Do we need a terrestrial fauna survey database in Western Australia?

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Introduction

Early in 2000 I started exploring the use of Microsoft Access® to record and organise data from a pit-trapping program that was being undertaken in the vicinity of Ora Banda, Western Australia. A database was developed that met our initial needs, but it soon became evident that it would be much more useful if it could include pit-trapping data for other study sites. In addition, I started to explore a range of additional questions for which the database could not effectively generate the appropriate data. This change in my requirements and focus meant that the Access® database needed to be significantly altered. Instead of going through the process all over again, I investigated how other researchers stored and accessed their data, hoping that I might learn from their experiences. It quickly became evident that a standard protocol for recording pit-trapping data, and perhaps data collected using other search strategies would be useful, as it would enable the sharing and comparing of data for a range of habitats. My enquiries indicated the issue of a Western Australian terrestrial fauna survey database had been discussed among the relevant State government agencies for a number of years, but nothing tangible had occurred. It was my assessment that a couple of the State government agencies saw it as their prerogative to develop and manage the database, but because agreement among agencies could not be reached and the issue was not given sufficient priority in any one agency, nothing had happened.

In May 2000 the Environmental Protection Authority (EPA) released Preliminary Position Paper No 3, *General Requirements for Terrestrial Biological Surveys* (EPA, 2000) that indicated it was concerned about the lack of appropriate, targeted information that would allow the Authority to properly assess potential impacts of disturbance at both a local and regional scale. The Preliminary Position Paper indicated the following key issues contributed to the difficulty of assessing the impact of a disturbance on the biodiversity:

- a lack of appropriate scale baseline information for most areas of the State;
- replication of databases;
- site-specific data not being interpreted / analysed for biodiversity value or in a regional context; and
- a lack of a consolidate database on fauna captures.

This paper was presented in similar form at the Workshop on the Co-ordination and Integration of Terrestrial Vertebrate Fauna Survey Database for Western Australia, held on April 5, 2002, at the University of Western Australia

In the subsequent EPA Position Paper No 3, *Terrestrial Biological Surveys as an Element of Biodiversity Protection* (EPA 2002), the Authority as an overarching principle indicates it 'expects that terrestrial biological surveys will be made publicly available and will contribute to the bank of data available for the particular region, to aid the overall biodiversity understanding and assessment by facilitating transfer into State biological databases'. The Position Paper goes on to indicate that the EPA intends to encourage the coordinated development of a state-wide database for EIA-related biological surveys in consultation with environmental practitioners and Western Australian natural resource management agencies and authorities.

My investigations also indicated that a number of government agencies already had their own databases for fauna, but there was little coordination among agencies or even within agencies. The Wildlife Branch of the Department of Conservation and Land Management (CALM) has developed a database of threatened fauna, and a database, *Fauna File*, to support its fauna recovery plans. Staff in CALM *Science* (Woodvale) had an alternative method of recording pit-trapping data. Staff in some of the regional offices of CALM also had pit-trapping data files, again recorded in locally-designed systems. Access to some of this information by researchers and environmental consultants was often difficult.

CALM, as part of its licence requirements to catch and take fauna, requires researchers and environmental consultants to submit an annual return of their fauna captures. The format in which consultants and researchers present data, and the recording of these data by CALM, is such that this information does not currently constitute a useful database of fauna records.

The Western Australian Museum (WAM) has a very substantial computerised record of mammals, reptiles and amphibians lodged with WAM since early last century. This is a very important database as it provides a description of known taxa in time and space. However, as pointed out by Ponder *et al*. (2001), there are significant problems with museum collections when used for biodiversity assessment. The most notable is the 'gaps' in species distributions because of the *ad hoc* nature of the collecting effort. Museum records are not a reliable source of data on abundance, and at a local scale are unable to provide accurate records of species richness unless the area was a specific study site for Museum staff or researchers that routinely provide voucher specimens. It is regrettable that many Australian museums are now charging researchers for access to records that were often provided by researchers. The selling of what should be publicly available information discourages the sharing of data and may inhibit the development of a State database for terrestrial fauna survey data.

Many of the well-established environmental consultants that regularly undertake terrestrial fauna surveys maintain their own databases, but in almost every case access to this information is restricted to the owners of the information. A small number of researchers (academics and postgraduate students) in Western Australia who have undertaken pit-trapping programs for small terrestrial fauna have significant fauna records for specific sites. Academic ownership of these records means that these data are generally not publicly available.

EPA (2002) stressed the need for quality field survey data inputs into the preparation of Environmental Impact Assessments (EIA) and comprehensive analyses of these data in the context of biodiversity conservation and ecological function. However, Fraser (2001) reported that during the preparation of 15 recent EIA statements for mining developments in the Goldfields region;

- 3 of 15 consultants searched the CALM or WAM databases;
- 12 of 15 consultants analysed field data in a regional context;
- 2 of 15 lodged voucher specimens with WAM, where there was a doubt about the specimens identity;
- 3 of 15 evaluated community assemblages and field data in an ecological context; and
- none of the field surveys were adequate for the preparation of an inventory of species in the area.

There appears ample evidence to suggest that an integrated database for terrestrial fauna survey data is required. For this to proceed, four general questions need to be addressed:

- what information should be recorded and stored, and how do we ensure its accuracy?
- who owns the data and how should it be accessed?
- who will manage the database? and
- who should develop the database and what should be its format?

These four broad questions can be further divided into a more detailed list of specific questions that need to be addressed before an integrated database of terrestrial fauna records can be established (Appendix 1). It was the task of this workshop to address those questions it considered appropriate.

References

Environmental Protection Authority 2002 Terrestrial Biological Surveys as an Element of Biodiversity Protection, Environmental Protection Authority, Perth.

Fraser J L 2001 Adequacy of terrestrial fauna surveys for the preparation of Environmental Impact Assessment in the mining industry of Western Australia. BSc(Hons) Thesis, School of Natural Resource Management, Edith Cowan University, Perth, Western Australia.

Ponder W F, Carter G A, Flemons P & Chapman R R 2001 Evaluation of museum collection data for use in biodiversity assessment. Conservation Biology 15:648–657.

Appendix 1

Issues to be considered in the development and management of a Western Australian terrestrial fauna survey database.

Information base:

What taxa are recorded?

- Reptiles
- Amphibians
- Mammals
- Birds
- Fishes
- Invertebrates
- Rare species
- Only terrestrial, aquatic, marine, stygofauna, vertebrate or invertebrate
- Metadata catalogues – are there general elements with wide applicability?

Specimen data

- Locality
- Geographic site registration conventions / protocols
- Habitat
- Date
- Collector
- Land tenure
- Morphometrics (size and mass; should we standardise measurements), do we need these data?
- Method of capture / observation
- Non-Western Australian specimens
- Past information or only new information

Accuracy of data

- Data standards, what are they and who is responsible for managing and publishing them?
- Data quality tags / standards
- Who checks the data
- Who changes the data
- Nomenclature – which authors and versions?
- Mis-identification
- Voucher specimens
- Submissions, additions and corrections to data
- Strategies for protecting indefeasible raw data

Integration with other databases

- Soils, pre-European vegetation (*Aust. Soils Atlas*, Bureau of Rural Sciences)
- Vegetation, (Beard's maps, available from Agriculture WA), remnant vegetation (AgWA)
- Climatic
- GIS friendly
  - o Arcview, Arcinfo
  - o ER Mapper
- Platypus – http://www.environment.gov.au/abrs/abif-fauna/intro.htm
- WAM database
- CALM rare and endangered, priority taxa

Proprietary issues

Ownership of data

- Copyright
- People just looking – interested
- Use by researchers but not for commercial gain
- Use by others for commercial gain

Access to data

- Discriminating between the roles and responsibilities of data producers and data publishers
- Who
  - Collector
  - Depositor
  - Researchers
  - Consultants
  - Students
  - Government departments
  - Restrictions placed on access (read only access)
- How, via
  - Internet
  - Email
  - Hardcopy

Who can change the database?

Management issues

Management

- Managing changes
- Who, which agency, people and costs
- Legal agreements
- Assessing the probability of use of data
- Identifying likely information retrieval requirements
- Strategies for managing derived data

Costs

- Establishment
- Maintenance
- Access

Should the database be linked to CALM licence returns?

Technical issues:

Storage of data

- Where
  - Physical location
  - Hardware
- Format
  - Software
- Internet