TANGIS

GIS INTERFACE AND METADATABASE FOR LAKE TANGANYIKA EFFECTS OF POLLUTION ON BIODIVERSITY PROJECT (LTBP)

METADATABASE MANAGEMENT MANUAL

CONTENTS

INTRODUCTION

TANGIS is the GIS interface for the Pollution Control and Other Measures to Protect Biodiversity of Lake Tanganyika Project (LTBP). LTBP is funded through UNDP for the GEF programme. The project's purpose is to set up a Strategic Action Programme to help the four riparian states around the lake manage the lake's resources, specifically to monitor pollution levels in the catchment and their effects on biodiversity. A series of Special Studies were set up to investigate the main causes and effects of pollution and other human activity on the lake and catchment and create a baseline monitoring system.

Purpose

To support the project's data storage requirements, a metadatabase of information about the lake has been created documenting all known information of use to the project. This data comes in three major forms:
1. Data collected by the Special Studies Groups for the purpose of baseline studies, monitoring and modelling the catchment system,
2. Data specifically of use to the project created for LTBP,
3. Data available from other sources that may be of use to the Special Studies or in catchment management.

Supporting this metadatabase are facilities available to the manager of the metadatabase to maintain, add, catalogue and archive the data and metadata. This manual documents the use of these facilities and the protocols needed to run the metadatabase efficiently.

The functions of the metadatabase are two-fold. First, the supporting GIS interface (TANGIS) provides a simple user-friendly interface to allow managers of the lake's resources, interested parties, researchers and others to look at the data collected for the purpose of the project. The metadatabase runs in tandem with the GIS interface, providing the necessary background information to add data quickly and easily to the digital maps.

The second function is to effectively catalogue data, allowing for non-GIS users across the region to inquire about the project's datasets as easily as possible.

Metadata

The TANGIS metadatabase allows the project to store references to all data relevant to LTBP. Metadata is just that - data about data - we store reference information that people can search for to find pertinent data for their needs, but this data may not just be digitally held on the TANGIS CD or machine. It may also be paper and held elsewhere in the region. The metadatabase therefore refers to four levels of metadata:

LEVEL1 - Non digital data not held in the TANGIS archive. This data is known about but not held with the project centre. It may be held by project counterparts or in national databases, or it may be referenced through an Internet site. A reference in the metadatabase gives a contact name and address to investigate these data sources further.

LEVEL2 - Digital data not held by LTBP. This again could be an Internet site or held by project counterparts. A reference in the metadatabase gives a contact name and address to investigate these data sources further.

LEVEL3 - These are non digital data held with the TANGIS archive. They have been purchased during the duration of the project and will be kept with the archive. They may be loaned to people related with the project, depending on copyright restrictions.

LEVEL4 - These are digital data held with the TANGIS archive. This data can be fully integrated with other datasets using the TANGIS interface or other GIS software.

Non digital data may comprise any information with a spatial context useful to the project. This includes papers maps, conference reports, paper tables.

Digital data may be explicitly related to maps or with some geographical reference (e.g. based around administrative units, settlement or rivers), and can be GIS vector data, raster data, databases or text tables.

ArcView and Access

The TANGIS interface runs using ArcView$^{©}$ software (from Environmental Systems Research Institute), and all normal ArcView commands are still available within the system.   TANGIS does not inhibit use of these functions, nor of the following extensions:

- Spatial Analyst
- Network Analyst
- Imagine Image Support
- CAD Reader
- JPEG Image Support
- Digitizer
- Database Themes

This manual uses several pieces of jargon, which are common words in ArcView. If you are uncertain as to their meaning, look at the glossary (see p. *51)* for explanations.

The metadatabase works from Microsoft® Access 97, and requires access to an Internet Browser and Microsoft Word 97.   These are all bundled on the current TANGIS machines. For the purpose of both the GIS and the metadatabase, it is useful to know the location of the Access application.

Interfaces

There are a series of interfaces

PART ONE:
NAVIGATING IN THE METADATABASE

The metadatabase is stored in an Access database. The metadatabase Manager needs to learn how to navigate through the Metadatabase through the use of the forms and buttons available. This section shows how you can use the metadatabase to look at the data. The following part will show how to add new data and manage the information on the metadatabase (see p. *14*).

This section details:

- How to open metadatabase in French and English *(p. 8)*
- How to view the data *(p. 10)*
- How to view the short catalogue and information available from there *(p. 11)*
- How to view the long catalogue and information available from there *(p. 12)*.

Opening the metadatabase

There should be an icon set up in the Start Menu of the computer to open the metadatabase marked "LAKE TANGANYIKA METADATABASE".
➔ **Click on this button,**
 The first screen will automatically appear.

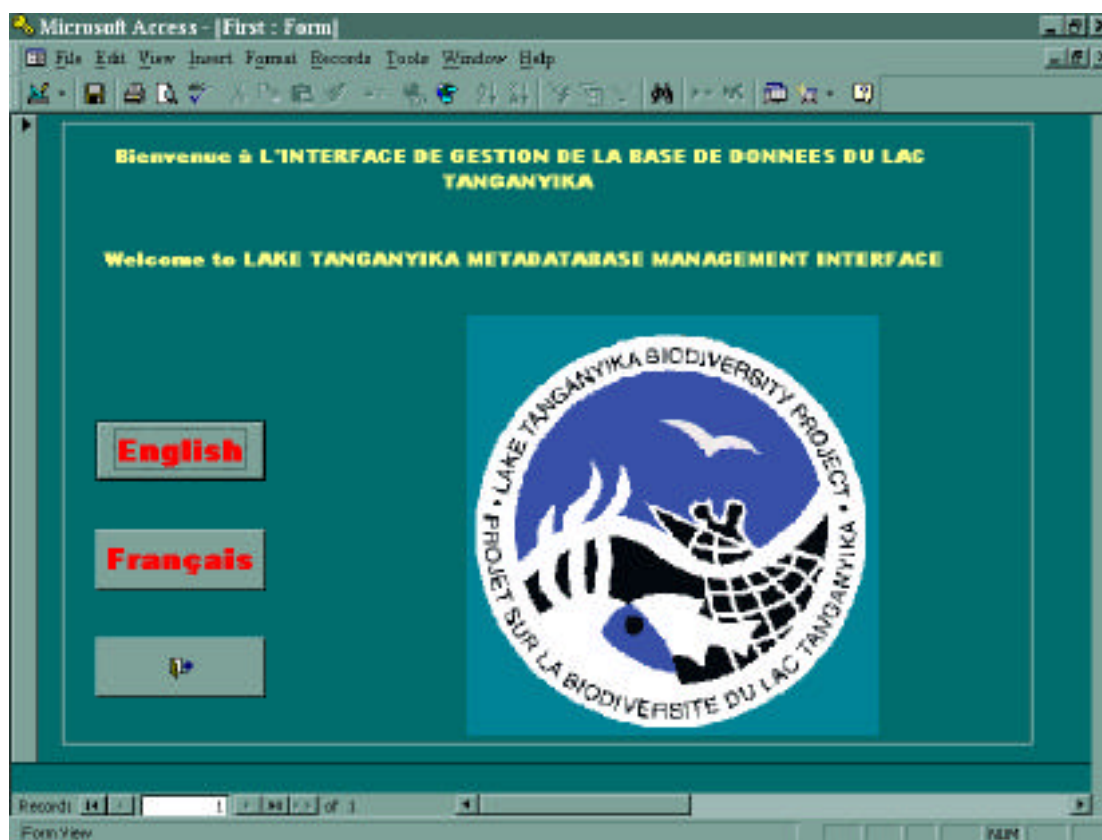If the icon is not present, you can still access the metadatabase.
➔ **Open Microsoft Access,**
➔ **Click on "More Files…"**
➔ **Select the "tangis\metadata\tangis.mdb" file**

Opening screen

The first screen when you open the metadatabase gives the options to:
•   Look at the Metadatabase in English.
•   Look at the Metadatabase in French.
•   Close the Metadatabase.

➔ **Click on the option you want.**

English Interface

When you click on English, the English Interface will appear.
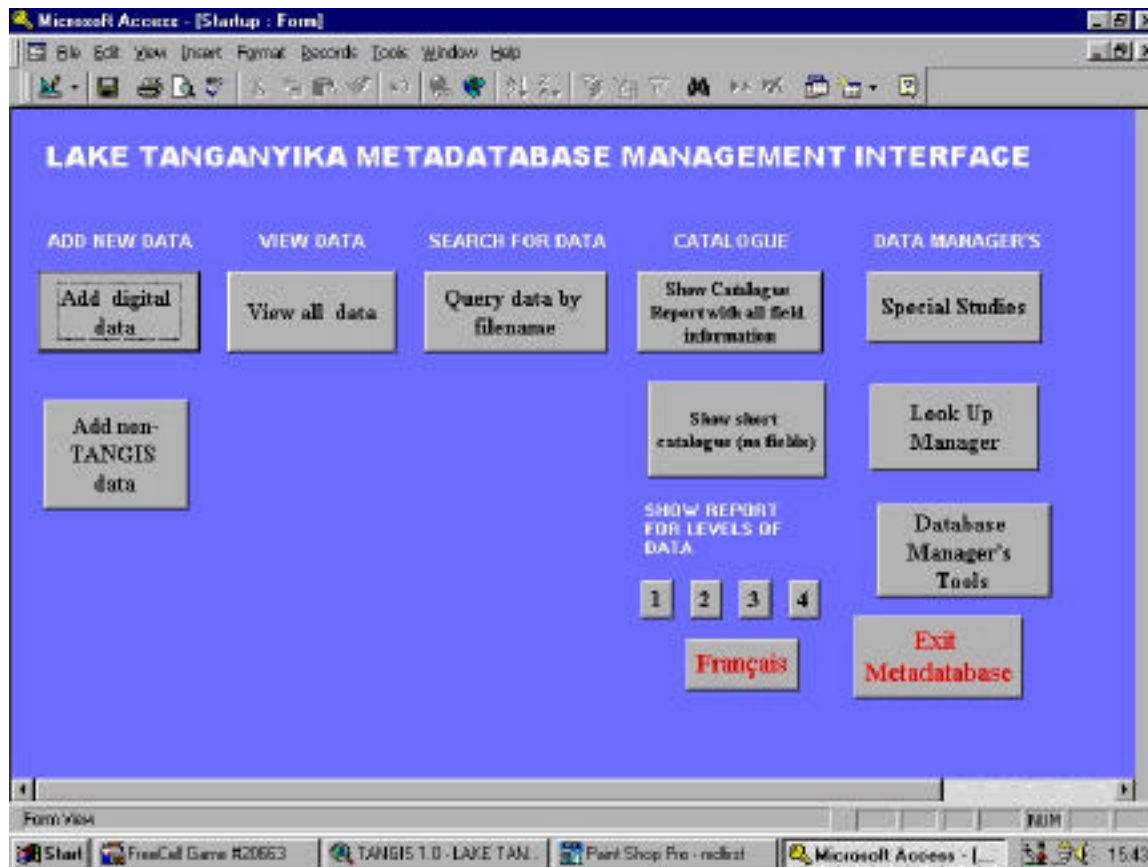
Notice that this is the main form in which you have the following options:

- To add data
    - Add digital data (that can be used in TANGIS) - *see p. 17*
    - Add non-TANGIS data (this is digital data not held on the current machine and non digital data) - *see p. 26*
- To view all data, see *p. 10*
- To show the data in the form of a report (a catalogue) - see *pp. 11 and 12*
- Data manager's options - see *p.32*.

➔ **Click on the button you wish to select.**

If you want to move to the French interface, click on **Français**

If you want to close, click on button marked **Exit Metadatabase**.

Viewing data

To view data in the metadatabase there are several different ways:
*   You can look in Forms by clicking on **Add data** button.
You can then use the usual Find facilities in Access to find the record you want to see.

*   You can click on **View all data**. This creates a table that shows all data - including that from the Vector and Field data tables (see *p. 15 to show relationships between data tables*). This means that for every field record, there is a record in this table. This means that the table looks a little unwieldy. There are many duplicate records. However, for some purposes, viewing the data in this way may be advantageous.
*   To close this box, click on the X button.

*   You can look at data for each dataset using the short or long catalogues (see *p. 11 and 12).*

See the relevant sections for more about viewing metadata.

Showing the short catalogue

You can view data through the short catalogue. This demonstrates the top-level information about TANGIS datasets in a handy tabular format.

The data shown in the short catalogue are:
- **ID number** – the unique reference number for the dataset (which should be quoted in all correspondence).
- **Name of dataset** - the dataset name given by the metadatabase manager. It is usually a short descriptive title.
- **LEVEL** - the different levels of data (see *p.5*).
- **Type** - type of data (non-digital - map, table, conference paper; or digital - Shapefile, Raster GRID, image etc).
- **Projection** - what map projection the data are stored in.
- **Description** - a longer description of the data held in the metadatabase.
- **Data Size** - for digital data the number of Kbytes are referenced. For non-digital data, the number of sheets and size.
- **Scale/ Resolution** - the scale or resolution of the data as it was originally digitised (or in map format the scale of presentation).

Each dataset is shown in a single line in alphabetical order (by name).

To print out the short catalogue:

➔ **Click on the 🖨 button at the top of the screen.**

To close the dataset:

➔ **Click on the** Close **button at the top of the screen.**

Showing the long catalogue

You can view data through the long catalogue. This has all pertinent information about TANGIS datasets, with at least one page per dataset. The datasets are stored in alphabetical order by name

The data shown in the long catalogue are grouped:
Top level information:
• **ID number** - the unique reference number for the dataset (which should be quoted in all correspondence).
• **Name of dataset** - the dataset name given by the metadatabase manager. It is usually a short descriptive title.
• **FileName** - if a digital dataset**.**
• **LEVEL** - the different levels of data (see *p.5*).
• **Type** - type of data (paper type - map, table, conference paper; or digital - Shapefile, Raster GRID, image etc).
• **Study area** - whether the dataset generally covers a town, district, geographical feature, country, the lake or the whole lake catchment.

Geographical information:
• **Projection** - what map projection the data are stored in.
• **Geographic extents** - the bottom left hand and top right x,y co-ordinates of the dataset.
• **Scale/ Resolution** - the scale or resolution of the data as it was originally digitised (or, in map format, the scale of presentation).

Descriptive information:
• **Copyright** - the copyright for the dataset including the organisation to which copyright is made. If relevant, a statement on the copyright restrictions are made in this section **AND THESE MUST BE ADHERED TO. If the copyright is LTBP, the data is open to all users.**
• **Data source** - the source from which LTBP have got the information. Any use of this data must include a reference stating acknowledgement of the data source.
• **Description** - a description of the dataset.
• **Size of dataset** - for digital data the number of Kbytes are referenced. For non-digital data, the number of sheets and size.
• **Contact** - the name, address and contact details of people responsible for the data. If this is LEVEL 3 or LEVEL 4 data, this will be the LTBP metadatabase manager. If not, the contact details should be given. If this section is empty, you should write to the source or copyright organisation listed above.

Field information:
- **Feature type** - Some datasets may relate to more than one feature type (e.g. an ARCINFO coverage of countries could contain features of both polygons (the area of the country) and lines (the boundaries). In this section, if there is only one feature type it is simply stated and all the attribute fields listed below. If there are two, then a table of fields for each feature type will be shown.
- **Field table** - Most datasets in TANGIS have an associated table that contains detailed attributes. The long catalogue gives the user some information about the level of detail in these fields. If there are no fields or table present then this will say "NONE".
    - **Field Name** - the name of the field as it appears in the table.
    - **Field Description** - a short description of the field.
    - **Field Type** - the type of data stored in the field (The options are String or character, Numeric, Boolean (True or False) and date).
    - **Code Name File** - if the field contains coded data, a look up table showing the code and its explanation will be stored in a code file. If you require this data, you must ask for the code file with the data request.

To print out the Long catalogue:

➔ **Click on the** 🖨 **button at the top of the screen.**

Note the long catalogue runs for over a hundred pages. It is advised that you only print out the pages of interest.

To close the dataset,

➔ **Click on the** [Close] **button at the top of the screen.**

PART TWO: METADATABASE MANAGEMENT

General concepts of metadatabase management

Metadatabase concepts:

Before entering new metadata, read the following notes.

General Access comments

Access works using a series of documents of various types; Tables, forms, queries, reports and macros. The TANGIS metadatabase contains all these documents, but the metadatabase manager will normally only have to use three types:

- **Tables** – these are where the data are stored, and look similar to a spreadsheet.
- **Forms** – most of the work in the metadatabase is done through here. There are several forms where buttons can be pressed. This helps to navigate through the database easily. Other forms have windows in which you can enter or select data. These directly link to the table documents.
- **Reports** –the short and long catalogues are examples of reports. Again, they refer back to the tables in Access.

Several parts of the database refer to **Queries** –these are where combinations of tables are set up, and filters are applied to sift the useful information. These have already been set up in the database and there should be no need to modify them. They are used in the formation of the reports, in being able to view data and also in passing information to the TANGIS interface.

Macros are needed to navigate around the forms on different button presses. Do not tamper with these.

Table relationships

The metadata needed to catalogue new data is split into three tables of information.
Datasets - This holds the top level information about the single dataset.
Vectors - This holds information pertinent to the particular feature type you are
    using (e.g. labelling or joining data to it). In most cases there is a one to one
    relationship between the database and the vector tables, but occasionally there
    may be more than one feature type associated with each dataset.
**Vector Fields** These are all the fields in the dataset.

Relationships
Access relates data in one table to data in another through relationships, which are set
up in the database. They assist in defining the queries, the forms and reports in the
database. They should not be tampered with, but the metadatabase manager should
have a basic understanding of their utility.

There is a one to many relationship between the database and the vector tables.
There is a one to many relationship between the vector and field tables.

The diagram below shows the relationships between these three tables in Access.
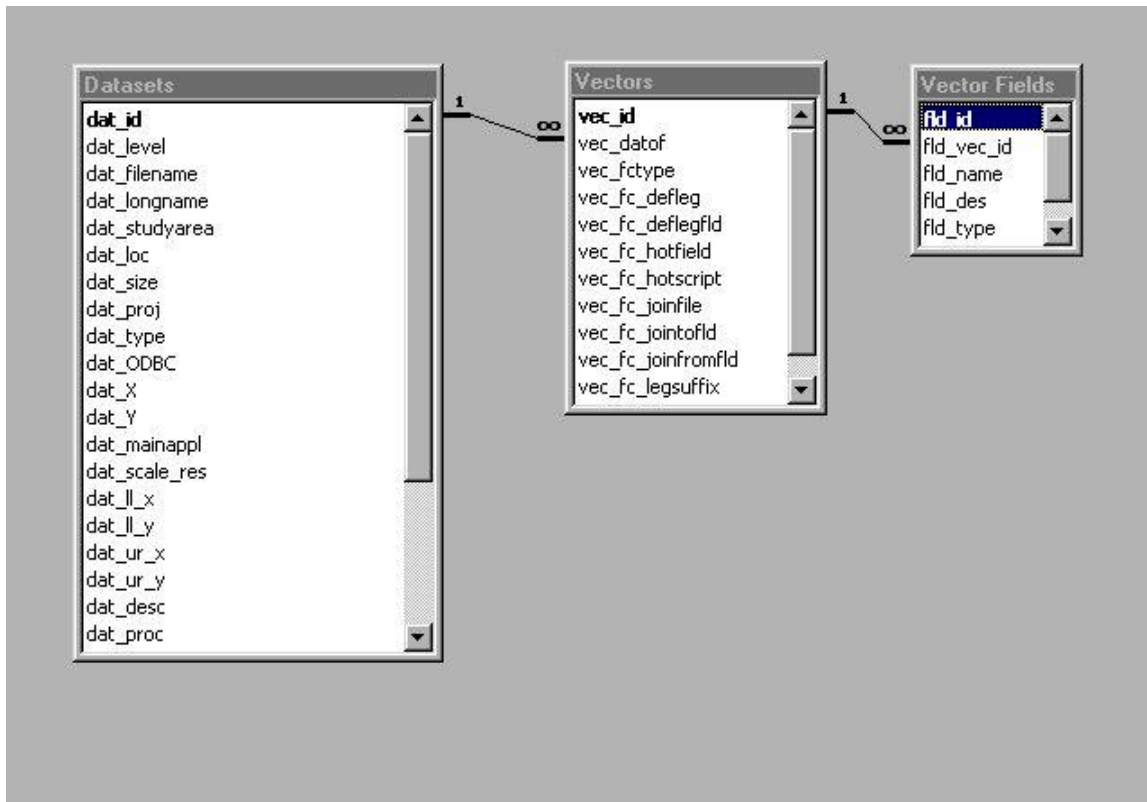
The implications of having these relationships become clear as data are entered.
Adding or deleting records in each of the tables will have implications for data in
other tables. You must ensure that data are added or deleted in the recommended way
(see *p. 17, 26, 30*).

ID Check

A **unique ID** number must be given to each record in each of the three tables. TANGIS provides you with an EXCEL spreadsheet that allows you to keep track of the numbers already used. To automatically open this EXCEL spreadsheet, click on
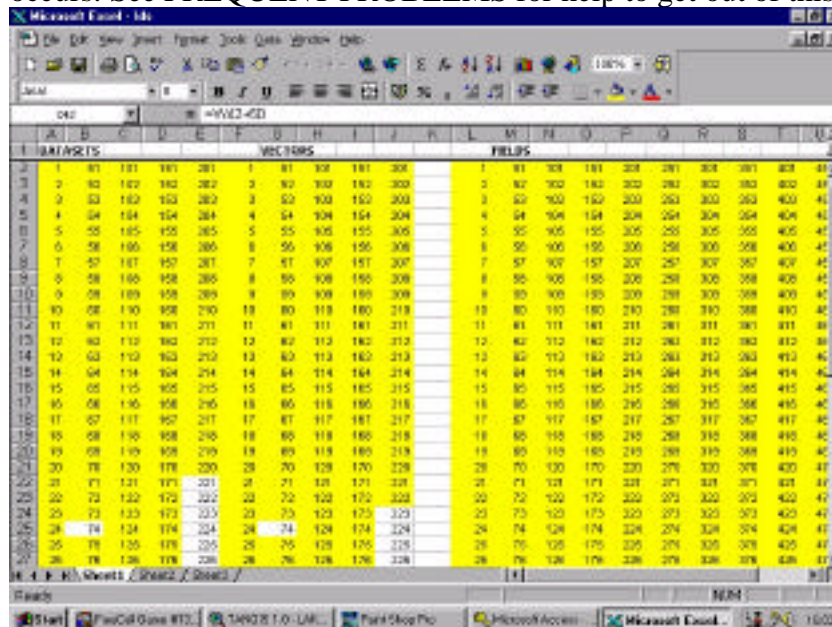
IDS Check in **Add Digital Data Form** or **Add non-Digital Data Form**. To keep track of the ID numbers systematically put a yellow background to the number you have used, using .

NOTE: in the sub-form, the related field in the table will be automatically updated, but you have to put in the ID number for that particular table.
E.g. in the field form, you want to enter a record - you need to enter a unique ID number for the field, but the record number from the vector dataset is automatically updated each time you add a new field.
Even if the dataset has no field you have to give a number to the field or it will not appear in the table and is not accessible in the long and short catalogues or in the GIS interface.

Make sure you tick off each ID number in the ID check spreadsheet as you use it, using this yellow background, and DO NOT use the same number twice in each form. IF you do, you will be unable to move on, and the database becomes locked. If this occurs: See FREQUENT PROBLEMS for help to get out of this situation *(see p.55).*

Protocol

Besides entering the data in the metadatabase, there are several other tasks that need completion when you are cataloguing new data into the system. See *protocol (p. 43) to see details of all these tasks.*

Adding digital data for TANGIS (LEVEL 4)

➔ **First read protocol (p. 43).**
The TANGIS metadatabase can be used to add new data into the system. This section
runs through the metadatabase form to do this. For more information on the protocol
for adding data and all ancillary jobs, see *p. 43*.

Preliminary information

From the Main Form, you can start adding metadata for data to be used in TANGIS
by clicking on button **Add Digital Data**.

Additional options:

Before starting to enter data, note that there are buttons at the bottom of the form to:
- **Add a new record.**
- To **Delete** a record, Select the form and click on the ⋈ button at the top of the
  screen.
- Go to the **IDS Check** spreadsheet - this allows you to keep a tally of the ID
  numbers used.
- **Close** and return to the main interface by **Stop Entering Data**.

Tips for entering data:
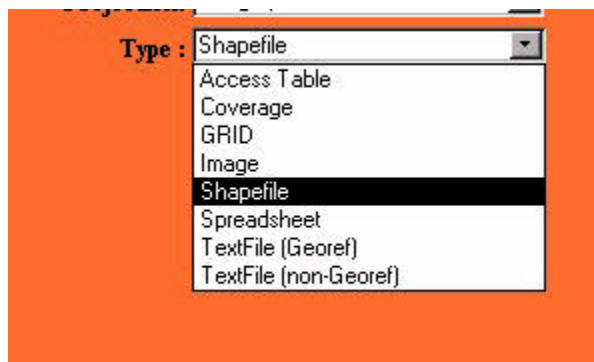
Many of the boxes are attached to drop down lists that restrict the options available. Use the mouse to select these. Note these drop down lists can be edited by going to the Look up table (see *p. 33*).

• Alternatively, if you type in the first few letters, the option will appear, you can press **Return** to select.

• You can use the tab keys to navigate around the page, or press **Return**.

• You can edit a specific record using the find function .

• You can go to a known record number by using the navigation keys at the bottom of the page.

Entering data:

Click on **Add New Record.**

This section gives an explanation of all the functions you must enter. There is a main Datasets form containing the top-level information, followed by Vector forms, dealing with feature data directly, and Vector Fields Form, which deals with attribute data.

Datasets form

Type in a new **ID** number - check your ID record first in the ID.XLS file.

Long name - this should be a short description (not greater than 150 characters) which will be used in the catalogue and will be the theme name in TANGIS.

LEVEL - this is fixed at LEVEL4 - you cannot edit this field.

File Name - this is the file name of the dataset. It should include the extension if there is one. If the file is a table in an Access database, use the table name as a file name.

Data Location/Path - This is the path name of the dataset. You should select this before you start entering the data. This reference path name is located below the :\tangis\ directory on your machine.

For example if the dataset is **d:\tangis\data\dnline.shp**, then the path name should be **data** and the file name should be **dnline.shp**

Study Area - this gives a general idea of the region that the dataset covers.

Study area	Examples / Notes
Lake	Lake specific datasets
Study Area	The whole catchment
Country	Burundi, DR Congo, Tanzania, Zambia
Districts	Kigoma (T), Bujumbura (B), Mpulungu (Z)
Other Place Names	When dataset is specific to one location, e.g. a national park or sub-catchment.

Note: if the study area is smaller than a country, put the first letter of the country in brackets after the name, i.e.:

(B) - Burundi

(C) - DR Congo

(T) - Tanzania

(Z) - Zambia

Main application - this is a way of categorising the datasets into different themes: It is used in TANGIS when you are selecting data in a particular interface. Currently the options are:

- Each special study
- General View - if the data is generic to all applications.

Data Size - this is the approximate data size - if data are stored in a directory (e.g. a grid or vector coverage), then this is the sum of all the files. With shapefiles, the sum of all the associated files is also needed (i.e. dbf and SHX files as well as shp). Note that this is only an approximate size and is used only in the catalogues for information, not TANGIS.

Projection: this is the original projection of the data. It is vital that the data are in one of the two formats available (NONE if it is a TextFileGeoref). These data are used in TANGIS so must be correct.

Type - This is the **type** of file. The following types of file are supported in TANGIS:

Type	Description	Notes
Coverage	Vector type ArcInfo 3.5 D (or earlier) coverages	(not Unix coverages)
Shapefile	Vector type ArcView shapefile	
GRID	Raster type ArcInfo GRID	INFO files are stored in separate directory at same level as dataset (see *p. 43 for more details*)
Raster Image	Image type data	Supported types: BIL, LAN, IMG (ERDAS IMAGINE only), BSQ, GeoTIFF, TIFF, BMP. Needs a world co-ordinate file (see *Glossary p. 51*).
TextFile (Georef)	a tabular dataset which contains x,y co-ordinate data that can be plotted as a point theme in TANGIS	Formats: dbf, INFO, txt or csv.
TextFile (Non-Georef)	a tabular dataset which has no x,y co-ordinate data but some reference name that can joined to a geographical dataset in TANGIS	These datasets cannot be directly used in TANGIS, but can be joined to another dataset. E.g. population statistics for Burundi districts can be joined to the map of Burundi.
Access Table	a tabular dataset stored inside an Access Table that has some x,y co-ordinate data.	an ODBC Name must be established and referenced in the metadatabase before these databases can be accessed.
Spreadsheet	To add spreadsheets into TANGIS	This function is not yet enabled.

Scale/Resolution - this is the scale the data were digitised at or the resolution of raster data.
Use the drop down boxes as a guide.
For satellite imagery, you should know the pixel resolution from the source data.
Point data usually has no scale associated with it.
Note that the scale/resolution data here are not used in TANGIS, so the format is not vital. However, it is used in catalogues and should be standardised as far as possible.

Minimum scale of display - This is a number you can choose for the minimum threshold of display. You can programme datasets only to show at certain scales in TANGIS through these boxes. Enter a single integer number.
Maximum scale of display - similarly, the maximum scale of display can be entered as a single number here.

GUIDE TO MAXIMUM AND MINIMUM SCALES OF DISPLAY

Scale of data	Minimum scale of display	Maximum scale of display
1:50 000	10 000	5 000 000
1: 100 000	20 000	5 000 000
1: 250 000	50 000	10 000 000
1: 1 000 000	100 000	15 000 000
1: 3 000 000	500 000	15 000 000
Resolution of data		
10 cm	1 000	50 000
1m	10 000	200 000
10m	20 000	500 000
30m	25 000	2 000 000
60m	50 000	5 000 000
1 km	100 000	15 000 000

If in TYPE Field you choose Access TABLE, a new field will appear. This is **ODBC name** and is the name of the connection to be established between TANGIS and the database containing the referenced Access Table. Type in the name here. Ensure that this is set up through the Control Panel (see *p.49*).

If you enter Access Table or TextFile(GEOREF) in Type field, two further boxes appear:
X Coord Field - the field in the table which contains the X co-ordinate for mapping (e.g. longitude, Xcoord, Long)
Y Coord Field - the field in the table which contains the Y co-ordinate for mapping (e.g. latitude, Ycoord, Lat).

Upper right and lower left co-ordinates:

These are the estimated dataset extents for catalogue purposes and in the Planning Interface to locate the position of a dataset.

For each field enter the co-ordinate using the co-ordinate system for the dataset (e.g. for a geographic projection use the longitude and latitude, entering only decimal degree format data, not degrees, minutes and seconds).

The fields are:

llx: lower left x co-ordinate

lly: lower left y co-ordinate

urx: upper right x co-ordinate

ury: upper right y co-ordinate

Data description: Enter a short description of the dataset. This needs to be carefully worded to give maximum information concisely. Include dates if relevant, and if data are part of a series of maps or datasets, list series and number. Also note whether the dataset can have other data joined to it (i.e. is a FRAMEWORK dataset).

Data processing: Enter description of any processing done during the dataset's creation, if known. Include here any conversion from other formats, digitising, scanning or GIS functions (e.g., building, cleaning, joining etc), by whom and when.

This ends the main part of the datasets form.

Vectors form

The **Datasets ID** is automatically updated when you enter this form.

ID Number: Enter a unique ID number here (and cross off on the ID.XLS file)

Feature type - this is for the unique vector type you are cataloguing. For most data this will be the same as Type in the datasets file. When there are more than one, enter the first type and complete the lower fields, then add another vector type for this data by clicking on relevant button. Then enter all information for the second feature type.

Default legend file - write the associated legend file name (always type in the .avl extension here) and make sure that a legend has been created in the Tangis\extras\legends folder.

Default legend field - this is generally not needed as one legend will adapt to the same field. However, if you are using a legend for another dataset which needs attaching to a different field, then type in the legend field here and it will attach itself to this current field automatically.

Hot Field - this is the field containing the specific parameter that could link this dataset to another. Options here might be a filename location, a name of another document in TANGIS or some name. Normally left empty.

Hotscript - this is the action you want when hotlinking tool is wanted. Normally left empty. *(See ArcView manual for more information on hotlinking, p. 134)*

Join files

Some datasets do not have spatial reference (TextFile Non-Georef) and need to be joined to specific framework datasets. You need only enter data in these three fields if this is a Text non-georef file or a framework dataset.

If it is a **framework** dataset (e.g. district boundaries, lakes, rivers, survey sites, weather stations, refugee camps, etc.) then in **Join File name** enter: JOIN FILE.

If the type of dataset is a **Text non Georef**, then;

• **Join File name** - the framework dataset's long name.

• **Join to Field** - the name of the field in the framework dataset that you want to join this data to

• **Join from field** - the name of the field in the text non-georef dataset to attach to the join to field in the framework dataset.

Label field - this is the field which will be the default field if the user wants to label features in a view. Type in a field name (for Vector map data and Tabular Access table only).

This completes the Vectors Form.

Fields data form

For each feature type in the dataset, you need to enter the names of all relevant fields in the attribute table. Even if the dataset has no extra tabular information, you need to enter a record here, and type **NONE** in Field Name.

ID value - type in a unique ID value and check it off in the ID.XLS spreadsheet.

Vector dataset ID - this is automatically updated in the field dataset.

Field Name - here type the exact name of the field as it appears in the table
Field Description - type in a very short description of the field with any dates or units if applicable.
Field Type - use the drop down box to select type: String, Number, Boolean, Date.

Code name file: Some fields are coded, using abbreviations or ID numbers. Each time a field has codes, create a Word file and store in the TANGIS\extras\codenames directory that gives a list of codes and their look up meanings.

An example code name file would be:

Land use

1	Urban or Built-Up Land
2	Dryland Cropland &Pasture
5	Cropland / Grassland mosaic
6	Cropland / Woodland mosaic
7	Grassland
8	Shrubland
11	Savannah
12	Deciduous Broadleaf Forest
17	Evergreen Broadleaf Forest
18	Water Bodies
20	Forested Wetland
21	Barren or Sparsely Vegetated

You can continue to add new records by selecting "**Add another field for this dataset**".

This completes the Fields Form.

Data managers Information

This contains information for the Data Manager specifically and is used for cataloguing purposes only.

Date of entry - enter the date you enter the metadata (format dd/mm/yy). It is vital for the archiving procedure.

Contact Name/Address - This is the metadatabase manager for LEVEL 4 data.

Source - enter here the web site, contact name or other data source from which you extracted the data.

Copyright - this has to be stated and should include any copyright statement with the data. This should include an organisation name and a date. If the data have been created by the project put LTBP.

Comment - put in here any extra information pertinent to the data source and copyright if applicable (e.g. if the data have been modified at all by the project).

Archive Name - This is the name of the CD that the data will be backed up to. It should be the name of the month from when the archive has been recorded (e.g. Dec98). Additional archive names should be put into the drop down box using the **Lookup Table Manager** - see *p.33*.

Three buttons across the bottom of the screen add give you more functionality.
Add a New record - to move to the end of the form and add a new record,
Stop Entering data - to move to the main interface,
ID Check - should link you directly to the ID spreadsheet.

Post data entry protocol

Once a dataset has been correctly put into the database, it should be checked in the GIS that all the functions are working. Pay particular attention to the following features:

1. The name of the dataset is correct in the TOC.
2. The data location is correct - check the path name if there are problems.
3. The Minimum and maximum scales of display are correct.
4. When you try to add data, it appears in the correct Theme type and projection.
5. That the legend shows correctly with the correct symbology.
6. That the label field works automatically when you try to label features.
7. If the file is a join file that the option to allow joined data to the dataset is enabled when this theme is highlighted.
8. If the file is TextFile NonGeoref, then the data can be joined to the specified dataset.

The dataset should also appear correctly in all the catalogues. Check that all the details are correct in:

The Long Catalogue - including punctuation and spelling.

The Short Catalogue - that the data appear in the short catalogue

Adding non digital data

Non-digital data or digital data not held by the project can also be catalogued in the metadatabase, but must be kept separate from Level 4 data that appear in the GIS.

This data can be catalogued from within its own form. Please note that this data will appear alongside the Level 4 information in all the catalogues. It thus needs to have unique IDS. Use the same IDS.XLS spreadsheet to keep a tally of IDS used.

To enter metadata for non-digital data, use the following checklist:
The add non TANGIS datasets form is accessed through clicking on the button **Add Non-TANGIS Data**.

Preliminary information

Additional options:
Before starting, note that there are buttons at the bottom of the form to:
Add a new record.
Delete a record, select the form and click on the **DELETE** button.
Got to the **check IDS** spreadsheet - this allows you to keep a tally of the ID numbers used.
Close and return to the main interface.

Tips for entering data:
- Many of the boxes are attached to drop down lists that restrict the options available. Use the mouse to select these. Note these drop down lists can be edited by going to the Look up table.
- Alternatively, if you type in the first few letters, the option will appear, you can press **Return** to select.
- You can use the tab keys to navigate around the page, or press **Return**.
- You can edit a specific record using the find function.
- You can go to a known record number by using the navigation keys at the bottom of the page.

| Record: |◄| ◄| | 10 | ►| ►|| ►* | of 193 |

Entering data:

Click on **Add New Record**

This section gives an explanation of all the functions you must enter. There is a main Datasets form containing the top-level information, followed by Vector forms and Vector Fields Form, which deals with attribute data

Datasets Form

Type in a new **ID** number - check your ID record first.

Long Name - this should be a short description (not greater than 150 characters) which will be used in the catalogue and will be the theme name in TANGIS.
It is recommended that you enter sensible long names that users can search easily.
We recommend the following rules:
- The long name should be divided into: **THEME, AREA, SCALE, MEDIA.**
  E.g. Topographic Rukwa 1:50 000 map
- We advise that you only use scale for general topographic maps.
- Keep the name as short as possible, and try not to repeat information that may appear in other top level fields.

LEVEL- Use drop down box to select level. See *p. 5* for a definitions of levels.

Data Location/Path - this is where the data are stored.
For LEVEL 3 data, enter TANGIS Archive here.
For web site data, enter the web address at this point.
Else give a contact name and Organisation where the data can be found

Study Area - this gives a general idea of the region that the dataset is set within

Study area	Examples / Notes
Lake	Lake specific datasets
Study area	The whole catchment
Country	Burundi, DR Congo, Tanzania, Zambia
Districts	Kigoma (T), Bujumbura (B), Mpulungu (Z)
Other place names	When a dataset is specific to one location, e.g. a national park or sub-catchment.

Note: if the study area is smaller than a country, put the first letter of the country in brackets after the name, i.e.:

(B) - Burundi

(C) - DR Congo

(T) - Tanzania

(Z) - Zambia

Main application - this is a way of categorising the datasets into different themes. It gives guidance to the reader of the catalogue as to the area in which the data will be of most use. Currently the options are:
Specific to a special study.
General View - if the data is generic to all applications.

Scale/Resolution - this is the scale at which data were created, digitised at or the resolution (if raster data).
· Use the drop down boxes as a guide.
· For satellite imagery, you should know the resolution of the pixels.
· Point data usually has no scale associated with it.

Projection: this is the original data map projection.

Type of data. There are various options that can be added to if necessary. There should be a short description of the type of data it is. Examples could include:
· Conference paper
· Paper map
· Image
· Database
· Book
· Map data

Upper right and lower left co-ordinates:
These are the estimated extents of the dataset for catalogue purposes only.
For each field enter the co-ordinate using the co-ordinate system for the dataset (e.g. for a geographic projection use the longitude and latitude.
The fields are:
llx: lower left x co-ordinate (left hand most longitude or eastings on a map)

lly lower left y co-ordinate (bottom latitude or northings on a map)

urx: upper right x co-ordinate (right hand most longitude or eastings on a map)

ury upper right y co-ordinate (bottom latitude or northings on a map)

Data Description: Enter a short description of the dataset. This needs to be carefully worded to give maximum information concisely. Include dates if relevant, and if data are part of a series of maps or datasets, list series and number. Also note whether the dataset can have other data joined to it (i.e. is a FRAMEWORK dataset).

Data processing: Enter here a description of any processing that has occurred during the making of the dataset. Include here any conversion from other formats, digitising, scanning or GIS functions (e.g., building, cleaning, joining etc), by whom and when. If this is a paper map, include the Spheroid and datum information and any other projection or co-ordinate system details in here.

This ends the datasets form.

Vectors form

The Vectors form is not as important as for TANGIS data, but to maintain the integrity of the metadatabase, an **ID** must be placed in here. Also, repeat the type in **Vecfctype** here.

The **Datasets ID** is automatically updated when you enter this form.

ID Number: Enter a unique ID number here (and cross off on the ID.XLS file).

Fields data

If the data has no attribute fields, or is not tabular, you need to enter a record here, and type **NONE** in Field Name.

For each feature type in the dataset, you still need to enter the names of all the relevant fields in the attribute tables.

ID value - type in a unique ID value and check it off in the ID.XLS spreadsheet.

Vector dataset ID - this is automatically updated in the field dataset.

Field Name - type here the exact name of the field as it appears in the table. This can also be used if you have a series of non-digital maps coming from a same source about the same area e.g. from an atlas.

Field Description - type in a very short description of the field with any dates or units if applicable. For non-digital data put a small description of the map.

Field Type - use the drop down box to select type: String, Number, Boolean, Date.

Code Name File: Some fields are coded, using abbreviations or ID numbers. Each time a field has codes, create a Word file in the TANGIS\extras\codenames directory that gives a list of codes and their look up meanings.

To continue to adding records, select "**Add another field for this dataset**".

Data Manager's Information - this contains information for the Data Manager specifically and is used for cataloguing purposes and data manager's records only.

Source - enter here the web site, contact name or other data source from which you extracted the data.

Date of entry - enter the date you enter the metadata (format dd/mm/yy). It is vital for the catalogue updating procedure.

Contact Name/Address - Type in a contact name, address, telephone, fax, email and web site for where the dataset can be accessed. If this is Level 3, this should be the LTBP data manager.

Copyright - this has to be stated and should include any copyright statement with the data. This should include an organisation name and a date. If the data have been created by the project, put LTBP.

Comments - put in here any extra information pertinent to the data source and copyright if applicable (e.g. if the data have been modified at all by the project).

Archive Name - This is an optional field for LEVEL 3 data to store a location where the paper details are held.

Three buttons across the bottom of the screen add give you more functionality.
Add a New record - to move to the end of the form and add a new record,
Stop Entering data - to move to the main interface,
ID Check - should link you directly to the ID spreadsheet.

Post data entry protocol

The dataset should appear correctly in all catalogues. Check all details are correct in:
The Long Catalogue - including punctuation and spelling.
The Short Catalogue - that the data appear in the short catalogue.
Level 1,2,3, - that the data appear in the correct level catalogue.

Deleting records

You can delete records in the form.
Note the ID numbers for dataset, vector and **ALL** fields associated with this record.
• Navigate to the record you want to delete in the **Add datasets** form.
• Highlight the grey bar on the left hand side of the form.
• Click on the **delete record** button .
• You will be asked to confirm this operation. Click **OK** if you are sure you want to delete this record.

- Clear the ID numbers for the dataset, vectors and fields for this form.

Data Manager's Tools

The data manager's page contains all programmes useful to the data manager. To enter, click on **Data Manager's Tools** in the main form.
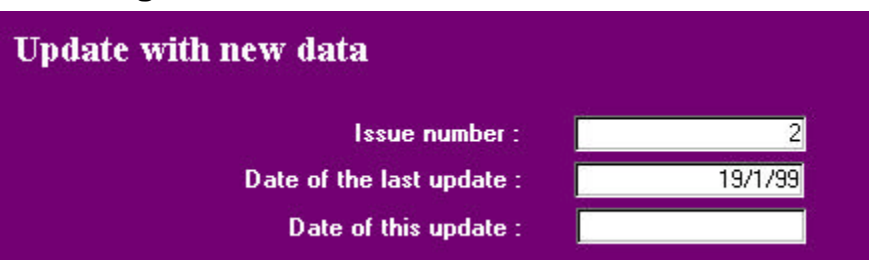
There are two areas on this form: **General Tools** and **Web Page Management**

General tools

These are the usual tools for metadatabase management, to ensure completeness and consistency in the database. There are five buttons here:
- **Lookup tables -** to add new or delete existing options given in the drop-down boxes in the data forms *(see p.33)*.
- **Special Studies -** providing a place to code data from a special study into the special views that can be hotlinked from the Over View *(see p. 34)*.
- **English \ French -** TANGIS metadatabase stores some information in separate fields in both English and French (e.g. description). This facility links to a table with the English field and their French version to allow the database manager to translate quickly the data in the relevant fields.
- **Archive Management -** to keep track of archived data. This table lists the archive CDs that data have been backed up onto.

Web Pages Products

Update with new data

Issue number :	2
Date of the last update :	19/1/99
Date of this update :	

This section manages data to be regularly updated to the LTBP Internet site. Only new data has to be uploaded to the Internet site, so this function allows you to set up when the last and present backup has taken place, from which the database is queried. Below these boxes are a series of buttons:
- **Show long catalogue Updated for web -** produces a report formatting the long catalogue ready for transfer to the web, simplified and in ID number order, (see *p. 35 for more details)*.
- **New records for short catalogue** produces a report for short catalogue containing new data since the last update of web pages. You must have entered the correct Date of the last update and Date of this update *(see p. 36)*.
- **Newsletter Template -** This button links to a Word 97 file template for the newsletter. You need to convert it to html and insert the text and pictures you want before adding it to the LTBP web pages (see *p. 38)*.

Look Up tables

The data manager can control the options given in the drop down boxes in data forms.

➔ **Go into Database Manager's Tools and click on the button marked :**
   Look up tables

A table with all the options for that look up table appears. You are then presented with a series of choices:

The options are:

Feature type	**Archive Name**
Study Area	**Non TANGIS Type**
Data path	**Main Application**
Special study theme	**Level**
Type	**Paper type**
Scale/resolution	**Projection**

➔ **Click on the look up table you want to amend.**
➔ **Type in your new option in the empty record on the end**. It does not matter if it is not in alphabetical order. This will be updated when you close the table.
➔ **Click on the X button in the top right hand corner to close the table and return to the form.**

Special Studies form

The Special Studies table provides a place for the data manager to code information into the special views that can be hotlinked from the Over View in TANGIS. This allows results from each Special Study to be presented using the Over View interface.

➔ **To enter, click on *Special Studies* in the Database Manager Tools Form.**

There are a series of options:

- **Name** - this will be used as the name of the view.
- **X co-ordinate, Y co-ordinate** - this will be used to locate the position of each special study in the Overview- and you can hotlink on that location. Type in longitude/latitude only.
- **Lower left x, y co-ordinates and Upper right x, y co-ordinates**.
- These co-ordinates will be used in setting the zoom extents for the special study view. It should be long/lat or UTM depending on data to be shown.
- **Region** - for documentation purposes only, type in the country or region.
- **Theme** - Choose from the list - this is used to decide which interface the special study belongs to and what symbol is used in the overview
- **Description** - this is a brief description of the view you are making.
- **View Theme** - enter here a list of all the themes that you want to add. Reference them by the Unique ID numbers from the Metadatabase. They will be added to the view with the default legend and correct labelling. It does not matter which order you add the themes, but ensure that they are separated by a space.

Creating Web Pages from the catalogues

Updating the Web Page Long catalogue

To convert to HTML format file.

In the main form in the metadatabase:

➔ **Click on *Database Manager's Tools*.**
➔ **Click on *Show Long Catalogue Updated for the Web*.**
➔ **Go to File menu.**
➔ **Select Save as HTML.**

➔ **Follow the instructions in the Web Wizard.**
➔ **1st screen - Press Next**
➔ **2nd screen - Select the Report tab and click on Long catalogue for web - press Select and click on Next**
➔ **3rd screen - Click on Next**
➔ **4th Screen - Choose Static HTML**
➔ **5th Screen - Select the Browse function and select the folder in the TANGIS folder called admin/WebPageData/NewPages**
➔ **6th Screen - Click on Next**
➔ **7th Screen - Click on Finish.**

At this point check which records need to be updated to the web page. There should be one page per record, and they should be in numerical order. Select out the files to be updated on the web page and delete the others.

➔ **Rename files. You need to rename all the new pages and move then into the admin/WebPageData/longcatalogue folder. The name of the file must be CAT followed by the ID-number of the dataset. E.g. For record number 256 the filename should be CAT256.htm**

The files are now ready and can be emailed or ftp to the web page manager for update to the web site.

Short catalogue HTML page

In the main form click on *Database Manager's Tools.*

Create the report with the new records for Short catalogue
➔ **In the Web Pages product section, ensure the following parameters in fields are correct.**

If you are making a new archive (e.g. to publish new records on the web page, or make a new newsletter) , you must add a new record in this form (click on ▶* button).

Update with new data

Issue number :	2
Date of the last update :	19/1/99
Date of this update :	

Issue number: Enter the number of the new newsletter you are going to create and send with the short catalogue.
Date of the last update: Date of the last time you sent a short catalogue and newsletter. This is very important because the computer searches the data that have been entered since this date (in dd/mm/yy format).
Date of this update: Enter the date of the day (in dd/mm/yy format).

➔ **Press on the button *New records for short catalogue.***

New records for short catalogue

This open a short catalogue with only the new records from the last update.

To convert to HTML
➔ **Go to File menu.**
➔ **Select Save as HTML**
➔ **Follow the instructions in the Web Wizard:**
· **1st screen - Press Next**
· **2nd screen - Select the Report tab and click on Short Catalogue for Web- Press Select and click on Next**
· **3rd screen - Click on Next**
· **4th Screen - Choose Static HTML**
· **5th Screen - Select the Browse function and select the folder in the TANGIS folder called admin/WebPageData/Shortcatalogue/**
· **6th Screen - Click on Next**
· **7th Screen - Click on Finish.**

Rename File

➔ **In Windows NT Explorer change the name of Short catalogue for web to "updatedsc" + the number of the issue (eg. updatedsc2).**

Create Newsletter

The regular LTBP GIS Newsletter contains features on new datasets acquired (some of which you can browse), requests for data, advancements in the capabilities of TANGIS and other news.

To create a Newsletter you first need to make a new folder to store all the documents you prepare for the newsletter: Store this folder in:
E:\Tangis\admin\WebPageData\Newsletters and call it Newsletter + the number of the issue (e.g. Newsletter1).

Preparation

1. Create views to insert

- In TANGIS build a view with the data theme you want
- Create a layout with your view and legend
- Go to **file menu**, **export**
- In **List Files of Type** choose **Windows Bitmap**
- Choose the newsletter folder you have just created.
- Give a name easy to recognise
- Click **OK**

2. Gather text together

These are the texts for any articles you want to have. Using the template, think about:
- The new datasets you have or want,
- Products i.e. maps you have produced or services provided,
- Any important news.

Creating the newsletter

Save the template

- In main menu of the metadatabase click on **Data managers tools,** and select **Newsletter Template**. Microsoft Word opens with the newsletter template.
- Save this file as html in a new folder:
  e:\admin\WebPageData\Newsletters\Newsletter(+number)
  and call the file nl + the date of publication, eg nl0299 for February 1999.
- Change the number of issue in the title.
- Update the New datasets.
- Fill the details you want under each heading.

Insert the pictures.

- Click once with the mouse at the location you want the picture to be
- Go to **menu insert** , **picture**, **from file**
- In **Look in** choose the location of your newsletter (see point 1). If you click once on a file it give you on the right a preview of the picture.
- Double click on the picture you want.
- You can easily resize the picture. When it is active (click once on it), drag one of the black squares on the edge and resize.
- Save and send the complete newsletter folder to the Web Manager.

PART THREE:
PROTOCOLS FOR MANAGEMENT

This section gives a step-by step guide to the various duties of the metadatabase manager. It lists the protocols for :
*   entering data (see *p. 43*)
*   data request (see *p. 45*)
*   back up (see *p. 46*)
*   sending CD's to TANGIS participants (see *p. 46*)
*   solving problems (see *p. 46*).

Introduction

The metadatabase manager is responsible for the smooth management of geographical metadata for all LTBP activities. The proposed strategy for implementing the GIS database, interface, and metadatabase attempts to address the issue of how timely data from the current set of Special Studies and future monitoring and research programmes can be passed up to the relevant bodies making management decisions for the Strategic Action Programme. The metadatabase is a key part of that process.

While the GIS may not have a role in every proposed data promotion pathway in the Strategic Action Programme, it will be a vital component in many of the activities.

The diagram below demonstrates the proposed role of the GIS and database in supporting the Strategic Action Programme. Spatial data for the project; from the databases established during the Special Studies, maps collected by the GIS component, National Statistics and census that may be available and satellite imagery, are all catalogued in a structured database. Using the TANGIS GIS Interface, timely and relevant maps, charts, statistics and models can be made that support current project activities, and provide monitoring data for a Strategic Action Programme. It is hoped that in the months following this visit report, the details of the Strategic Action Programme will specifically highlight which areas the GIS can support.

```
                          ┌─────────┐
                          │   SAP   │
                          └─────────┘
                               ⬆

        ┌────────┐  ┌────────┐  ┌────────┐  ┌────────┐
        │  MAPS  │  │ CHARTS │  │ STATS  │  │ MODELS │
        └────────┘  └────────┘  └────────┘  └────────┘
                               ⬆

            ┌──────────────────────────────────┐
            │     GIS INTERFACE - TANGIS        │
            └──────────────────────────────────┘
                               ⬆

        ┌──────────────────────────────────────────┐
        │   STRUCTURED DATABASE    Managed by Metadatabase   │
        └──────────────────────────────────────────┘
                               ⬆

  ┌──────────────┐  ┌──────────────┐  ┌──────────────┐  ┌──────────────────┐
  │ SS DATABASES │  │   MAP DATA   │  │   NATIONAL   │  │  SATELLITEIMAGE  │
  │              │  │              │  │    STATS     │  │    PRODUCTS      │
  └──────────────┘  └──────────────┘  └──────────────┘  └──────────────────┘
```
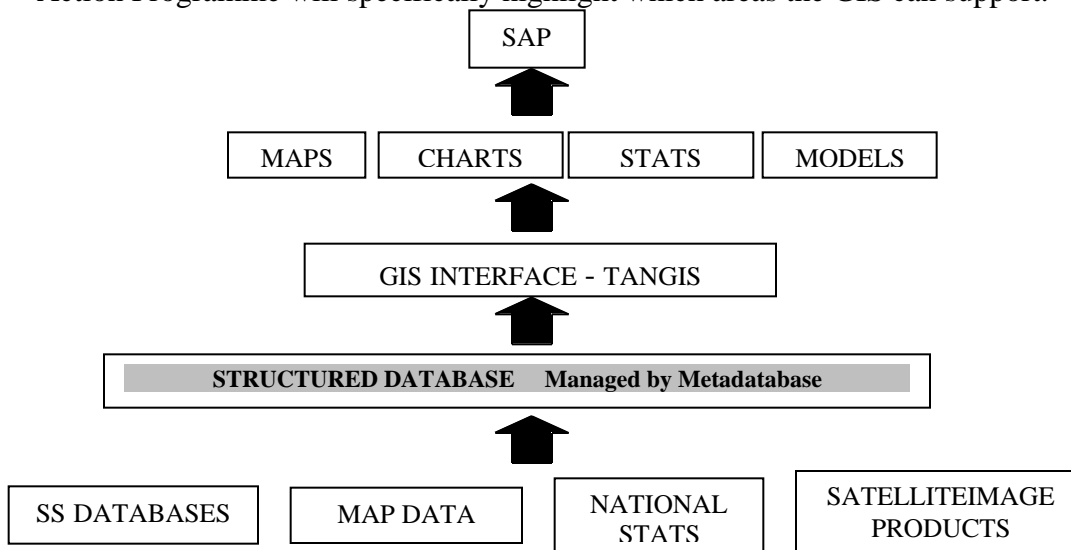
The diverse nature of the institutes involved in lake management and their geographical spread precludes complete centralisation of GIS activity in one location. Therefore, a network needs to be established containing data providers, cataloguers and users. Additionally, clear protocols need to be established to maintain this network, defining responsibilities for routine data collection, agreements to pass data between institutions and for maintaining the metadatabase and catalogues. There has to be agreed data promotion pathways up to the activities of the Strategic Action Programme, as well as horizontal links to other scientific and implementing agencies so they have access to complete datasets.

While we are encouraging widespread use of the GIS, and a devolved system for data storage and usage, centralising the mechanism for cataloguing metadata is the only workable schema to integrate all activity.

The proposed data network for the GIS.
1. **Data providers** – these are institutes currently involved in the Special Studies and others who routinely monitoring facets of the lake (e.g. biodiversity, pollution, sediments, fisheries). Responsibility needs to be clearly stated in the SAP for those responsible to routinely update data for future SAP activities.
2. **National GIS data co-ordinator** - On a routine basis (e.g. once every three months), a national data co-ordinator is sent the updated datasets from the data providers. If the data are not with the national data co-ordinator by an agreed date, then it is up to this national co-ordinator to follow up with the data providers.
3. **Regional Metadatabase co-ordinator** -At an agreed time these datasets are sent to the regional metadatabase manager, who catalogues the updated databases and all new datasets. This centre produces new metadata catalogues, publishes through web pages, archives new datasets and makes CD's for distribution.
4. **GIS users** – These are recognised GIS centres that routinely receive updates to the TANGIS database and should be open to all project counterparts to use TANGIS. These installations should have:
   1. Arcview (3.0 or better) already installed or proposed
   2. MS Access (Office 97 or better) to store databases created by Special Studies.
   3. 2 Gb of hard disk available to store TANGIS datasets.
   Full integration of TANGIS including use of satellite and raster based data can be achieved if the users have access to the Arcview Spatial Analyst Extension.

Proposed Timetable for routine updating of data

There should be a cycle of data transfer for the GIS, (which may need to fit into any strategy for the SAP). Below is an example strategy to ensure timely outputs. It is based on a quarterly update of the system.

Week	Job	Responsibility
1	Required database updates sent to National Co-ordinator (or to report no new data)	Database managers (National Co-ordinator to follow up if not sent by certain date)
2		
3	Full set of databases sent to METADATABASE MANAGER	National Co-ordinators (METADATABASE MANAGER to follow up if not sent by certain date).
4		
5	Database catalogued by METADATABASE MANAGER	METADATABASE MANAGER
6		
7	Newsletter and Web Pages Produced	METADATABASE MANAGER
8		
9	Strategic Inputs sent to SAP co-ordinators	METADATABASE MANAGER (Responsible parties of SAP to follow up if not sent by certain date)
10	TANGIS datasets available to all identified sites	METADATABASE MANAGER (National co-ordinators to check with GIS sites and follow up if not complete by certain date).
11		
12		
13		

Protocol for entering data

➔ **Copy new data into e:\tangis\New Data folder**

➔ **Check the information sent to you by the original creators of the data. If you are uncertain of copyright, source, data processing or codes used in the attribute tables, contact the source directly.**

➔ **You need to decide on a long name for the dataset.**

➔ **If the data is text (non-georef) then ensure that there is a framework dataset that you can join this new dataset to.**

➔ **Open the ID.XLS file (click on the IDs Check button).**

➔ **Start an ArcView project (not TANGIS)**

➔ **Add theme of your data to view** *(see your ArcView book p. 22)*

➔ **Retrieve following parameters from dataset:**
  - File Name (from Windows Explorer)
  - Data size (from Windows Explorer)
  - Projection (if determinable)
  - Data type
  - Data scale of original if known
  - Make a view in an ArcView session. Use the cursor to locate the lower left and upper right co-ordinates of the theme.
  - Vector type (point, line, polygon)

➔ **Make suitable legends using legend editor - two are needed; French and English:**
  - Save legends (.avl) to e:\tangis\extras\legends folder *(see ArcView book p. 20, 93).* French legend prefixed by an f

➔ **Decide which field will be for the labels**

➔ **Decide where to put data**
  - Main application
  - Relevant folder

➔ **Close ArcView project (do not save)**

➔ **Copy dataset to relevant folder**

➔ **Check whether there are any hotlinks or join files which need entering**

➔ **Open metadatabase – go to Add Data and enter the parameters of your new data** *(see section Entering data p. 17, for level 4, p. 26 for other levels)*

➔ **Save a copy of the new data in the back up directory** *(see p. 46. Note special rules for copying Arcview GRID data below).*

➔ **Erase the data in the Newdata folder**

➔ **Run TANGIS and check that the data with all the metadata is loaded into the system**
  - The theme appears in the metadatabase table
  - The theme draws with the correct legend file
  - The theme draws at the correct scales
  - The themes comments contain the Description and Processing details.
  - If the dataset is a framework dataset, that the **Add Data Joint Themes** menu is highlighted
  - The default label field is loaded in the Theme properties

➔ **Run the metadatabase and check that the catalogues are working.**
  - Check all details in the long catalogue. Ensure there are no spelling mistakes and the format is consistent with other records in the metadatabase.

To move and save grid data

As they have attached info files, Grid cannot be moved from the Windows Explorer interface. They can only be moved through the option manage grid in the spatial analyst extension of Arc View.

➔ **Open ArcView**
➔ **Load the Spatial Analyst extension**
> - **In the project window interface, go to the *menu file, Extensions...***
> - **Scroll down the list of extensions**
> - **Click on the tick box for Spatial Analyst**

➔ **Manage grid**
> - **In the view window interface, go to *menu file, Manage Grid***
> - **Choose the grid you want to copy**
> - **Press *copy***
> - **Change the directory for the back up directory**
> - **Press *OK***

➔ **Save the grid in the appropriated location in TANGIS**
➔ **Save a copy in the back up directory**
➔ **In the add digital data interface of the metadatabase change the name of the archive to the new one**

Other Notes:

ID's: There is a one-to-many relationship between the datasets and the vector tables.
There is a one-to-many relationship between the vectors and the field tables.
Use the ID.XLS to keep a tally of all the ID numbers you have used for the datasets, vectors and field tables

ODBC: For database datasets you have to use an ODBC link. For some databases this has already been set up (BIODIVERSITY), but others will need creating.
To create a new ODBC link:

➔ **Open up *Control Panel* and click on ODBC**
➔ **Click on *Add* button and select type of file (e.g. Access driver)**
➔ **Click on Finish**
➔ **Enter *Data Source Name* (this is the ODBC Name in the metadatabase)**
➔ **Enter Description, a short description of the database will do**
➔ **Click on *Select* and use explorer window that appears to find the database**
➔ **Click on *OK***
➔ **Close ODBC window**
➔ **Enter ODBC Name in the relevant part of metadatabase.**
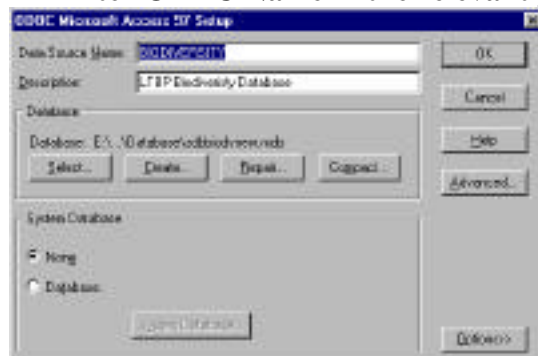
Protocol for data requests

Data can be requested by email, fax or telephone control. When receiving data requests:
- Check that a unique ID number has been received for each dataset. It is difficult to differentiate between datasets with similar titles unless the unique ID number is used.
- Check that you have the postal details of the person involved if data cannot be sent by email or FTP.
- Check the computer and software facilities are available to give the data in appropriated format.

To prepare the dataset
➔ **Check the data in TANGIS is correct and has a legend.**
➔ **Check the size of the dataset and decide the most relevant media to copy the data onto (e.g. floppy disc, CD, MO, Jaz disc).**
➔ **Check the copyright. If LTBP is listed as holding copyright this data can be freely downloaded. If another copyright holder is listed ensure that permission has been granted before the data is downloaded.**
➔ **Provide:**
    - A standard letter
    - The dataset
    - The associated legend file (.avl)
    - The associated code name file from the long catalogue (if relevant)
    - A hard copy of the record

If it is a GRID dataset, be sure you provide the associated <u>info</u> file *(see p. 46)* **copied using the Datasets Manager Interface in Arcview** *(see p. 44).*
➔ **Keep a record of which file you give and to whom is was given.**

Protocol for Back up

The back up procedure has been standardised and can be used to preserve an archive copy for the metadatabase manager.

Set up of the directories in TANGIS

To make the backing up of new data simple a special backup directory has been set up. Each time a new data set is catalogued in TANGIS it should also be saved in the correct file within the Backup directory (see *p. 43*). This directory can then be periodically saved to CD so avoiding the repetitive archiving of all the data sets held within TANGIS (i.e., the TANGIS/data folder) .

The new folder for backup is set up as Backup + month + year, e.g.
        Backupdec98
The backup folder's name will change on the event of a backup. In the example above the backup directory had last been archived to a CD in December 1998. The directory would then be emptied of all data and then renamed with the date of this archiving/clearing out activity.

➔ **Save your data in the backup folder**
        To know where each data must be located in TANGIS when you update an older version, look at the Archive Management Table in the Manager Tools interface (see *p. 32*).

To Compact the metadatabase

Before recording the back up reduce the size of the metadatabase by compacting
➔ **Open only the metadatabase interface of TANGIS (not the GIS)**
➔ **Go to the *tools menu, Database Utilities, Compact Database***
The dataset is compressed, then reopened.

To Record a CD with GEAR CD Writing Software

1. **Start GEAR**
➔ **Insert the CD in the Compact Disc Recorder tray of the computer**
➔ **From the Start button go to *program, GEAR for Windows NT, GEAR for Windows NT***

2. **Create your project**
➔ **When GEAR is opened, click once on the *Create* button**
➔ **Choose drive E:/**
➔ **In file Name enter TAN1.vol**
➔ **Click *OK***

3. **Edit a CD**
➔ **Click on the *Edit* button**
➔ **Choose the E:/ drive in the upper left window**
➔ **In My E:/ drive window click on TANGIS to see the subfolders**

➔ **In the right window of My E:/ drive, select the folder you want to copy by clicking once on it** (All folders excepted the folder TANGIS/data)

➔ **Click on the selected folder and drag it to the right window in my ISO track window without releasing the button of the mouse**

➔ **Release the button of the mouse**

➔ **Repeat for all the folders in TANGIS excepted the folder data**

➔ **Go into menu file and click *Save&Close*.**

4. Write the CD

➔ **Click on button *Burn a CD-R***

➔ **BE CAREFUL! Don't knock the table or the computer whilst it is recording as it can cause the writing to fail**

➔ **Wait for the CD to be written successfully. If there is an error, this may be due to various factors. Refer to your Gear Help for assistance. Often, trying to write the CD again will work.**

5. Exit GEAR

➔ **Close GEAR**

➔ **Delete temporary file TAN1.vol created in the E:/ drive**

After writing the CD

If the data archiving was a success:

➔ **First check that all the data is on the CD**

➔ **Delete all the data in the backup folder**

➔ **Give a new name to the back up folder using the date of this successful backup**

To label a CD

➔ **Put a label on top of the compact disc box with the name of the archive: (date of beginning and end)**

➔ **Write the name of the archive on the CD**

Distribution Of TANGIS CD

To write CD's for distribution, you must ensure that the following data are loaded onto the CD.

1.   The backup data archive
2.   The associated legend file
3.   The most recent cut down version of the metadatabase.
4.   The codename file where appropriate.

Label the CD

INSTALLING TANGIS

TANGIS is supplied on CD, containing all the datasets, programmes, extra information and the metadatabase.

To install:
- ➔ **Place the CD in your CD drive and open Windows Explorer.**
- ➔ **Copy All data on the CD into a TANGIS directory on your machine.**
- ➔ **TANGIS expects to be located in d:\tangis directory, but you are able to load it in any location (drive and path), as long as all the files are contained below a TANGIS folder.**

Because the CD is an archive media, you have to turn off the "read only " attribute of every dataset in the TANGIS directory. The easiest way to do this is to go into DOS and type the following command at the TANGIS directory level.
- ➔ **attrib -r -a * /s**

This will turn off the read only for all data at TANGIS and all subdirectories.

TANGIS ODBC connection.

To make TANGIS work, it has to interact with the metadatabase. You must make this link between the metadatabase before you first start TANGIS. This is done through an ODBC connection in Windows.

To run this:
- ➔ **Go to the Control Panel and open up the *ODBC* icon**
- ➔ **Add a new database to the list with the *Add* button**
- ➔ **Select a Microsoft Access Database and press *OK***
- ➔ **In the next window, Press *Select database***
- ➔ **Select the \Tangis\metadata\sites.mdb and press *OK***
- ➔ **Call this TANGIS in the top box (Name)**
- ➔ **Press *OK***

You have now established the connection between TANGIS and the metadatabase.

Note: When new copies of TANGIS are installed, they will still refer to the same ODBC link. You should copy the new version of the metadatabase into the new location, but you do not need to reinstalled ODBC connection. The new copy of the ODBC should automatically be picked up by the TANGIS interface.

Run TANGIS once. If you get an error message when you try to add data:

- Open the StartUp.Start script (can be found in the Scripts window)
- Change the line: **_HOME = "e:\tangis"** Make sure the drive letter is correct - change if wrong (e.g. "c:\tangis" or "d:\tangis") and compile the script (✔).

- Close TANGIS (it will automatically save) and reopen. This problem will be solved.

If you do not store TANGIS on your E Drive, you will have to complete this procedure every time you get an updated TANGIS program.

Other ODBC Connections

Several other databases will have an ODBC connection to make them work within the TANGIS interface. You must have the ODBC name from the metadatabase manager.

For example, the BIOSS LITERATURE database has an ODBC name of LITERATURE.

To install the LITERATURE database effectively.
- ➔ **Go to your control Panel and open up the ODBC icon**
- ➔ **Add a new database to the list with the** *Add* **button**
- ➔ **Select a Microsoft Access Database and press** *OK*
- ➔ **In the next window, Press** *Select database*
- ➔ **Select the \Tangis\metadata\sites.mdb and press** *OK*
- ➔ **Call this LITERATURE in the top box (Name)**
- ➔ **Press** *OK*

The Literature database is now referenced through an ODBC name. You should close down the TANGIS interface and reload to ensure that the connection has been effectively set up. Then, to check that the database has been properly registered, add the Literature database data through the metadatabase through the **Add Database data** menu.

Other ODBC connections should be set up in the same way. You will be notified if new databases have been added to the TANGIS datasets and any ODBC connections that need to be established.

Arcview Glossary

Active Theme - a theme which is highlighted in the TOC (appears raised). Active themes can be processed in many different ways, for example, you can set the legend, zoom to the extent of, look at the attribute table or edit an active theme.

Button - these are contained in the first line of buttons below the menu. When you click on a button something happens.

Chart - a document in ArcView allowing you to chart tabular data.

Document - types of object which are stored inside an ArcView project. Documents come in several forms; view, table, chart and layout.

Hotlink - a link between a geographical feature in a view and some other document. This might be a document in your project such as a view, a table, a chart or a layout, or an external file such as a photograph, a text or others.

Layout - a document in ArcView which allows you to present a page layout ready for printing. Layouts can contain views, tables, images, charts and text.

Legend - contains information necessary to display a theme's features using different symbols.

Menu - this is the top line of any document and all the functionality of TANGIS is stored in here.

Properties - most items in ArcView have a set of properties which define what you are looking at. E.g. views have a name, map units and perhaps a projection; themes have names, definitions and display thresholds. You can look at an item's properties through the menu "properties".

Table - a document inside ArcView that allows users to view, query and manipulate tables. Files in Dbase IV, ASCII files or Database files (e.g. Access Tables) can be viewed in these documents. Tables can also show the attributes of spatial files.

Table Of Contents (TOC) - the grey area to the left of the view which contains a list of themes. It shows the theme names and any legends /symbolization, and can tell you which themes are visible and active.

Theme - map data shown in a view. A theme can come from many different sources (ARCINFO shapefile or coverage, raster GRID, image or from a georeferenced text file).

TOC - see Table of Contents.

Tool - these are contained in the second line of buttons below the menu. Tools are related to the document you are using, and only work when you do something in that document. For example the zoom in tool can only work when you click and drag inside the view display.

View - this document allows you to view map data by building up a series of themes. From here you can symbolize the data, look and query attributes and make layouts. Most of TANGIS interfaces are views - all the special studies and planning interface, the general view and the main view.

View Frame - in a layout the view frame is the area which contains the view. You can relate this to the view, add graticules and rescale.

Visible Theme - a theme which is visible in the display window of a view. It is made visible by clicking on the check box to the left of the theme name in the TOC.

World Co-ordinate File - this is a file which contains the information necessary to locate a raster image file in the map.

The following is taken from the Arcview On-line Help:

Images are stored as raster data, where each cell in the image has a row and column number. Shapefiles and ARC/INFO coverages are stored in real-world co-ordinates. In order to display images with coverages or shapefiles, it is necessary to establish an image-to-world transformation that converts the image co-ordinates to real-world co-ordinates. This transformation information is typically stored with the image.

Some image formats, such as ERDAS, IMAGINE, BSQ, BIL, BIP, GeoTIFF and grids, store the georeferencing information in the header of the image file. ArcView uses this information if it is present. However, other image formats store this information in a separate ASCII file. This file is generally referred to as the world file, since it contains the real-world transformation information used by the image. World files can be created with any editor. They can also be created using ARC/INFO's REGISTER command.

World file naming conventions
It's easy to identify the world file which should accompany an image file: world files use the same name as the image, with a "w" appended. For example, the world file for the image file mytown.tiff would be called mytown.tiffw and the world file for redlands.rlc would be redlands.rlcw. For workspaces that must adhere to the 8.3 naming convention, the first and third characters of the image file's suffix and a final "w" are used for the world file suffix. Therefore, if mytown.tif were in a an 8.3 format workspace, the world file would be mytown.tfw. If redlands.rlc was in an 8.3 format workspace, its world file would be redlands.rcw.

World files may also use a .wld extension.

For images that lack an extension, or have an extension that is shorter than three characters, the "w" is added to the end of the file name without altering it. Therefore the world file for the image file terrain would be terrainw; the world file for the image file floorpln.rs would be floorpln.rsw.

How the georeferencing information is accessed

The image-to-world transformation is accessed each time an image is displayed (e.g., when you pan or zoom). The transformation is calculated from one of the following sources, listed in order of priority:

· the world file
· the header file (if the image type supports one)
· from the row/column information of the image (an identity transformation)

Because a world file has higher priority, you can override the header file transformation information by creating your own world file.

World file contents

The contents of the world file will look something like this:

20.17541308822119
0.00000000000000
0.00000000000000
-20.17541308822119
424178.11472601280548

4313415.90726399607956

When this file is present, ArcView performs the image-to-world transformation. The image-to-world transformation is a six-parameter affine transformation in the form of:

$x1 = Ax + By + C$

$y1 = Dx + Ey + F$

where

$x1$ = calculated x-co-ordinate of the pixel on the map
$y1$ = calculated y-co-ordinate of the pixel on the map
x = column number of a pixel in the image
y = row number of a pixel in the image
A = x-scale; dimension of a pixel in map units in x direction
B, D = rotation terms
C, F = translation terms; x,y map co-ordinates of the center of the upper-left pixel

E = negative of y-scale; dimension of a pixel in map units in y direction

Note: The y-scale (E) is negative because the origins of an image and a geographic co-ordinate system are different. The origin of an image is located in the upper-left corner, whereas the origin of the map co-ordinate system is located in the lower-left corner. Row values in the image increase from the origin downward, while y-co-ordinate values in the map increase from the origin upward.

The transformation parameters are stored in the world file in this order:

    20.17541308822119 - A
     0.00000000000000 - D
     0.00000000000000 - B
    -20.17541308822119 - E
   424178.11472601280548 - C

   4313415.90726399607956 - F

Note: ArcView does not rotate, or warp, images.

Frequent Problems

This section aims to troubleshoot some frequent problems you can have as a data manager. This section will expand with more experience and we invite all users to email with any problems you have.

- **A dataset entered in Add Data doesn't appear in the View all data table in metadatabase:** Make sure the vector or field ID'S have been entered. You have to give one even if you have no field. Call it NONE.

- **The theme added with the add data button doesn't appear in the view:** Probably the scale of the view is too big or too small for the level of accuracy of the data. You can solve that by going to the menu theme, properties. Click on the icon display on the left side and delete the min and max value. Your data will appear on the screen.

- **Error message when adding data from the add data table:** Check the location path and the spelling of the filename in the metadatabase.