DEFL

USER MANUAL

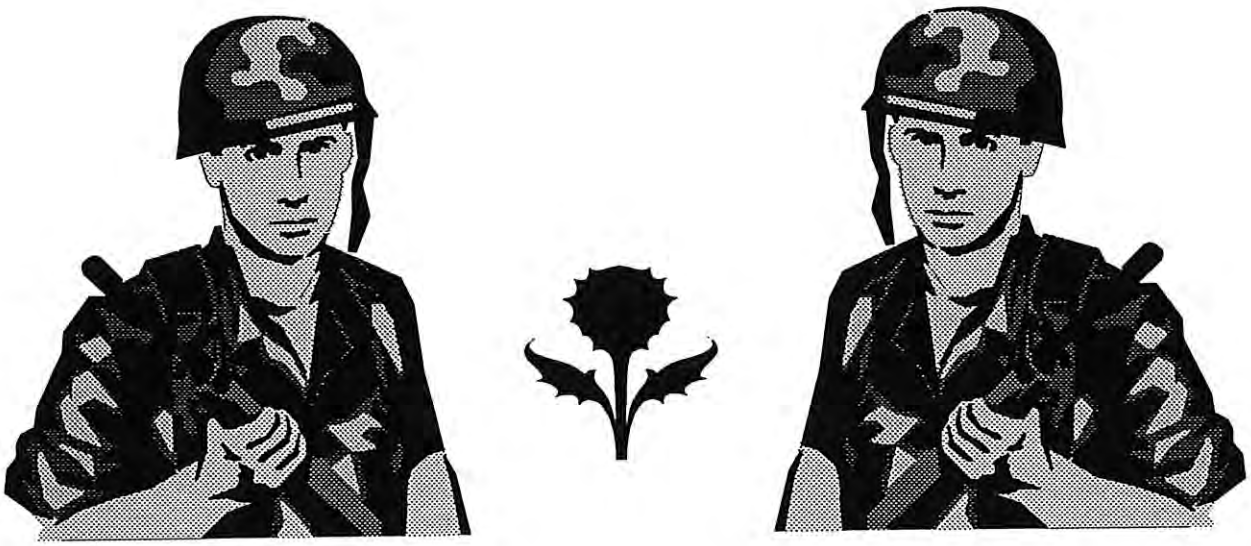
for the

Threatened Flora

Database Management System (= DEFL)

by Paul Gioia and Mark Burgman

27 July, 1994



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1. Contents

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1. About This Manual

This user manual was written by Mark Burgman and Paul Gioia. Constructive comments would be appreciated and should be referred to the senior biologist, Flora.

2. Background

The Database Management System is a program for the storage and retrieval of information about the distribution, abundance and status of populations of rare or endangered plants in Western Australia. Information is stored as a series of records, each of which refers to a single geographical location. This location, or site, has associated with it a number of attributes. These attributes are the data provided on the Rare Flora Field Report Forms.

The program has special characteristics that furnish answers to two kinds of questions:

- Which populations of Threatened Flora and Reserve List species occur within a grid cell specified by given latitudes and longitudes?
- Where does species X occur?

In using the Threatened Flora system we assume that the user is familiar with the fundamentals of recording information on rare and endangered plant populations in the field. The section entitled **Getting Started** details hardware requirements and steps through the procedure to get access to the program. The following sections describe the use of the program in detail and cover menu choices, function keys, data base interrogation procedures, and data input and output.

Remember, if you have trouble using the program then it is most likely the fault of the program's logic or design, the user manual, or the training provided for users. If the program crashes, if it is difficult to use or confusing, if steps in the program seem redundant, or if some aspect of the program is simply annoying, the fault usually does not reside with the user.

If something occurs to you that would make a useful addition to the program, let the Senior Biologist know about it. Many additions are planned for the program including summary schedules and powerful graphics capabilities. However, the priorities for their implementation depend on their potential usefulness, so any suggestions are welcome.

3. Getting Started

The first thing you will need is an account. Information Systems Branch does not charge other Branches within CALM for computer time at this point in time (but don't hold your breath), and the account is used simply to document who uses computer time, and what it is used for. Your account number allows you access to programs and data for which you have need, and restricts access to areas that are confidential.

There are a number of VAX mainframe machines at Como one of which, SELDON, contains the Threatened Flora application. *To get an account on SELDON, contact the Senior Biologist, Flora and she/he will arrange for you to have your own VAX username and password.*

SQL, the database language Oracle uses is a programming language designed for data management, very different to dBASE III and much more powerful. The database management program was written in Oracle by Paul Gioia of the Science and Information Division, Woodvale. The data are organised to be like the Rare Flora Field Report Forms (FRF's), and the various features of the program were designed to accommodate as many different questions as possible that might be asked of the database by CALM officers.

4. Conventions

In this manual, we'll use a number of different conventions. When you are presented with a prompt on the screen that requires a response, the computer's message will be shown in this document in **bold** face (two examples are **username:** and **Do you want to commit the changes [Y/N]:**).

Other responses to computer prompts will require that you type in an instruction, such as 'Y' or 'N'. These instructions will be shown in *italics*.

- In situations where more than one key has to be pressed to do something there are two ways of pressing those keys. Any key preceded by either **Ctrl** or **Shift** (eg. *Ctrl P* or *Shift F4*) means you must press the second key (eg. *P* or *F4*) whilst *simultaneously* holding down the first (eg. **Ctrl** or **Shift**).

  In *any other* situation (eg. *PF1 Tab*) you press the first key (eg. **PF1**), *then* the second key (eg. **Tab**). Computers are full of things like this.

- Throughout the manual the symbol ↵ is used to refer to the **Enter** key (sometimes referred to as the **Return** key) and is situated in the centre of the keyboard. It is usually used to enter a line of input or to move to the next field. Oracle refers to it as the [NxtFld] key.

  This key is not to be confused with the **Enter** key found in the numeric keypad to the right of the keyboard. When ORACLE refers to the **Enter** key it is talking about the latter.

5. Oracle Function Keys

At various points in the application you'll need to perform a database function by entering a keystroke (or sequence of keystrokes). An example of a database function is "execute a query" or "delete a record". The actual sequence of keystrokes required to perform that function will vary depending on which terminal protocol you're using (eg. VT100, VT220) and, if using a PC emulation software, how that software maps a VT100 or VT220 keyboard to your PC's keyboard. (Sometimes it's a one to one mapping, other times it's something totally obscure).

Rather tying the manual to situation-specific keystrokes database functions will be referred to by a mnemonic. For example "execute a query" will be referred to by the function [ExeQry], "delete a record" by [DelRec]. In **Appendix 1** is a table showing what physical keystrokes you need to press to invoke the required function. The table includes keystrokes for VT100 and VT220 terminals and TelNet equivalents of those protocols. If you are using another terminal emulation you can use a blank column in the table to fill in the keystrokes for your program (which its documentation should contain).

6. Running The Program

If you are using a PC to connect to the VAX start your terminal emulation software. For example, to start up TelNet, and type

TN SELDON↵

Note that if you are accessing the VAX over a network connection you will be granted direct access to SELDON's Login prompt. However, if you're connecting over a serial line you will now talking to the CALM network multiplexor. The multiplexor allows you to connect to a variety of computers. Type

Ctrl P ↵

to tell the multiplexor that you want to select a computer. Then type

/SE ↵

to gain access to SELDON.

The screen should then display

<ACCESS GRANTED TO /FI (xxx)>

.

.

...Commercial VAX 6410. ..

Next comes the prompt

Username:

Type in the username supplied by ISB followed by ↵. The computer will respond with the prompt

Password:

Enter your password.

Note that if you are too slow in entering either your username or your password your connection to SELDON will be released. If this happens you need to re-do the above procedure.

After doing this, a the VAX prompt will appear, something similar to **SELDON >**.

To invoke the Threatened Flora Data Management Program, type

DEFL ↵

beside the prompt.

You'll then be asked what terminal protocol you're using like so:

Enter terminal emulation (Default = VT100):

If you're running VT100 just press ↵ (this protocol is easier to use on a PC keyboard than VT220). Otherwise if you're using VT220 enter those characters and press ↵. The following message is displayed.

Eventually a screen looking like **Figure 1** will appear.

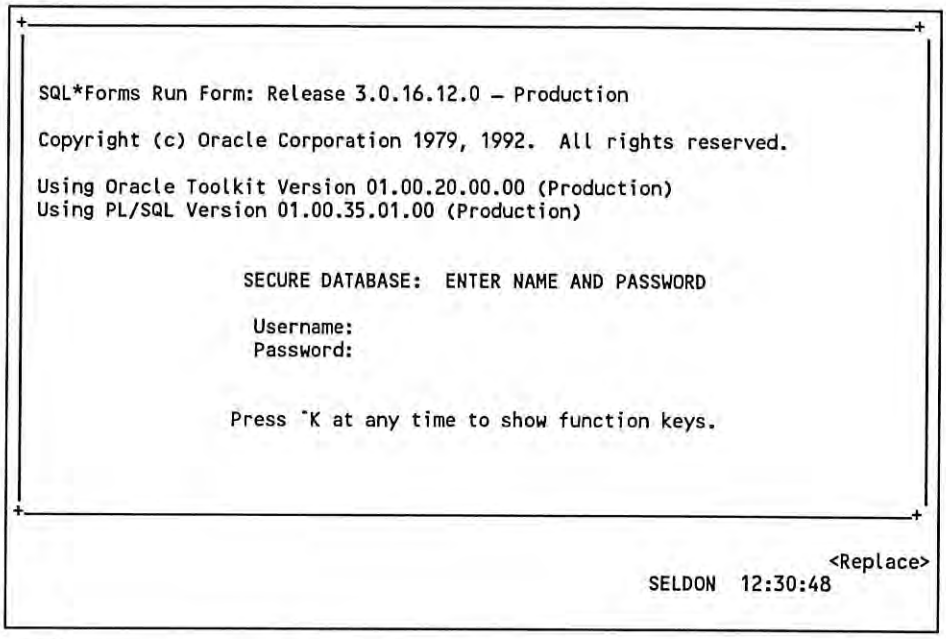


Figure 1. Threatened Flora Login Screen

The top two lines of the screen display the date and time, and Oracle's copyright. These are followed by a prompt for an Oracle **username** and **password**

Depending on how ISB has set up your Oracle access you may not need to enter an Oracle username and password. In this case press ↵ twice (if this screen appears at all). Otherwise, if you have not been given automatic access to Oracle you will need to enter yet another username and password. These two codes are also provided by ISB and may be different to the ones used to gain access to the VAX. Type them in at the appropriate place and you are away.

The line beneath the prompts tells you that the key sequence *Ctrl K* will provide a list of function keys (Remember, this means press the **K** key whilst holding down the **Ctrl** key). This key sequence will provide you with a list of other keys available to perform various functions such as save data, or move around the screen. See the list in **Appendix 1** of this manual for keys used in this application.

The list of ORACLE function keys, obtained by pressing *Ctrl K*, is context sensitive so it will let you know which keys are available depending on where you are in the program. If, at any time, you can't remember the keys to do something, press *Ctrl K*.

Note that when you press *Ctrl K* a list of keystrokes is displayed on the screen. This list may extend below the bottom of the screen. To display those keystrokes press ↓.

If you are using a PC running under a terminal emulation program the bottom line is usually reserved for PC messages. It can be ignored in most cases.

The line second from the bottom says

<Replace>

This means that the computer assumes you wish to overwrite characters. On this and subsequent screens, if you want to insert characters or numbers rather than overwrite them, press the [Insert/Replace] key. It will allow you to toggle between the two modes. To discover which key this is, press [redacted]. (In VT100 mode it's *Ctrl A.*)

As stated above, the Threatened Flora Database Management Program is function key oriented. At most times, you will be presented with a set of possible actions that can be performed next. Most of these will be executed by pressing a single function key or a sequence of function keys. Occasionally, you will be presented with a menu choice or a prompt which requires you to type a response. To initiate the action, type a response or choose an option, then press ↵.

7. Emergency Commands

One of the keys that does not change its function throughout the program is the [Exit] key. It will always exit from the current level and move back to the level at which you were most recently.

It's bound to happen, especially when familiarising yourself with a new system, that you will get hopelessly tied up somewhere in the program.

The [Clear Form] key will empty the current workspace and restore things as if you had just entered the system.

As a last resort you can disconnect from the VAX at any time by pressing the exist key for PC emulation program. If you release your connection in this way, any changes that have not been saved will most likely be lost. If that doesn't work turn the machine off and do something else for the rest of the day.

8. The Main Menu

Having typed in the username and password specific for the Data Management Program, a new screen will appear as in **Figure 2.**

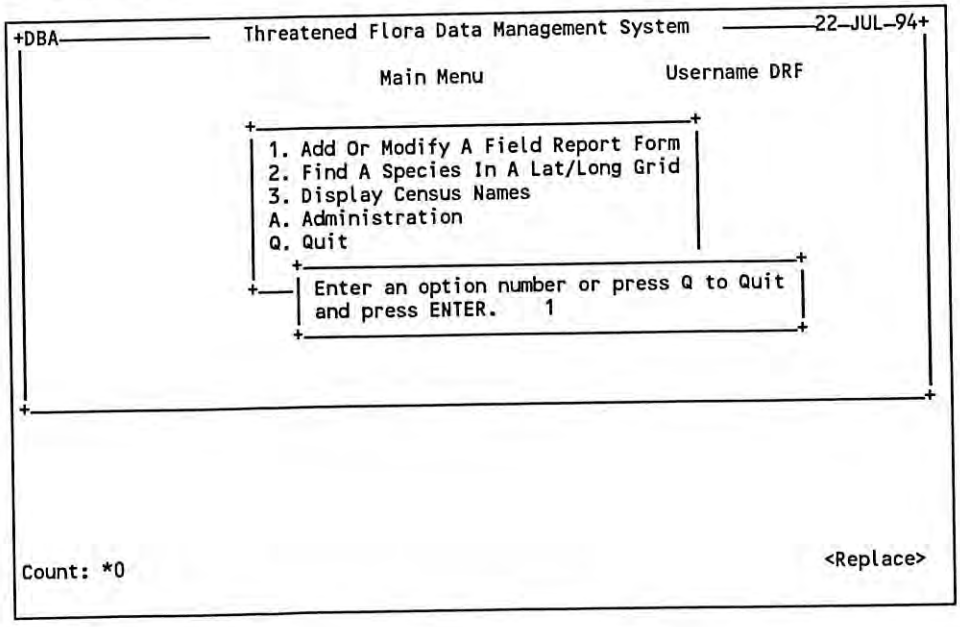


Figure 2. Threatened Flora Main Menu

This is the Main Menu, the highest level of the program and it specifies the two main functions; "enter data", and "find populations within a grid cell".

Four options, 1, 2, 3 and A, are present as well as Q to Quit the program. Only options 1, 2 and 3 are available to general users. Option A is reserved for Wildlife Administration Branch and it allows them to modify various lists. The lists are protected from other users to save the lists from being corrupted.

9. Adding/Modifying Data

To add or modify data choose option 1 by typing

1 ↵

at the cursor position. This will display page 1 of four data entry screens as in **Figure 3.** (Note that the screen will have blank fields initially. **Figure 3** shows the screen appearance after fields have been entered.)

```
Sheet      1    Threatened Flora Data Management System    DRF        22-JUL-94
DBA                  Add/Modify A Field Report Form
+- Taxon Details ------------------------------------------------------------+
|TaxonID                          Taxon                              ms  Cons. |
|1996     Grevillea dryandroides                                          T   |
|                                                                  +----------+
|Population No.    9    Surveyed by BLR on 01-OCT-80  Current?     |Confirmed ? |
|                                                                  |    YES     |
+--- Locality Details ------------------------------------------------------+
|  Nearest place Ballidu                  Distance 1.1    Direction W        |
|                                                                            |
|  Furthur Locality Details                                                  |
|  Ballidi-Bindi Bindi Rd. 0.9-1.3km W of Townsend Rd. Road res.             |
|                                                                            |
|  Shire 132  Latitude 30°36' 6"  Longitude 116°45'23"  Resol'n 2  Map TV    |
|                                                                            |
|  District MER  Vesting SHI  Land District NIN  Location No.                |
|                                                                            |
|  Purpose 1 VER  Purpose 2       Reserve No.         Class                  |
|----------------------------------------------------------------------------|
UpdPop Update population   DispSp Display Species Name
-------------------------------------------------------------------------------
Enter a species name.
Count: *1                                                          <Replace>
```

Figure 3. Page 1 - entering/editing data

There are a number of things to note. The screens are organised to look as much as possible like the Field Report Forms (FRF's). The screen has a number of different fields corresponding to different pieces of information on the FRF's. A field is a highlighted area on the screen.

There are too many fields in an FRF to fit on one screen. Thus they have been grouped under the sections **Taxon, Locality, Habitat, Plant Biology, Herbarium** and **Administrative Details** and spread over four screen pages.

Throughout the program, many fields have a list of legal values associated with them. The fields are validated when they are entered to ensure that the information matches one of the elements in the

associated list. If they don't match, they will be rejected. There is more about lists and how to use them below.

9.1. Navigating Between Fields

To move between pages press [Next Page] to go forwards and [Previous Page] to go backwards. You may move between fields forwards with the [NxtFld] key (generally ↵) and in reverse with the [PrvFld] key.

9.2. Page 1 - Taxon And Locality Details

The first screen you will see on choosing option 1 is titled **Taxon Details**. The field uppermost on this screen is labelled **Sheet**. It is blank because the record you are working on has not yet been entered. Each new record, or sheet, corresponds to a FRF and is given a unique number when it is saved.

When you enter a generic, specific and/or sub-specific epithet in the field labelled **Taxon** (**Figure 3**), it must match exactly one of the names in the Census of Western Australian Plants as maintained by the W.A. Herbarium. The **Taxon** field is special because it is compulsory. It is one of four fields that must be filled in. That's not to say we recommend leaving the other fields blank!

When you successfully enter a species name the two subsequent fields, **TaxonID** and **ms** will automatically be updated. These fields are taken from the Census. You can't change the **TaxonID** and **ms** fields but you can query them.

A Taxon ID is a unique numeric code that is synonymous with a complete species name (including specific and infra-specific authorities). However, there are situations where a combination of genus and species and/or subspecies may have different authors. The Taxon ID will be different for each of the species/author combinations. Thus it is possible that you may enter a genus/species/subspecies combination that is not unique even though the TaxonIDs are.

When this happens the system will display a message saying the name is not unique. In this situation you should press [ListVal] inside the species field and select which particular TaxonID is correct.

You can press the [Display Full Species] key to display the full authority information for a taxon. Figure 4 will then appear. Make sure the cursor is in the **Taxon** field before you press it.

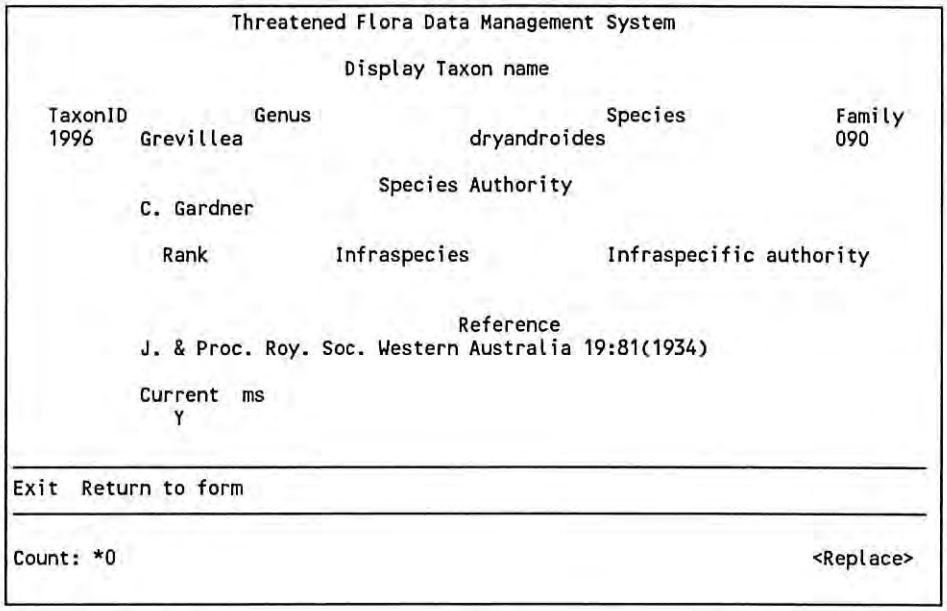


Figure 4. Display full taxon name attributes

The **ms** field will contain MS if the name is in manuscript or PN if it is a phrase name.

This is followed by the field **Cons.** This is short for **Conservation Status**. This field may contain "**T**" meaning threatened, "**X**" meaning threatened, presumed extinct or the digits **1-4** and refers to the taxon's priority status. This field may not be modified in this screen but can be used in queries.

The **Population No.** field has a space for a numeric value followed by a character, **A-Z**. In biological terms, a population is a collection of individuals that are sufficiently close geographically that they can find each other and reproduce. In practical terms, it is any collection of individuals of the same taxon distributed more or less continuously. The limits of a population depend on the life form of a taxon, its mode of reproduction and seed dispersal, its habitat specificity and pattern of distribution within its geographic range.

However, populations often straddle land with different vestings and for administrative purposes it is important to distinguish between individuals on different blocks. Thus, the letter codes should represent sub-populations occurring on land with different vestings, purpose or ownership. Each group of individuals occurring on a block with different vesting should be assigned a separate letter code.

The **Surveyed by** field should include a three letter code representing the person who filled out the FRF. There is a validation list associated with this field. The field following the label on is for the date of the observation. The format for entering the date is **dd-MON-yy** (e.g.., *31-MAR-90*).

The field **Current** is used to retrieve the **most recent survey of particular taxon populations** in a query. The **Current** field can only be entered when performing a query. It is inaccessible otherwise. To use it enter query mode ([EntQry]), enter a *Y* in the **Current** field, fill in any other fields as required, then press [ExeQry]. Records returned from this query will have **Current** showing *Y* to remind you that these are only the most recent records.

There is a field in the upper right hand corner of the screen which is not available to users. It says **Details Confirmed ?** and the default is *No*. This field is available to Wildlife

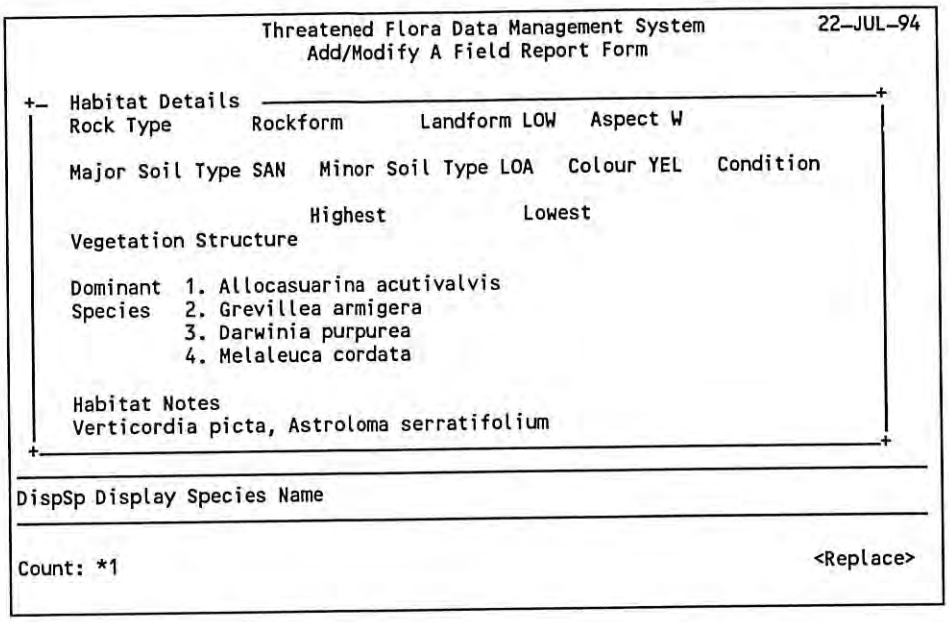


Figure 5. Page 2 - Habitat information

The field at the bottom labelled **Habitat Notes** is for any other salient details of the habitat. Information here should be restricted to physical habitat, edaphic features and details of associated species not accounted for above.

9.5. Page 3 - Plant Biology and Herbarium Details

The third screen (**Figure 6**) is labelled **Plant Biology**. The first field, labelled **No. of plants**, must be filled in if the FRF is to be counted as a valid record. The value entered may be specified in the **Accuracy** field as either exact (type *EXA*) or estimated (type *EST*).

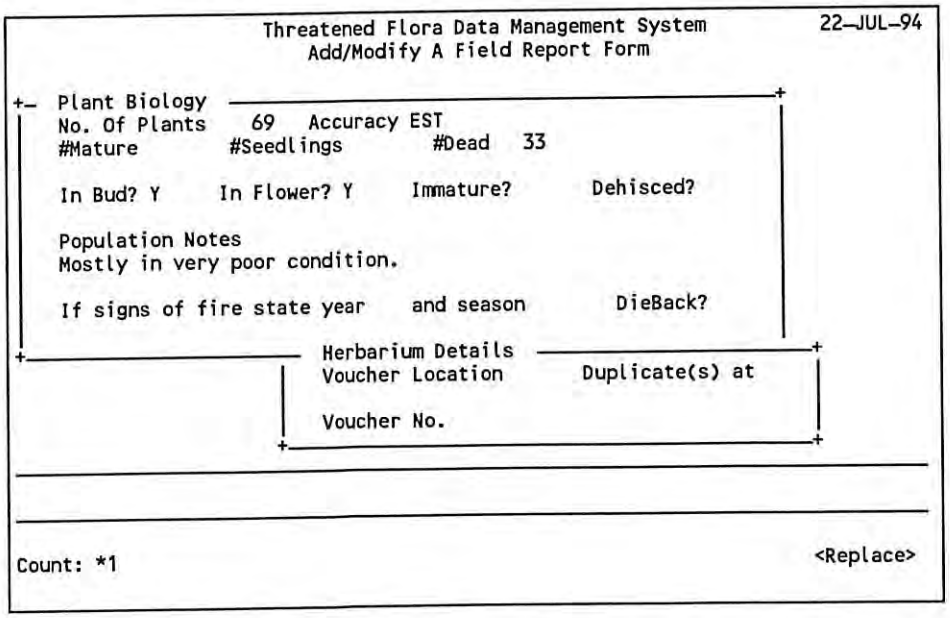


Figure 6. Page 3 - plant biology

Administration and would normally only be changed to *Yes* by the Senior Biologist, Flora. A record will be counted as confirmed only on meeting a set of conditions, namely: the date of observation should be less than 5 years old, the **Surveyed by**, and **Population size** fields should be filled in, and the **Resolution** field should say that the latitudes and longitudes have an accuracy less than 500m (an accuracy less than or equal to 30"). These are the minimum requirements for a valid FRF. Other validation procedures will be at the discretion of the Senior Biologist, such as the question of the accuracy of identification in the absence of a voucher specimen.

9.3. Geographic Location

The **Latitude, Longitude** and **Shire** fields are central to an FRF and must be entered. *If the Latitude and Longitude do not fall within a rectangular area enclosing the shire extremities then the record will be rejected.* When you enter the **shire** field a message at the bottom of the screen appears saying "Press [Shire Boundaries] to see boundary for this shire". Enter a shire code and then press [Shire Boundaries] to see the extremities of that shire.

The **Nearest Place** should be a valid name of a town, mountain, station homestead or any other point location present on most small scale maps of Western Australia.

The **Further Locality Details** field allows up to 250 characters of information about the location of the population. In the absence of sophisticated graphics, mud maps are impossible so the information here should replace the details on a mud map. Be as detailed as possible.

The remaining fields on the first screen of option 1 (**Figure 4**) are self explanatory. The only thing to know is that there is a limited list of different codes for each and unless you type a valid code, it will be rejected. For example, the field labelled **Class** will only accept values A, B or C and should be filled in only if the **Location** is a Conservation Reserve.

Some pertinent function keys available to carry out particular actions are listed at the bottom of this and the following three screens (**Figure 3**). They list the function mnemonic so you will have to cross reference to with **Appendix 1** to get the actual keys. A more complete list may be obtained by pressing *Ctrl K*.

9.4. Page 2 - Habitat Details

The second screen, titled **Habitat Details**, will appear when you press ↵ in the last field of the first screen. This screen (**Figure 5**) has fields for habitat details corresponding to the habitat details on the FRF's. They include rock type and form, landform and aspect, soil type and colour, and associated vegetation. All of these fields have a list of codes associated with them against which your entries will be validated.

The fields for vegetation structure expect Muir's classification and there are fields available for four dominant species. It's acceptable to enter only the genus name here. However you can press [ListVal] to select a name from the census.

The population structure and reproductive state may be specified. There are fields available for recording fires and for the presence and level of infection of Phytophthora. **Population Notes** is a field in which you may record any details of the biology of the population in question. It may include such things as pollinators, weed invasion or disturbance.

A separate box at the bottom of the screen is titled **Herbarium Details.** It allows you to record the collection code of a voucher and the place(s) where the voucher is kept.

9.6. Page 4 - Administrative Details

The fourth screen (**Figure 7**) is titled **Administrative Details.** It records information about administrative procedures and actions requested or undertaken by CALM in relation to the population. The first field allows CALM to record if an inspection has been carried out and it will facilitate keeping track of these requests in future.

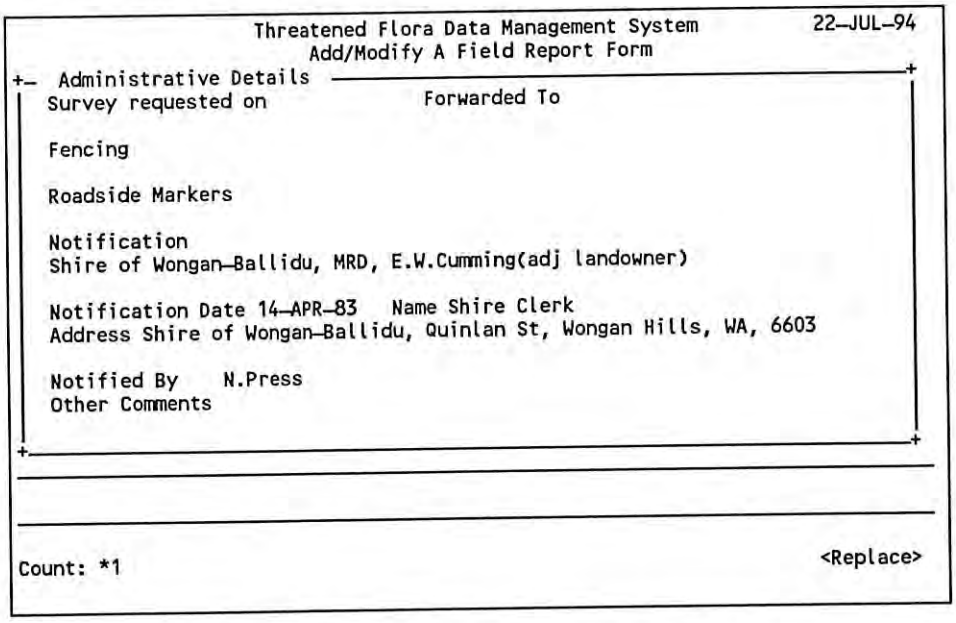


Figure 7. Page 4 - administrative details

There are special fields for **Fencing, Roadside Markers** and **Notifications**. These fields will accept any details (ie., there is no special validation list linked to them). Any aspect of the administration of the population that does not fit into these categories may be described in the **Other Comments** field.

9.7. Saving Data

Once fields have been entered, the data may be saved by pressing the [Save Changes] key. The new record is then assigned a sheet number. To add the next record, press ↓ on the keyboard and a new blank template will appear.

If you make changes in any field of any of the four screens for data entry, Oracle will know. If you attempt to leave the option or perform some other task without saving these changes, the program will display the following screen.

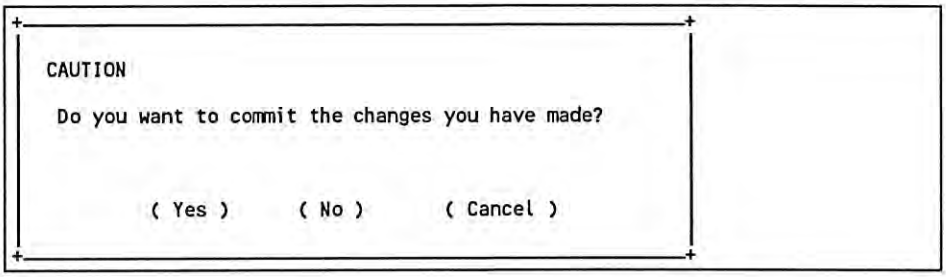


Figure 8. Commit Changes Query WindowsFigure 8. Commit Changes Query Windows"

(Yes) is hilighted by default. If you press ↵ changes will be saved. You can select a different action with →.

9.8. Special Topics

9.8.1. Validation Lists

We mentioned above that many fields have a list associated with them. These lists provide a means by which the data entered in particular fields may be validated. The lists contain the range of alternative valid entries for that field and the characters entered must correspond to one of the elements of the list for that field. For example, the list for the **Class** field on page 1 of Main Menu option 1 contains the elements A, B and C. Any entry in that field must be either A, B or C, or the entry will be rejected.

The list for the **Class** field is easy enough to remember but there are lists associated with most other fields. The species list is several thousand taxa long. Happily, it's not necessary to remember what the various codes for each field are. They are stored in the computer and to see the list, simply move the cursor to the field in question, then press the [ListVal] key. If you are in any field other than the species fields a screen like **Figure 9** will appear (assuming that this field has a list of values associated with it). The program is sensitive to the context of the command and you will be presented with the appropriate list of alternative codes and their meaning.

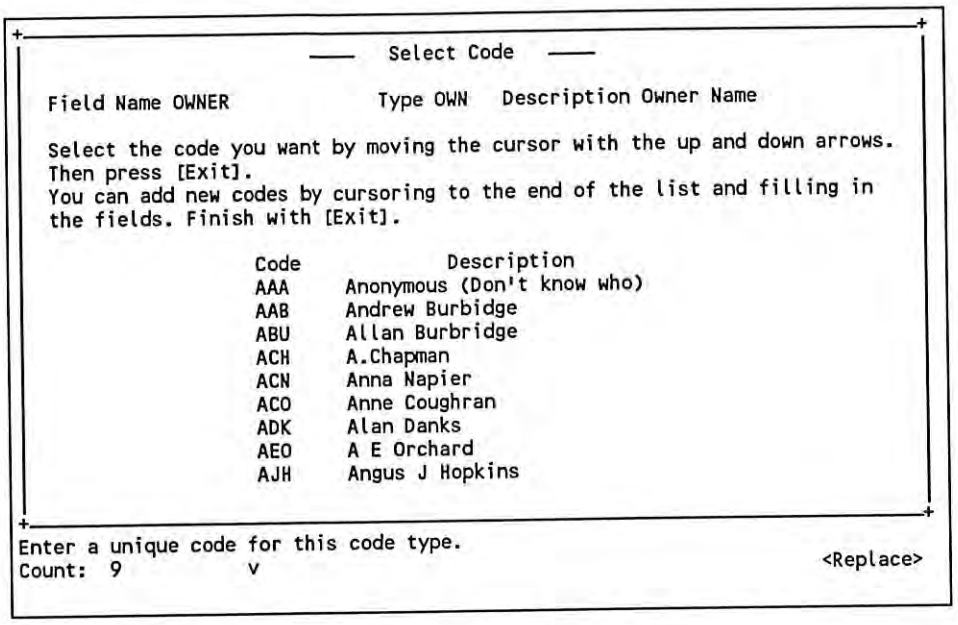


Figure 9. Threatened Flora Codes

Some of the lists contain more codes than there are rows on the screen. You may move around the list using the ↑ and ↓ arrows on the keyboard. To leave the list and go back to the data entry field, press the [Exit] key. It's a good idea to move the cursor to the row on which the code you want lies. The code will be written automatically to the field after you have pressed [Exit].

It may happen that a code you need is missing. This will happen most often when you want codes for **Observer**, and **Taxon**. The facility to add or change codes is the domain of Wildlife Administration and the best way to have a code instated is to ring the Senior Biologist, the Administrative Officer, Flora or the Endangered Flora Clerk.

9.8.2. Finding Species Names

If you press [ListVal] when in a species field (e.g. the **Taxon** field or any of the **Dominant Species** fields) a screen like **Figure 10** will appear.

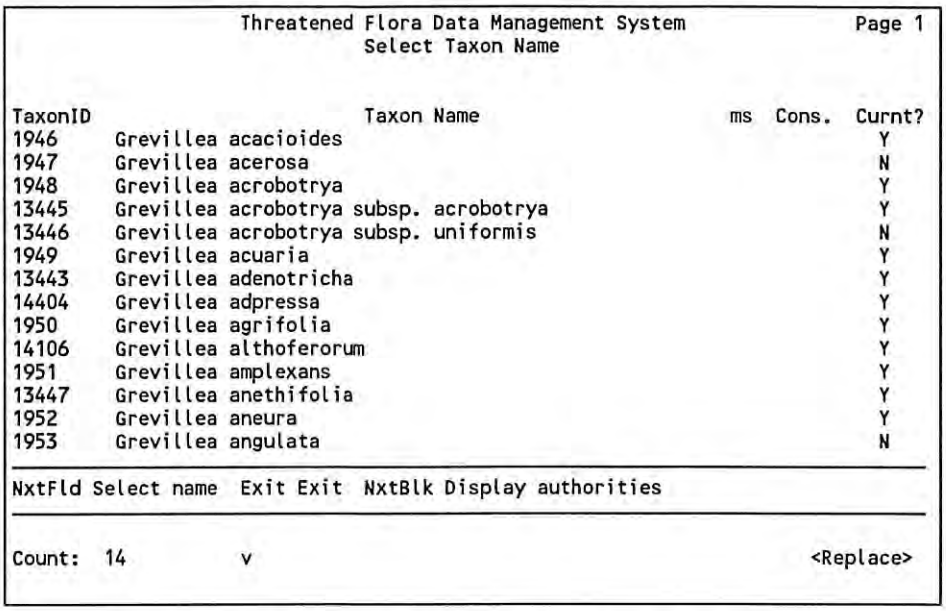


Figure 10. Selecting species names from the census

If the **Taxon** field was empty when you pressed [ListVal] no species are immediately retrieved but you are placed straight into query mode. Enter some query criteria and then press [ExeQry]. Select the appropriate species with the ↑ and ↓ arrows and then press ↵. If you press [Exit] no change will be made to the field you are in.

Alternatively you can enter the first few characters of the species name before pressing [ListVal] in which case all names starting with those characters will be retrieved.

Of course, if you forget to enter those characters before pressing [ListVal] you can always perform a standard query once in the list.

The records in figure 10 were obtained by first entering the characters *Grevillea%* into the **Taxon** field and *then* pressing [ListVal].

Note that there are over 11000 possible names to choose from. These names are maintained by the WA Herbarium and any changes or additions to the names must be done by them.

9.8.3. Updating Population Records

When updating populations of taxa that have already been entered in the database it would be tedious if the user had to re-enter all the fields even though only one or two may have changed.

A facility had been incorporated into the Threatened Flora system for updating populations as follows:

1. Press the [Update Population] key. A new screen will appear as shown in **Figure 11**.

2. Enter the taxon name as you would in the main data entry screen. You can press [ListVal] to select from a list. Then press ↵.

3. Enter the population ID. If it doesn't exist the system will inform you and ask you to re-enter the ID. Press ↵ when entered.

4. Enter the sub-population letter if one exists. Press ↵ when ready.

5. The system will return you to page 1 of the main data entry screen. It will then retrieve the last record surveyed for this taxon population. ie. *the one with the most recent* **Surveyed On** *date*. No other criteria are used for the search.

6. The retrieved record is a template based on the last surveyed record for this population. Note that the sheet number is blank indicating that this is a new record.

7. Change any fields that have altered since the last survey. Then save the record by pressing the [Save Changes] key (See **Saving Data** above). You can now repeat the process or any other operation.

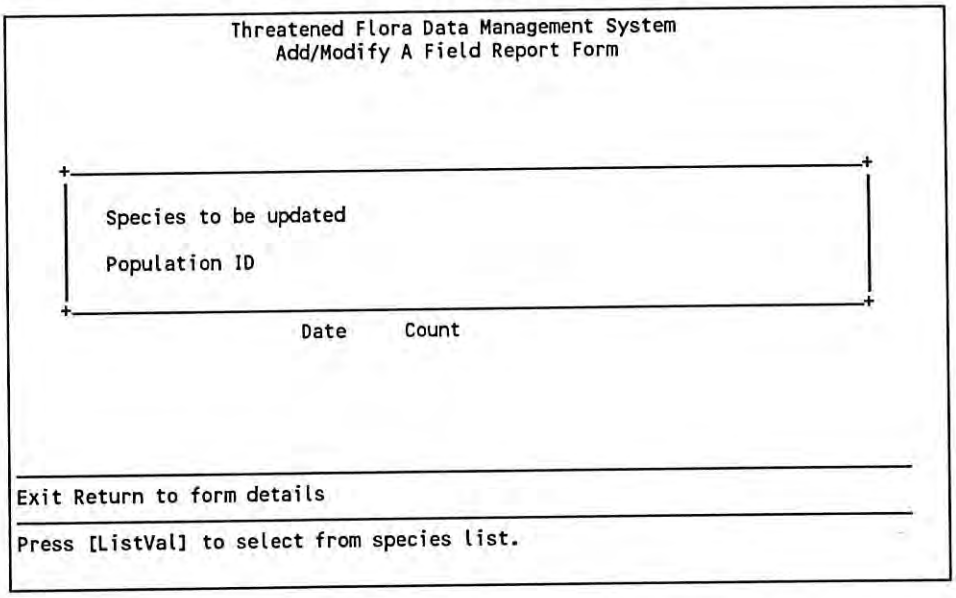


Figure 11. Updating species populations

9.8.4. Committing Changes

Under ORACLE the word **Commit** is synonymous with "**Save Changes**". You may be asked to commit changes at various points in the Threatened Flora system - sometimes when you think you haven't made any! If you are sure you haven't made any changes in records returned in query then select *(No)* in the Commit Changes Query window show above.

10. Query Mode

Query Mode is a powerful function built into Oracle data entry screens that allows you to find records for a large number of criteria.

Whilst the following discussion centres on option 2, finding populations by geographic position, the principles apply equally well to option 1 and any other screen displaying database records.

10.1. Finding Populations Within A Grid Cell

The second option on the Main Menu is called **Find a species in a lat/long grid**. As the title suggests, it allows you to search the data base and recover records within a specified grid cell. You may choose this option by typing 2 and ↵ on the Main Menu. The screen shown in **Figure 12** will appear. However, all the fields will be blank.

```
DRF                    Threatened Flora Data Management System          22-JUL-94
                          Select Species By Lat/Long Range

                            Latitude   Longitude       Latitude   Longitude
Geographic Range : From  30°  '  "  115°  '  "  to  30°30'  "  115°45'  "

Current    Conservation Code      CALM District      Shire

Sheet TaxonID              Name                    ms Pop No  Latitude  Longitude
 1413 3341    Acacia forrestiana                      2 A  30° 6' 6" 115°10'18"
 1277 3341    Acacia forrestiana                      2 B  30  6  6  115 10 18
 1278 3341    Acacia forrestiana                      3    30  5  8  115 12 23
 1279 3341    Acacia forrestiana                      4 A  30  5 44  115 12 41
 1414 3341    Acacia forrestiana                      4 B  30  5 44  115 12 41
 1280 3341    Acacia forrestiana                      5    30  6 19  115 12 41
 1415 3341    Acacia forrestiana                      6    30 11     115 13
 1416 3341    Acacia forrestiana                      7    30 10     115 16
 1571 4397    Asterolasia drummondii                  2    30  5 50  115 12 40
 1566 4397    Asterolasia drummondii                  2    30  5 50  115 12 40
 1565 4397    Asterolasia drummondii                  2    30  5 50  115 12 40

LLRange Switch between upper and lower screen   NxtPag Next Page

Count:  11          v                                              <Replace>
```

Figure 12. Page 1 - Selecting species by geographic region

The screen under Main Menu option 2 has two logically separate regions (or blocks), separated by a horizontal line. The top part of the screen is labelled **Geographic Range**. The cursor is automatically positioned in this block when you first enter this option.

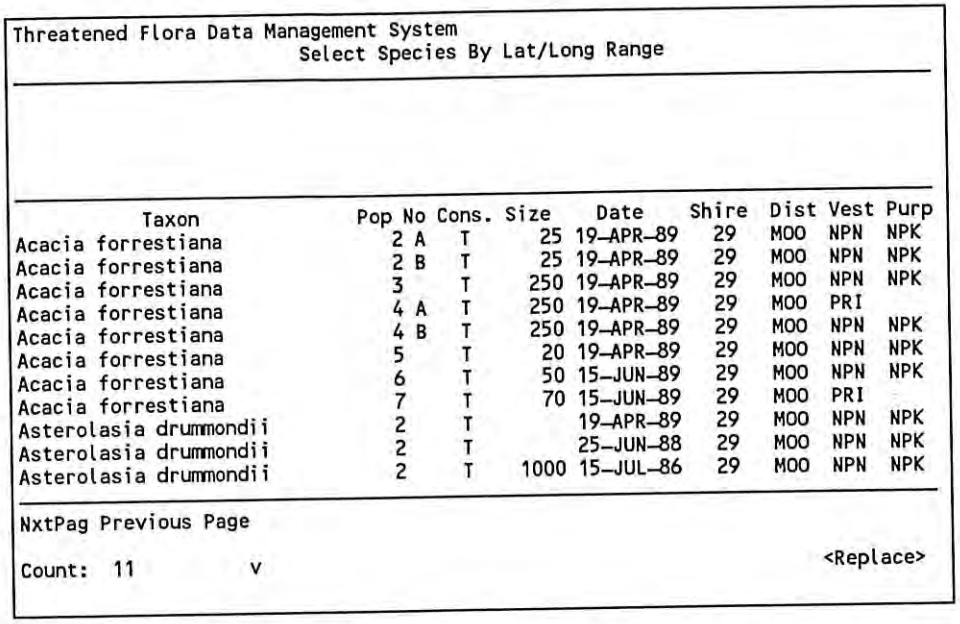
Here, you may specify a box defined by two lines of latitude and two lines of longitude. The labels **from** __ __ __, __ __ __ **to** __ __ __, __ __ __ therefore represent the upper left hand corner and the lower right hand corner of the box respectively.

By specifying a *Y* in the **Current** field you will restrict the query to return only the most recently surveyed records for given taxon populations. Note that if you enter a geographic range as well as specifying **Current = Y** only records within that range will be considered even though there may be more current records outside that range.

You can also specify the **Conservation** code of the taxa you are querying. In addition you can query on the CALM district and shire. You may move between the two blocks by pressing the [NxtBlk] key.

The lower region is set aside to output all those FRF's that fall within the specified box. It provides a single line for each population on which are listed a number of fields including sheet number, taxon name, population number, latitude and longitude, and population size.

The screen is split over two pages. You can change pages by pressing the [Next Page] key. Page 2 is shown in **Figure 13.**



Threatened Flora Data Management System
Select Species By Lat/Long Range

Taxon	Pop No	Cons.	Size	Date	Shire	Dist	Vest	Purp
Acacia forrestiana	2 A	T	25	19-APR-89	29	MOO	NPN	NPK
Acacia forrestiana	2 B	T	25	19-APR-89	29	MOO	NPN	NPK
Acacia forrestiana	3	T	250	19-APR-89	29	MOO	NPN	NPK
Acacia forrestiana	4 A	T	250	19-APR-89	29	MOO	PRI	
Acacia forrestiana	4 B	T	250	19-APR-89	29	MOO	NPN	NPK
Acacia forrestiana	5	T	20	19-APR-89	29	MOO	NPN	NPK
Acacia forrestiana	6	T	50	15-JUN-89	29	MOO	NPN	NPK
Acacia forrestiana	7	T	70	15-JUN-89	29	MOO	PRI	
Asterolasia drummondii	2	T		19-APR-89	29	MOO	NPN	NPK
Asterolasia drummondii	2	T		25-JUN-88	29	MOO	NPN	NPK
Asterolasia drummondii	2	T	1000	15-JUL-86	29	MOO	NPN	NPK

NxtPag Previous Page

Count: 11 v <Replace>

Figure 13. Page 2 - Selecting species by geographic region

Once the geographic range has been specified, you will want to tell the program to execute a search of the data base to find all populations within the cell. To execute a search, you must press the [ExeQry] key. All those sheets that fall within the grid cell will appear listed in the lower region of the screen. If there are more than 13 FRF's you will be able to look at them all by using the ↑ and ↓ arrows on your keyboard.

We have completed an example of a search of a subset of the data base here. After selecting option 2 on the Main Menu, we entered the values from 30° 00', 115° 00' to 30° 30' 115° 45' in the **Geographic Range** fields. We pressed the [ExeQry] key to execute the search and the list of populations in **Figures 12 & 13** appeared.

This example shows how to answer the most general question asked of the DRF data base; what populations are known from a given grid cell. There are numerous other questions we'd like to put to the data base, such as which populations of Threatened Flora occur on Railway Reserves in Toodyay Shire, or which populations of species *Hemiandra gardneri* occur on Nature Reserves.

10.2. Choosing Combinations Of Attributes

You can enter **Query Mode** at most points in the **Threatened Flora** system, and you can ask to find FRF's with any combination of attributes. Because this mode of operation is such a powerful tool, there are many variations in applying it and we can only specify a few of them here.

Whenever you press the [EntQry] key, a blank template of the current screen will appear and the words **Enter Query** will appear at the bottom of the screen. You can do this under Main Menu option 1 as well as under option 2. If you've been working under option 1, entering

data, and you want to locate FRF's, the program will first ask you if you want to save any changes made before it produces the blank template. Answer *(Yes)* or *(No)* accordingly.

Once the blank template is presented, the procedure is essentially the same as before. Type into the fields any characters you want. If you want to find populations in Toodyay Shire on Railway Reserves, type the code for Toodyay into the **Shire** field and type the code for Railways in the **Vesting** field. Then press the [ExeQry] key. The program will find all FRF's that match these criteria. You may page through the FRF's using the ↑ and ↓ arrows.

The same thing may be done under option 2. If, in the previous example (**Figure 13**), we had been interested only in *Spirogardnera rubescens* within the specified grid (as will be described below), we could type that name in the **Taxon** field after entering **Query Mode** and specifying the **Geographic Range**. The program will then find only those populations in the grid cell whose name exactly matches the specified one.

10.3. The Wild Card

Query Mode has a number of features that you must know to use it effectively. Firstly, if a field is left blank, it is ignored in the matching process. The only exception to this is if *all* fields are left blank, in which case *all* records will be retrieved from the database.

Secondly, **Query Mode** provides a wild card, the symbol %. If you type a % in a field the search will find all records with *anything* in that field. Remember, blank fields are ignored. If you type characters in a field followed by a %, the Query will find all sheets that match the characters in the specified field, followed by anything.

You can use the wild card in either Main Menu option 1 or option 2. Let's assume you have chosen option 2 and that you are interested in *Spirogardnera rubescens* populations within the grid cell specified in **Figure 12.** If, for example, you weren't too sure how to spell the name beyond the first few characters, you could enter *Spiro%* in the **Taxon** field (**Figure 14**).

```
DRF                    Threatened Flora Data Management System          22-JUL-94
                           Select Species By Lat/Long Range

                            Latitude   Longitude       Latitude   Longitude
Geographic Range : From  30° '  "  115° '  "  to  30°30'  "  115°45'  "

Current    Conservation Code      CALM District      Shire

Sheet TaxonID                Name                  ms Pop No  Latitude  Longitude
              Spiro%                                              °  '  "    °  '  "




LLRange Switch between upper and lower screen   NxtPag Next Page
Enter a query;  press KP-, to execute, PF4 to cancel.
Count: *0                          ENTER QUERY                          <Replace>
```

Figure 14. Retrieving species within a geographic range using a wild card

Upon executing the query, the program will find all FRF's that have the letters *Spiro* in the first five columns of the **Taxon** field, ignoring all other characteristics of that or any other field (it ignores the others because they were left blank) but within the specified geographic range. In this case, it found five records (**Figure 15**).

```
DRF                    Threatened Flora Data Management System          22-JUL-94
                          Select Species By Lat/Long Range

                          Latitude   Longitude       Latitude   Longitude
Geographic Range : From   30°  '  "  115°  '  "  to  30°30'  "  115°45'  "

Current    Conservation Code      CALM District      Shire

Sheet TaxonID              Name                          ms Pop No  Latitude  Longitude
 3890 2360    Spirogardnera rubescens                      2 A   30° 7'27"  115°29'41"
   79 2360    Spirogardnera rubescens                      2 A   30  7 27   115 29 41
 3893 2360    Spirogardnera rubescens                      2 B   30  6 42   115 30 15
   80 2360    Spirogardnera rubescens                      2 B   30  6 42   115 30 15
 3891 2360    Spirogardnera rubescens                      4 A   30 12 13   115 33 22
   77 2360    Spirogardnera rubescens                      4 A   30 12 13   115 33 22
   78 2360    Spirogardnera rubescens                      4 A   30 12 13   115 33 22
 3892 2360    Spirogardnera rubescens                      4 B   30 12 13   115 33 22
   76 2360    Spirogardnera rubescens                      4 C   30 12 14   115 32 45
 3898 2360    Spirogardnera rubescens                      5     30 12 37   115 36 45
 3897 2360    Spirogardnera rubescens                      6     30 22 12   115 28 12

LLRange Switch between upper and lower screen   NxtPag Next Page

Count: 11          v                                                  <Replace>
```

Figure 15. Species returned from wild card query

10.4. Counting Records Satisfying A Query

You can always find out how many records will be returned by a query without actually performing the query. To do this proceed to set up the query as outlined above. Before pressing [ExeQry] press [CntQry] instead. The count is given at the bottom of the screen, next to the label **Count:**.

10.5. Searching Validation Lists

You can use **Query Mode** on validation lists, as well. It's useful mainly for working through the species list, or for finding out if your name is in the list of observers. For example, assume you have chosen Main Menu option 1. The cursor is in the **Surveyed by** field. The FRF you are entering was completed by Andrew Brown but you don't know his observer code. Press the [ListVal] key and the list of observers currently in the computer's memory will be displayed. Instead of paging through the entire list looking for the name, press the [EntQry] key. A blank template of the list will appear. Type *%Brown* in the **Name** column and the computer will show all those names in the list ending with Brown. Move the cursor to the line for Andrew Brown, press the [Exit] key and you will return to the screen you were entering data on. Andrew Brown's code will be written in the appropriate place in the **Surveyed by** field.

As the above example shows, the wild card may be used before or after letters or a number, or between letters or numbers in any field. You may select a new template with the ↓ arrow while you are in **Query Mode**.

An alternative to the wild card is to use algebraic operators to specify a range of characters or numbers to be matched within a given field. Any of the operators <, >, <= or >= are valid in any of the fields of Main Menu options 1 or 2.

For example, if you put *>100* in the **Sheet** field of Option 1 while in **Query Mode**, the search will provide you with all FRF's with sheet numbers greater than 100.

If you enter the expression *#is null* into any field only records where that field is empty will be returned.

You can specify more complex expressions and change the order in which records are returned. When in **Query Mode** enter a colon (:) in any field not already used to restrict the query. The colon acts as a placeholder. The first field with a colon in it is referred to as :1, the second as :2 and so on, the order being determined by the order of fields the cursor goes through as you press [NxtFld]. When [ExeQry] is pressed ORACLE will prompt with **Query Where?**. e.g. you could enter

where :1 > 35 ↵ (assuming the field you entered *:* in was numeric)

or *where :1 > 35 order by :2* ↵

Query Mode has a few limitations. One is that you can't go and look at validation lists while it is in operation. Another is that not all queries will work and not all fields will respond with the same facilities. There are far too many variations to list and we probably haven't discovered them all, anyway. For each user, it will be a matter of trial and error to discover what will work and when.

11. Leaving The Threatened Flora System

When you are finished entering data or querying the data base, return to the Main Menu and select option Q. You will leave the Database Management Program and return to the VAX environment. Next to the prompt

SELDON >

type

logout (or *lo* for short)

You should then return you to the DOS environment by pressing your emulation program's exit key (if required).

12. Printing

If you are using a PC the easiest way to produce hard copy is to use the print screen facility on your keyboard. This dumps the information on your screen to a printer. For more neater summaries you

will need to produce a report. You can produce reports in either Option 1 or 2. This is done in two steps.

First, execute a query. Those query results can then be printed to the screen, a printer or a file by pressing the [Print] key.

Note: The physical key to press in VT100 mode is *Ctrl P*. If you're accessing the VAX through CALM's wretched CS150 or CS200 multiplexers this will close your connection. Disaster! As an alternative to the [Print] key you can select the same function via a special menu. First press [Menu], then select **Action**, then arrow down to **Print Screen** and press ↵.

When the [Print] key has been pressed (or selected via a menu) the window in Figure 16 appears.

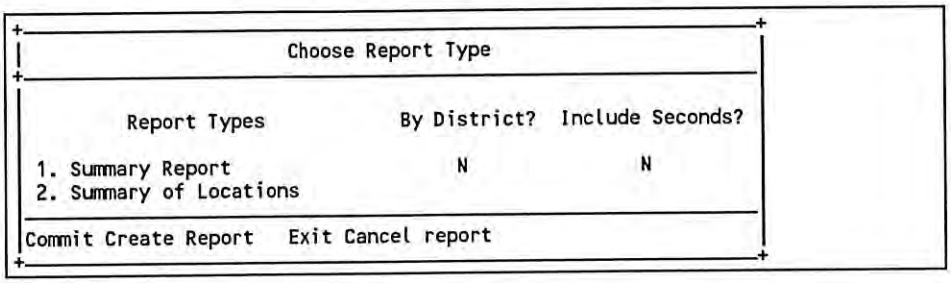


Figure 16. Report Selection MenuFigure 16. Report Selection Menu"

The system currently supports two types of reports: 1) **Summary Report**, which is a basic report with a pre-defined selection of fields reported on and 2) **Summary of Locations**, which is designed to replicate the Summary of Locations page currently at the beginning of every species file. Both reports say the same information but in different ways.

To select a report type use the ↑ or ↓ keys. Optionally you may choose to exclude seconds of location from being printed or grouping the report by CALM district. To do this press [NxtFld] and enter **Y** or **N** in the appropriate field. When you are ready to generate the report press [Commit] (the same key as [Save Changes]). The screen in Figure 17 appears.

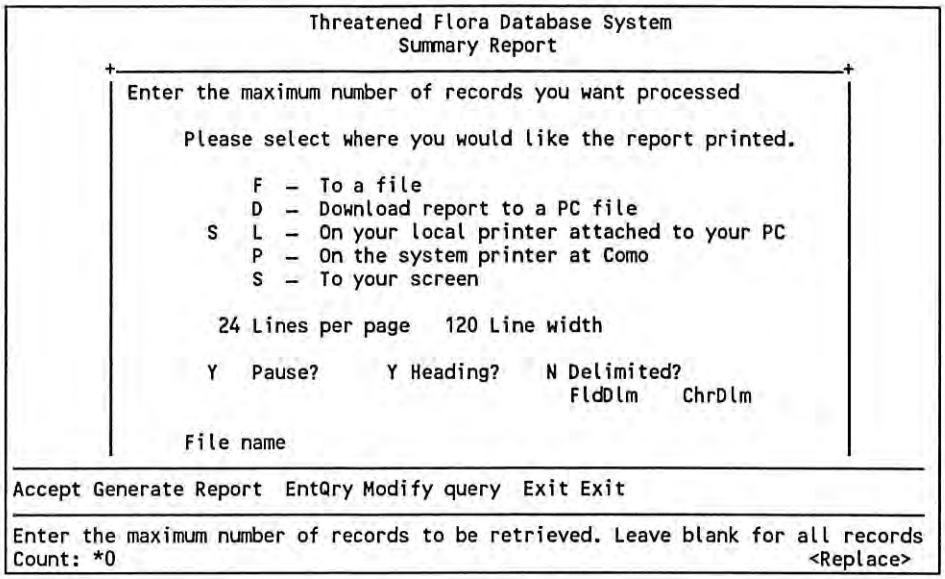


Figure 17. Report Destination Screen Figure 17. Report Destination Screen"

The report can be sent to a number of destinations.

Selecting "F" will save the report in a VAX ASCII file.

Selecting "D" is designed to facilitate saving the report to a local file on your PC. You can then incorporate this ASCII in to a word processor and format it in landscape or whatever. To use this option you must know how to initiate capture of screen output by your PC emulation program. Follow the prompts for when to turn the capture on and off.

Selecting "L" will send the report to any local printer you have attached to your PC on LPT1. If this printer has front panel controls for font size and orientation (like an HP DeskJet) then you can produce reports very easily with a minimum of intervention.

Selecting "P" will send the report to the system printer at ISB (if it's running).

Selecting "S" will send the report to the screen. This will not appear very readable as the reports are greater than 80 characters wide.

Once you have selected a destination press [Accept] (same key as [Commit]).

12.1. Summary Report

The Summary Report comes in two flavours: with or without seconds of geographical location included in the listing and with the option of grouping the records by CALM district. A sample of this report, grouped by CALM district is shown below.

```
22-JUL-94          Summary of Threatened Flora Data Grouped by CALM District          Page   1

Taxon Name                                Cons.  Pop ID  Latitude   Longitude   Purpose  Vesting
----------                                -----  ------  --------   ---------   -------  -------

CALM District: Geraldton
-----------------------
Diuris recurva                              T      1      28^08'     114^22'     VER      SHI
Diuris recurva                              T      1      28^08'     114^22'     VER      SHI
Diuris recurva                              T      2      28^18'     114^29'     VER      SHI
```

Diuris recurva	T	2	28^18'	114^29'	VER	SHI
Diuris recurva	T	2	28^18'	114^29'	VER	SHI
Diuris recurva	T	3	28^11'	114^21'	VER	SHI
Diuris recurva	T	3	28^11'	114^21'	VER	SHI
Diuris recurva	T	6	28^15'	114^28'	VER	SHI
Diuris recurva	T	6	28^15'	114^28'	VER	SHI
Diuris recurva	T	7	28^14'	114^29'		
Diuris recurva	T	8A	28^10'	114^39'	WAT	WAT
Diuris recurva	T	8B	28^10'	114^38'	VER	SHI
CALM District: Harvey						
Diuris purdiei	T	12	33^00'	115^46'		PRI
Diuris purdiei	T	14	32^55'	115^47'		PRI
CALM District: Moora						
Diuris recurva	T	4	30^04'	115^31'		PRI
Diuris recurva	T	5	30^39'	116^00'		SHI
Diuris recurva	T	5	30^39'	116^00'		SHI
Diuris recurva	T	5	30^39'	116^00'		SHI
Diuris recurva	T	9	30^15'	116^02'	VER	

12.2. Summary of Locations

The Summary of Locations can be printed with or without seconds of geographical location included in the listing but cannot be grouped by CALM district. A sample of this report using the same records as above is shown below.

22-JUL-94 Threatened Flora Species Summary Page 1

Species: Diuris drummondii File No. _____

Common Name: _____ Flowering Period: _____

Photos: _____ Description: _____ Line Drawing: _____

Pop ID	District	Location	Vesting	Purpose	No. Plants	Last Inspect	Notification	Notify Date	Folio RFRF	Folio Map
1A	Manjimup	4.5km E of Red Lake Rd on Muirs Hwy. N of road on Lake Muir N.Res.	NPN	WAT	21	15-DEC-88	Shire of Manjimup.	21-OCT-87		
1A	Manjimup	4.5km E of Red Lake Rd on Muirs Hwy. N of road on Lake Muir N.Res.	NPN	WAT	500	14-DEC-84	Shire of Manjimup.	21-OCT-87		
1B	Manjimup	4.5km E of Red Lake Rd on Muirs Hwy. N & S road res.	MRD	VER	110	20-DEC-89	MRD	20-JUN-89		
1B	Manjimup	4.5km E of Red Lake Rd on Muirs Hwy. N & S road res.	MRD	VER	29	15-DEC-88	MRD	20-JUN-89		
2	Manjimup	ca. 1.7km S of Pindicup Rd on Buranganup Rd. W, on Talling State Forest (No 38). Opposite Kodjinup N.Res.	LFC	FOR	0	10-DEC-90				
6	Dwellingup	Land on SE cnr of jnc of Wilson Rd & the Pinjarra to Mandurah Rd. Res 12081.	NON	OTH	75	15-NOV-89				
7	Manjimup	Lake Muir Nature Res. 850m W of internal firebreak on N boundary of Loc 1394. N of boundary firebreak.	NPN	WAT	1	23-DEC-91				

22-JUL-94 Threatened Flora Species Summary Page 2

Species: Diuris micrantha File No. _____

Common Name: _____ Flowering Period: _____

Photos: _____ Description: _____ Line Drawing: _____

Pop ID	District	Location	Vesting	Purpose	No. Plants	Last Inspect	Notification	Notify Date	Folio RFRF	Folio Map
1A	Perth	530m S of Orton Rd on Johnson Rd, W side. Between road and drain on Lot 1205.	DOL	VCL	500	08-DEC-92	WAWA, Shire of Kwinana, DOLA	16-MAR-89		
1A		530m S of Orton Rd on Johnson Rd, W side			750	29-SEP-89				
1B	Perth	ca 600m S of Orton Rd on Johnson Rd, W side. On W side of drain on Lot 1201.	HOW		0	08-DEC-92				
2A	Collie	Bowelling-Duranilling Rd. 3.1km ESE of Coalfields(Collie-Darkan) Rd. 700m W of railway crossing. N & S road res.	SHI	VER	50	11-OCT-92	WAWA, DOLA, Shire of West Arthur	06-NOV-92		
2B	Collie	Bowelling-Duranilling Rd. 3.1km ESE of Coalfields(Collie-Darkan) Rd. 700m W of railway crossing. Both sides of road.	NON	WAT	50	11-OCT-92	WAWA, DOLA	06-NOV-92		
3	Dwellingup	Culeenup Island, Yunderup.	SHI	REC	20	24-NOV-92	Shire of Murray	13-NOV-92		
4	Manjimup	530m S of Wingebellup Rd on edge of track along W bdy of Res 35307. On edge of swamp that extends into cleared WAWA land.	NON	GVT	1	03-NOV-92	DOLA	16-FEB-93		

13. Appendices

13.1. Appendix 1 - Keyboard functions for an IBM compatible PC.

VT100 Emulation

ORACLE Function	Description	VT100 key	TelNet key
[EntQry]	Enter query	*kp6	kp6
[ExeQry]	Execute query	kp+	kp-
[Save Changes], [Commit] or [Accept]	Save changes	PF3	F3
[Exit]	Exit to previous level	PF4	F4
[Insert/Replace]	Toggle insert/replace mode	Ctrl A	Ctrl A
[Range]	Set geographic range, option 2	kp9	kp9
[Update Population]	Update population, option 1	kp5	kp5
[Shire Boundaries]	Display shire boundaries	kp-	kp*
[Display Species Name]	Display full species name, option 1	kp9	kp9
[CreRec]	Create record, option 1	kp2	kp2
[DelRec]	Delete record, option 1	kp3	kp3
[NxtFld]	Advance to next field	↵ or Tab	↵ or Tab
[PrvFld]	Move to previous field	PF1 ↵ or PF1 Tab	F1 ↵ or F1 Tab
[ClrFld]	Clear current field	kp4	kp4
[Clear Form]	Clear form	PF1 kp4	F1 kp4
[Up]	Previous sheet/record	↑	↑
[Down]	Next sheet/record	↓	↓
[Page Up]	Previous page, opt. 1	PF1 ↑	F1 ↑
[Page Down]	Next page, opt. 1	PF1 ↓	F1 ↓
[CntQry]	Count sheets found in query	PF1 PF3	F1 F3
[DupRec]	Duplicate Record		
[Menu]	Display special menu	kp0	kp0
[Print]	Produce report	Ctrl P	Ctrl P
[ListVal]	Show list of legal values	kp.	kp.
[List Keys]	Show function keys	Ctrl K	Ctrl K

VT220 Emulation

ORACLE Function	Description	VT220 key	TelNet Key
[EntQry]	Enter query	F11	Ctrl-Alt-F1
[ExeQry]	Execute query	F12	Ctrl-Alt-F2
[Save Changes], [Commit] or [Accept]	Save changes	Do	Ctrl-Alt-F6
[Exit]	Exit to previous level	PF4	F4
[Insert/Replace]	Toggle insert/replace mode	Ctrl A	Ctrl A
[Range]	Set geographic range, option 2	PrevScreen	End
[Update Population]	Update population, option 1	F18	Ctrl-Alt-F8
[Shire Boundaries]	Display shire boundaries	NextScreen	PgDn
[Display Species Name]	Display full species name, option 1	PrevScreen	End
[CreRec]	Create record, option 1	Insert	Home
[DelRec]	Delete record, option 1	Remove	PgUp
[NxtFld]	Advance to next field	Tab	Tab
[PrvFld]	Move to previous field	PF1 Tab	PF1 Tab
[ClrFld]	Clear current field	F17	Ctrl-Alt-F7
[Clear Form]	Clear form	F19	Ctrl-Alt-F9
[Up]	Previous sheet/record	↑	↑
[Down]	Next sheet/record	↓	↓
[Page Up]	Previous page, opt. 1	PF1 ↑	PF1 ↑
[Page Down]	Next page, opt. 1	PF1 ↓	PF1 ↓
[CntQry]	Count sheets found in query	PF3	PF3
[Menu]	Display special menu	F14	Ctrl-Alt-F4
[DupRec]	Duplicate Record	PF1 F12	PF1 Ctrl-Alt-F2
[Print]	Produce report	Ctrl P	Ctrl P
[ListVal]	Show list of legal values	Find	Ins
[List Keys]	Show function keys	Ctrl K	Ctrl K

13.2. Appendix 2 - Threatened Flora System Cheat Sheet (VT100)

Getting in : TN ↵, Username ↵, Password ↵, DEFL ↵, ↵, Username ↵, Password ↵

Getting out : F4 (repeat until at main menu), Q, logout ↵

Option 1 - Data Entry

Enter Query kp 6
Fill in fields
e.g. enter sheet no. for particular sheet or taxon name for particular taxon
enter SPIRO% for all names starting with SPIRO

Execute Query kp,

Option 2 - Taxa In A Lat/Long Grid

Species In A Grid Enter grid coordinates
kp,

Threatened Species kp9 until in upper block
Press ↵ until in **Conservation Status** field
Enter *T* then kp,

General Query As for option 1

General Information

Ctrl k List Keys
PF1 ↑ Previous page in data entry screen
PF1 ↓ Next " " " " "
↓ Next record
↑ Previous record

Record count incomplete until * appears on bottom line.
"Print Screen" button to print screen