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Storage And Manipulation Of The Land Systems Of Western New South Wales:

A Relational Database For Polygonal Data

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A report arising from the
Murray - Darling Basin Commission
funded Soil Information Strategy
(Project No. D5038)
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Purpose

This report is describes a polygonal database for the Land Systems of Western New South Wales (LSWNSW). The current data holdings are also reported.
We have used the Microsoft Access database software (V.2). A detailed knowledge of MS Access is not essential, however some general database knowledge is an advantage.
The database has been structured in a hierarchical manner. The broader data are at the highest level of the structure and as progression is made through the levels more specific data becomes available.

This should increase the use and ease of use of the LSWNSW.

With any data acquisition project of this magnitude, we realise that errors may have been made. If during your use of the database you encounter any such errors, please contact Dermot McKane before the 31st of March 1998.
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The Murray- Darling Basin Soil Information Strategy Project

The Murray - Darling Basin (MDB) has an area of 1 058 000 km^2 (14% of the Australian continent) and contains 42% of Australian farms, 50% of the country's sheep, 50% of its cropping, 75% of all irrigation and 25% of the nation's cattle (Anon. 1996). Until now, the only basin-wide coverage of soils has been the Atlas of Australian Soils (Northcote 1968) which, at a scale of 1:2,000,000, provides only a broad overview of the MDB's soil resources.

Each of the states in the MDB, New South Wales, Queensland, South Australia and Victoria, has undertaken soil survey mapping in various forms for many years. CSIRO, mainly the former Division of Soils, has also undertaken numerous detailed surveys in areas of the basin. The states have used different methods and formats for their reports. However many have their hallmarks and origins in the work of Christian and Stewart (1953) and in Rowan and Downes (1963). Many of the detailed irrigation area surveys have built on the work of Taylor and England (1929). The data collection and publication of this early work (from the early 1930s to the present) was undertaken at different scales using different methodologies, but for broadly similar purposes -- the improvement of knowledge about soils and their responses to various management techniques in different locations.

The Murray-Darling Basin Soil Information Strategy (MDBSIS) project is designed to provide a reconnaissance scale overview of soil resources within the MDB. One of the project's specific objectives is to collate all available information within a consistent framework, in a common Geographical Information System (GIS) and database format. More detailed information about the MDBSIS project is available on the World Wide Web at http://www.cbr.clw.csiro.au/research/mdb/mdb.htm.

This Murray-Darling Basin Commission (MDBC)-funded project, will greatly assisst in the consolidation and compilation of the polygonal data that exists for the basin. The MDBSIS project is funded by the MDBC. CSIRO Land and Water (formerly CSIRO Division of Soils)

is the lead/managing agency and collaborating agencies are the Australian Geological Survey Organisation (AGSO) and the Natural Resources Information Centre (NRIC), as well as the relevant state conservation or agricultural agencies. The amount, condition, and format of the data provided by the states ranged from hard copy printed maps and reports, to original line tracings, to fully digitised and attributed polygons stored in accessible digital format. The project has used the ARC/INFO GIS as its standard storage and manipulation tool of digital line work and coverages. This is available in CSIRO Land and Water, AGSO, NRIC and is the dominant GIS used in all environment and agricultural departments in all states except NSW where Genamap is used. Although it was known that significant data sets existed within the basin, this was the first project to attempt to bring them all together in a uniform coherent format.

The project has separated the compilation of polygonal data from the point data. To facilitate the storage and manipulation of the large amount of polygonal data that exists within the MDB, an extensive database is required. The database needs to permit storage, integration and manipulation of polygonal data at various scales.

We have defined polygonal data as the data which describes the mapping unit. What we have is snap shot data that describes the unit: its area, landform, soil, geology and vegetation types.

LAND SYSTEMS OF WESTERN NEW SOUTH WALES (LSWNSW)

The Western Division of NSW is bounded by the borders of Victoria, South Australia, and Queensland; the Lachlan River from Balranald to almost Condobolin then almost due north to the Barwon River east of Brewarrina. It then follows the Barwon River upstream to the Queensland border (Figure 1).

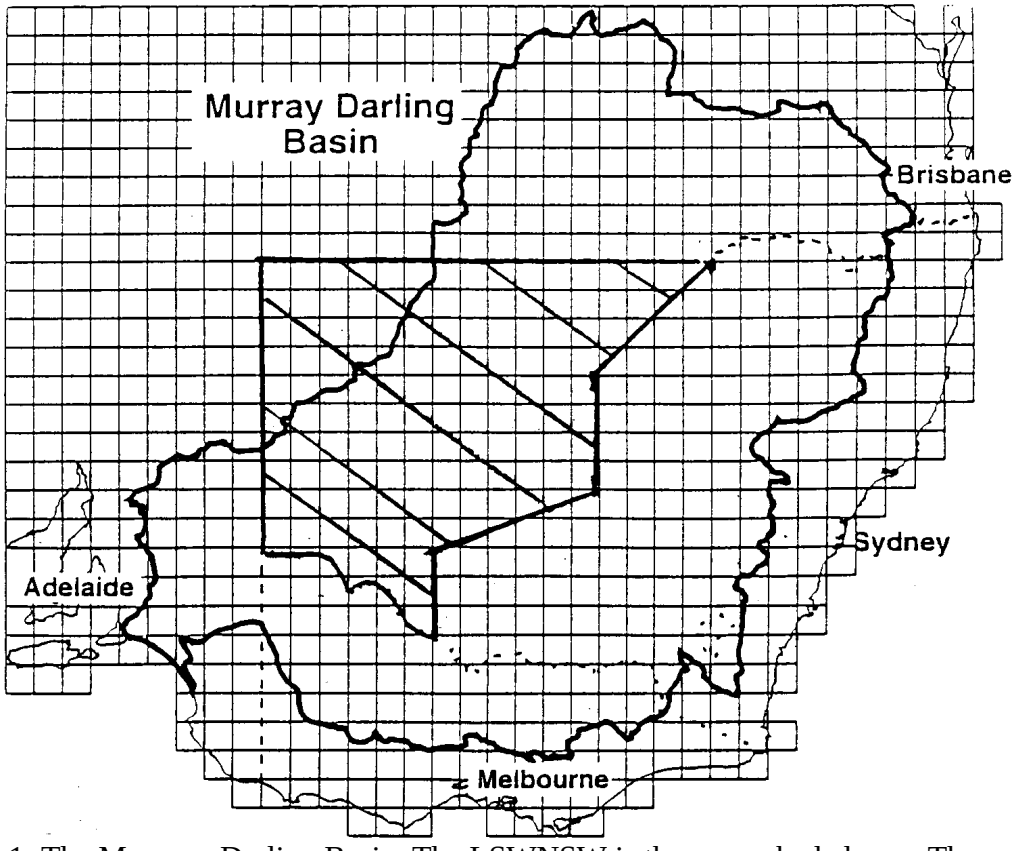


Figure 1: The Murray - Darling Basin. The LSWNSW is the cross shaded area. The underlying grid is the 1:100,000 map sheets.

The LSWNSW was a large mapping exercise which was conducted over eleven years. Although the 1:250,000 maps were published when they were completed (24 maps between 1979 and 1990), it was not until 1991 that descriptions of the land systems were compiled in a single, comprehensive report (Walker 1991). The time, resources and finances invested were significant and the data collected include landform, geology, soil and vegetation types. LSWNSW continues to be used extensively in all areas of the Western Division in many varied ways. As is typical with much natural resource data, the LSWNSW have been used in ways which were not envisaged when the data were first collected. The tying of land system data to dryland cropping capability and likelihood of occurrence of aboriginal artefacts are just two of the many uses (R Anderson pers. comm.). But like many natural resource data sets, its use has been somewhat restricted by the nature of its hard copy form.

The LSWNSW contains 251 fully described land systems. Of these, 222 of the units occur in the MDB. All of the polygonal data in Walker (1991) for these 222 units in the MDB were entered into the Access database. There is provision for the remaining 29 land systems (those outside the basin) to be entered by DLWC.

The digital linework of the LSWNSW is held at DLWC's GIS unit in Genamap format (the department's main GIS package). Polygon identification and land management factors taken from the land unit descriptions of the land systems are stored in an ARC/INFO Polygon Attribute Table at CSIRO Land and Water in Canberra.

Database Packages

Two database packages have been used in MDBSIS: Microsoft ACCESS is the PC database used and ORACLE links the database to the digital coverages to permit the spatial application of the data.
The structure of the ACCESS database has been mirrored in ORACLE.
ORACLE was used as the mainframe database storage because of its capacity to interface with ARC/INFO. Computer mainframe storage and access is essential to enable interaction with ARC/INFO, use of NRIC's ASSESS (A System for SElecting Sites for a Suitable land use) interpretation package and for the ongoing maintenance of the total data set.
Microsoft ACCESS has been used for data entry of the state data and for returning data back to regions within the States. This was done as the States already have Microsoft ACCESS and because no knowledge of Structured Query Language (SQL) is required to query the database for information. Ease of query of the database is essential if the data, once compiled, are going to be of increased use, accessibility, and benefit. This is not an endorsement of ACCESS but rather a recognition of its widespread use.

The database has been designed so that polygonal data can be entered, retrieved and interrogated.

The Database Layout

There are 32 data entry tables (List 1). Their hierarchy is shown in Figure 2. These tables are designed to embrace all forms of polygonal data available for the MDB. There are also 97 look up tables (LUT) in the database. These enable data to be stored in a coded form and uncoded

in report format or appear as combo boxes in forms. When activated, combo boxes display the full list of choices for that data entry field.

Data were entered exactly as present in the report except for the landform descriptions which were converted to the now standard terminology contained in the Australian Soil and Land Survey Field Handbook (referred to from here on as the "Yellow Book") (McDonald et al. 1990). Data have been entered in specifically designed forms which attempt to mirror the published text thus making them easier to follow and understand. The broad land system data are at the highest level (Fig. 3).

Figure 3 shows the layer relationship and hierarchy of the database. The layer at which various tables relate are shown. The shaded tables are those which have data from the LSWNSW. The Soil Strata layer is individual horizon data from soil profiles. No data have been entered at this level. The pc-Sites package will be used for this level of data (Kidston and McDonald 1997).

Appendix 1 contains the structure of each table.

List 1: The data tables that make up the polygonal database.

TABLE	**TABLE**	**TABLE**
ASSOCIATED_SYS	LAND_CAPABILITIES	SEGREGATION
COARSE_FRAGS	LAND MANAGEMENT	SOIL
COLOURS	LAND_SUITABILITIES	SOIL_STRATA
DEGRADATIONS	LAND_USES	STRENGTHS
DISTURBANCES	MAP_SHEETS	STRUCTURES
ELEM_GEOMORPHS	MICRORELIEFS	SURFACE_WATERS
FABRICS	MOTTLES	SYSTEMS
FACETS	PATT_GEOMORPHS	TEXTURES
GEOLOGIES	PHS	VEG_SPECIES
GROUNDWATERS	POINT_OBSERVATIONS	VEG_STRATA
HAZARDS	ROCK_OUTCROPS	

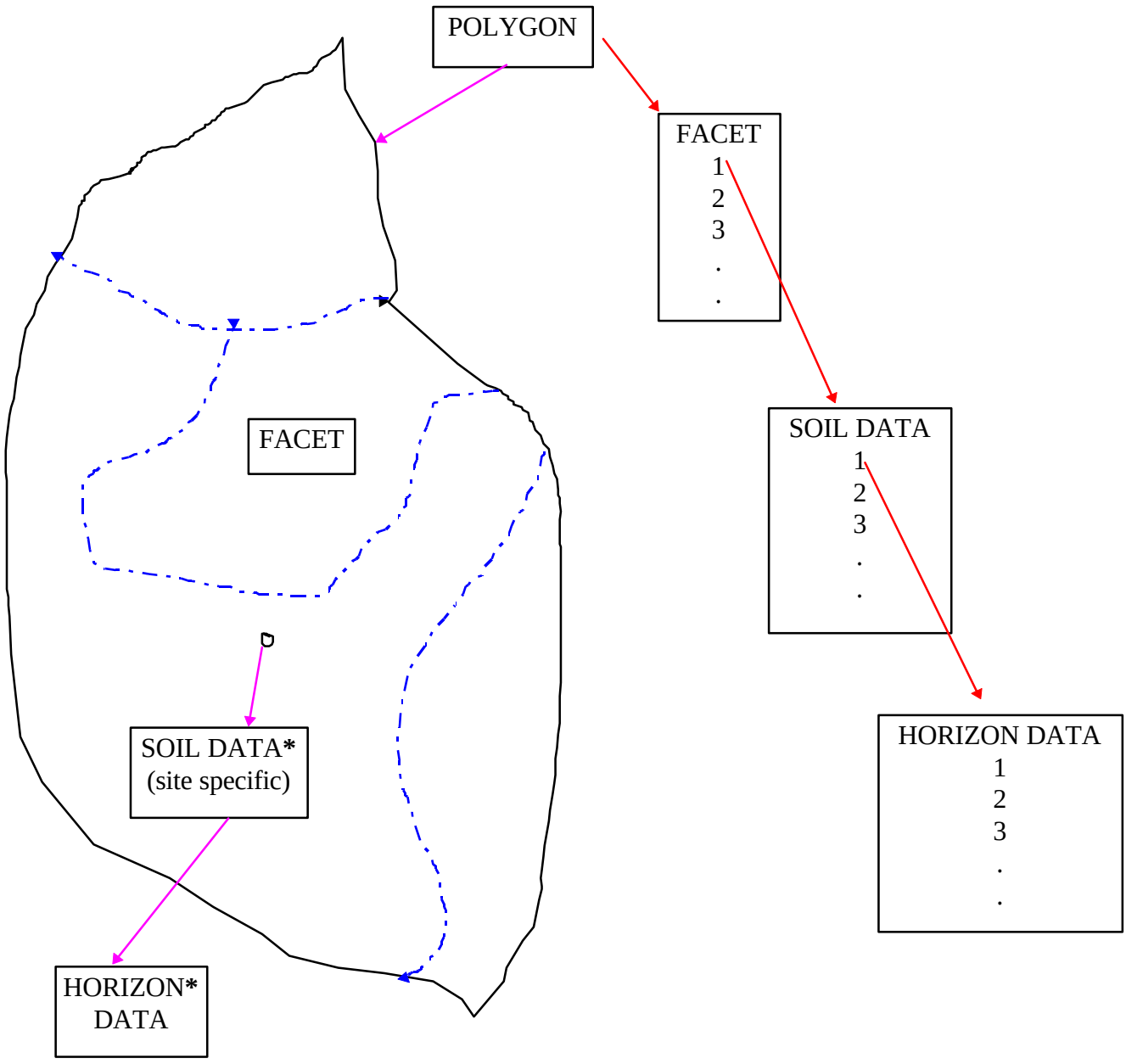


Figure 2: Visual Interpretation Of The Data Layers

- No data at this level has been entered into the database. PC-Sites can be used for this purpose.

The LSWNSW report has data which are relevant to nine (9) of the 32 tables (Table 2).

Table 2: The 9 data tables that contain LSWNSW data

TABLE	CONTENTS
Systems	Land System data: eg Name, Abbreviation, Size
Map_Sheets	Scale and map sheets where the land system occurs
Geologies	Geology and/or geomorphology of the unit
Land management	Land management concerns for the land system
Facets	Data described for each unit, but not delineated in the maps
Degradations	Type(s) of degradation recorded in the land system and its severity
Soils	Soil classifications and soil specific notes
Veg_Species	Vegetation species and abundance comments
Veg_Strata	Vegetation growth form descriptions

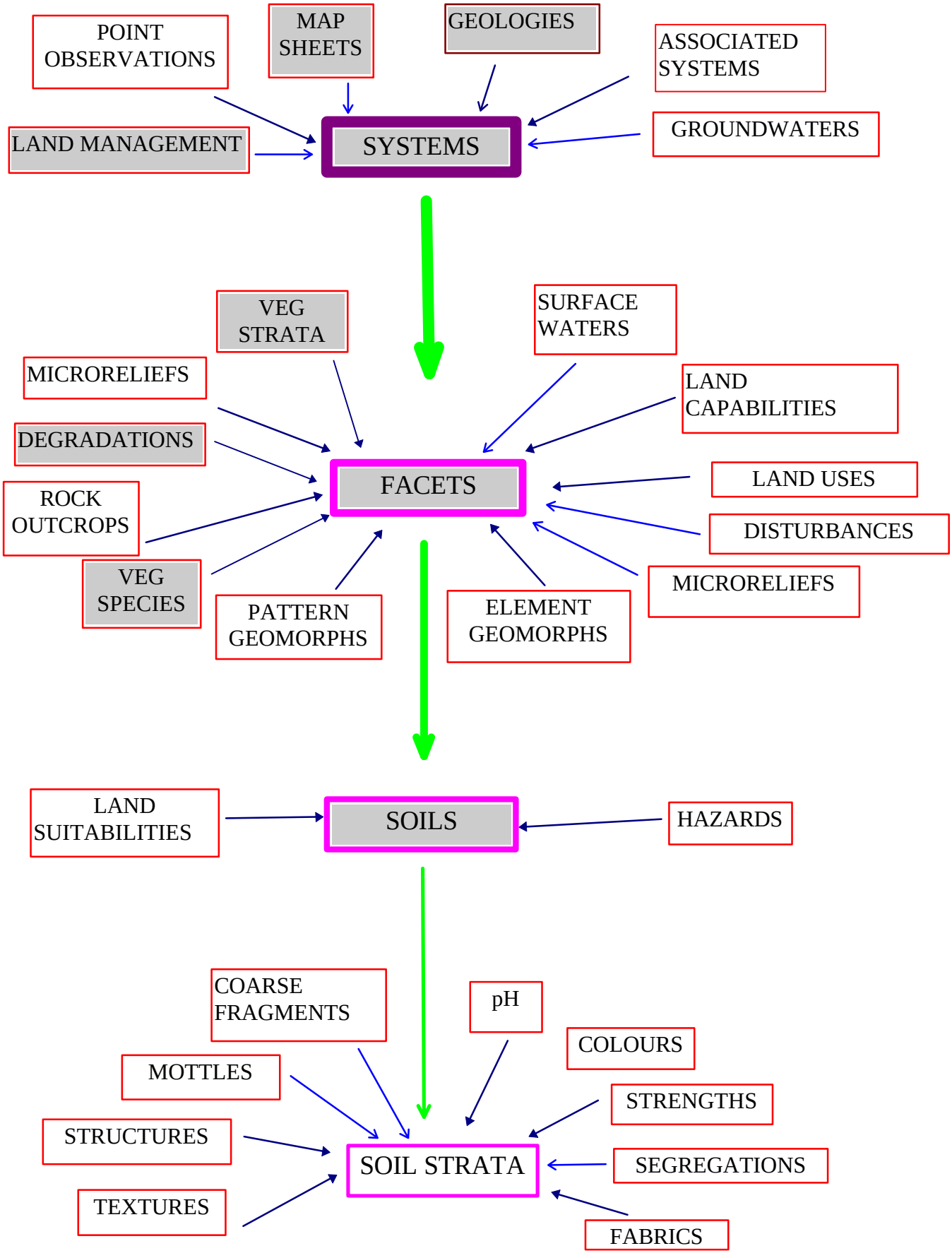


Figure 3: The Layer Relationships

PC Installation Information

The database has been designed and created in Microsoft Access v. 2.0.

The storage requirement for LSWNSW is 2.9 Mbytes.

The database is supplied in a "zipped" format on 1 diskette. The diskette contains both the database and the winzip program to "unzip" the file.

1. Insert the diskette into drive A:.
2. Activate the file manager.
3. Select the A: drive.
4. Double click on the .EXE file. (If using WINDOWS 95, the .EXE extesion will be replaced by an icon). This starts the winzip application.
5. Insert the name of the directory where the file is to be stored (ie. replace TEMP with the directory of your choice)
6. Once unzipped, close the winzip application
7. Go to the directory where you placed the file
8. Double click on the file name.
9. You are ready to commence using the database.

NB: This assumes that Microsoft ACCESS is already installed.

DESCRIPTION OF THE TABLES AND THEIR CONTENTS

All codes, rating systems and Land System abbreviations are defined in Walker (1991).

Not all fields in each table will contain data. This is because the tables have been designed to cater for all forms of land resource survey data, not just the LSWNSW report.

DEGRADATIONS

Field Name
PS_ID
F_ID
DEG_TYPE
DEG_STATE
DEG_DEGREE
DEG_PROPORTION

NB: Only the fields which contain data are described

PS_ID This is a unique identifier for each land system. In the case of LSWNSW this takes the format of NWCu1. The N identifies the polygon as being from NSW, the W as from LSWNSW, the Cu as the Curranyalpa land system and the 1 as a unique identifier within the LSWNSW.

F_ID This is a unique identifier for each facet in each land system. There can be any number of facets (usually between 2 and 7). The F_ID for Curranyalpa land system are 1Cu, 2Cu, 3Cu, 4Cu, 5Cu.

DEG-TYPE The type of degradation as listed in each facet description in the text.

DEG-DEGREE Rated 1 - 5 with increasing severity, 6 is used for the term negligible.

FACETS

Field Name
PS_ID
F_ID
F_PROP
F_TYPE
F_PERCENTAGE

NB: All fields contain data

PS_ID Refer to the degradation's explanation.

F_ID Refer to the degradation's explanation.

F_PROP The proportion of the land system occupied by each facet.

F-TYPE The facet type, in this case land unit.

F-PERCENTAGE The percentage of a land system that each facet occupies. This is a numerical representation of the F_PROP field

GEOLOGIES

Field Name
PS_ID
GEOL_SUMM
GEOL_UNIT
GEOL_LITH
GEOL_REGOLITH
GEOL_WEATH

NB: Only the fields which contain data are described

PS_ID Refer to the degradation's explanation.

GEOL_SUMM The general description of the geology and geomorphology contained within Walker (1991).

GEOL_LITH The lithology that is listed in Walker (1991).

LAND MANAGEMENT

Field Name
PS_ID
L_MGMT_CONSID

NB: All fields contain data

PS_ID Refer to the degradation's explanation.

L_MGMT_CONSID Land Management Considerations refer mainly to pastoral management as listed in the report

MAP SHEETS

Field Name
PS_ID
MS_ID
MS_NAME

NB: All fields contain data

PS_ID Refer to the degradation's explanation.

MS_ID The AUSLIG map code for each map sheet.

MS_NAME The official AUSLIG name for each map sheet.

SOILS

Field Name	Field Name	Field Name
PS_ID	SOIL_STRM_CH_DEV	SOIL_SB_LITH
F_ID	SOIL_STRM_CH_DTOW	SOIL_PPF
SOIL_ID	SOIL_STRM_CH_MIG	SOIL_GSG
SOIL_NAME	SOIL_STRM_CH_PATT	SOIL_SOIL_TAXONOMY
SOIL_SUMM	SOIL_STRM_CH_NET_INT	SOIL_ASC_CONF
SOIL_PROPORTION	SOIL_STRM_CH_DIR_NET	SOIL_ASC_ORD
SOIL_SLOPE	SOIL_PATT_TYPE	SOIL_ASC_SUBORD
SOIL_SLOPE_CLASS	SOIL_ELEVATION	SOIL_ASC_GSG
SOIL_MORPH_TYPE	SOIL_ASPECT	SOIL_ASC_SUBG
SOIL_ELEM_INC_SLOPE	SOIL_DRAINAGE	SOIL_ASC_FAM1
SOIL_ELEM_LENGTH	SOIL_INUND_FREQ	SOIL_ASC_FAM2
SOIL_ELEM_WIDTH	SOIL_INUND_DUR	SOIL_ASC_FAM3
SOIL_ELEM_HEIGHT	SOIL_INUND_DEPTH	SOIL_ASC_FAM4
SOIL_ELEM_TYPE	SOIL_INUND_VEL	SOIL_ASC_FAM5
S_RELIEF	SOIL_DEPTH_WATER	SOIL_ASC_NOTES
S_MODAL_SLOPE	SOIL_DEPTH_RHORIZON	SOIL_UNI_SOIL_CLASS
S_RELIEF_CLASS	SOIL_RUNOFF	SOIL_NOTES
SOIL_REL_MS_CLASS	SOIL_PERMEABILITY	
S_STRM_CH_SPACING	SOIL_SB_DEPTH	

NB: Only the fields which contain data are described

PS_ID Refer to the degradation's explanation.

F_ID Refer to the degradation's explanation.

SOIL_SLOPE The slope value expressed as a percent

SOIL_SLOPE_CLASS The Yellow Book slope class.

SOIL_ELEM_WIDTH Width of element in meters (not often given).

SOIL_ELEM_TYPE The Yellow Book landform element type.

S_MODAL_SLOPE The Yellow Book modal slope class for slope.

S_RELIEF_CLASS The Yellow Book local relief class.

SOIL_PATT_TYPE The Yellow Book landform pattern type.

SOIL_PPF The Principle Profile Form classification (Northcote 1979).

SOIL_GSG The Great Soil Group classification (Stace et al 1968).

SOIL_NOTES Additional soil notes from the text.

SYSTEMS

Field Name
PS_ID
PS_TYPE
PS_NAME
PS_ABBREV
PS_SUMM
PS_SCALE
PS_BOUNDARY
PS_SHAPE
PS_AREA
PS_CLIM_SUMM
PS_RAINFALL
PS_EVAP
PS_CLIM_ZONE

NB: Only the fields which contain data are described

PS_ID Refer to the degradation's explanation.

PS_TYPE Allocated as a default value for the entire LSWNSW units as land system.

PS_NAME The name of the land system.

PS_ABBREV The 2 letter code of each unit that appears in the text and on the maps.

PS_SUMM The general unit description which occurs in the text.

PS_SCALE Allocated as a default value for the entire LSWNSW units as 1:250,00.

PS_AREA The total area occupied by the land system, expressed as km^2

VEG SPECIES

Field Name
PS_ID
F_ID
VSTR_CODE
VSP_NO
VSP_CODE
VSP_ANBG_ID
VSP_ABUN
VSP_ABUN_DESC

NB: Only the fields which contain data are described

PS_ID Refer to the degradation's explanation.

F_ID Refer to the degradation's explanation.

VSP_NO Number assigned to each consecutively recorded vegetation species.

VSP_CODE A 5 letter code for each species, 1st 2 letters from the genus, last 3 from the species.

VSP_ABUN_DESC LSWNSW abundance description (extremely varied).

VEG STRATA

VEG_STRATA

Field Name
PS_ID
F_ID
VSTR_CODE
VSTR_GROWTH_FORM
VSTR_HEIGHT_CLASS
VSTR_COVER_CLASS
VSTR_CROWN_COVER
VSTR_GROWTH_FORM_DESC

NB: Only the fields which contain data are described

PS_ID Refer to the degradation's explanation.

F_ID Refer to the degradation's explanation.

VSTR_GROWTH_FORM_DESC This is a description of the vegetative growth forms. Not all land systems contain these data.

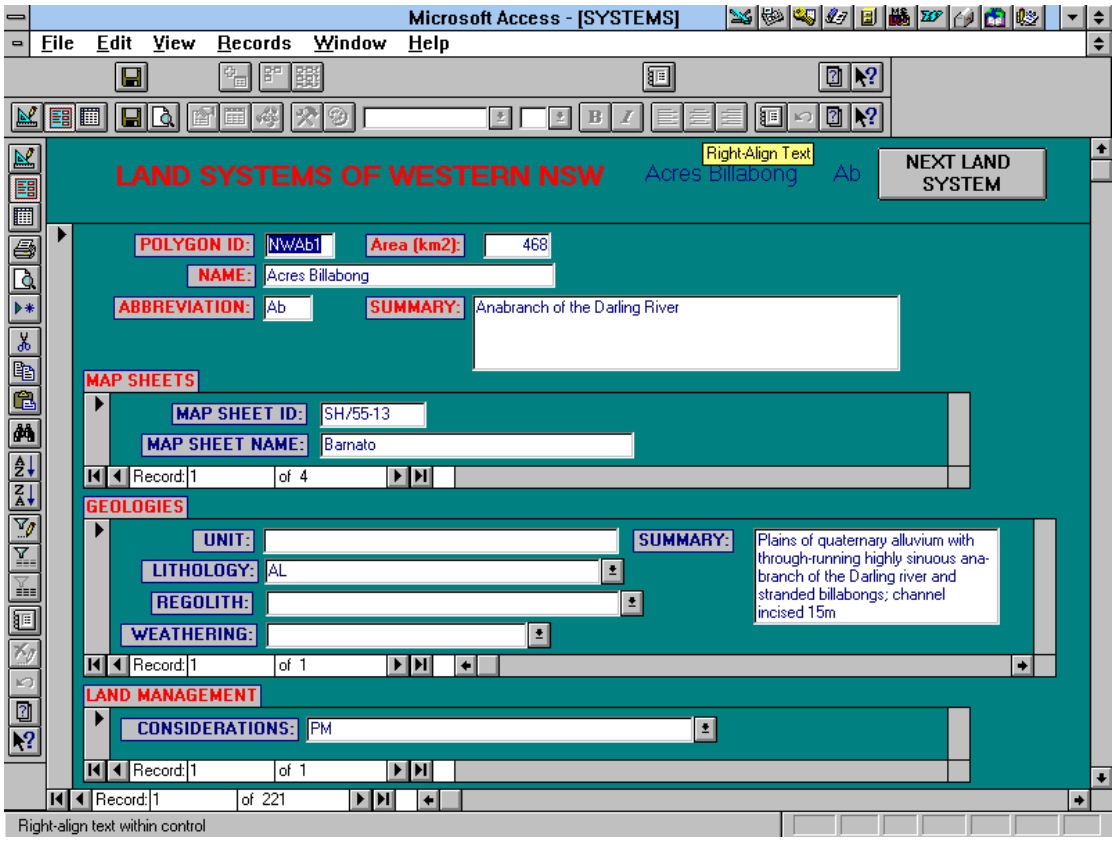
DATA ENTRY AND ENTRY FORMS

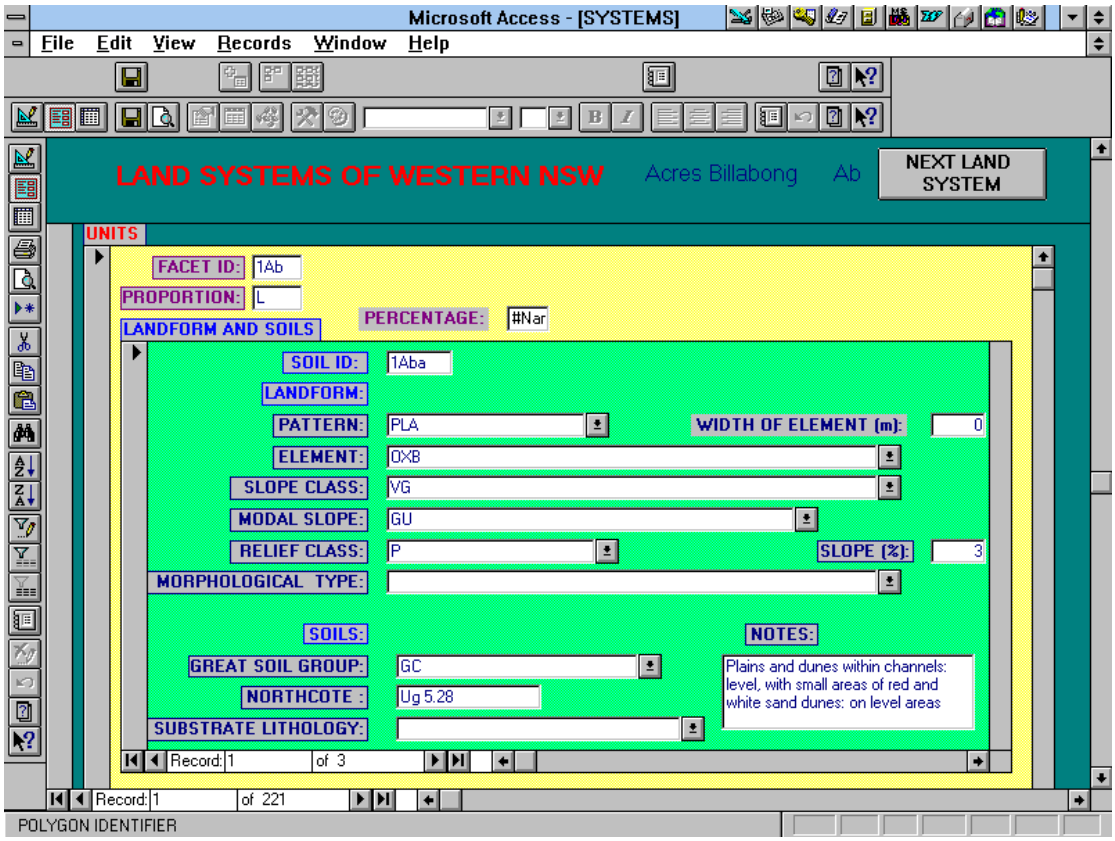
Data can be entered directly into data tables or by using specifically designed forms. Forms were used to enter the data into the LSWNSW database. This was done to enable a smoother flow of data entry compared to directly entering data into the data tables

Forms are generally based upon a data table, which is established with fields to cater for the data. These fields have allocated sizes and specific data is allocated to each field. A form uses the same field names, sizes and data types but is set out to allow a more logical order of entry than that used when entering directly into data tables. The data tables have been designed to accept information from the various reports containing polygonal data.

The data entry form was called Land Systems of Western NSW

The following is a completed data entry form for the Acres Billabong unit (Figure 4).


Microsoft Access - [SYSTEMS]
File Edit View Records Window Help
LAND SYSTEMS OF WESTERN NSW
Acres Billabong
Ab
Right-Align Text
NEXT LAND SYSTEM
POLYGON ID: NWAb1
Area (km2): 468
NAME: Acres Billabong
ABBREVIATION: Ab
SUMMARY: Anabranch of the Darling River
MAP SHEETS
MAP SHEET ID: SH/55-13
MAP SHEET NAME: Barnato
Record: 1 of 4
GEOLOGIES
UNIT:
LITHOLOGY: AL
REGOLITH:
WEATHERING:
SUMMARY: Plains of quaternary alluvium with through-running highly sinuous ana-branch of the Darling river and stranded billabongs; channel incised 15m
Record: 1 of 1
LAND MANAGEMENT
CONSIDERATIONS: PM
Record: 1 of 1
Record: 1 of 221
Right-align text within control


Microsoft Access - [SYSTEMS]
File Edit View Records Window Help
LAND SYSTEMS OF WESTERN NSW
Acres Billabong
Ab
NEXT LAND SYSTEM
UNITS
FACET ID: 1Ab
PROPORTION: L
PERCENTAGE: #Nar
LANDFORM AND SOILS
SOIL ID: 1Aba
LANDFORM:
PATTERN: PLA
WIDTH OF ELEMENT (m): 0
ELEMENT: OXB
SLOPE CLASS: VG
MODAL SLOPE: GU
RELIEF CLASS: P
SLOPE (%): 3
MORPHOLOGICAL TYPE:
SOILS:
NOTES:
GREAT SOIL GROUP: GC
NORTHCOTE : Ug 5.28
SUBSTRATE LITHOLOGY:
Plains and dunes within channels: level, with small areas of red and white sand dunes: on level areas
Record: 1 of 3
Record: 1 of 221
POLYGON IDENTIFIER

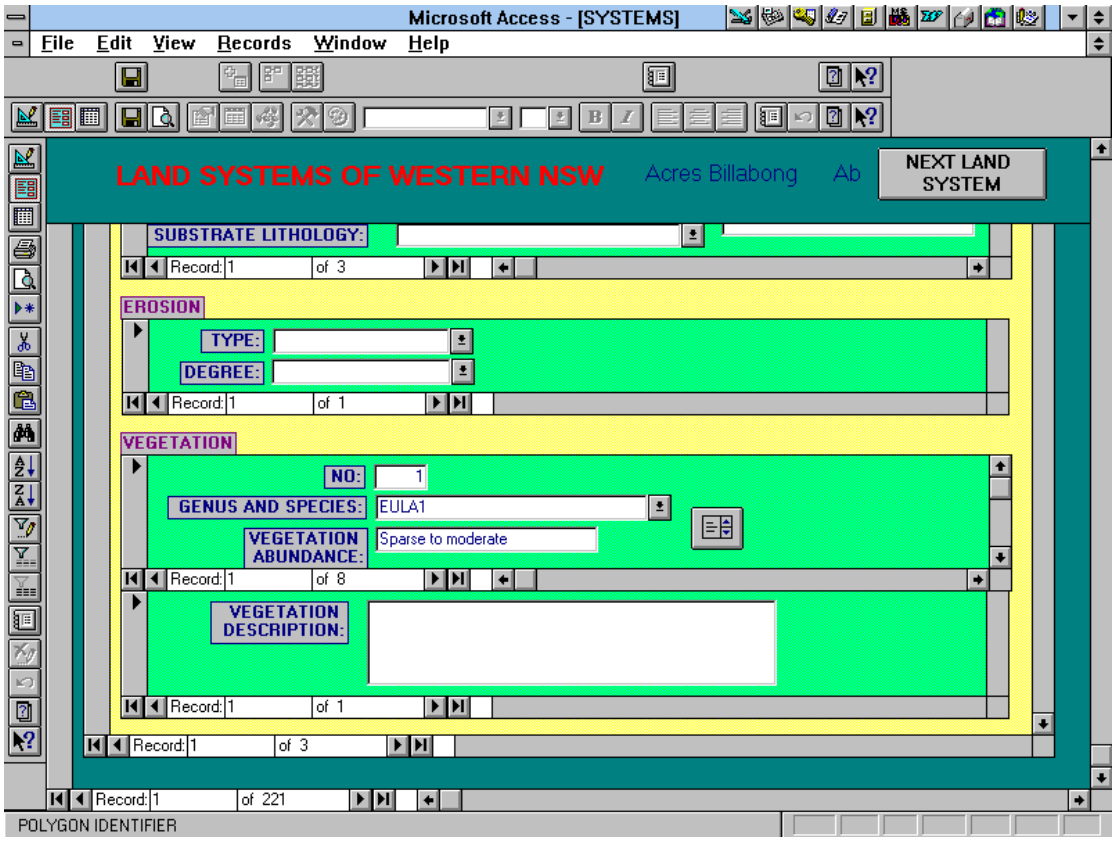


Figure 4: A completed copy of part of the data entry form used for the LSWNSW. The form shows data for the Acres Billabong land system.

Searching the Database

The query facility allows for data extraction using specified search.

It is possible to search for data by any of the fields listed.

However most useful starting points for searches to generate information should be polygon name (Land System name) or the 1:250,000 map sheet name or number. Appendix 1 contains a full structural listing of the data tables relevant to the LSWNSW.

The field describing the Land System name is PS_ID rather than LS_ID. This is because the database is scale independent and will accept all scales of data. Polygonal data at 1:5,000 is as easy to enter as data at 1:1,000,000 and the same format and hierarchical concepts can be applied.

As the database is fairly large it can be of benefit to make the initial data search a “make table” query. This type of query will result in the creation of a new table containing the data in which you are specifically interested and can be queried itself, or manipulated and sorted in different ways. (For detailed advice refer to the MS Access Manual)

To derive the greatest benefit from the queries, the following explanation of the facet data table should help. Facets are sub-units within the land systems that have been described in the text and shown in the block diagrams (Walker 1991) but are not delineated at the map scale. The soils, landforms and vegetation within each of the facets are also recorded hierarchically.

The original compilation of the LSWNSW (Walker 1991) has the proportions of a land system occupied by each facet described as a range (Table 4).

Table 4: The description and corresponding percentage range used for each facet in the LSWNSW.

DESCRIPTION	PERCENTAGE
Very Small	<5 %
Small	5 - 15%
Medium	16 - 30%
Large	31 - 50%
Very Large	> 50 %

The facets have been allocated a percentage value so that the facets total 100% of the land system. The percentages allocated within the facets have been kept within the ranges described in Table 4. This means that a facet which occupies a large proportion will have a value between 31 and 50%, depending on the other facets in that land system (Table 5).

Table 5: The allocated percentages for the Curranyalpa land system

Land System	Facet	Range	Percent
Curranyalpa	1Cu	VS	3
	2Cu	VS	3
	3Cu	S	10
	4Cu	L	74
	5Cu	S	10

This allocation of the percentage values enables the dominant facet of each Land System to be selected by the use of queries.

The soils of each facet were entered in the order in which they appear in the text. The first soil was allocated a , the 2nd b and so on.

Thus 1Aba is decoded to facet 1, AnaBranch (Ab is the abbreviation of the Land System Anabranch) and the first soil type.

It is thus possible to select the dominant soil of the dominant facet and thus allocate a dominant soil for each Land System. Although it is a less than perfect way to allocate a dominant soil, it is consistent across all units of the LSWNSW.

The following query is designed to select the Polygon ID and the PS name of all the units on the five map sheets which border Queensland within the MDB. These map sheets are Urisino (U*), Yantabulla (Y*), Enngonia (E*), Angledool (Ang*) and Moree (Mo*) (Figure 5).

The * acts as a wildcard in the criteria for the queries. Everything in the query shown has been generated by “point and click” methods, except the typing of the criteria. The boxes with the x indicate that this column will be shown in the output table. If the x is removed, this column will still be involved in the search but the data relating to this column will not be displayed. The x is the default value.

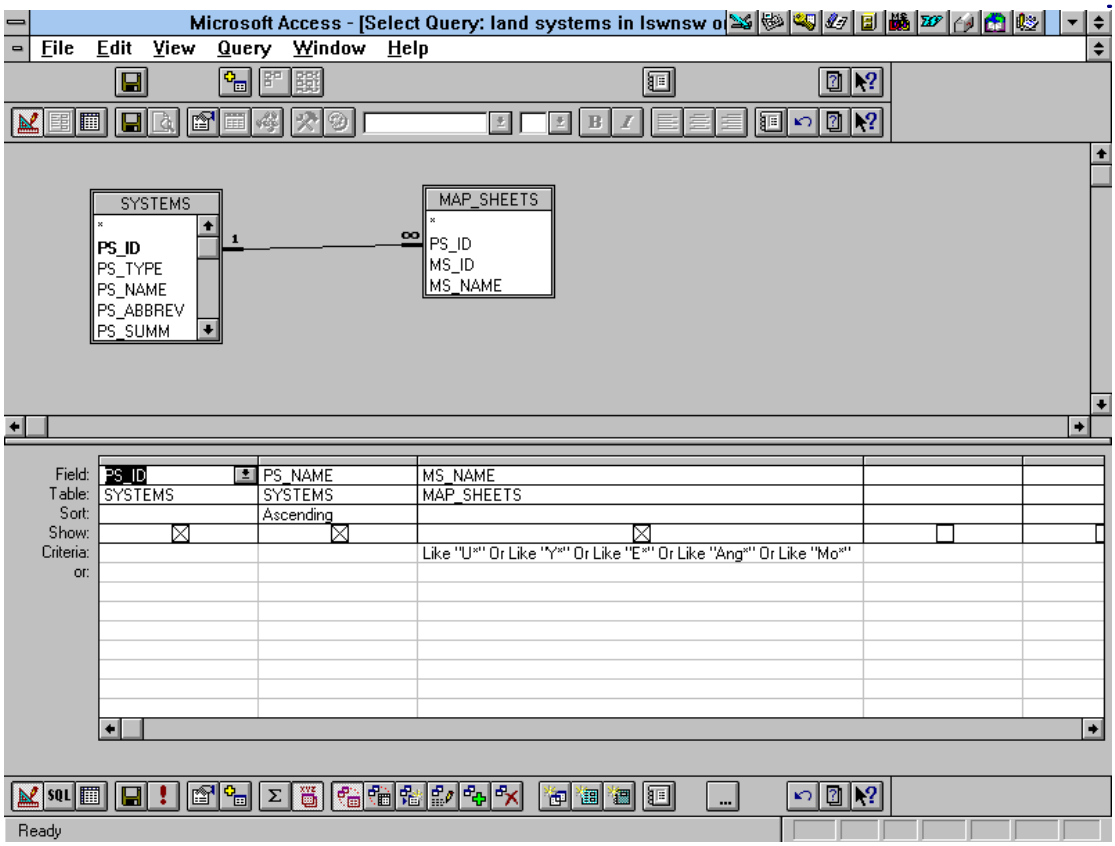


Figure 5: The query is designed to select the Polygon ID and the PS name (land system name) of all the units on five of the map sheets which are at the New South Wales Queensland border within the LSWNSW area of the MDB. These map sheets are Urisino (U*), Yantabulla (Y*), Enngonia (E*), Angledool (Ang*) and Moree (Mo*). The land systems will be listed in alphabetical order because of the ascending command in the PS_NAME column.

Acknowledgments

Contributions to database design (Dr Brian Slater, Ms Carrie Waldron and Mr Maw Maw Oo) and data entry (Mrs Hazel Rath) are sincerely acknowledged. The advice and encouragement received from Dr Elisabeth Bui as Project Leader has been most appreciated.

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APPENDIX 1

Access database: Data Table Structural Information

DEGRADATIONS

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
F_ID	Facet identifier	Text	5	Yes	No	No
DEG_TYPE	Degradation type	Text	1	No	No	No
DEG_STATE	Degradation state	Text	1	No	No	No
DEG_DEGREE	Degradation degree	Text	1	Yes	No	No
DEG_PROPORTION	Proportion of polygon affected	Text	3	No	No	No

FACETS

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
F_ID	Facet identifier	Text	5	Yes	No	No
F_PROP	Proportion of polygon	Text	3	Yes	No	No
F_TYPE	Facet type	Text	2	Yes	No	No
F_PERCENT	% of facet	Number	Integer	Yes	No	No

GEOLOGIES

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
GEOL_SUMM	Geology summary	Text	240	No	No	No
GEOL_UNIT	Unit or formation name	Text	100	No	No	No
GEOL_LITH	Dominant lithology	Text	2	No	No	No
GEOL_REGOLITH	Type of regolith	Text	2	No	No	No
GEOL_WEATH	Weathering status	Text	1	No	No	No

LAND_MANAGEMENT

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
L_MGMT_CONSID	Land management considerations	Text	50	No	No	No

MAP_SHEETS

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
MS_ID	1:250 000 map sheet identifier	Text	6	Yes	No	No
MS_NAME	Map sheet name	Text	50	No	No	No

SOILS

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
F_ID	Facet identifier	Text	5	Yes	No	No
SOIL_ID	Soil identifier	Text	6	Yes	No	No
SOIL_NAME	Class name	Text	100	No	No	No
SOIL_SUMM	Text	Text	240	No	No	No
SOIL_PROPORTION	Proportion of facet	Text	3	No	No	No
SOIL_SLOPE	Slope value	Number	Single	No		No
SOIL_SLOPE_CLASS	Slope class	Text	2	No	No	No
SOIL_MORPH_TYPE	Morphological type	Text	1	No	No	No
SOIL_ELEM_INC_SLOPE	Relative inclination of elements	Text	1	No	No	No
SOIL_ELEM_LENGTH	Field Size of element	Number	Single	No		No
SOIL_ELEM_WIDTH	Width of element	Number	Single	No		No
SOIL_ELEM_HEIGHT	Height of element	Number	Single	No		No
SOIL_ELEM_TYPE	Type of element	Text	3	No	No	No
S_RELIEF	Pattern relief	Number	Integer	No		No
S_MODAL_SLOPE	Modal slope	Text	2	No	No	No
S_RELIEF_CLASS	Relief class	Text	1	No	No	No
SOIL_REL_MS_CLASS	Relief/modal slope class	Text	2	No	No	No
S_STRM_CH_SPACING	Stream channel spacing	Text	2	No	No	No
SOIL_STRM_CH_DEV	Stream channel development	Text	1	No	No	No
SOIL_STRM_CH_DTOW	Stream channel depth relative to width	Text	1	No	No	No
SOIL_STRM_CH_MIG	Stream channel migration	Text	1	No	No	No
SOIL_STRM_CH_PATT	Stream channel pattern	Text	1	No	No	No
SOIL_STRM_CH_NET_INT	Stream channel network integration	Text	1	No	No	No
SOIL_STRM_CH_DIR_NET	Stream channel network directionality	Text	50	No	No	No
SOIL_PATT_TYPE	Pattern type	Text	3	No	No	No
SOIL_ELEVATION	Mean elevation	Number	Integer	No		No
SOIL_ASPECT	Aspect	Number	Integer	No		No
SOIL_DRAINAGE	Soil water regime	Text	1	No	No	No
SOIL_INUND_FREQ	Inundation frequency	Text	1	No	No	No
SOIL_INUND_DUR	Inundation duration	Text	1	No	No	No
SOIL_INUND_DEPTH	Inundation depth	Text	1	No	No	No
SOIL_INUND_VEL	Inundation velocity	Text	1	No	No	No
SOIL_DEPTH_WATER	Mean water table depth	Number	Single	No		No
SOIL_DEPTH_RHORIZON	Depth to R horizon	Number	Single	No		No
SOIL_RUNOFF	Runoff	Text	1	No	No	No
SOIL_PERMEABILITY	Permeability	Text	1	No	No	No
SOIL_SB_DEPTH	Depth to substrate	Number	Single	No		No
SOIL_SB_LITH	Substrate lithology	Text	2	No	No	No
SOIL_PPF	Northcote code	Text	9	No	No	No
SOIL_GSG	Great Soil Group	Text	3	No	No	No
SOIL_SOIL_TAXONOMY	Soil Taxonomy	Text	6	No	No	No
SOIL_ASC_CONF	Aust Soil Classification confidence	Text	1	No	No	No
SOIL_ASC_ORD	Aust Soil Classification order	Text	2	No	No	No
SOIL_ASC_SUBORD	Aust Soil Classification suborder	Text	2	No	No	No
SOIL_ASC_GSG	Aust Soil Classification great soil group	Text	2	No	No	No
SOIL_ASC_SUBG	Aust Soil Classification subgroup	Text	2	No	No	No
SOIL_ASC_FAM1	Aust Soil Classification family; likely to be horizon thickness	Text	1	No	No	No
SOIL_ASC_FAM2	Aust Soil Classification family; likely to be gravel content	Text	1	No	No	No
SOIL_ASC_FAM3	Aust Soil Classification family; likely to be A1 Texture	Text	1	No	No	No
SOIL_ASC_FAM4	Aust Soil Classification family; likely to be B Texture	Text	1	No	No	No
SOIL_ASC_FAM5	Aust Soil Classification family; likely to be soil depth	Text	1	No	No	No
SOIL_ASC_NOTES	Aust Soil Classification notes	Text	240	No	No	No
SOIL_UNI_SOIL_CLASS	Unified soil classification p173	Text	5	No	No	No
SOIL_NOTES	General soil notes	Text	240	No	No	No

SYSTEMS

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	Yes (No Duplicates)
PS_TYPE	Type of tract	Text	2	Yes	No	No
PS_NAME	Name of unit	Text	100	No	No	No
PS_ABBREV	Abbreviation of unit	Text	3	No	No	No
PS_SUMM	Text	Text	240	No	No	No
PS_SCALE	Source map scale	Text	1	No	No	No
PS_BOUNDARY	Type of boundary (distinctness)	Text	1	No	No	No
PS_SHAPE	Shape of polygon	Text	1	No	No	No
PS_AREA	Area of polygon	Number	Double	No		No
PS_CLIM_SUMM	Climate summary	Text	240	No	No	No
PS_RAINFALL	Mean annual rainfall	Number	Integer	No		No
PS_EVAP	Mean annual evaporation	Number	Integer	No		No
PS_CLIM_ZONE	Climate zone	Number	Integer	No		No

VEG_SPECIES

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
F_ID	Facet identifier	Text	5	Yes	No	No
VSTR_CODE	Stratum, T=tallest, M=mid, L=lower, U=undescribed p64	Text	2	No	No	No
VSP_NO	Vegetation species number	Number	Integer	Yes		No
VSP_CODE	Vegetation species	Text	8	No	No	No
VSP_ANBG_ID	Vegetation species ID used by Australian National Botanic Gardens	Number	Integer	No		No
VSP_ABUN	Vegetation species abundance	Text	3	No	No	No
VSP_ABUN_DESC	Vegetation species abundance description for W NSW	Text	50	No	No	No

VEG_STRATA

Field Name	Description	Data Type	Field Size	Required	Allow Zero Length	Indexed
PS_ID	Polygon identifier	Text	9	Yes	No	No
F_ID	Facet identifier	Text	5	Yes	No	No
VSTR_CODE	Stratum, T=tallest, M=mid, L=lower, U=undescribed , CM=continuum mid, p64	Text	2	Yes	No	No
VSTR_GROWTH_FORM	Growth form p64	Text	1	No	No	No
VSTR_HEIGHT_CLASS	Height p66	Text	50	No	No	No
VSTR_COVER_CLASS	Crown and foliage cover class p66 NB Values different for Lower	Text	1	No	No	No
VSTR_CROWN_COVER	Crown cover percentage p70 99.9	Number	Single	No		No
VSTR_GROWTH_FORM_DESC	Vegetation growth form notes	Text	255	No	No	No

APPENDIX 2

LIST OF ACRONYMS

ACRONYM	
AGSO	Australian Geological Survey Organisation
ASC	Australian Soil Classification
ASSESS	A System for Selecting Sites for a Suitable land use
AUSLIG	Australian Surveying and Land Information Group
DLWC	Department of Land and Water Conservation (New South Wales)
GIS	Geographical Information System
GSG	Great Soil Group
LSWNSW	Land Systems of Western New South Wales
MDB	Murray - Darling Basin
MDBC	Murray - Darling Basin Commission
MDBSIS	Murray - Darling Basin Soil Information Strategy
NRIC	National Resource Information Centre
NRMS	Natural Resource Management Strategy
PAT	Polygon Attribute Table
PPF	Principal Profile Form
SCS	Soil Conservation Service
SQL	Structured Query Language