

The Western Australian Threatened Species Scientific Committee: lessons from invertebrates

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The Western Australian Threatened Species Scientific Committee was formed in 1997 following the disbanding of separate flora and fauna committees. Its role is to advise the Minister for the Environment on the listing of threatened and specially protected flora and fauna under the *Wildlife Conservation Act 1950*, and to advise the Minister on the ranking of threatened flora and fauna according to internationally accepted (IUCN) guidelines. The current committee comprises nine members, two of whom are invertebrate biologists.

Thirty-three invertebrate species are currently listed as "rare or likely to become extinct", and one is listed as "presumed extinct" (CALM 1998). A further five taxa are listed as "protected fauna" under the provisions of a close season notice (CALM 1994) which restricts collecting, except under licence. This paper reviews some of the procedures that are followed when considering organisms for listing. It focuses on those invertebrates that have been considered for listing and highlights trends in the procedures, pointing out the strengths and weaknesses of the system.

INTRODUCTION

Invertebrates first appeared on schedules of the Western Australian *Wildlife Conservation Act 1950* in 1987. Jewel beetles (all Buprestidae) and ants of the monotypic genus *Nothomyrmecia* were listed as "protected fauna", meaning that collecting was not permitted unless a licence was obtained. Two water mites, and a troglobitic schizomid and cockroach were added in a replacement notice in 1994 (CALM 1994).

In the early 1990s the Department of Conservation and Land Management (CALM) convened the Threatened Fauna Scientific Advisory Committee (TFSAC), and the Endangered Flora Consultative Committee (EFCC). Their role was to make recommendations for the declaration of fauna and flora pursuant to sections of the *Wildlife Conservation Act 1950*. In addition, a Scientific Ranking Panel was set up to rank threatened flora and fauna (on the same list) according to categories of threat. Recovery Plans or Interim Wildlife Management Guidelines were prepared for species designated as Critically Endangered (according to IUCN criteria). The activities of the TFSAC resulted in seven species of arachnids, two cave shrimps, an amphibious snail and a native bee being listed as "rare or likely to become extinct" in 1994. These invertebrates were the first to be given the highest level of protection under the Act. Included on the list of arachnids was the schizomid *Draculoides vinei*, which had been previously listed in the Protected Fauna notice.

In 1996 consideration was given to restructuring the TFSAC and EFCC to eliminate duplication between the two committees, and the ranking panel. They were replaced by a new Threatened Species Scientific Committee (TSSC). Its role is to: 1) review CALM listings and make recommendations annually to the Minister, via the Executive Director and the National Parks and Nature Conservation Authority, on threatened and specially protected listings as well as priority flora and fauna lists for species which do not qualify for any of the schedules but which require monitoring or further survey; 2) allocate annually, threatened flora and fauna to IUCN threat categories for endorsement by the Minister; 3) consider the status of taxa throughout their total natural range; and 4) provide advice and recommendations to the Executive Director with respect to research and management arising from its reviews of lists and threat categories.

The TSSC was formally appointed in January 1997 and comprises a chairperson from within CALM, plus eight members, three of whom may be broadly classified as botanists, three as vertebrate biologists and two as invertebrate biologists. It has met three times since its formation. A total of 139 invertebrate taxa have been nominated for listing since 1995, 69 of which were accepted, three rejected and 67 deferred pending further information being obtained on the distribution and status of the species. Two species, the shrimp *Stygiocaris stylifera* and the schizomid *Draculoides vinei* have been deleted from the

list of species considered rare or likely to become extinct as they have both been found to be more common and widespread than was previously believed. The current listing of specially protected invertebrates, derived from the cumulative activities of all of the above-mentioned committees, is shown in Table 1 and includes 33 invertebrates which are rare or likely to become extinct, one presumed to be extinct and five under the "protected fauna" notice. Thirty-nine other species are listed as priority fauna in need of monitoring (these species do not have the same formal protection as those listed in Table 1).

Twenty-four of the taxa listed occupy subterranean habitats with restricted distributions (often a single cave); 12 taxa are, or have been, adversely affected by clearing of native vegetation for agriculture and pastoral activities and; two taxa are listed due to such adverse impacts as altered fire regimes, or the effects of the fungal pathogen *Phytophthora cinnamomi* on particular habitat plants.

DISCUSSION

Difficulties in conserving threatened invertebrates

Legislation or policy relating to threatened fauna should be equally applicable to both vertebrates and invertebrates. In reality, dealing with invertebrates is proving more difficult for a number of reasons. These can be considered under four broad headings:

(i) Taxonomy and Nomenclature

Invertebrates represent more than 95% of all living organisms, but only a very small percentage of them have been formally described by taxonomists, and only slightly more have been collected and had voucher specimens lodged in museums. In Western Australia a taxon cannot be listed as threatened fauna unless it has been described, or a voucher specimen catalogued into a museum collection that can be referred to in a gazettal notice (e.g., *Hyella* sp. nov. (WAM#BES 1154), *Moggridgea* sp. nov. (BY Main 1990/24, 25 in Table 1).

Table 1. Specially protected invertebrates in Western Australia. [Schedule 1 — "fauna which is rare or likely to become extinct"; Schedule 2 — "fauna which is presumed to be extinct" as per CALM (1998); PF — "protected fauna" for which a closed season notice is declared as per CALM (1994)]. IUCN rank — CR = Critically endangered, EN = Endangered, VU = Vulnerable and EX = Presumed extinct.

	Species	Schedule	IUCN Rank
Molluscs	<i>Austroassiminea lethra</i> Cape Leeuwin Freshwater Snail	1	VU
	Undescribed rhytidid sp. (WAM#2295-69) Stirling Range Rhytidid Snail	1	VU
Arachnids (Schizomida)	<i>Bamazonus</i> sp. (WAM# 95/748)		EN
	<i>Draculoides bramstokeri</i>	1	VU
	<i>Draculoides</i> sp. (WAM#96/1151)	1	EN
(Pseudoscorpionida)	<i>Hyella</i> sp. (WAM#BES 1154)	1	CR
(Araneae)	<i>Aganippe castellum</i>	1	EN
	<i>Austrarchaea mainae</i> Western Archaeid Spider	1	VU
	<i>Idiosoma nigrum</i> Shield-backed Trapdoor Spider	1	VU
	<i>Kwonkan eboracum</i> Yorkrakine Trapdoor Spider	1	CR
	<i>Moggridgea</i> sp. (BY Main 1990/24,25) Stirling Range Moggridgea Spider	1	EN
	<i>Tartarus mullamullangensis</i> Mullamullang Cave Spider	1	VU
	<i>Teyl</i> sp. (BY Main 1953/2683, 1984/13) Minnivale Trapdoor Spider	1	CR
	<i>Troglodiplura lowryi</i> Nullarbor Cave Trapdoor Spider	1	VU

Table 1 — continued

	Species	Schedule	IUCN Rank
(Hydracarina)	<i>Acerella pooginup</i> Pooginup Swamp Water-mite	PF	—
	<i>Pseudohydryphantes doegi</i> Doeg's Water-mite	PF	—
Millipedes (Diplopoda)	<i>Speleostrophus nesiotus</i> Barrow Island Millipede	1	VU
	<i>Stygiochiropus isolatus</i>	1	VU
	<i>Stygiochiropus peculiaris</i> Camerons Cave Millipede	1	VU
	<i>Stygiochiropus sympatricus</i>	1	VU
Crustaceans (Remipedia)	<i>Lasionectes exleyi</i> Cape Range Lasionectes	1	VU
(Isopoda)	<i>Abebaioscia troglodytes</i> Pannikin Plains Cave Isopod	1	VU
(Decapoda)	<i>Stygiocaris lancifera</i> Lance-beaked Cave Shrimp	1	VU
(Amphipoda)	<i>Bogidomma australis</i> Barrow Island Bogidoma	1	VU
	<i>Liagoceradocus branchialis</i> Cape Range Liagoceradocus	1	EN
	<i>Liagoceradocus subthalassicus</i> Barrow Island Liagoceradocus	1	VU
	<i>Nedsia fragilis</i>	1	VU
	<i>Nedsia humphreysi</i>	1	VU
	<i>Nedsia hurlberti</i>	1	VU
	<i>Nedsia macrosculptilis</i>	1	VU
	<i>Nedsia sculptilis</i>	1	VU
	<i>Nedsia straskraba</i>	1	VU
	<i>Nedsia urifimbriata</i>	1	VU
(Blattodea)	<i>Nocticola flabella</i> Cape Range Blind Cockroach	PF	—
(Collembola)	<i>Australomoturus</i> sp. (SAM#I22621) Guildford Springtail	1	CR
(Orthoptera)	<i>Throscodectes xederoides</i> Mogumber Bush Cricket	1	CR
(Coleoptera)	All species of the family Buprestidae	PF	—
(Hymenoptera)	All species of the genus <i>Nothomyrmecia</i>	PF	—
	<i>Hesperocolletes douglasi</i>	2	EX
	<i>Leioproctus contrarius</i>	1	EN
	<i>Leioproctus douglasiellus</i>	1	EN
	<i>Neopasiphe simplicior</i>	1	EN
(Lepidoptera)	<i>Synemon gratiosa</i> Graceful Sunmoth	1	EN

This means that there is a requirement for taxonomists, or at least qualified "experts", to have been involved in the collection and identification of invertebrates. At present taxonomists and "experts", such as researchers studying invertebrates, are fewer in number than their counterparts working on vertebrates. This is reflected in the uneven spread of listed taxa among invertebrate orders; the preponderance of taxa in some groups reflecting the activity and interest of local taxonomists.

The problems of taxonomy and nomenclature also have important implications for conservation managers. If a species is not formally described, drawn or photographed, it is difficult for conservation managers to identify and conserve threatened invertebrates in the field. This problem is exacerbated by the fact that most invertebrates are also much smaller than vertebrates. It is difficult to conserve something that you cannot see without the aid of a microscope.

(ii) Adequacy of Survey

Invertebrate populations can be difficult to survey or census because the target organisms are often very small (e.g., water mites), or occupy difficult to access habitat (e.g., subterranean caves), or are active for only short periods of the year (e.g., mygalomorph spiders), or have protracted stages to parts of their life cycles (e.g., some dragonflies), or are slow to reach sexual maturity (e.g., mygalomorph spiders), or breed infrequently (many troglodites), or demonstrate little or no dispersal capacity (e.g., terrestrial snails). Any one of these characteristics can make it difficult to gather sufficient information to allow a proper assessment of the conservation status of invertebrates. When combined with infrequent surveys by trained searchers, many invertebrate nominations put forward for consideration by the TSSC appear to be of a lower quality than those typically put forward for vertebrates.

To address this problem the TSSC has adopted a set of guidelines (see Appendix 1) to help in assessing nominations for threatened fauna listings. They are equally applicable to vertebrates, and also help to identify what specific steps need to be taken to collect additional field data to bolster weak nominations.

(iii) Species Ranking

There are numerous examples of invertebrate species known from only a few (Cape Range *Lasionectes Lasionectes exleyi*), or even a single museum specimen (Mogumber

Bush Cricket *Throscodectes xederoides*), and yet many may not actually be threatened with extinction. Assessing the conservation status of such species according to IUCN criteria can be very challenging. An inability to arrive at any rank other than "Data Deficient" would suggest that the nominations require more work (this is reflected in the 67 invertebrate nominations that are pending).

It has also become apparent that the IUCN criteria used to determine threat status are biased towards vertebrates and that there is a need to modify them to allow invertebrates to be better assessed. The TSSC is currently considering draft changes to those criteria for ranking species to take into account the current bias towards vertebrates and the problem of having less biological data by which to assess invertebrates.

If the TSSC believes that the likelihood of obtaining further biological data is small, it still has the option of recommending to the Minister that the species be considered for listing as threatened — in effect adopting the precautionary principle.

(iv) How to Manage Threatened Invertebrates

If there is sufficient biological and survey data to support a nomination for threatened listing, conservation managers are still left with the problem of how to protect and conserve populations. For those invertebrate species which are highly cryptic it is likely that the easiest way to conserve them is to conserve their habitat. It is also likely that much of the basic biological data provided in the nomination will be of great importance to conservation managers, so the more that is provided the better the prospects for the species continued survival.

To this end, it is vital that the nomination forms presented to the TSSC are designed in such a way as to elicit the maximum amount of information from the author of the nomination. Their design is being revised so that the maximum amount of information can be included and so that the process of ranking species and determining their threat status according to IUCN criteria can be quickly calculated.

Conservation managers will still be faced with the problem of ongoing surveys of the threatened invertebrates to determine whether or not populations are declining. This may require expert assistance, particularly for those species which are surveyed using specialist equipment (e.g., video cameras down bore holes).

The pitfalls of listing too many threatened invertebrate taxa

The value of having a system which allows threatened fauna to be given maximum protection, and to have additional conservation resources directed towards conserving them, is widely accepted. However, there may be a down side to listing large numbers of invertebrates as threatened fauna. Once accepted as being threatened, there is an onus on conservation agencies to devote resources to conserving them. Throughout Australia, conservation agencies are faced with the dilemma of having dwindling resources to devote to an ever increasing number of threatened species. Currently much of the funding directed to conserving threatened species is obtained from the Federal Government.

The process of deciding which species should receive some of that limited funding is usually based on the ranking results. Adding many invertebrates to the threatened fauna list, especially species for which there is little biological data, and hence a "Data Deficient" status, may create a conflict within conservation agencies. Situations arise where a species is listed as threatened but it is not possible to direct any funds towards conserving it because the merit of doing so relative to other, better researched species, is not clear. While ranking species has obvious benefits, it does not always help in dealing with poorly researched fauna.

Another pitfall in being over enthusiastic about listing fauna for which there are limited data is that once added to the threatened fauna list, considerably more effort is required to delete it from the list. The case that needs to be produced to delete species invariably requires much more survey effort than was needed to get a species on to the list in the first place. It also requires a much better appreciation of what were considered to be the key threatening processes and how those factors no longer represent the threat they were previously believed to constitute.

All of the above are not intended to suggest that invertebrates should be treated as second class fauna. It does serve as a useful reminder that the processes that were established to deal with vertebrate fauna do not apply equally as well to invertebrates, and that a degree of caution needs to be applied when

considering nominations for listing invertebrates as threatened fauna.

The value of conserving all fauna, not just vertebrate fauna, is only just being appreciated in the wider community. The potential value of invertebrates is receiving greater attention since bio-prospecting commenced. Invertebrates can also provide ideal "flagship" species that can be used to stimulate community support in conserving habitat. Proposed replacement legislation for the Western Australian *Wildlife Conservation Act 1950* will also provide better recognition of the value of all fauna as it will have biodiversity conservation as its central theme rather than simply "wildlife", as in the existing Act.

APPENDIX 1

Western Australian Threatened Species Scientific Committee (TSSC). Guidelines for Assessing Adequacy of Taxonomy and Surveys for Proposed Threatened Fauna Taxa (March 1997).

ADEQUACY OF SURVEY

1. Surveys should encompass the range of available techniques and sampling should have been conducted throughout the possible (as distinct from the known) geographic range of the taxon.
2. Surveys should be conducted in a range of seasonal and environmental conditions consistent with the biology of the taxon.
3. Taxa confined to geographically restricted or specialized habitats may require less time or effort to survey than those occurring in more widespread habitat.
4. In the case of taxa known from very few specimens, a fact pertinent to the nomination, the nominator should demonstrate that all available collections have been examined.

TAXONOMY

1. Taxonomic treatment must be comprehensive and generally accepted, and have been conducted or supported by a person experienced with the group to which the taxon belongs. This does not preclude the nomination of taxa which have not formally been named; but it does require that the taxa have been studied sufficiently that they can be clearly and reliably distinguished from other known taxa.

REFERENCES

- CALM, 1987. *Wildlife Conservation Act 1950* Notice. Invertebrate Fauna. 11 December, 1987. P. 4381 Government Gazette.
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