Operational fauna databases within the Western Australian Department of Conservation and Land Management: Tools for managing rare and threatened species

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Introduction

The Western Australian Department of Conservation and Land Management operates and maintains two fauna databases to assist in its statutory role as conservator of native fauna. One was originally established in the early 1990s on an ORACLE mainframe system. This database, the Threatened Fauna Database (TFdB), was later transferred to a stand-alone Microsoft Access system and is upgraded regularly. The second database was established in April 1996 to support the Department's fauna recovery program, *Western Shield*. This database, *Fauna File*, is also established on a Microsoft Access system.

The two databases share common features and there is potential to readily transfer data from *Fauna File* to the Threatened Fauna Database as required. Both systems are geo-spatial and can be interfaced with GIS software packages such as Arcview® and ArcInfo®. Both databases are housed in the Department's Wildlife Branch and two senior staff act as custodians of the datasets. Software maintenance and upgrades are provided from within the Wildlife Branch.

Threatened Fauna Database

The Threatened Fauna Database is used to store geo-spatial records on all species of native fauna that are gazetted as being 'rare or likely to become extinct' under the provisions of section 14(2)(ba) of the *Wildlife Conservation Act 1950*. The database also contains records on those species of native fauna on the Department's Priority Fauna List. The data set includes historical records, some dating back to the 19th century.

The minimum information requirements necessary to establish a record in the database are; species, observer's name, date of observation, and location (Lat/Long or AMG). There are a number of additional fields that can be completed for each record, and the more that can be completed the more useful the record can be (see Appendix 1).

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

When the database custodian receives each new record, it is vetted to determine veracity (is the species correctly identified) and accuracy (does the geo-spatial data match the location description). Based on the information provided in the record submission, the quality of the record is coded from 1-3, 1 being very certain, 2 moderately certain, and 3 uncertain. The value of such data vetting becomes obvious when considering records that constitute range extensions, new, extra-limital and disjunct populations, or records of species that were presumed to be extinct (*e.g.* Gilbert's Potoroo).

The data that form the basis of new records are obtained from a variety of sources. Some are derived from Departmental staff activities, in particular fauna inventory and fauna monitoring such as with *Western Shield* (see below). The general public provides other records, along with researchers affiliated with tertiary institutions, staff from other government departments, and professional biological consultants. Most of the latter sources of data reach the department via reports submitted as part of Scientific Purposes (Regulation 17) licence returns.

The TFdB currently contains more than 4500 records, up from 500 in 1994. At present only a small proportion of the data on threatened fauna and rare fauna species available in the Western Australian Museum (WAM) database are incorporated in the Department's TFdB. Negotiations are underway to reach an agreement on a data exchange. It is worth noting that the WAM data set includes all fauna species and is largely based on vouchered specimens, while the Department's data set is largely based on sightings, documented records from the literature, and catch-release records from various surveys and monitoring programs.

The data record sheets also contain a number of other fields such as land tenure, landform, vegetation association and datum type. The completion of these fields becomes very important when considering rare or threatened species that are poorly represented in museum collections, or for which there is very little biological information. It is almost impossible to interpret the presence of rare or threatened species in a variable landscape when insufficient data have been recorded on exactly which part of the landscape the species was using when it was observed or trapped. The situation becomes even more important if the species is cryptic or known to have little or no capacity for movement or dispersal (*e.g.* mygalomorph spiders and *Geocrinia* frogs).

Fauna File

The Department's fauna recovery program *Western Shield* was launched in April 1996 with the aim of restoring a suite of native species, primarily small–medium sized mammals, to a range of sites within the south-west of the state. The most obvious aspects of this program have been the broad scale fox baiting on conservation estate and the well-publicised species re-introductions and translocations. What is less well known is that the Department has established 66 fauna monitoring sites throughout the south-west from Kalbarri south to Albany and east to Cape Arid. A range of census techniques is used to either monitor the response of extant fauna populations following the implementation of fox baiting, or the re-establishment of re-introduced or translocated populations.

The Department has developed an in-house training course to ensure that those staff involved in the fauna monitoring program are competent and can carry out the work efficiently and humanely. To date nearly 160 staff have completed the course and a high percentage of those remain within the Department.

The fauna monitoring carried out under the *Western Shield* banner results in a wide range of mammal, reptile and amphibian species being captured, along with a small range of birds. *Fauna File* was established to store all of the records derived from the monitoring program and also caters for common and widespread species as well as threatened and priority species. The success of *Western Shield* is measured by the recovery and maintenance of selected species at pre-determined levels.

As with the TFdB, *Fauna File* records geo-spatial information on species, along with specific details on the monitoring sites, the location of trap lines or survey routes, and survey effort. The data entered into *Fauna File* are predominantly generated via departmental activities but there is provision for the collection and storage of incidental sightings by members of the public.

Fauna File is a far more complex relational database than TFdB but with a 'user friendly' interface designed to enable some basic data manipulations. For example, it can calculate 'trap success' or 'known to be alive' (KTBA) statistics for individual species on a transect or groups of transects. These data manipulations are easily achieved by the user selecting the appropriate parameters and values from a simple menu and clicking on a button to generate the results. The user can therefore get useful information from survey and monitoring data with a minimum of effort. This encourages more effective use of the database by Departmental staff and the *Fauna File* has become a very valuable tool for storing and analyzing fauna data on an operational scale within the Department.

What makes a good database?

The old adage "if you put rubbish in you get rubbish out" sums up the most important aspect of databasing. It is vital that the custodian of any database vets and verifies records prior to incorporating them into the master data set. A number of factors influence the quality of potential records including:

- the quality of the observation (was it an animal in the hand or a fleeting glimpse of an animal crossing a road at night?);
- the skill of the observer (a seasoned field ecologist or a new graduate?);
- the record being founded on good field notes rather than a half remembered recollection;
- the taxonomic identity assigned to the record being correct and current;
- the geo-spatial system used in the field being accurate (AGM datums have changed several times in the last 40 years); and
- accurate reconciliation of Museum accession numbers with field notes.

Good databases work both ways – data in and out

There is little value in accumulating data if there is no subsequent analysis of the data and no capacity to share some or all of the information with other potential users. The Department uses the data in its two databases to help it manage threatened and priority fauna, since it is responsible for conserving those species whether they reside in conservation estate or lands and water vested in other agencies, or private freehold land. The Department offers a fee-for-data service on threatened and priority fauna to consultants and researchers, with the information generally provided in a presence/absence format based on a search of particular areas defined by co-ordinates provided by the consultant or researcher. The reason the client is seldom given direct access to the geo-spatial information is that it is sometimes necessary to protect the precise location of highly valued species (such as nest location of black cockatoos) or cryptic and sedentary species (such as some frogs). The other reason is that without expert interpretation some data can by misleading, and experience has shown that not all clients have the necessary knowledge of less well-known species to make best use of the data without some assistance.

Not surprisingly, the Department pays particular attention to the results from its own fauna monitoring activities in areas subject to fox control programs. Regular analysis of trapping data can provide early warning of sub-optimal baiting effort, or the early achievement of target levels in fauna recovery programs that may then lead to formal changes in the conservation status of threatened species (*e.g.* downgrading from EN to VU, or even de-listing from the threatened fauna list) or allow the option of redirecting limited resources to other projects ahead of schedule.

This workshop provides a unique opportunity to discuss what we would like, what we really need, and what we can actually create, so look, ask questions, and think about what you need and can contribute.

APPENDIX 1

DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT
THREATENED FAUNA REPORT FORM

FILE# _____ PRECISION: _____ DATABASE RECORD# _____
SPECIES _____ NO. SEEN: _____
DISTINGUISHING FEATURES OBSERVED: _ _____

CERTAINTY OF IDENTIFICATION: ☐ Very certain ☐ Moderately certain ☐ Not sure

AGE AND SEX:
No. of Adults: _____ Male _____ Female _____ Sex unknown
No. of Juveniles: _____ Male _____ Female _____ Sex unknown
COLLECTOR/OBSERVER: _____ PHONE NO: _____ SURVEY DATE: _____ TIME: _____
SHIRE: _____ CALM REGION: _____
LOCALITY: _____

MAP REF: CALM MAP NAME: _____ Grid Reference _____
(Complete one line ONLY) Latitude ☐☐° ☐☐ ☐☐ S Longitude ☐☐☐° ☐☐ ☐☐ E
AMG Zone ☐ 49 ☐ 50 ☐ 51 Northing ☐☐☐☐☐☐☐ Easting ☐☐☐☐☐☐

LAND STATUS:
☐ Nature Reserve ☐ State forest ☐ Private Property ☐ Road Verge Shire ☐ National Park
☐ Vacant Crown Land ☐ Road Verge MRD ☐ Pastoral Lease ☐ Other reserve _____ ☐ Unknown

LANDFORM TYPE:
☐ Flat ☐ Gully ☐ Lake ☐ Cliff ☐ Rocky outcrop ☐ Other _____
☐ Slope ☐ Swamp ☐ River ☐ Ridge ☐ Sand dune

VEGETATION TYPE:
☐ Forest Significant species _____ ☐ Grassland
☐ Woodland Significant species _____ ☐ Sedgeland
☐ Mallee Significant species _____ ☐ Rock communities
☐ Tall Shrubland Significant species _____ ☐ Wetland
☐ Heathland Significant species _____ ☐ Other _____

OBSERVATION/COLLECTION METHOD:
☐ Daylight sighting ☐ Night sighting ☐ Heard ☐ Caught or trapped ☐ Diggings
☐ Droppings ☐ Feathers ☐ Bones ☐ Dead ☐ Other

BEHAVIOUR:
What was the animal doing? _____
BREEDING:
☐ Pregnant ☐ Lactating ☐ Mating ☐ Male in breeding colours ☐ Eggs/young in nest ☐ Other _____

FIRE HISTORY:
☐ Not known Year burnt _____ Month (approx) _____
☐ Next prescribed burn: Year _____ Month _____
CURRENT LAND USE:
☐ Nature Conservation ☐ Agriculture ☐ Pastoralism ☐ Mining ☐ Forestry/Multiple purpose ☐ Recreation ☐ Other _____
FERAL ANIMALS:
Habitat damaged by feral animals ☐ Yes ☐ No ☐ Unknown
Feral species and damage type _____

SPECIMEN: ☐ Retained by collector ☐ WA Museum ☐ Other _____ ☐ Not retained
ATTACHED: ☐ Map ☐ Mud map ☐ Photo ☐ Notes
ACTION, TAKEN/REQUIRED: _____

OTHER COMMENTS: _____

COPY SENT TO: ☐ Regional Office ☐ District Office ☐ Head Office
Signed: _____ Date: _____

PLEASE SEND COMPLETED FORM TO SENIOR ZOOLOGIST, WILDLIFE BRANCH
DEPARTMENT OF CONSERVATION AND LAND MANAGEMENT, LOCKED BAG 104 BENTLEY DELIVERY CENTRE W.A. 6983
[RECORD NO.]