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Threatened fauna issues not covered under *Wetern Shield*: *Western Shield* review—February 2003

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This review paper addresses the following terms of reference:

- Provide an overview of threatened fauna recovery projects not included under the *Western Shield* umbrella.
- List critically endangered and endangered fauna species for which there are no or limited recovery programs and provide a brief overview of what needs doing for each of them.
- Discuss the pros and cons of including additional or all fauna recovery projects under *Western Shield*.
- Discuss links between recovery plans and *Western Shield* activities.

INTRODUCTION

The *Western Shield* Fauna Recovery Program provides for the recovery of terrestrial vertebrate animals, especially 'critical weight range' (CWR) mammals (Burbidge and McKenzie 1989), threatened by predation by introduced animals. Current concentration is in the south-west region, and expansion to the rangelands awaits an operational technique for controlling feral cats as well as foxes. *Western Shield* is based upon a program for the abatement of a single Threatening Process and enhancement, largely by translocation, of the status of target native species.

Western Shield 's current objectives (CALM, 1999) are to:

- Maximise the recovery of sustainable populations of vulnerable native fauna by reducing the impact of predation by foxes and feral cats.
- Develop cost efficient and effective control techniques for foxes and feral cats.
- Through education and public relations programs increase the awareness of the effect of fox and feral cat predation on native fauna and what can be done to mitigate this effect (best practice).
- Link predator control and fauna recovery to complementary research projects.
- Develop and maintain partnerships with groups and organisations that maximise the efficiency and effectiveness of fauna recovery across Western Australia.

Thus, *Western Shield* is not, in its present form, a broad fauna recovery program for all Western Australian threatened fauna. In addressing the terms of reference we have kept in mind three broad questions:

1. To what extent should *Western Shield* operate as the department's umbrella program for all recovery work on threatened fauna and threatened faunal communities?
2. To what extent should the total money available from departmental resources for the recovery of threatened species and ecological communities be distributed in accordance with levels of threat as allocated by the Threatened Species Scientific Committee and Threatened Ecological Communities Scientific Committee?
3. If strict allocation according to threat status is not practicable what alternative mechanism should be established to ensure that all of the State's threatened species and communities are provided sufficient resources for reasonable confidence of recovery? In particular, what coordination or change is needed to ensure that the highest priority threatened species and communities receive resources, and that *Western Shield* does not warp departmental priorities?

The questions above are critical ones for the Department, particularly with the increasing uncertainty that Commonwealth funds (now mainly from the Natural Heritage Trust (NHT)) will continue to be available for the State's highest priority recovery programs.

THE THREATENED FAUNA OF WESTERN AUSTRALIA

The list of threatened fauna[1] (excluding most marine species[2]) gazetted under the Western Australian Wildlife Conservation Act on 9 April 2002 includes 17 Critically Endangered (CR) species, 26 Endangered (EN) species and 91 Vulnerable (VU) species (Tables 1 and 2).

It is apparent from Table 2 that only six of the 43 fauna taxa currently listed as CR or EN in Western Australia are benefiting or likely to benefit directly or significantly from funding via the current *Western Shield* program. Of these six, Gilbert's potoroo, dibbler, western barred bandicoot and western ground parrot are the subject of significant other recovery actions that are not covered under *Western Shield*. For Gilbert's potoroo, dibbler and western ground parrot these additional actions are critical to the species' recovery. There are also other taxa such as western swamp tortoise that, while it potentially benefits from *Western Shield* , is currently entirely funded from other programs for actions to ensure the species' survival.

Thus, there are 40 CR and EN animal species not adequately funded under *Western Shield* (Table 2). Of these, 24 are currently the subject of greater or lesser recovery actions funded from a variety of sources (Tables 2 and 4), and 16 have no recovery actions in train in Western Australia (although four species of arachnids are under the general supervision of the North West Cape Karst Management Advisory Committee).

As noted above, 24 taxa of Kimberley camaenid land snails are to be listed as CR or EN. Most (23) occur in the Ningbing Range area and their recovery can be dealt with through a single plan dealing with the whole range. This plan would need to be written in consultation with other stakeholders. A millipede from the south coast forests is to be listed as EN and will need separate recovery actions. This species is now the subject of recovery planning under the supervision of the recently established South Coast Threatened Invertebrate Group. This group is also dealing with other relict species of invertebrates occurring in humid areas, historically with long periods between fires, along the south coast of Western Australia.

To ensure this review is comprehensive, fauna-based Threatened Ecological Communities (TECs) need to be considered as well as species. There are currently eight CR and four EN faunal TECs listed on the department's TEC Database (Table 3).

None of the twelve CR and EN TECs listed in Table 3 benefits from *Western Shield* . Thus, only six of 55 CR and EN faunal species and TECs are benefiting directly or significantly from *Western Shield* .

On the other hand, two species of mammals currently listed as Vulnerable (not shown in Table 2) are now listed under this lower threat category because of actions under *Western Shield* . These are chuditch (*Dasyurus geoffroii*), and numbat (*Myrmecobius fasciatus*). Complete cessation of fox baiting within the range of these species would almost certainly result in them quickly needing to be reclassified into one of the higher threat categories. Other Vulnerable species are benefiting from *Western Shield* , eg, bilby (*Macrotis lagotis*), western ringtail possum (*Pseudocheirus occidentalis*), boodie (*Bettongia lesueur*), black-flanked rock-wallaby (*Petrogale lateralis*), quokka (*Setonix brachyurus*), and probably the dayang (heath rat) (*Pseudomys shortridgei*). Three mammals, now in the 'Conservation Dependent' category, have recovered sufficiently due to *Western Shield* that they could be delisted: woylie (*Bettongia penicillata*) (Start *et al.* 1998), tammar wallaby (*Macropus eugenii*) and quenda (*Isoodon obesulus*). In addition, it is clear that a number of other species of mammals not currently listed as threatened, have recovered in *Western Shield* areas. These species, including the common brushtail possum (*Trichosurus vulpecula*) and western brush wallaby (*Macropus irma*) (not strictly a CWR species, but appears to benefit from fox control), could be expected to continue declining within the distribution of foxes if fox baiting was significantly reduced. Some larger ground-nesting birds, including the Vulnerable malleefowl (*Leipoa ocellata*) and the Near Threatened bush stone-curlew (*Burhinus grallarius*), probably also benefit from fox baiting, as do larger reptiles, such as carpet pythons (*Morelia spilota*), *Varanus* spp. and *Egernia* spp.

TABLE 1

Threat categories and taxonomic groups of threatened animals in WA[1] (excluding whales, albatrosses and petrels)[2]

CATEGORY	MAMMALS	BIRDS	REPTILES	FROGS	FISH	INVERTEBRATES	TOTAL
CR	3*	1	1	1	0	11	17
EN	7	5	2	0	0	12	26
VU	27	21	14	2	4	23	91
Total	**37**	**27**	**17**	**3**	**4**	**46**	**134**

* includes one taxon (*Lagorchestes hirsutus* ssp. (NTM U2430), Mala, Rufous Hare-wallaby) listed as Extinct in the Wild

[1] At its March 2002 meeting, TSSC recommended that 20 taxa of Camaenid snails be listed as CR, four as EN and two as VU. A millipede was also recommended as EN. This will increase by 50% the number of CR+EN fauna taxa in WA.

[2] We have not included whales, albatrosses and petrels in this review, because as oceanic species they are dealt with by National Recovery Plans overseen by the Commonwealth government. No albatrosses or listed petrels breed in WA.

Table 2

Recovery programs in WA for CR and EN fauna listed under the *Wildlife Conservation Act 1950.*

SPECIES	THREAT CATEGORY	*WESTERN SHIELD* FUNDING	OTHER CALM AND/OR EXTERNAL FUNDING
MAMMALS			
Potorous gilbertii, Gilbert's potoroo	CR	Partly	Yes
Zyzomys pedunculatus, antina, central rock-rat	CR	No	Yes
Dasycercus hillieri, ampurta	EN	No	No
Parantechinus apicalis, dibbler	EN	Partly	Yes
Phascogale calura, kenngoor, red-tailed phascogale	EN	Partly	No
Sminthopsis psammophila, sandhill dunnart	EN	No	No
Notoryctes caurinus, kakarratul, northern marsupial-mole	EN	No	No
Notoryctes typhlops, Itjaritjari, southern marsupial-mole	EN	No	No
Perameles bougainville bougainville, marl, western barred bandicoot	EN	Partly	No
Lagorchestes hirsutus ssp. (NTM U2430), mala, rufous hare-wallaby	EW	Fully	No
BIRDS			
Pezoporus occidentalis, night parrot	CR	No	Yes
Calyptorhynchus latirostris, Carnaby's black-cockatoo	EN	No	Yes
Cacatua pastinator pastinator, Muir's corella	EN	No	Yes
Pezoporus wallicus flaviventris, western ground parrot	EN	Partly	Yes
Falcunculus frontatus whitei, crested shrike-tit (northern)	EN	No	No
Erythrura gouldiae, Gouldian finch	EN	No	Yes
REPTILES			
Pseudemydura umbrina, western swamp tortoise	CR	No	Yes
Caretta caretta, loggerhead Turtle	EN	No	Yes
Lepidochelys olivacea, Olive Ridley Turtle	EN	No	No
FROGS			
Geocrinia alba, white-bellied Frog	CR	No	Yes
POLYCHAETE WORMS			
Prionospia thalanji (Bundera Sinkhole)	CR	No	Yes
MOLLUSCS			
Undescribed Rhytidid sp. (WAM#2295-69), Stirling Range Rhytidid snail	EN	No	No
MILLIPEDES			
Stygiochiropus peculiaris, Camerons Cave millipede	CR	No	Yes
ARACHNIDS			
Hyella sp. (BES#1154, 2525, 2546), Camerons Cave pseudoscorpion	CR	No	Yes
Kwonkan eboracum, Yorkrakine trapdoor spider	CR	No	Limited
Teyl sp. (B.Y. Main 1953/2683, 1984/13), Minnivale trapdoor spider	CR	No	Limited
Aganippe castellum, tree-stem trapdoor spider	EN	No	No
Draculoides brooksi, Northern Cape Range Draculoides	EN	No	No
Draculoides julianneae, Western Cape Range Draculoides	EN	No	No
Bamazomus subsolanus ms (WAM#98/1540), Eastern Cape Range Bamazomus	EN	No	No
Bamazomus vespertinus ms (WAM#95/748), Western Cape Range Bamazomus	EN	No	No
Moggridgea sp. (B.Y. Main 1990/24, 25), Stirling Range Moggridgea spider	EN	No	Limited
Moggridgea tingle, Tingle trapdoor spider	EN	No	No
CRUSTACEANS			
Bunderia misophaga (Bundera Sinkhole)	CR	No	Yes
Danieolpolina kornickeri (Bundera Sinkhole)	CR	No	Yes
Hurleya sp. (WAM#642-97), Crystal Cave crangonyctoid	CR	No	Yes
Lasionectes exleyi, Cape Range remipede	CR	No	Yes
Speleophria bunderae (Bundera Sinkhole)	CR	No	Yes
Stygocyclopia australis (Bundera Sinkhole)	CR	No	Yes
Liagoceradocus branchialis, Cape Range Liagoceradocus amphipod	EN	No	Yes
NATIVE BEES			
Leioproctus douglasiellus	EN	No	No
Neopasiphae simplicior	EN	No	No
MOTHS			
Synemon gratiosa, graceful sunmoth	EN	No	No

TABLE 3
Recovery programs for CR and EN fauna-based Threatened Ecological Communities in WA.

THREATENED ECOLOGICAL COMMUNITY (FAUNA-BASED)	THREAT CATEGORY	*WESTERN SHIELD*	OTHER FUNDING
Cape Range remipede community (Bundera Sinkhole)	CR	No	Yes
Camerons Cave troglobitic community	CR	No	Yes
Aquatic root mat community of caves of the Swan Coastal Plain	CR	No	Yes
Aquatic root mat community Number 1 of caves of the Leeuwin-Naturaliste Ridge	CR	No	Limited
Aquatic root mat community Number 2 of caves of the Leeuwin-Naturaliste Ridge	CR	No	Limited
Aquatic root mat community Number 3 of caves of the Leeuwin-Naturaliste Ridge	CR	No	Limited
Aquatic root mat community Number 4 of caves of the Leeuwin-Naturaliste Ridge	CR	No	Limited
Tumulus springs community (organic mound springs) of the Swan Coastal Plain	CR	No	Limited
Organic mound springs community of the Three Springs area	EN	No	No
Mandora Marsh organic mound springs community	EN	No	No
Black Spring organic mound spring community	EN	No	No
Ethel Gorge aquifer stygobiont community	EN	No	No

DISCUSSION OF SPECIFIC TERMS OF REFERENCE

Term of Reference 1. An overview of threatened fauna recovery projects not included under the ***Western Shield*** umbrella

The 24 taxa referred to in Table 2 as receiving or having received funding from sources other than *Western Shield* consist of three mammals, five birds, one tortoise and one turtle, one frog and 13 invertebrates (Table 4). None of the twelve CR and EN faunal TECs (Table 3) receives any funding from *Western Shield* , and the eight CR TECs for which some recovery actions are occurring are also listed in Table 4.

Twenty of the 24 taxa in Table 4 are covered by Western Australian Recovery Plans (RPs) or Interim Recovery Plans (IRPs), for all of which significant implementation has begun. The Gouldian finch and loggerhead turtle have national RPs, of which limited implementation occurs in Western Australia. The two species with no IRPs are trapdoor spiders. Of these, the Stirling Range Moggridgea is under the care of the South Coast Threatened Invertebrates Group, and survey work by the WA Museum and Dr Barbara York Main, contracted by the Department, has rediscovered one population of the Yorkrakine trapdoor spider, for which recovery work is urgently needed. All eight CR TECs have IRPs and implementation has commenced for them, (Table 4) while IRPs are not written for the four EN TECs, although some very limited recovery actions have been implemented.

Even for those species and communities with completed Western Australian RPs or IRPs, there are varying degrees of adequacy of funding. Most of the CR and EN vertebrates are covered by full RPs and substantial funding has been available for their implementation. However, significant spending has yet to occur under the Muir's corella RP, which is in late draft, and there is insufficient information to prepare full RPs for the central rock rat and the night parrot, neither of which are positively known to still occur in WA. The central rock rat occurs in other jurisdictions and the night parrot is likely to do the same. Until recently, there has also been inadequate information for the western ground parrot.

The situation is very different for invertebrate fauna and faunal communities, none of which have full Recovery Plans. The two trapdoor spiders referred to above do not have IRPs either, and the amounts of money available and/or spent per species are vastly smaller for invertebrates than for vertebrates. For most of the TECs listed in Table 4, and the individual threatened species they contain, the sums of money identified in the IRPs are all understated because further research is needed, is difficult to cost, and may point to new or altered actions being required. Nevertheless, for some of these TECs containing gazetted threatened species, there is only one occurrence, the area of each one is very small, and the threatening processes are manageable. In these cases, such as Cameron's Cave and Bundera Sinkhole, the cost will be relatively low, even at the whole ecosystem level. Per threatened species it will be at least an order of magnitude less than many single species recovery programs.

For other TECs, especially the Yanchep Caves and the Swan Coastal Plain organic mound springs community, protecting the TECs will also provide relatively cheap protection of all threatened species within them. However, total costs could be very significant because of the need for detailed research and the possible need to provide quite large volumes of water to maintain these groundwater systems into the foreseeable future. Although all spending on these two Swan Coastal Plain communities has, until very recently, been by the Department and the Water and Rivers Commission, a trial artificial recharge of groundwater for Yanchep caves was underway at the end of 2002 and was largely funded by the Water Corporation. In addition, negotiations for longer term funding are currently in train with the Water Corporation and the Forest Products Commission. These negotiations are aimed at designing and funding more robust and generous artificial watering systems as an emergency measure to conserve the TECs and species within them, and to design and implement long term management strategies that will return groundwater aquifers of the Gnangara Mound to sustainability.

For many species and TECs, the sums required in the future under RPs or IRPs are much greater than has so far been committed (Table 4). With the scaling down of Commonwealth funding, there is no obvious source for most of this money, including for species that have been relatively well funded to date. For example, the western swamp tortoise (CR) has been funded significantly by the Commonwealth during the past 10 years, but there is no assurance of any future funding. If Commonwealth funding does not eventuate, this recovery program could be seriously impacted, eg, by the lack of funds to employ the chief investigator Dr Gerald Kuchling. Captive breeding at Perth Zoo, the source of all translocated tortoises, would also be greatly impacted. Recovery programs for other taxa, including Gilbert's potoroo, Australia's most endangered mammal, are similarly at risk.

Thirteen taxa and TECs in Table 4, discussed above, for which funding is deficient are also listed in Table 5, with indicative amounts of funding needed to conduct appropriate recovery programs in the future.

TABLE 4

Recovery actions for CR and EN taxa and ecological communities not adequately funded under *Western Shield*

TAXON/TEC	THREAT CATEG-ORY	PAST & CURRENT ACTIONS	TOTAL COST OF RP	SPENT TO DATE	FUNDING SOURCE[1]
Gilbert's potoroo	CR	Recovery Plan (RP), Recovery Team (RT)	$759 750 first 3 years	$945 300 1997-01	NHT (Natural Heritage Trust), Department
Dibbler	EN	Draft RP, RT	RP still in draft. Cost/year about same as to date	$1.328m 1997-01	NHT, Department
Central rock-rat	CR	Interim Recovery Plan (IRP), Searching in WA (unsuccessful); more proposed by Pilbara Region Biological Survey	$13 605 for two field trips	$28 650 over last 5 years	NHT, Department (proposed)
Night parrot	CR	IRP, Publicity, searching (unsuccessful)	$18 500 for searching	~$30 000 (publicity and searching)	NHT, Department, Australian Museum, volunteers
Muir's corella	EN	Draft Recovery Plan (RP) and Recovery Team (RT), research, monitoring, liaison	$59 100 (Year 1)	$4 000	Department, Dept of Ag, WAM
Carnaby's black cockatoo	EN	RP,RT	$2 253 000 over next five years	$50 000	Department, NHT, Gordon Reid Foundation, Birds Australia, landowners, community groups
Western ground parrot	EN	RP, RT, research, public liaison	$108 855 over 3 years	$120 000 over last 5 yrs	Department, NHT Birds Australia,
Gouldian finch	EN	National RP & RT, extensive research, liaison. Survey in WA	$1 046 200 Five- year national plan to February 03	~$5 000 over last 5 years in WA	NHT, mining companies, Department
Western swamp tortoise	CR	RP, RT	$1 323 900 over the next five years	Work at similar level since1992	NHT, Department, Perth Zoo, UWA
Loggerhead turtle	EN	National RP, limited WA actions	$ 5 620 000 for all species	$60 000 since 1996	Department, NHT, Landscope Expd
White-bellied frog	CR	RP, RT	$301100 over 3 years	~$170 000 over last 5 years	NHT, Department (about equal contributions)
Bundera Sinkhole polychaete	CR	IRP, RT	>$99 750 total over 3 years[3]	Department, NHT, ~ $45 000 over last 3 years[3]	Dept. of Defence, Department, NHT
Camerons Cave millipede	CR	IRP, RT, survey, revesting and monitoring of Cameron's Cave under TEC RP	$58 750 over 3 years[2]	>$15 000 over last 3 years[2]	

TABLE 4 (continued)

TAXON/TEC	THREAT CATEG-ORY	PAST & CURRENT ACTIONS	TOTAL COST OF RP	SPENT TO DATE	FUNDING SOURCE[1]
Camerons Cave pseudoscorpion	CR	IRP, RT, survey, revesting and monitoring of Cameron's Cave under TEC RP	$58 750 over 3 years[2]	>$15 000 over last 3 years[2]	Department, NHT
Yorkrakine trapdoor spider	CR	Survey, status report, monitoring by WA Museum under contract	NA	$14 000 over three years	NHT, Department
Minnivale trapdoor spider	CR	IRP, Searching by WA Museum under contract	$24 155 over three years	$6 000 over three years	NHT, Department
Stirling Range Moggridgea spider	EN	RT, some searching	NA	$9 700	Department, NHT
Bunderia misophaga (Bundera Sinkhole)	CR	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Danieolpolina kornickeri (Bundera Sinkhole)	CR	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Crystal Cave crangonyctoid	CR	IRP, RT, emergency provision of water, negotiations for long term strategy	$333 350 over next 5 years[4]	$120 000 over last 5 years	Department, DoE
Cape Range remipede	CR	IRP, RT, fencing, traffic management, research and monitoring in TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Speleophria bunderae (Bundera Sinkhole)	CR	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Stygocyclopia australis (Bundera Sinkhole)	CR	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Cape Range Liagoceradocus amphipod	EN	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Cape Range remipede community	CR	IRP, RT, fencing, traffic management, research and monitoring under TEC RP	>$99 750 total over three years[3]	~ $45 000 over last 3 years[3]	Department, NHT, Dept. of Defence
Camerons Cave troglobitic community	CR	IRP, RT, survey, revesting and monitoring of Cameron's Cave under TEC RP	$58 750 over 3 years[2]	~$15 000 over last 3 years[2]	Department, NHT
Root mat community of Yanchep caves	CR	IRP, RT, emergency provision of water, negotiations for long term strategy	>$333 350 over next 5 years[4]	~$140 000 over last 5 years[4]	Department, DoE Water Corporation, Forest Products Commission
Leeuwin-Naturaliste cave community No 1	CR	IRP, RT,	$87 900 over 3 years[5]	~$25 000 over last 3 years[5]	Department
Leeuwin-Naturaliste cave community No 2	CR	IRP, RT,	$87 900 over 3 years[5]	~$25 000 over last 3 years[5]	Department
Leeuwin-Naturaliste cave community No 3	CR	IRP, RT,	$87 900 over 3 years[5]	~$25 000 over last 3 years[5]	Department
Leeuwin-Naturaliste cave community No 4	CR	IRP, RT,	$87 900 over 3 years[5]	~$25 000 over last 3 years[5]	Department
Organic mound springs of Swan CP	CR	IRP, Acquisition of two occurrences, fencing, weed control.	> $93 650 over 3 years (excl purchase)	~$230 000 over last five years[6]	NHT, Department

[1] In order of magnitude of contribution.

[2] Total figure for the Camerons Cave troglobitic community and all threatened species within it.

[3] Total figure for the Cape Range remipede community (Bundera Sinkhole) and all threatened species within it.

[4] Total figure for the Yanchep Cave root mat community and the Crystal Cave crangonyctoid.

[5] Cost of planned recovery actions for all four Leeuwin Naturaliste cave communities excluding possible maintenance of stream levels, water quality investigations, and possible regeneration program for trees above caves.

[6] Includes acquisition of two occurrences at total cost of $190 000.

Term of Reference 2. CR and EN fauna for which there are inadequate recovery programs

Listing taxa and TECs for which there are inadequate recovery programs is difficult, as funding levels and guidelines vary from year to year. Apportioning funding is particularly difficult in relation to external funding from the NHT, as this program seems to be in a hiatus with relation to funding to the State.

However, the 16 EN species and four EN TECs listed in Tables 2 and 3 with no funding in WA clearly fall under this term of reference (Table 5). In addition, Table 5 lists 13 CR and EN taxa and TECs from Table 4 for which current actions are limited and funding in WA is inadequate. Most of the unfunded taxa require clarification of their distribution, and ecological and biological characteristics. The four Cape Range invertebrates are under the general supervision of the North West Cape Karst Management Advisory Committee. Table 5 includes four vertebrate species (sandhill dunnart, loggerhead and Olive Ridley turtles and Gouldian finch) for which national Recovery Plans exist but for which little or no implementation is currently being conducted in Western Australia.

If VU taxa and TECs were included, the table would be much larger. Attention especially needs to be paid to identifying those VU taxa and TECs whose conservation status is declining.

TABLE 5

Some urgent actions needed for neglected and under-funded CR and EN fauna and TECs[3]

TAXON / TEC	CAT	ACTIONS REQUIRED	APPROX COST
Ampurta	EN	Searching in WA	$15 000 per year for 3 years
Sandhill dunnart	EN	Survey in WA as in recent national RT, research into fire and predators	$20 000 per year for 3 years
Northern marsupial mole	EN	Survey and ecological work as in SA, NT	$100 000 per year for 3 years
Southern marsupial mole	EN	Survey and ecological work as in SA, NT	Included in above
Antina	CR	Searching in WA	(Pilbara Survey)
Night parrot	CR	Following up reported sightings	$5000 per year
Crested shrike-tit (northern)	EN	Survey and ecological studies in WA	$20 000 per year for 5 years
Gouldian finch	EN	Survey and conservation actions in WA	$20 000 per year for 5 years
Loggerhead turtle	EN	Establish RT, implement RP in WA	$ 15 000 per year for 5 years
Olive Ridley turtle	EN	Not known to breed in WA. Survey of Kimberley Islands and mainland required.	$ 7 000
Stirling Range rhytidid *Kwonkan eboracum*,	EN	Survey and conservation actions within SRNP	$20 000 per year for 5 years
Yorkrakine trapdoor spider	CR	Single very threatened population known	$25 000 per year for 5 years
Teyl sp. Minnivale trapdoor spider	CR	No extant animals known	Calculate if and when population found
Moggridgea sp., Stirling Range Moggridgea spider	EN	South Coast Invertebrates Recovery Team	Included in rhytidid
Tingle trapdoor spider	EN	South Coast Invertebrates Recovery Team	$20 000 per year for 3 years
Tree-stem trapdoor spider	EN	Survey, biological and ecological research	$25 000 per year, 3 yrs
Eastern Cape Range Bamazomus	EN	Survey, preparation of IRP	$60 000 over 2 years
Western Cape Range Bamazomus	EN	Survey, preparation of IRP	Included in above
Northern Cape Range Draculoides	EN	Survey, preparation of IRP	Included in Eastern Cape Range Bamazomus
Western Cape Range Draculoides	EN	Survey, preparation of IRP	Included in Eastern Cape Range Bamazomus

[3] Some broad indications only; not a comprehensive compilation

TABLE 5 (continued)

TAXON / TEC	CAT	ACTIONS REQUIRED	APPROX COST
Leioproctus Native bee	EN	Survey	$25 000 per year for 3 years
Neopasiphae Native bee	EN	Survey	Included in *Leioproctus*
Graceful sun moth	EN	Survey proposed by WA Insect Study Society; funding to be sought from Gordon Reid Foundation or TSN	$90 000 one off, follow up funds as indicated by survey
Aquatic root mat community of caves of the Swan Coastal Plain	CR	Implementing IRP, emergency water supply; funding proposed from other agencies with responsibilities for groundwater management	$500 000 over 5 years
Aquatic root mat community Number 1 of caves of the Leeuwin-Naturaliste Ridge	CR	Implementation of IRP for all four Leeuwin-Naturaliste cave communities	$200 000 over 5 years
Aquatic root mat community Number 2 of caves of the Leeuwin-Naturaliste Ridge	CR	Implementation of IRP	Included in No. 1
Aquatic root mat community Number 3 of caves of the Leeuwin-Naturaliste Ridge	CR	Implementation of IRP	Included in No. 1
Aquatic root mat community Number 4 of caves of the Leeuwin-Naturaliste Ridge	CR	Implementation of IRP	Included in No. 1
Tumulus springs community (organic mound springs) of the Swan Coastal Plain	CR	Implementation of IRP, Hydrological research and emergency water supply if necessary	~$200 000 over 5 years
Organic mound springs community of the Three Springs area	EN	Further faunal survey and hydrological research, writing and implementing IRP	>$100 000 over 5 years
Mandora Marsh organic mound springs community	EN	Further faunal survey and hydrological research, writing and implementing IRP	>$120 000 over 5 years
Black Spring organic mound spring community	EN	Further faunal survey and hydrological research, writing and implementing IRP	>$120 000 over 5 years
Ethel Gorge aquifer stygobiont community	EN	Writing and implementing IRP	>$50 000 over 5 years

Term of Reference 3. Pros and cons of including additional or all fauna recovery projects under *Western Shield*

In considering this term of reference we wish to address the wider question of how best to organise, coordinate and fund all recovery work on threatened species and ecological communities in this State. The approach taken should be consistent with the department's redrafted Policy Statement No. 9 'Conserving Threatened Species and Ecological Communities' currently in the public review stage. One of its primary objectives is that:

Recovery plans for threatened species and ecological communities will be prepared, published and implemented on a priority basis according to priorities recommended by the WA Threatened Species Scientific Committee and the WA Threatened Ecological Communities Scientific Committee and endorsed by the Minister, with the most threatened species and ecological communities being treated first.

One logical structure to achieve the above objective would be to have two overarching programs, *Western Shield* and Western Everlasting, driving all work on recovering threatened species and ecological communities. *Western Shield* would deal with threatened fauna and ecological communities based on animals, and Western Everlasting would deal with threatened flora and ecological communities based on plants and micro-organisms. The department's total State budget available for recovery work could then be divided between the two programs according to the number of CR and EN taxa and communities (and to a lesser extent VU taxa and communities) being dealt with by each and the relative cost of recovery work (recovery of animals tends to be more expensive than for plants).

The major advantage of putting all threatened fauna and threatened faunal community recovery under *Western Shield* is to ensure that departmental resources available for such work are assigned to the highest priority taxa and threatening processes. It would also give the recovery

of other fauna and faunal communities more status and public recognition by being dealt with under the department's flagship fauna program. A new management structure and decision making process will be required for *Western Shield* and Western Everlasting if this happens.

The major risk in such an amalgamation is the danger of losing the gains made in the recovery of taxa threatened mainly by exotic predators. This can be, at least in part, addressed by reducing the resources being spent on species that are now more secure. In the recent past, considerable resources from *Western Shield* have been directed towards vulnerable taxa such as black-flanked rock-wallaby (*Petrogale lateralis lateralis*), bilby (*Macrotis lagotis*) and Shark Bay rufous hare-wallaby (*Lagorchestes hirsutus bernieri* and *L. h. dorreae*), and even non-listed taxa such as the tammar wallaby (*Macropus eugenii*) and woylie (*Bettongia penicillata*).

We acknowledge that some species referred to above are conservation dependent and fox-baiting throughout much of their range is still necessary. However, the following steps could significantly reduce the costs of continued management of these less threatened species:

- translocations to be restricted to CR and EN species in all but exceptional circumstances
- a more strategic approach to widespread baiting programs with consideration being given to stopping baiting in areas where it has proved to be of little or no benefit
- a clear decision-making process to ensure the greatest benefit, especially for CR and EN species (see discussion of decision making process under Term of Reference 4 below)
- continued development of improved, cost-effective baits and more targeted baiting methods.

A major issue is that many Western Australian threatened fauna programs have depended for some time on Commonwealth funding, initially via the Australian Nature Conservation Agency's Endangered Species Program and later via the Natural Heritage Trust. This has meant that some high priority species recovery work that should be departmental core business has depended almost entirely on external funding, while some low priority species have been well funded from *Western Shield*. Even a relatively minor reduction in Commonwealth funding has had significant ramifications; eg, a $40,000 reduction in NHT funds for Gilbert's potoroo caused significant problems in implementing recovery work for the most endangered mammal in Australia. In our view, this situation should never have arisen—the highest priority species should be funded as part of the department's core funding, while external funds should be used as 'top up/matching funds' for lower priority segments of recovery plans or to initiate new projects on lower priority species or threats.

For those species and ecological communities without obvious sources of funding the situation is even more parlous. For example, last year's faunal monitoring of the Yanchep cave root mat community indicated a sudden decline in condition of the root mat and the absence of many species, despite a limited artificial watering system that had apparently been adequate in previous years. The several to many undescribed species of invertebrates known only from this community appear to be threatened with imminent extinction unless a major emergency watering system is established quickly (all of these species qualify for listing as CR). The Department has allocated an additional $40,000 to assist with this task, but much more will be needed. Negotiations with Water and Rivers Commission, Water Corporation and Forest Products Commission are in train to gain assistance, but this Department will need to contribute to a multi-agency recovery effort.

Dividing resources more evenly and logically between all of the most threatened elements of biological diversity in the State would require *Western Shield* and Western Everlasting to use available State money to meet their core needs and to seek alternative sources of money for other tasks. Because of the 'flagship' nature of many of the taxa currently being dealt with under *Western Shield* , that program is well positioned to attract significant resources from outside the Department.

Term of Reference 4. Links between recovery plans and *Western Shield* activities

There is currently no formal linkage, and limited informal linkage, between the implementation of recovery plans by recovery teams and the operation of *Western Shield* , even for those species for which *Western Shield* is seen to be delivering the most essential recovery actions. For example, a decision to stop *Western Shield* fox-baiting in an area significant to the recovery of the dibbler was recently taken without reference to the Dibbler Recovery Team. *Western Shield* has no input to the recovery team for the western swamp tortoise, for which fox-baiting is essential and organised by the recovery team without assistance from *Western Shield* . For Gilbert's potoroo the baiting of Two Peoples Bay Nature Reserve is funded and executed by *Western Shield* , but the monitoring is otherwise funded. There are numerous other examples. For the 37 species and twelve faunal communities to which *Western Shield* does not contribute, there is no link between the recovery plans and *Western Shield* .

Whatever the role and form of *Western Shield* following the departmental review, some formal linkage is needed between the program and recovery teams for all threatened fauna and faunal communities that *Western Shield* has the potential to benefit. For example, a simple but regular (say monthly) email report on *Western Shield* activities could be distributed to the Chairpersons of all relevant

recovery teams. Such reports should list significant issues needing input or decision, including funding matters, the results of decisions, and any significant activities conducted or planned. It would also be appropriate to hold an annual workshop between the *Western Shield* program team and relevant Recovery Team Chairpersons and senior Region and District staff.

Perhaps more importantly, a clear decision-making process is needed so that the interests of Regions, Districts and Recovery Teams are automatically included in each decision about matters that might affect them. Such decisions in *Western Shield* 's current form include how, when and where to bait, what animals should be translocated and where, how and by whom monitoring will be conducted. The decision-making process should include clear criteria for determining when a translocation, either of a particular species or to a particular place, should be discontinued.

An improved decision-making process of the kind suggested above would also contribute to ensuring that resources are divided more evenly and logically between all of the most threatened elements of biological diversity in the State.

CONCLUSIONS

It is our view that:

- *Western Shield* is very limited in terms of the number of species of threatened fauna addressed.
- The great majority of CR and EN taxa and faunal TECs are not addressed by *Western Shield* and some of these not addressed at all by the Department.
- Commonwealth (including NHT) funding has supported the recovery of many taxa and communities in the past. If this funding is not continued, additional resources from the State will be urgently required; otherwise the recovery of these taxa and communities will be compromised.
- *Western Shield* continues to spend significant resources on low priority (Vulnerable and Conservation Dependent) taxa, including those delisted some time ago (woylie, tammar wallaby, quenda), for which savings can be made in a variety of ways.
- Communication between *Western Shield* management and recovery teams is poor, even for those six species significantly aided by *Western Shield* , unless a member of the recovery team is 'in the know', and regular liaison should be formalised.
- The decision-making process for *Western Shield*, whatever the program's eventual form, needs to be clarified and formalised with input from all interested or affected groups within the Department.

THE FUTURE

It is our view that the review of *Western Shield* should recommend either:

1. That *Western Shield* be broadened to include all threatened WA fauna species and all threatened faunal ecological communities and funds (including staff salaries) currently allocated to *Western Shield* be reallocated on a degree of threat basis.
   Or
2. That the Department retain *Western Shield* as a program that deals primarily with exotic predators and the recovery of species threatened by them, but move towards a more over-riding, priority-driven method of funding recovery of threatened species and threatened ecological communities State-wide. The method should be based on priorities recommended by the Threatened Species Scientific Committee and the Threatened Ecological Communities Scientific Committee.

We also recommend that whichever option is adopted, additional State funding be found to better recover all CR and EN fauna taxa and communities. If most *Western Shield* funds currently allocated to low priority taxa are diverted to high priority taxa and communities, a lesser amount of new money will be required.

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