

ANNUAL RESEARCH ACTIVITY REPORT

June 2002 – June 2003

Science Division

Discovering the nature of WA
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EXTERNAL PARTNERSHIPS

Biological component

Partnership Name	Project - i.e. CRC, Govt Depts, Universities, Industries, Other (sponsorships etc)	Involvement (\$)	Involvement (inkind)
AGWA	GIS vegetation mapping	2002-03 - \$20k 2003-04 - \$10k	G Serendenco (0.3)
Bushfires CRC	Managing fires in forest landscapes SW Australia	\$ 40k per annum over 7 yrs 2003-10 contributed by DCLM. \$94k for next 4 yrs to fund PhD	L McCaw (0.4), R Robinson (0.2), J Farr (0.2), B Ward (0.2), G Liddelow (0.2), B Smith (0.2), J Neal (0.2), F Metcalfe (0.2), Li Shu (0.2), R Smith (0.1) (2.1 FTE per annum)
Assessment of the emission of dioxins from bushfire activity in Australia	Work is being conducted as part of Environment Australia's National Dioxins Program, co-ordinated through CSIRO Division of Atmospheric Research.	\$ 10k funding made available from Environment Australia to cover costs of sampling emissions from bushfires in south-west WA	L McCaw, R Smith, J Neal; Total 0.3 FTE per annum. Other collaborators include National Research Centre for Environmental Toxicology and University of Melbourne.
Project Vesta – behaviour of summer fires in dry eucalypt forests	Collaborative fire research with CSIRO Forestry and Forest Products, with funding support from Australasian Fire Authorities Council.	\$ 1 054k over 8 yrs 1995-03. Project completed July 2003. However ongoing finalisation of project until end 2003	L. McCaw, R. Smith, J Neal
Chevron-Texaco	Monitoring mammals on Barrow Island	\$6k yr for 5 yrs	K Morris (0.05), A Burbidge (0.05)
CMAE / AGWA/ Gascoyne Murchison Project	Gascoyne Murchison Strategy	2002-03 - \$180k 2003-04 - \$150k	K Tinley (1.0), J Richardson (0.6), G Burke (0.5), J Richardson (1.0) for 25 days
CRC Tropical Savannas	Kimberley Mammals	\$55k for 2002-03 \$55k for 2002-04 DCLM contributes \$10k yr into CRC Sally Black's contract was paid for by DCLM	T Start (0.8), N McKenzie (0.1), J Rolfe (0.1), S Black (0.25), A Burbidge (0.1)
CRC for Plant Based Management of Dryland Salinity	Program 2, sub-program 3 – how ecosystems are affected by salinity function. Program 4 sub- programs 4 and 6 Development of systems with balanced water use Program 7 – Potential Weeds and Monitoring wheatbelt wetlands Major national salinity research funding and coordination body. DCLM has 3 major projects pending that will deliver revenues of approx \$400 k/yr	\$100k per annum for 7 yrs, commenced 2001	J Bartle, B Maslin, D Cooper, R Harper, G Brennan, R Mazanec, M Byrne, J McGrath, B Copeland, R Hill, I Dumbrell, J Kinal, K Mungham, P Ryan, W Edgecombe, D Huxtable, A Stilwell, N Robinson, B Hingston, R Moore, M Lyons, S Halse, N Gibson. Total ± 8.2 FTE
ANZEC / CRC Weeds	Technical Group for weeds of conservation significance	Nil	G Keighery (0.05)
CRC Greenhouse Accounting	Project A2 Developing Carbon Accounting systems	In kind 1.9 FTR	P Ritson 0.5 (FPC), R Harper 0.3, J McGrath 0.2, I Dumbrell 0.3 (FPC), B Brand 0.5 (FPC), R McKellar (0.1), S Sochacki (1.0), CRC Funds – Totals 1.3 FTE from FPC, 0.6 FTE from DCLM
Dampier Salt	Pilbara survey	20 airfares Perth – Karratha - Return	S Van Leeuwen
Dept of Premier and Cabinet	Bushplan	\$100k for 2003-04	A Hopkins (1.0)

Partnership Name	Project - i.e. CRC, Govt Depts, Universities, Industries, Other (sponsorships etc)	Involvement (\$)	Involvement (inkind)
Dept of Primary Industries Victoria	PAPP toxicosis	To be advised	D Algar (0.02), K Morris (0.02)
Desert CRC	3 Scientists	No \$ contribution	D Pearson (0.25), M Cowan (0.25), A Hopkins (0.5), K Tinley (1.0) + 1 more to be advised
Hammersley Iron	Pilbara Survey – rental of accommodation unit at Karratha	\$690 month subsidized	S Van Leeuwen signed the contract
Joint Venture Agroforestry Program – ext partners at UWA	Phase Farming with Trees – Field validation and extension	In kind contribution only	R Harper (0.2) N Robinson (0.5)
LWA/CSIRO	Genetic & ecological viability of plant populations in remnant vegetation. (PhD scholarship)	\$92k total (\$67k LWA, \$25k SAP) \$7k DCLM contribution	D Coates (0.4), M Byrne (0.1), C Yates (0.2), C Elliott (1.0), B McDonald (0.1)
Millennium Seedbank Project	Seed collection, storage and biology	\$105k yr to 2010	A Cochrane (0.8), D Coates (0.1)
Morgan	Feral cat research	\$951k over 5 yrs	D Algar (1.0), N Hamilton (1.0), M Onus (1.0), J Angus (1.0)
Murdoch University	Western Barred, Gilbert's Potoroo, Quenda – ARC Linkage Grant	\$15k pa for 3 yrs	T Friend (0.05)
Murdoch University/ Ravensthorpe Nickel	PhD student – D Cancilla Management guidelines for the threatened Heath Mouse and other rodent species in mining lease areas of southern WA	ARC Linkage Grant	B Johnson (0.4), K Morris (0.05), + \$5 k yr for 2003-5 from Stipend funds (DCLM contribution)
Murdoch University	ARC Linkage Project – Landscape fragmentation and rare plant species. PhD student A Franks	\$27 615 for 2002 \$28 615 for 2003 \$28 218 for 2004	C Yates (0.2), + \$7500 yr for 2002-4 DCLM contribution
Murdoch University	Survival of <i>Phytophthora cinnamomi</i> in rehabilitated bauxite mining areas S Collins (PhD student)	Nil	B Shearer (0.04)
Murdoch University	Phosphonate distribution in <i>Eucalyptus marginata</i> Donn ex Sm. forest and colonization by <i>Phytophthora cinnamomi</i> Rands R Pilbeam (PhD student)	Nil	B Shearer (0.04)
Murdoch University	Epidemiology of Marri canker	Nil	B Shearer (0.4)
Murdoch University	Tuart woodland decline (ARC project) including support for a PhD student	\$20k per yr	J McGrath (0.05), D Haswell (0.05), L McCaw (0.05)
Netherlands Institute for Sea Research (NIOZ)	Benthic studies – Roebuck Bay, NHT + Wettenhall – Roebuck Bay book	\$27k	G Pearson (0.15)
Netherlands Institute for Sea Research (NIOZ)	PhD – T Compton	\$5k from Stipend funds (DCLM)	G Pearson (0.05)
NHT	Protect island habitat from feral animals - Project 40977	\$10k	A Burbidge - contract
NHT	Western Bristlebird Research Plan	\$99 387	A H Burbidge (0.1), J Rolfe (0.05)
NHT	Dibbler Research	\$13 727	T Friend (0.1)
NHT	Regional assessment of the conservation status of vegetation units throughout WA (Beard)	\$31 525	A Hopkins (0.1)
NHT	Review and update of Ramsar	\$6900	J Lane (0.15)

- To train DCLM Bushrangers in mammal conservation and handling.

Summary of progress

- Populations of Woylies are stable, with normal distribution curves for ages.
- Captures for Woylies are high at c. 73%, with little variation between treatments and through time. It is unlikely to increase above this level because other traps are usually disturbed and not available for captures.
- Other vertebrates have to compete with the Woylies for the traps and even though their capture rates are low they are consistent with other areas of similar faunal suites.
- The numbers of feral predators are consistently low

Future direction(s)

Continue monitoring in the PNR at twice/year using the DCLM Bushrangers as a reward and teaching exercise in fauna handling and trapping techniques.

DCLM Region
Warren.

IBRA Region
Jarrah Forest.

Directory of important wetlands in Australia: revised editions

SPP # 1999/0014

Team members

J Lane (0.15), G Pearson (0.1), A Clarke (0.35), S Elscot (0.1); Total (0.7).

Aim

To prepare revised editions of the Western Australian Chapter of *A Directory of Important Wetlands in Australia* (Environment Australia 2001), incorporating additional wetlands and information. To periodically update the national database of Directory wetlands.

Summary of progress

- The most recent (3rd) edition of the Directory was published in 2001. Western Australia has 120 listed sites.
- Further research is needed to ensure that wetlands in remote regions of the State are adequately represented and well documented.
- Funding was provided from Environment Australia's Natural Heritage Trust National Funding Program in May 2003 for DCLM to undertake work leading to the nomination and improved documentation of nationally important wetlands in under-represented IBRA regions of the State.

Future direction(s)

- Representation of Western Australian wetlands in the Directory will be reviewed.
- Attention will be focused on IBRA regions with few listed sites and on the adequacy of documentation of these sites. Wetland literature relating to these regions and sites will be collated and analysed.
- This literature, specialist knowledge and existing biophysical maps, photographs and satellite images will be used to plan a program of wetland data and knowledge acquisition.
- Site managers and others with substantial relevant knowledge will be contacted and site visits and surveys conducted to collect field data and other information to support site listings.
- Specimens will be identified, data analysed and information synthesized.
- Descriptions of proposed new sites for the Directory will be prepared, together with enhanced descriptions of existing sites.
- The Western Australian component of the national Directory will be updated in 2005 to include these new sites and enhanced site descriptions.

DCLM Region(s)

Kimberley, Pilbara, Goldfields, Midwest.

IBRA Region(s)

Central Kimberley, Coolgardie, Murchison, Nullarbor, Ord Victoria Plains, Pilbara, Yalgoo.

Identification and monitoring of benthic invertebrate communities of tropical intertidal mudflats

SPP # 1999/15

Team members

J Lane (0.0), G Pearson (0.2); Total (0.2).

Aim

To facilitate and participate in research on the wildlife conservation values of intertidal mudflats including Roebuck Bay and Eighty-mile Beach.

Summary of progress

Roebuck Bay

- A major collaborative study of the whole of the intertidal mudflats of Roebuck Bay was completed in June 2002.
- The project attracted substantial external funding.
- Continued collaboration with other interest groups.
- A one-day information forum.
- Featured on Channel Nine 'Postcards WA', depicting the role of DCLM Science Division in wetland conservation.
- Landscape Expedition.

Eighty-Mile Beach

- Collected background information on Eighty-mile Beach through Dr R Hickey.
- Visited Eighty-mile Beach for discussion on Section 16a dual-purpose management reserve.
- Initiated analysis of data collected from the Eighty-mile Beach monitoring ('Monanna') Project.
- PhD Project - T Compton, Comparison of tropical and temperate bivalves in 2 intertidal mudflats.
- Promoter - Prof W Wolff.
- Supervisors: Dr T Piersma, G Pearson.
- University of Groningen, Netherlands Institute of Sea Research and the Department of Conservation and Land Management.
- The aim of this study will be to test the hypothesis that organisms have a wider distribution and physiological tolerance in a range of temperate relative to tropical regions.

Future direction(s)

Roebuck Bay

- A book on the ecology of the Bay. Funded by NHT, WWF and DCLM and published by DCLM. The book will extend public understanding of the conservation values of Roebuck Bay.
- A food-web study of the Bay incorporating use of stable isotopes, by RNIOZ, University of Western Australia and DCLM.
- Salary sought for an Education Officer/taxonomist based at Broome Bird Observatory working in collaboration with Environs Kimberley, employed by DCLM.
- Collaborate with Rubibi Aboriginal Group in a monitoring program of mangal and benthic communities at Dampier Creek.

Eighty-Mile Beach

- A program is being developed in collaboration with Karen Wheeler of MCB that might result in community monitoring of the crab fauna of parts of the Beach.
- Monitoring of the benthos continues through Broome Bird Observatory.

IBRA Region
Pilbara.

Monitoring of Carnac and Penguin Island Silver gull populations

SPP # 1999/0012

Team members

J Lane (0.05); other DCLM collaborator D Coughran; Total (0.05).

Aim

To monitor trends in the numbers of breeding pairs of Silver Gulls *Larus novaehollandiae* on Carnac and Penguin Islands, as an indicator of the effectiveness of DCLM's Perth metropolitan area gull management plan.

Summary of progress

Numbers of gulls on low-level, oblique, aerial photographs of Carnac and Penguin Islands taken in May of 2000, 2001 and 2002 were counted. Trends in gull numbers on these 2 islands since the project began 1994 were determined statistically. Preparations were made for the May 2003 survey. This will probably be the last survey for several years.

Future direction(s)

Following completion of the May 2003 aerial photographic census, trends in annual gull numbers on Carnac and Penguin Islands over the period 1994-2003 will be determined and a report prepared. This report will contribute to a Departmental review of Silver Gull management in the greater Perth Metropolitan Area.

DCLM Region

Swan.

IBRA Region

Swan Coastal Plain.

State Salinity Strategy wetland monitoring

SPP # 1998/0018

Team members

Fauna - S Halse (0.1), D Cale (0.5), M Penniford, (0.2), R. Dodds (0.1); Flora - M Lyons (0.8), N Gibson (0.05); Surface water - J Lane (0.35), G Pearson (0.1), A Clarke (0.6), Y Winchcombe (0.3), B Johnson (0.05); Groundwater - S Halse (0.05), contracts; Total (3.2).

Aim

To monitor changes in biodiversity, surface water quantity and quality, and groundwater levels at selected Wheatbelt wetlands in relation to increasing dryland salinity and land-use changes.

Summary of progress

- Fauna monitoring – results from commencement of program in 1997 to April 2001 summarized in paper submitted to *Conservation Science Western Australia*. Monitoring for 2002-03 completed.
- Vegetation monitoring – monitoring for 2002-03 completed, collaboration began with CRC for Plant-based Management of Dryland Salinity on detailed measures of soil and plant vigour.
- Surface water monitoring – 2002 monitoring completed; database corrections and update completed; analyses of 1978-2000 depth and salinity data from 151 wetlands completed; compilation of 1978-2000 report well-advanced.
- Wetland bathymetry – mapping of lake bed, shoreline, inflow and outflow contours of Lakes Bryde, East Lake Bryde, Lake Warden System and part Yenyening Lakes System completed. Maps and depth-volume calculators prepared.
- Groundwater monitoring – data loggers installed in all bores to be operational from mid-2003. Monitoring for 2002-03 completed.

- Management –contributed to Bryde, Buntine-Marchagee, Drummond, Muir, and Toolibin TAGs and provided advice to Warden Biodiversity Recovery Catchments, have advised on biodiversity aspects of drainage issues in Wheatbelt.
- Publicity – filmed Post Cards WA segment on faunal aspects of monitoring program to be screened in June 2003.

Future direction(s)

- Continue monitoring according to current protocols.
- Report on trends in depth and salinity of monitored wetlands from 1978-2000 to be completed.
- Compile bathymetric mapping of Lake Gore, Lake Mears and additional part of Yenyening Lakes System.
- Monitoring bores to be surveyed to depth gauges.
- Analyse groundwater data.

DCLM Region(s)

Midwest, South Coast and Wheatbelt with 1 site in each of South West and Swan.

IBRA Region(s)

Avon Wheatbelt, Esperance Plains, Geraldton Sandplains, Jarrah Forest, Mallee.

Impacts of Dawesville channel on Peel-Harvey Estuary waterbirds

SPP # 1999/0016

Team members

J Lane (0.35), G Pearson (0.05), A Clarke (0.05), Y Winchcombe (0.05); Total (0.5).

Aim

To assess the impacts of the Dawesville Channel (completed in April 1994) on waterbird populations of Peel-Harvey Estuary.

Summary of progress

- The following reports were completed during 2002-03:
 - Lane, J.A.K., Clarke, A.G. & Pearson, G.B. (2002). *Waterbirds of Peel-Harvey Estuary in 1996-97*. Department of Conservation and Land Management, Western Australia, pp. 1-41.
 - Lane, J.A.K., Clarke, A.G. & Pearson, G.B. (2002). *Waterbirds of Peel-Harvey Estuary in 1998-99*. Department of Conservation and Land Management, Western Australia, pp. 1-40.
 - Lane, J.A.K. & Pearson, G.B. (2002). *Waterbirds of Peel-Harvey Estuary in the Mid 1970s*. Department of Conservation and Land Management, Western Australia, pp. 1-73.
- Preparation of 3 related reports: '*Black Swan and Australian Pelican populations of Peel-Harvey Estuary*'; '*Swans, pelicans and egrets on estuaries of south-western Australia in the 1970s*' and '*Waterbirds of Leschenault Inlet in the early 1970s*' was commenced and is well-advanced.
- Planned field work for this project was completed in Feb 2001. Additional censuses of swans and pelicans were undertaken in Dec 2002, Feb 2003 and April 2003 due to Australia-wide drought conditions and an expected increase in waterbird numbers in coastal areas, possibly to pre-Dawesville Channel levels.

Future direction(s)

- The 3 partially-prepared reports referred to above will be completed.
- An additional 'comparisons' report, comparing the results of the pre- and post-Dawesville Channel waterbird surveys, will also be prepared.

DCLM Region

Swan.

IBRA Region

Swan Coastal Plain.

Management of the Vasse - Wonnerup wetlands

SPP # 1999/0017

Team members

J Lane (0.1), Y Winchcombe (0.05), G Pearson (0.05); Total (0.2).

Aim

To undertake monitoring programs that will enable impacts of water level and salinity management regimes of Vasse-Wonnerup to be assessed. The principal issues of interest in this project are impacts on waterbird populations, fringing plant communities and the occurrence of mass fish deaths.

Summary of progress

- A report on waterbird surveys undertaken between 1998 and 2001 has not been prepared, due to priority being given to other work. The fringing vegetation monitoring plots established in 2000 have not been revisited, due to priority being given to other work by the District.
- Monitoring of water levels in the Vasse and Wonnerup estuaries has been rationalized, by reducing the number of data loggers, relocating them to easy access points and having a locally-based officer download the data. Conversion (to Australian Height Datum) and graphing of data has been brought up-to-date during 2002-03.
- Monitoring of fish activity and water levels at the floodgates was undertaken during 2002-03. The Vasse estuary floodgates were opened on several occasions to maintain the target, summer-autumn, water level and to allow fish to pass. There were no mass fish death incidents in the Vasse or Wonnerup estuaries during summer-autumn of 2002-03.
- Meetings of the inter-agency Vasse Estuary Technical Working Group were convened to decide arrangements for summer opening of the sandbar at the wetland system mouth; for water level, water quality and fish monitoring, and for floodgate openings to release fish and manage water levels. The VETWG also provided technical advice to the Water Corporation regarding environmental aspects of the design and operation of the proposed replacement floodgates (scheduled for 2003-04).
- Advice was supplied in response to public queries about management of the wetland system and places to see waterbirds. Technical input was provided to the TWG responsible for preparation of the Draft Busselton Wetlands Conservation Strategy (BWCS; released April 2003).

Future direction(s)

- A concise report will be prepared, recording water levels, floodgate openings, fish releases and fish death incidents in the Vasse-Wonnerup system since the Dec 1997 report of Lane, Hardcastle, Tregonning & Holtfreter.
- Monitoring of water levels and fish activity during summer will continue. Gates will be opened as necessary to manage water levels and release fish. The VETWG will be convened as necessary.
- Further technical advice will be provided if needed concerning design and operational aspects (environmental) of the proposed replacement floodgates. Public enquiries concerning management of the wetlands will be responded to. Further technical input will be provided for finalization of the BWCS.

DCLM Region

South West.

IBRA Region

Swan Coastal Plain.

The impact of wildfire, in old growth forest of the Walpole-Nornalup National Park, on short-range endemic invertebrates and their forest floor communities

SPP # 2003/03

Team members

I Abbott (0.02), A Mellican (0.02), P Van Heurck (0.5); regional staff - E Middleton; Walpole-Nornalup Parks Association & Walpole community volunteers; Total (0.54).

Implementation of the Lancelin Island skink Recovery Plan

SPP # 1999/0011

Team member

D Pearson (0.1), Perth Zoo - captive breeding; Total (0.1).

Aim

To ensure the survival of the Lancelin Island skink through strategic research, monitoring and translocation of the species as outlined in its Recovery Plan (Pearson and Jones 1997).

Summary of progress

- The Lancelin Island skink is known only from Lancelin Island (7.6 ha) and a single location on the adjacent mainland. Further surveys have failed to find any other individuals on the mainland.
- Two translocations undertaken to Favourite Island (total 90 skinks) after 12 months monitoring of the existing lizard populations. First translocation of a lizard in WA and one of the few translocations of reptiles worldwide.
- Ongoing collaborative work with Perth Zoo in maintaining captive colony (monitoring condition, selecting breeding stock, measuring and sexing neonates and selection of individuals for translocation).
- Reports on progress of Lancelin Island Skink Recovery Team provided to Dennis Hockey and Corporate Executive.

Future direction(s)

- Monitoring of Favourite Island translocated population and Lancelin Island population in Dec 2003 and March 2004. Further release of captive-bred skinks and direct transfer of Lancelin Island wild stock proposed for Dec 2003.
- Publication of results of captive breeding and translocation to Favorite Island.
- Report to Recovery Team and Corporate Executive.
- Supervision of student (Z Hamilton, UWA) examining genetics of sympatric skinks on Jurien Bay islands.
- Analyse collected genetic material to examine reproductive dynamics of captive colony.

DCLM Region

Midwest.

IBRA Region

Geraldton Sandplains.

Breeding ecology and conservation of the Banded stilt

SPP # 1999/0013

Team members

J Lane, G Pearson, A Clarke; Total (0.0).

Aim

- To identify principal breeding locations of Banded stilt in Western Australia.
- To develop improved understanding of breeding biology.
- To quantify factors governing breeding success.
- To identify threats.
- To disseminate knowledge to ensure conservation.

Summary of progress

- No field work was undertaken during 2002-03, due to annual rainfall in Eastern Goldfields being insufficient to warrant aerial inspections for Banded stilt breeding activity.
- Report on previous breeding activity was not prepared, due to priority being given to other work.

Future direction(s)

- Rainfall reports from the Eastern Goldfields (main breeding range of Banded stilt in WA) will be monitored.
- Following exceptional rainfall events and reports of flooding, aerial surveys will be conducted to locate and monitor breeding colonies.
- Colonies will be photographed from the air and, if feasible, visited on the ground to determine number of breeding pairs, nesting and fledging success, water depths, water chemistry and food availability.
- Chicks will be banded and leg-flagged to obtain information on movements and longevity.
- A report on previous breeding activity will be prepared.

DCLM Region
Goldfields.

IBRA Region
Murchison.

Ground parrot recovery

SPP # 2000/0002

Team members

A Burbidge (0.05), J Rolfe (0.02); Total (0.07).

Aim

- To develop an understanding of habitat requirements, including response to fire.
- To create management prescriptions that will increase the survival chances of the Ground parrot and increase its total population size.

Summary of progress

- All contemporary and historical records brought into a digital environment, for use in a GIS, to facilitate planning of specific management actions.
- In collaboration with regional staff, discussion paper developed concerning fire management at Waychinicup–Manypeaks.
- In collaboration with regional staff, options have been developed for fire management for the major population in Fitzgerald River NP.
- Monitoring at Cape Arid NP has led to the rediscovery of the species at this location.
- NHT funding proposal developed in collaboration with regional staff; high likelihood of being funded.

Future direction(s)

- Validate accuracy of all location records using GIS framework.
- Develop monitoring protocol.
- Analyse data from monitoring program.
- Write Recovery Plan.
- Implement Recovery Plan where funds permit (including monitoring and a trial translocation).

DCLM Region(s)
South Coast, Warren.

IBRA Region(s)
Esperance Plains, Jarrah Forest, Warren.

Pro bait trials: phase 2

SPP # 2000/ 0014 (includes 99/ 0018)

Team members

N Marlow (0.35), A Williams (0.4); Total (0.75).