# PREY SPECIES TRAPPING DB SYSTEM

(database in MS Access vers 2, for Windows)

## USER GUIDE

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**ABSTRACT:**

The system is designed to store the trapping data of the prey species for the fox baiting project. The areas covered are the Northern Jarrah Forest and Dryandra.

The field procedure is briefly as follows.

In the Northern Jarrah Forest, trapping of the prey species is carried out and data hand-written on the field sheet. Some woylies are also captured in Dryandra and translocated to the Northern Jarrah Forest and released. They may be captured there repeatedly and indiscriminately together with other species.

Relational database theory was used in the Data Analysis and Design, minimising data redundancy, maintaining data integrity and making available powerful querying facilities.

It is used by the staff of this project only. The user is assumed to have the basic experience of data entry with MS Access Vers 2 or any other database software.

## Computing requirements:

| | |
|---|---|
| Computer: | IBM-PC 486 upwards, or compatibles |
| Operating system: | MS Windows 3.1 |
| Software: | Microsoft Access Vers 2 |

# 1 TABLE STRUCTURE AND SYSTEM DESIGN:

The data sheet for taking data manually in the field provided by the User was decomposed into a number of Normalised tables using the Relational Database Theory, which is summarized in appendix 1.

The Normalised tables of data are listed in appendix 2, but their fields are not. Please use the Access Utilities to look at the table structures on-line if required. The tables are represented by the labelled boxes in the Data Model diagram in appendix 3 and exist as Access tables.

A double arrow represents a 1-to-many relationship and a single arrow represents a 1-to-1 relationship, directions being also significant. For a table, only the key fields, **whose values together are unique**, are shown, namely {GTS, date}. The common fields over different tables are used to form the linking of the relations.

In data entry and maintenance, these tables are not edited independently, but are edited in a number of different Forms shown in the Data Model as described below.

Data integrity is enforced automatically by using the **Referential Integrity** (R I) facility. Take the first form "GTS treat" and its 1-to-many relation for example. This form is a main form that contains a subform. Each record in the table of the main form may be related to none, one or many records of the table of the subform. The former table is called the **Master table** and the latter the **Detail table**. You will not be allowed to delete or change a GTS value while it has related records in the table "GTS trap nite2". This is to stop the related records from becoming orphans and not related to any GTS and lose information. You would have to delete the related Detail records first before deleting the GTS.

## 2 USER OPERATIONS

The whole database system resides in a single sub-directory namely C:\trap9\. You must check with the project leader Paul de Tores regarding which is the latest version.

It is most convenient to display the Data Model Diagram on the wall when you are using this system.

### 2.1 Data entry & maintenance

**START:**

Start the system by opening the Master form "GTS treat" in the Database Window.

**VIEW & EDIT DATA**: After starting you are automatically in editing mode.

**Master form editing:**

You start data editing in the Master form first. This form contains the information about the GTS's and Trap Nights, which you get from the heading section of you field sheet. However the displayed fields in the main form are locked and you cannot change their values. To change their values, you must use another form, which is to be designed.

In the heading section of the Master form, there are three combo boxes on this form namely: "Trapping Session", "find GTS" and "species cap.". Click the down-arrow and choose a value for each, if the one showing is not the one you want. If you leave any of these blank, you will be asked to choose a value for it. "species cap." is the species captured of your first capture record on you field sheet.

Then you go to the lower part of this form, the subform, to enter the information about the Trap Nights

The Trapping Session dates will be used for date validation when you enter a new date in the subform. The Trapping Session name will be automatically entered for you into the subform, when your cursor passes through that field.

When you finished entering data for the Master form you can commence entering the captures data.

**Entering the captures data:**

For each captures record on the field sheet, you carry out the following steps:

(1) You click the button "Open a captures table". The value in the field "species cap." you chose will be used to call the correct captures table with the correct form, out of a total of six captures tables. The called form, eg the form for Medium Mammals, will lay on top of the calling form, the Master form.

Before you click the button above, you should leave the cursor in the subform pointing to a record of the same Trapping Session as shown in the Heading of the form. Otherwise a message will appear to ask you to do so.

(2) Here you key-in the captures data for the first record on you field sheet.

Then you click the "Return ---" button to close the captures data editing form, the form for Medium Mammals, to return to the Master form

(3) You choose another species pertinent to the next record on your field sheet and repeat the steps above.

In short, for each captures record, you go from the Master form to a captures data editing form and back.

When you finished editing, your data is automatically saved when you close the form..

## 2.2 Data validation and key violation:

Other than the Data Type consistency, eg integer, alphanumeric, enforced by Paradox for Windows, each field has got data validation built-in according to the User Requirement documents.

In a main form, the key fields of the Master table are always in bold and underlined. The common fields that link the Master table to the Detail table are displayed only once in the main form. The key fields in the Detail table are not labelled so. Please refer to the Data Model for this.

The above mentioned uniqueness requirements are enforced by testing for key violation in each table used by the form. If you enter a GTS name, which is already in the table (using the corresponding form), you will see a Dialogue Box displaying "Key violation error ---" to prompt you to try again. Hit the Escape key if you want to give up the current record , which you are entering. This message also appears if you enter an existing key value in the subform table. That is: you must check for key-violation for the data you just entered both in the main form and the subform by looking at the Data Model diagram..

## 2.3 Caution:

The user should also use 3 disks cyclically for backing up his data regularly.

## 3 QUERYING OF THE DATABASE, REPORTS & STATISTICAL ANALYSIS:

The Forms can be used for on-line querying such as searching for a group of records, but are restricted to their in-built data models, which were designed mainly for data editing.

Querying the database in a more general manner will have to use the Querying facility outside the Forms. If you know the Structured Querying Language (SQL), you can also use it.

In executing a query, you can choose to create a table, which can then be printed as a report if required. In a similar way, any alternative tabulation of the data can be extracted from the database and Exported to do further statistical analysis using another package such as SYSTAT or SAS.

## APPENDIX 1 The Normalization Process of the Relational Database Theory - a summary

The Relational Database Theory was invented by a mathematician and usually takes at least a Semester of a computer science course to teach properly.

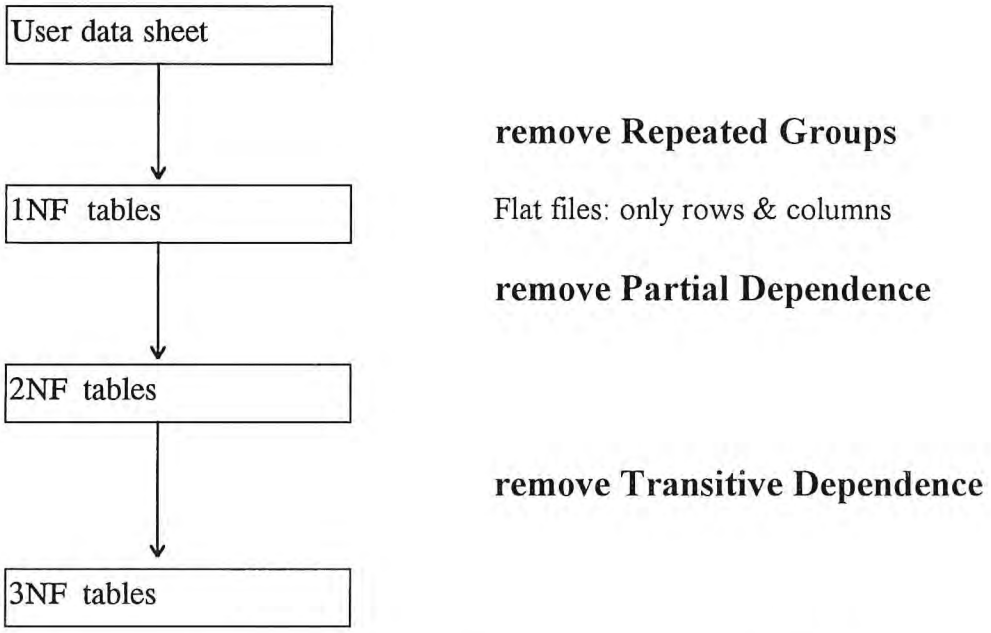
In short, data are organised in tables, which can have rows and columns only. Thus each table is also a relationship **between** its columns , which are its fields. You also have another set of relationships **between** these tables, as dictated by the meanings of your data.

The theory here has nothing to do with any software you happen to use, may it be dBase III, Paradox or any other. Being familiar with a software is of no substitute for knowing this theory well.

Here is a **very brief** description of the Normalization Process. Obviously only the theme can be stated here. However it is sufficient for the User to appreciate what has to be done to design such a system well. In the following the terms special to this theory are in upper case.

To minimize Data Redundancy and maintain Data Integrity, it is most likely necessary to decompose the hardcopy data sheet designed by the User into a number of tables. In fact it can be proved mathematically that to avoid **problems** in Data Insertion, Deletion, Updating and Querying , these Tables must be at least in the Third Normal Form, 3NF. The database designer would have to understand the meanings of each field and their relationships thoroughly.

This decomposition process is called the Normalization Process and is illustrated here:




**Repeated Group**: For example, in an improper table with blank cells like

| Salesman | customer 1 |
|---|---|
| | customer 2 |
| | customer 3 |

the field Customer forms a Repeated Group. To remove it, the value of Salesman must be repeated in the other two rows to make it a flat file, ie a proper Table with only rows and columns without other structures. Such a proper Table is said to be in the First Normal Form, 1NF.

**Key:** For each Table, a Key is a group of fields whose values together is unique in that Table. Other fields are called **non-key attributes**.

**Partial Dependence:**

If a non-key attribute depends on only some and not all the key fields, then this is called a Partial Dependence.

**Transitive Dependence:**

Given a non-key attribute depends on the whole key; but its value can also be determined solely by knowing the values of some other non-key attributes, then this is called a Transitive Dependence.

After removing the Transitive Dependence, each of the resultant Tables is said to be in the Third Normal Form, 3NF.

Many complications can arise in this process with more advanced methods available to solve them. Unfortunately this process cannot be automated yet, That is why it is worthwhile to work with a database specialist at an early stage.

A badly designed database will inevitably result in time consuming exercise to the User in data maintenance, information loss or information not being able to be extracted readily. This may subsequently force a nightmare of system redesign and data repair.

**Ref**. Date, C J, An Introduction to Database System, Vol 1, 1986.

**APPENDIX 2 List of Access data Tables**

**Data tables:**

| | |
|---|---|
| GTS treat | contains information about the GTS, its type & treatment. |
| GTS trap nite2 | contains information about the Trap Nights, its date, Trapping Session name & the traps used etc |
| Medium | contains the captures records of the Medium Mammals |
| Small | contains the captures records of the Small Mammals. |
| Clip rep | contains the captures records of the reptiles with clippable toes |
| Non clip rep | contains the captures records of the reptiles with non-clippable toes |
| Amphibian | contains the captures records of the amphibians |
| Miscel | contains the captures records of the miscellaneous animals like birds |
| | |
| species list1 | contains the species list |
| family | contains the family list |
| trapping sessions1 | contains the trapping sessions name, start & end date |
| | |
| woylie status | contains the woylies' id, translocation history, status code, radio collared or not |
| woylie captures | contains the captures records of the woylies |
| cause of death codes | |
| measurers code | |
| source codes | |
| status codes | |
| radio-collared woylies | animal id, name, date of death/censored, cause, last live signal |

## APPENDIX 3 The Data Model diagram and the Access Forms on it

| GTS * | GTS type | treatment | |
|---|---|---|---|

Please see hand-drawn diagram instead, for the time being.

## GLOSSARY

GTS: the name of a grid, transect or supplementary site

treatment: There four treatments defined by the number of times fox are baited, namely zero, two, four & six times a year.