklets and certificates, and make the pre-excursion and excursion props. One of the biggest challenges was to build a portable giant leaf in which six students can crouch to learn about photosynthesis. The Department of Conservation and Land Management paid for the materials and provided the technician to make the leaf on the understanding that CALM would have eventual ownership.

"Chloro-spies" discovering the secrets of a giant leaf "food factory"

OUR TREE — "poetree" from Earth Caretakers

Shade and light that
Can't be seen from below
Windblown
A tree for kids
I can see ships at sea
Rocks
And the mainland
Very powerful
Sun glinting
Quivering, quivering
Skeleton of branches
Feels like a cushion
A mushroom
Caverns, Coves and crevices
Gnarls and knots
Spiderwebs and branches
Speaks of antiquity
Tired and given up
Home habitat
and hideaway.

It's dominant
The bark's thick and it's spread out
It's torn two ways trying to cover
all the bush
Dashes of green, mottled green
I can see the sun shining
through the leaves
It feels very comfortable, it feels
very homy, soft and warm
I've got a wet bum. It's incredible
Many interlacing branches
The blue sky, an incredible blue colour
Patches of lichen like green
sprinkled parmesan cheese
A fungus like the fur of an animal
It's another world
Little seeds caught up in the bark
A bright red one that almost glows
The bark is fissured and burnt
on the outside
Cobwebs spread across it
The remains of a few dead spiders
A new seedling springing up
at the base.



Cobwebby, soft and feathery
a bird—nest there too
Sweeping skirts, hanging and sweeping
Like a puzzle, intertwining,
a puzzle that needs sorting out
a jungle of branches
a nice grey, soft, flaky bark
Interesting spiders web, dead creature,
little brown ants
It's been split with a fire
I'm like a bird
a little bird in my nest
I can see all around,
everything that's going on
I feel protected, all the branches are covering me
all the little ants are crawling around the branches
The bark is rough, flaky with moss
The whole tree's soft but it doesn't look soft from a distance.

Faded and not much green left in them,
long curved as if it's on it's last . . .
it's making the most of it's last moments
Tree is huge, pretty content
some life left in it
Huge but friendly
There's a broken down beehive
where the branch has broken off
The twigs are fighting for their life
Ants — little growths like fungi
(mushrooms)
Crumbling crevices
Difference in texture between the
two ridges
Marks by aborigines
for making a shield
Wet smells of mushrooms
crumbly not course but soft
Like a doomed feeling,
the tree's trying to carry on.

Once ready to go, promotional materials were sent to all western suburbs primary schools directly and through district newsletters. Talks were given to any appropriate teacher meetings, seminars and workshops. The programme needed to be well promoted because schools and students were asked to cover the costs of a teacher attending an induction day ($20 plus teacher relief at the school), bus travel and $6 per child for the excursion. The $6 mainly covered the costs of employing an assistant to the PWW co-ordinator since the programme relies on small group activities (three groups of 10 lead by the co-ordinator, an assistant and the teacher).

11.3 Participant schools

Two induction days were held in 1990, for almost 30 teachers and other interested adults. An additional induction was held for a class of students of the Edith Cowan University recreation degree. Earth Caretakers was conducted for ten primary schools in Terms 3 and 4 of 1990. Five of these were government schools, two were special district courses run by PEAC (Primary Extension and Challenge), and three were private schools.

11.4 Earth Caretakers to continue

Community education staff of the Department of Conservationand Land Management (CALM) were keen to have the programme continue on completion of the Watch. The Department found sufficient resources to act as administrator for the programme - renew equipment, print materials, take bookings and develop a volunteer support team. Dr Wykes is continuing as co-ordinator - training and organising leaders, running induction sessions and maintaining course quality. The leaders for each excursion are younger casual staff such as recreation course graduates, who get paid for their time from the student fee. The teacher-notes have been revised and expanded for the CALM-sponsored programme.

A major advance of the new programme is that it shifts to a different area of the suburbs each term, to cut down school travel costs and to bring it into the local bush of participant schools.

The new programme started at Hollywood Reserve for Term 2 of 1991. An induction was attended by 20 teachers and leaders, and five schools ran the programme. Kelmscott, to the south-east of Perth was the Term 3 venue. The induction was attended by ten adults and two schools ran the programme.

Northam District, in the Avon Valley east of Perth, worked hard to enable the programme to come to them for Term 3. An induction was held for ten teachers and ten volunteers from organisations such as the Agriculture Department, followed by excursions by ten schools to a site in the Avon Valley.

11.5 Review

Perth Wildlife Watch achieved its objective of establishing an Earth Education programme in Perth The programme lived up to expectations of being a stimulating and effective way of turning young people on to the local bush, teaching them how the bush community works as an integrated system and inspiring them to take action in their own lives to further conserve the natural world.

All teachers, parents and volunteers who participated in Earth Caretakers were enthusiastic about the programme. However, it did not attract as many schools as the programme deserved. Cost was likely to have been the main disincentive to schools, although the Watch was conducted at a time of many discouraging factors, as discussed in Chapter 10. Ideally, leaders would be paid by the sponsoring organisation and there would be no charge to students. However, the same economic climate that discourages teachers and parents from paying for the programme makes unlikely further sponsorship than that now being provided by CALM. The Northam experience suggests that where schools in a district want the programme (inspired by a teacher who attended an induction), a community will put in much of the effort needed to book the schools, arrange teacher relief for the induction, organise volunteers and raise the money. Unfortunately, suburban districts seldom pull together in this way.

An approach being tried for 1992 is to get a small amount of sponsorship from Shire Councils to cover the teacher induction costs - relief time and the $20 fee. In return for this relatively small cost, the Shire gets credit for sponsoring an environmental education programme for its schools held at one of its bush reserves, using its community facilities of hall. It is hoped that teachers will find hard to resist the opportunity to attend a student-free day in the bush at the induction, and from there will be sold on the merits of the programme.

12. Adult Programmes

12.1 Introduction
One of the most efficient ways to get a conservation message across is to train leaders, teachers and parents. Several PWW courses were offered through the University Extension community programme aimed at this audience (for a fee) and other opportunities arose to address groups at conferences and workshops.

12.2 University Extension
Four holiday course were conducted over the period of the PWW, for interested members of the public, and particularly teachers:

A. Beach to bush - winter wildlife trails
July 18 - 21, 1989
Day excursions along various metropolitan heritage trails, discovering wildlife and Aboriginal and European cultural heritage along the Swan River from the coast to the Darling Range.

B. Perth Wildlife Watch - going wild in the suburbs
October 9 - 11, 1989
A lecture and field experiences of pit trapping for ground fauna and mist-netting for birds and bats.

C. Gardens for wildlife
January 16 - 19, 1990
A lecture and field trips to investigate bushland models, a retained bush garden, a re-established bush garden and a community local plant nursery.
A segment on "Burke's Backyard" television series, and an interview on National ABC radio on wildlife in bush gardens of Perth arose from the course.

D. Breakfast for the early birds
January 21 - 25, 1991
A beginners bird-watching course of a lecture and field excursions to metropolitan habitats of garden, bush, lake and estuary, including mist-netting at the PWW bird-banding site.

12.3 Community holiday programme
PWW was featured at a Perth City Council "Bold Bush" holiday programme in autumn 1990. The biennial week-long programme at the Bold Park reserve in the western suburbs is a popular event for families at weekends and evenings, and for children on school holidays. PWW contributed a weekend wildlife walk. The Council supported the Watch by including the PWW logo on the Bold Bush pamphlets and poster.

12.4 Teacher training and in-services
Seminars and workshops were conducted for teachers and community leaders on the following occasions:

i) "Pathways To The Future I & II" student/teacher/-community conference, University of Western Australia, September 1989 and June 1990 (week of display and workshops),
ii) Primary Science Weekend Seminar, Pt Peron Camp School March 1990 (workshop),
iii) Swanbourne District science teachers in-service, Oct. 1990,
iv) Seminar "The environment in your teaching", State School Teachers Union, April 1990 (seminar),
v) Scarborough District Teacher in-service "Environment Day", June 1990 (seminar),
vi) Community arts educators planning Environmental Art Holiday programmes, co-ordinated by Wanneroo Council, June 90 (workshop),
vii) Recreation Degree students, Edith Cowan University, August 1990 (seminar), September 1990 (workshop),
viii) Education Degree students, Edith Cowan University, October 1990 (field workshop, 100 trainee teachers over two mornings),
ix) Australian Association for Environmental Education/Greenteach, June 1990 (seminar/workshop),
x) "Pathways Now" State-wide student environmental conference, Gosnells Senior High School, June 1991 (member of panel on regenerating and preserving wildlife habitat).

UNIVERSITY EXTENSION
THE UNIVERSITY OF WESTERN AUSTRALIA

GARDENS FOR WILDLIFE
Summer School Course No 72
Tutor: Dr Boyd Wykes
Perth Wildlife Watch

ITINERARY

Tuesday January 16th, Hollywood Reserve:
The Bush Model
TOPICS • Investigating a bush model for plants and animals that will establish in a garden - Karrakatta sand vegetation;
• Collecting seed for propagation;
• Looking at bush 'nature strips' as alternative to turf.

Wednesday January 17th, Robert Powell's Garden:
Retaining a Bush Garden
TOPICS • Retaining native vegetation;
• Wildlife of a bush garden;
• The "self-effacing gardener" approach.

Thursday January 18th, Barbara Rye's Garden:
Re-establishing a Bush Garden
TOPICS • Re-establishing appropriate native plants in an altered garden through transplanting and germination.

Friday January 19th, Winter House, North Fremantle:
Propagating local natives for gardens
TOPICS • Seed germination;
• Seedling propagation, planting, care.

13. Conclusions and Recommendations

13.1 Achievement of objectives

A wide variety of education activities was undertaken during the two years of the Perth Wildlife Watch. For a project with a single half-time officer, supplemented by some user-pays components, a solid contribution was made to achieving the community educational objectives of the project, as defined in Chapter 1.

Objective: to raise community awareness of wildlife in "the suburbs" and issues affecting its survival - through contributing to the diary and through the newsletters and associated publicity, a broad section of the community were made aware of the values of urban wildlife in Perth.

Objective: to encourage residents to preserve and improve garden habitat for wildlife - the diary activity and the associated feed-back through newsletters on ways to maintain wildlife in gardens was the main component that encouraged conservation action at home. The Greening Australia education programme with which the Watch was associated is addressing this objective with students and an adult course on "Gardens for Wildlife" run for the Watch was enthusiastically received.

Objective: increase community support for estblishment and good management of urban wildlife reserves - the ground fauna and bird-banding projects were the most successfull components of the Watch for directly educating the community about conservation of urban wildlife in reserves. The Kings Park study showed how rich a fauna remains in some reserves and how little has been done to understand or manage the habitat for conserving the wildlife community. The bird-banding project became centrally involved in trying to retain important habitat as reserve.

Objective: build on urban conservation awareness to promote the wider goals of the World-Wide Fund for Nature and of conservation in general - whenever possible, the messages of urban wildlife conservation were extended to encompass the broader picture. This message appeared to be readily received because the wider goals of the sponsor, the World-Wide Fund for Nature, are well known to Perth's public and the media because of high profile contributions to conservation in WA, in particular to the numbat and Short-necked Tortoise programmes, and through WWF's championing of international action such as halting the ivory trade. The opportunity to participate in a WWF project close to home and through ways other than just contributing funds will hopefully now make wildlife conservation seem more relevant and urgent to all of those people who took part in the Perth Wildlife Watch.

13.2 Continuation of some components

With the Perth Wildlife Watch completed, some aspects of the project will continue.

The wildlife diary was to be the basis for a published diary for the public to continue to keep records of their sightings, assisted by notes on seasonal wildlife occurrences as documented by the PWW, and by identification keys. The budget for the PWW has some funds remaining which will need to be supplemented with further sponsorship if this project is to go ahead. Publishing a diary within the time of the Watch proved to be beyond the half-time position.

The ground fauna project at Kings Park was only approved with trepidation by the Kings Park Board but is now to continue for at least another year with Kings Park Board funding for a co-ordinator of volunteers. An interim scientific report on the results is being prepared. The many community volunteers who hauled logs into the bush, dug pit-traps and monitored the traps will be justifiably proud of the contribution their efforts will make to conservation management in Kings Park and perhaps other small reserves. All reports and publications will acknowledge WWF sponsorship and copies will be forwarded to WWF.

The bird-banding project will continue as a community activity, at least while there remains a threat of subdivision to the Mt Claremont Bush site.

The school and adult education programmes involving wildlife monitoring will not continue but hopefully many students, teachers and parents will carry on their interest in urban wildlife and make good use of the skills they gained from the PWW.

The primary school Earth Caretakers programme will continue through CALM sponsorship. It may yet achieve the aim of inspiring a Perth organisation to find a home for the soundly devised Earth Education programmes of which Earth Caretakers is but a small derivation.

13.3 Limitations on the PWW

The Perth Wildlife Watch was a successful project which, with some adjustment, would serve as a good model for such projects elsewhere. In fact, a volunteer on the project is doing just that back at her centre in California (see Chapter 4).

The major limitation on the Watch was the difficulty in gaining momentum with only funding for a part-time position. An initial splash for the Watch was relatively easy to obtain with a launch and media release. Maintaining a profile required much more effort, achieved by promoting forthcoming events and announcing results of interest from the components of the project.

An ideal outcome which was not achieved would have been to establish the project as an institution in the community. There seems to be a threshold which must be crossed in order for a project to be generally recognised and taken up by others so that it is maintained and expands through its own momentum.

Any future project of this sort needs additional sponsorshipand should be based in an appropriate organisation such as a wildlife or education agency where administrative and colleague support is available from the outset.

The sponsorship from a government department that was sought but not obtained by WWF at the conception of the PWW may have been the missing factor in building upon the initial Watch. This sponsorship would have given the project a "home" within a larger organisation, provided the funds for the co-ordinator to be employed full time and been a better basis for attracting additional private sponsorship. Support from other agencies is particularly important where WWF does not have staff in the region.

Greater emphasis (and better skills) by the co-ordinator for seeking sponsorship may have made some difference. However, the project was conducted at a time of unprecedented decline in W.A. corporate and government finances. It was most unfortunate that the project lost access to the expertise of Mr David Fischer, patron of WWF (Aust), when he left the R &I Bank shortly after helping launch the PWW.

13.4 Recommendations for future WWF education projects

Since World-Wide Fund for Nature (Australia) has very limited funding available for future education projects, careful consideration is obviously needed as to where future effort should be expended. In Perth, the Watch came at a time of increasing community interest in wildlife and conservation. Other organisations have responded by covering much of the same ground and further expenditure by WWF on similar projects may not be warranted. The education initiatives of the WA Museum and CALM are particularly similar to those conducted by the Watch and the E.P.A. is involving the community in conservation of urban bush remnants through a "System 6 Ecoplan" programme. The opportunity for user-pays programmes is also increasing with the increased community interest and subsidy from donor funds to WWF are less vital.

One of the most popular aspects of wildlife education and public involvement is endangered species. WWF involvement in the National Threatened Species Network is therefore most appropriate. However, any expansion of education for endangered species by WWF should take into consideration the focus on this topic at the Perth Zoo.

13.5 Representation of WWF in Western Australia

The co-ordinator of PWW represented WWF to the community on occassion, such as speaking on television on banning ivory imports. However, not being an official spokesperson, he had no authority to make statements on behalf of WWF, and besides, had little time available for this task. WWF has a very good profile in WA through its research funding but someone who can be seen as a local spokesperson is needed to liaise with the media and community and to seek sponsorship.

WWF has long considered how to establish a Perth base. A number of WWF volunteers put in many hours of work to support the PWW and a Perth support group for WWF may be an approach worth considering. A public meeting, bringing together members and grant recipients to consider WWF's contribution to WA and how they might enhance that contribution could succeed. A call to participants in the Perth Wildlife Watch to be further involved with WWF would be an appropriate outcome of the project.

13.6 Future of the co-ordinator

- a personal thank-you to WWF from the co-ordinator

One important outcome often left unstated in a project report is what becomes of the staff with the knowledge and skills that they have gained through the grant. I am pleased to say that I am continuing in the field of wildlife education and that my next major project is building upon the Perth Wildlife Watch. I am helping to establish a community supported native wildlife sanctuary in Perth's Darling Ranges which has obtained funding from a private benefactor. To be known as Karakamia Sanctuary, the 100ha reserve of ranges, scarp and valley will be fenced and cleared of vermin using the methods of Dr John Wamsley of Warrawong Sanctuary in South Australia. All of the native mammals once found in the Darling Ranges are being considered for re-introduction, while the site already supports a rich variety of plants and birds. The sanctuary is to become self-sufficient through entry fees for the families, tourists and school classes who will visit to experience our forest wildlife as it once was. The sanctuary will also make direct contribution to conservation with breeding programmes for rare species to produce a surplus which can be re-introduced elsewhere.

I would like to conclude this report by expressing my gratitude to WWF Australia and to its members and donors for making the Perth Wildlife Watch possible. It has been the most satisfying project of my career and, I believe, added much to the lives of many people in Perth who in turn will add their efforts to the rapidly maturing conservation ethic of our society.

Dr Boyd Wykes
Enviro-Ed Services

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