

Biotics 4.0 Installation, Configuration, and Administration Guide

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1. INTRODUCTION

1.1. Purpose of this Document

The purpose of this document is to provide an overview of the installation and configuration process for Biotics. In addition, this document provides information on how to perform administrative functions, such as defining new users and backing up the system.

For complete details on how to use Biotics, refer to the *Biotics User's Guide* available on-line within Biotics.

1.2. Overview of the Installation and Configuration Process

Installation and configuration of Biotics is done in the following steps:

Prepare Technical Environment

The prerequisite hardware and software is acquired, installed, and configured for the server(s) and client machines. Oracle and MTS are installed and configured on server and client machines as detailed in the document *Oracle and MTS Installation and Configuration Guide for Biotics 4*.

Convert Data

Data are converted from legacy database(s) and imported to Biotics 4 database.

Install Tracker and Administrator

Tracker and Administrator software is installed on the server and client machines.

Create Extensibility

Extensible tables are created, dynamic tabs are configured, and optional data are loaded.

Install Mapper

Mapper software is installed on the server and client machines.

Define Coordinate System

The coordinate system to be used for all theme data are defined.

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Set System Settings	General settings, such as the province/state code, are set.
Integrate Reference Theme Data	Reference theme data are acquired, imported, restructured, and defined to Mapper. Legends are established for the themes.
Define Index Theme	The index theme used to set the "work area" is defined.
Configure Zoom By	Themes are made available for use with the Zoom By function, which allows users to quickly zoom to a specific geographic location by searching existing theme data.
Modify Scenes	The scenes that Mapper automatically loads when working with element occurrences, managed areas, and sites are modified to include local data.
Define Spatial Attributes	Information to be automatically calculated by Mapper when a feature is created is defined.
Modify Database Views	The database views that Mapper joins to the shapefile data are customized.
Create Managed Area and Sites Themes	Themes are created for Managed Areas and Sites.
Create Element Occurrence Themes	Themes are created for Element Occurrence Sources and Element Occurrence Representation Polygons.
Configure Powerpack Mapper	Map types and templates are defined.
Put Mapper into Production	The system is tested, staff are trained, and Mapper is put into production.

1.3. Biotics Software Components

Biotics includes four primary applications, described below. Each application provides a windows interface and manages data stored within a common Oracle database.

Tracker	Provides data management capabilities for all of the tabular data ported from BCD and a number of new methodological enhancements.
Mapper	Provides spatial data management capabilities through a custom ArcView GIS interface. Supports the spatial EO methodology.
Administrator	Interface for managing security, system options, and extensibility.
Exchanger	Utilities for data import/export and bi-directional data exchange.

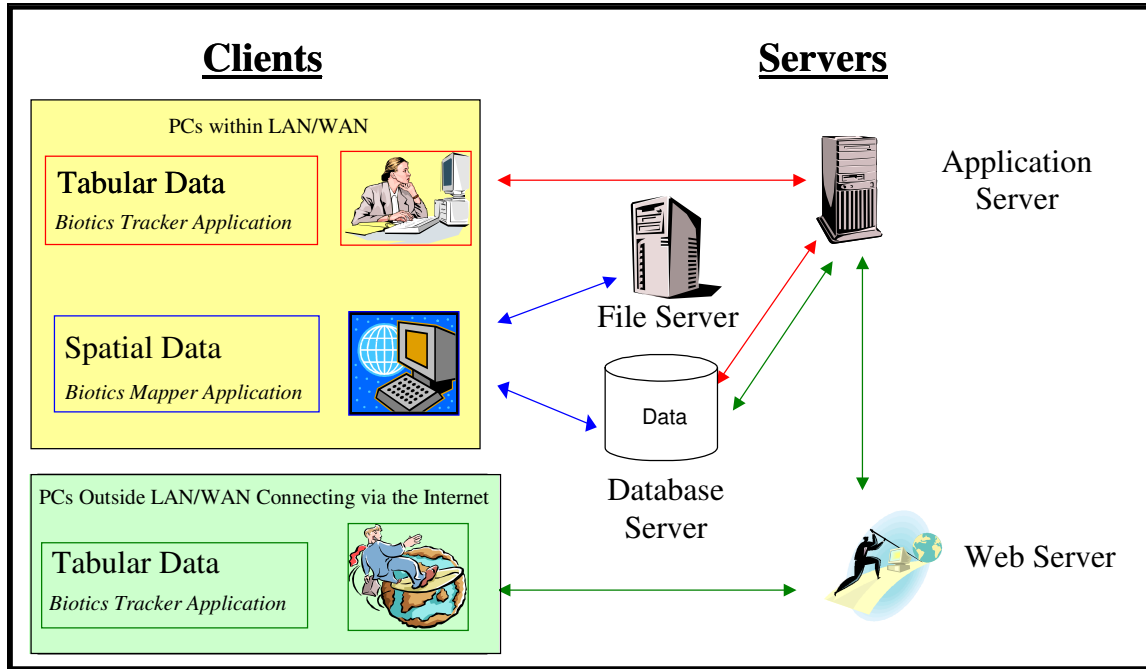


Figure 1-1 – Biotics Architecture Components

The above figure illustrates all of the logical components. The server components may be installed on separate computers or may be installed on the same computer. Biotics requires software to be installed on the client (each user's computer) and one or more servers depending on a member program's configuration. Each application accesses data stored within the Oracle database. The Biotics Tracker application connects to the database through a middle tier called an Application Server, while the Biotics Mapper application connects to the database directly. Users unable to directly access a member program's computer network may use the Biotics Tracker application (but not the Biotics Mapper application) by connecting through the Internet. A web server is required to support this configuration. Biotics Mapper accesses spatial data stored in ArcView shape

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files that reside on a file server. The following tables provide a more detailed look at each component.

Components in common between the Biotics Tracker and Biotics Mapper applications:

Component	Description	Required Software
Database Server	Manages all of the non-spatial Biotics data.	Oracle server (8.1.7 or later) running on any supported operating system.

Components specific to the Biotics Mapper application:

Component	Description	Required Software
Biotics Mapper Client	The user interface for the Biotics Mapper application.	Windows NT/2000/XP ArcView (3.1, 3.2, 3.2 ^a , or 3.3) Oracle client (8.1.7 or later) with a configured Net Service Name. If accessing map data from an ArcInfo or ArcStorm server, NFS must be installed.
Biotics Mapper File Server	The Biotics Mapper application software and managed spatial layers are stored on a file server. Other GIS reference layers can be stored elsewhere as long as they can be mapped to a drive.	Microsoft Windows NT, 2000, or 2003 will perform best for the Mapper application software, but GIS reference data may be served from any operating system.

Components specific to the Biotics Tracker application:

Component	Description	Required Software
Biotics Tracker Client	The user interface for the Biotics Tracker application.	Windows 98/NT/2000/XP
Application Server	Manages the Biotics COM objects that perform business logic, data access, and data transport.	Microsoft Windows NT with Microsoft Transaction Server (MTS) (MTS is free), Windows 2000, or Windows 2003.
Web Server	Manages http requests. Required for Biotics Tracker application users connecting remotely via the Internet.	Microsoft's IIS (comes with NT, 2000, and 2003)

The following table lists the deployment options for Biotics:

Option	Description	Comments
Biotics Tracker and Mapper	Both Biotics Tracker and Mapper applications are installed.	Not all users need to run both applications.
Biotics Tracker only	The Biotics Tracker application may be utilized by itself without Biotics Mapper. Programs who need more time to prepare for Biotics Mapper or who want to use their own GIS may deploy this option.	Programs can add Biotics Mapper at a later date. Programs can use their own GIS application. These programs will be responsible for any integration with Biotics Tracker.

1.4. Biotics Mapper Architecture

Biotics Mapper is made up of a number of components that all work together. This section briefly describes these components.

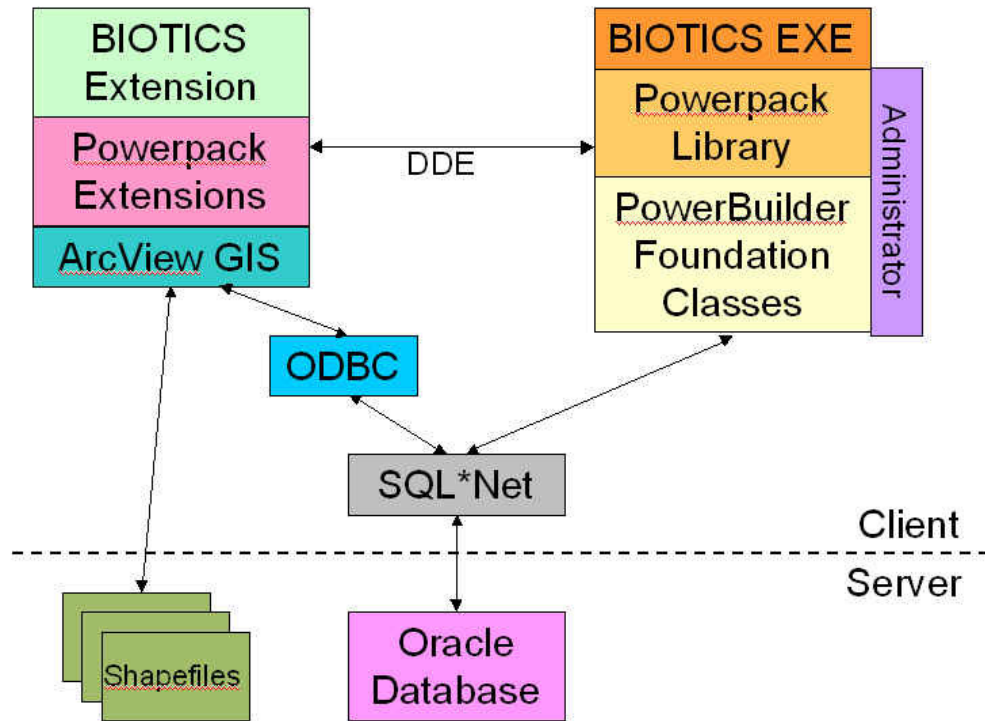
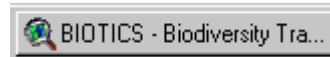


Figure 1-2 – Biotics Mapper Software Architecture

ArcView

ArcView (by ESRI) provides the GIS engine, the user interface, map display, and GIS functions used by Mapper. It is installed prior to Mapper. All Mapper tools are embedded in the standard ArcView user interface (to the user they appear as normal ArcView functions). Mapper tools make extensive use of *Avenue scripts* (Avenue is ArcView's programming language).

The ArcView component of Biotics Mapper shows up on the Windows task bar as follows:



Powerpack Extensions

Powerpack is a product within a product. It provides 75% or more of the GIS functionality required in Mapper. These extensions extend the functionality of ArcView, and make common tasks easier to perform. The extensions are written using ArcView's programming language, Avenue.

Powerpack Navigator allows you to add or remove themes from the view, manage legends, manage filters, zoom to locations, and manage multi-user shapefiles.

Powerpack Designer helps users create, edit, delete and query shapes.

Powerpack Mapper produces paper maps.

The Powerpack component of Biotics Mapper does not show up on the Windows task bar.

Biotics Extension

The Biotics extension provides the remaining GIS functionality that Powerpack does not deliver (the functionality that is specific to the Heritage Business), such as the "Examine Separation Distance" function, and the generation of EO Representation Polygons from Source Features.

The extension does not show up on the Windows task bar.

Shapefiles

Shapefiles are ArcView's proprietary, native, storage format for shape data. They are used to store the Source Feature, EO Representation, Managed Area, and Site shapes, and consist of at least 3 files:

.SHP
.SHX
.DBF

Typically there are 4 additional index files for each shapefile: .AIN, .AIH, .SBN, and .SBX.

The default location of the "master" shapefiles is the \Biotics\Themes\Biotics directory on the server.

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There is also a mirror set of “archive” shapefiles for each Biotics shapefile that stores edited & deleted shapes.

The default location of the “master” archive shapefiles is the \\Biotics\Themes\Biotics\Archive directory on the server

Shapefiles are created during installation, and do not appear on the Windows Taskbar.

ODBC

ODBC is a standard that allows any software program (ArcView, Excel, Word, etc) to talk to any database (dBase, Oracle, SQL Server, etc). It is implemented by a main ODBC program and “ODBC Drivers” that must be installed on each machine.

The main ODBC program (EXE and DLLs) is usually installed with Windows (into the winnt\system32 directory). If it is not present, the Oracle installation program will install it.

The ODBC Drivers (DLLs) are installed by each database program (usually into the winnt\system32 directory). The Oracle ODBC Driver will be installed by the Oracle installation program.

The ODBC program is accessed using the Windows Control Panel.

Using the ODBC program, you create and configure “Data Sources” for each database that you want to access. Mapper will create an ODBC data source for the Biotics database during installation. Data Sources are saved in the Windows Registry.

A Data Source based on an Oracle ODBC Driver (as is the case in Mapper) simply references the name of an Oracle “Alias”.

Beware of the old 16 bit version of the ODBC program on the computer. The current/proper version of the ODBC program is the 32 bit version. The 16 bit version will cause problems (ArcView will not be able to access the Data Sources).

ODBC does not appear on the Windows Taskbar.

SQL*Net

SQL*Net is the Oracle software that allows client machines (workstations) to talk to the Oracle database on the server. It must be installed before Mapper.

Once installed, you must configure a Net Service Name that specifies the physical location of the Oracle database.

SQL*Net does not appear on the Windows Taskbar.

Powerpack Library and Biotics EXE

Complex application components, such as the data entry forms and Navigator, are provided by custom windows-based programs. These programs communicate with ArcView through DDE, and are developed in PowerBuilder.

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The PowerBuilder component of Mapper shows up on the Windows task bar as follows:



Oracle Database

Tabular data created and maintained using Mapper are stored in a relational SQL database (Oracle). It is a fully multi-user environment. Oracle starts up automatically with Windows, and stops when Windows shuts down.

Oracle does not show up on the Windows task bar when Mapper is running.

DDE

DDE (Dynamic Data Exchange) allows two programs to talk to each other (send messages to each other). It is built into the Windows Operating System. This is how the ArcView part of Mapper communicates with the PowerBuilder part of Mapper.

Most DDE communications are logged in the ArcView Interface Monitor.

Occasionally the DDE connection between the ArcView and PowerBuilder parts of Mapper can be broken. When this happens, the application will stop working properly. For example, you will click on the Navigator button, but the Navigator window will not open. You must exit Mapper (and manually end the PowerBuilder part using the EXIT button on the PowerBuilder window) to rectify this problem.

2. PREPARING THE TECHNICAL ENVIRONMENT

Before you install and configure Biotics, you must first prepare your technical environment. This includes the server, database, and client machines.

2.1. Server

The server components can be deployed on a single computer or across multiple computers. As a very general guideline, here are some ways the components might be deployed starting from the most minimal configuration:

1. Database server, application server, and file server all on one computer.
2. Database server on one computer; application and file server on another computer.
3. Database server, application server, and file server all on separate computers.

For the Biotics server, use the guidelines below to estimate whether your current hardware will be adequate to support the Biotics Mapper and Tracker applications.

Factors to consider when selecting a server include:

1. Number of users: Under 4 is small, 4 - 12 is medium, above 12 is large.
2. Oracle installation on the server (if Oracle is on another server, the resource load will be spread across the two machines).
3. The Size of GIS datasets (especially images)
4. Number of Element Occurrences in database, less than 4000 is small, greater than 20,000 is large.
5. The size and quantity of database queries by users

Depending on the current technical environment, some or all of the following steps may be required to prepare the server:

1. Install the hardware. The recommended hardware configurations for the server machine are:

	<i>Minimum Configuration</i>	<i>Medium Configuration</i>	<i>Large Configuration</i>
CPU	1 GHz	2.4 GHz	Dual 2.4 GHz
RAM	2 GB	3 GB	4 GB

If the server is hosting a large amount of GIS data such as images, dual network cards on the server will improve throughput.

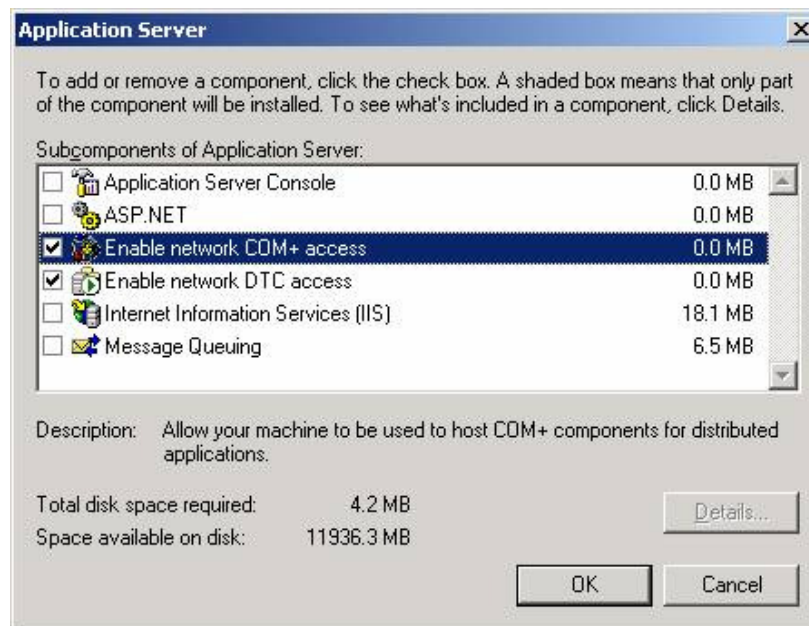
2. Install Windows 2000 (server version preferred, with Service Pack 4) or Windows 2003 for the application and file servers. A Unix server can be used for the Oracle database.
3. Decide where the Biotics Mapper software and theme data will be installed, and share the drives/directories if necessary. For example, you might install the Mapper software into \\server1\apps, and the theme data into \\server1\data.
4. Define Windows users.
5. Refer to the *Oracle and MTS Installation and Configuration Guide for Biotics 4* for details about installing and configuring Oracle and MTS for your Biotics server.

2.2. Configuration instructions for Windows 2003 server

Default settings changed significantly from Windows 2000 server to Windows 2003 server, necessitating a number of additional configuration changes in order for Biotics to work.

Enable Network COM+ Access

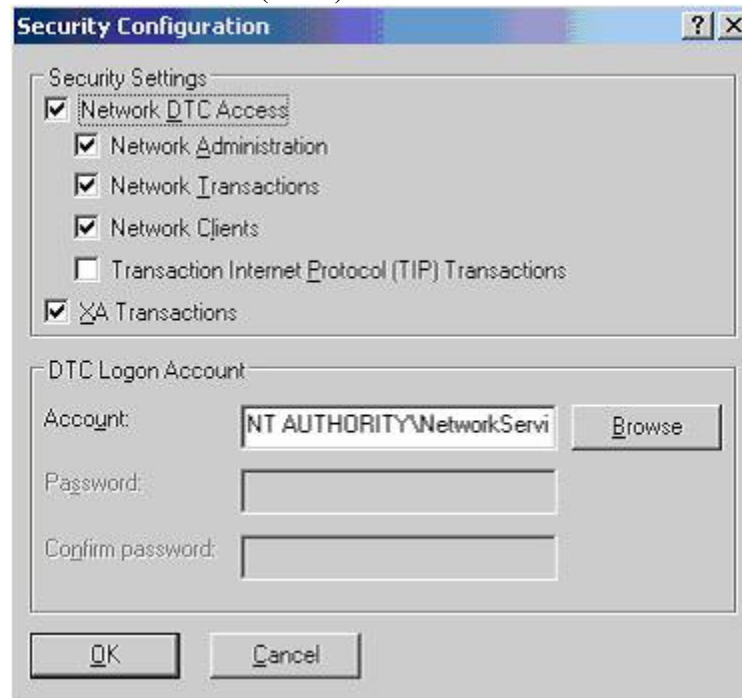
1. Click Start, point to Control Panel, and then click Add or Remove Programs.
2. Click Add/Remove Windows Components. (left side of window)
3. Select Application Server, and then click Details.
4. Click Enable network COM+ access and DTC access, and then click OK.
5. Click Next, and then click Finish.



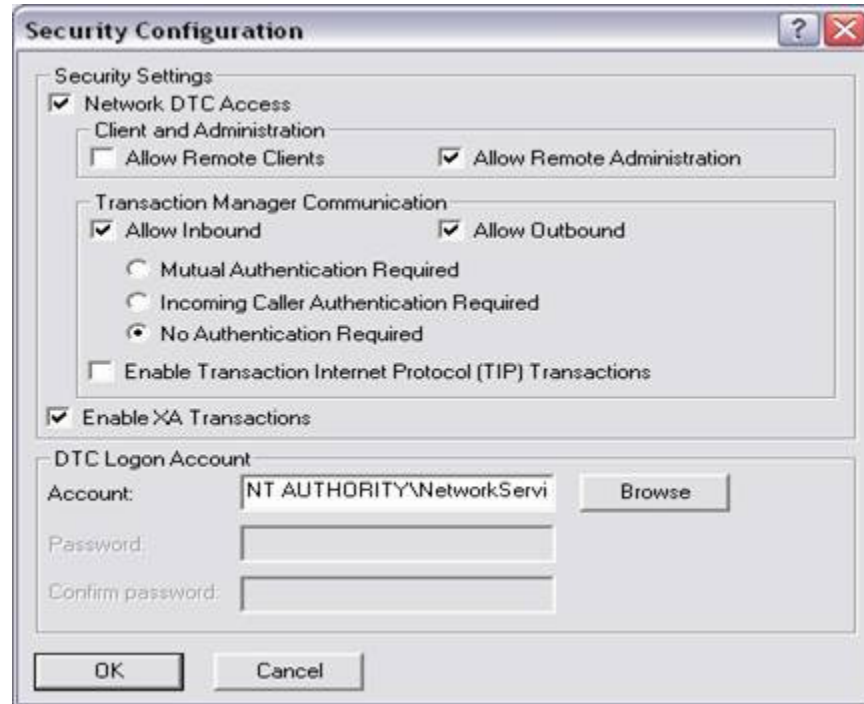
Configure MSDTC Security:

1. Click Start, point to Control Panel, Administrative Tools, and then click Component Services.
2. Expand Component Services to My Computer.
3. Right click on My Computer in the tree view and select Properties.
4. Click on the MSDTC tab.
5. Click on the "Security Configuration..." button.
6. Configure based on the below screen shots (different if service pack 1 has been applied or not):

Windows 2K3 Server (no SP)



Windows 2K3 Server SP1:



Ensure the executing user has Access and Launch permissions

For Windows Server 2003 SP2+

Server 2003 SP2 has a special group called "Distributed COM Users" which is automatically added in the COM+ Security Limits of the machine. Users need to be added to this group who will need access to run COM+ components (i.e. usually the ALL_DOMAIN_USERS groups for the domain will be added).

1. Click Start, point to Control Panel, Administrative Tools, and then click Computer Management.
2. Expand "System Tools" and then "Local Users and Groups"
3. Click on the "Groups" folder and double click the "Distributed COM Users" group in the right hand window.
4. Ensure that all domain/machine users which need to run COM+ components are added to this group. Typically the "Domain Users" group for the domain will be sufficient.
 - a. Right click "My Computer" located on the desktop or the Start menu and choose Manage.
 - b. Open the "Local Users and Groups" part of the tree and click Groups.
 - c. Double-click "Distributed COM Users" and click the Add button.
 - d. Add a domain-level group (e.g., NATURE\Tracker_Users) that contains users you want to have access to Tracker.
 - e. Click OK to confirm your choices and close the Group Properties window.

For Windows XP SP2 (and Windows Server 2003 SP1)

Open COM+ Component Services.

1. Click Start, point to Control Panel, Administrative Tools, and then click Component Services.
2. Expand Component Services to My Computer.
3. Right click on My Computer in the tree view and select Properties.view and select Properties.
4. Click on the COM Security tab.
5. Click on "Edit Limits..." (the next step will need to be applied to both "Edit Limits..." buttons under "Access Permissions" and "Launch and Activation Permissions").
6. Ensure all Domain/Computer users who will be accessing the COM+ components have both Local and Remote Access. Typically the "Domain Users" group for the domain will be sufficient.
 - a. Right click "My Computer" located on the desktop or the Start menu and choose Manage.
 - b. Open the "Local Users and Groups" part of the tree and click Groups.
 - c. Double-click "Distributed COM Users" and click the Add button.
 - d. Add a domain-level group (e.g., NATURE\Tracker_Users) that contains users you want to have access to Tracker.
 - e. Click OK to confirm your choices and close the Group Properties window.

Ensure Windows Firewall allows MSDTC to access port 135

Configure Windows Firewall to include the MSDTC program and to include port 135 as an exception. To do this, follow these steps:

1. Click Start, and then click Run.
2. In the **Run** dialog box, type Firewall.cpl, and then click OK
3. In Control Panel, double-click Windows Firewall.
4. In the Windows Firewall dialog box, click Add Program on the Exceptions tab.
5. In the Add a Program dialog box, click the Browse button, and then locate the Msdtc.exe file. By default, the file is stored in the <Installation drive>\Windows\System32 folder.
6. In the Add a Program dialog box, click OK.
7. In the Windows Firewall dialog box, click to select the msdtc option in the Programs and Services list.
8. Click Add Port on the Exceptions tab.

9. In the Add a Port dialog box, type 135 in the Port number text box, and then click to select the TCP option.
10. In the Add a Port dialog box, type a name for the exception in the Name text box, and then click OK.
11. In the Windows Firewall dialog box, select the name that you used for the exception in step j in the Programs and Services list, and then click OK.

2.3. Client

Depending on the current technical environment, some or all of the following steps may be required to prepare the client machines:

1. Install the hardware. The minimum and recommended hardware configurations for the client machine are:

	<i>Minimum Configuration</i>	<i>Recommended Configuration</i>
CPU	400 MHz	1 GHz or better
RAM	256 MB	512 MB or better
Screen Resolution	1024 x 768 or higher	1024 x 768 or higher

2. Install Windows 2000 Professional, Windows XP, or Windows 2003.

Notes: Windows 3.x, Windows 95, and Windows 98 are not supported. The setup program will prevent you from installing the Biotics Mapper client on these versions of Windows.

For maximum performance and stability, make sure the file system on the computer is NTFS (Windows NT) not FAT (DOS).

3. In addition to these operating system requirements, a minimum of Internet Explorer 5 is required for Tracker clients.

4. Define users

In a peer-to-peer network environment, it is necessary to define users on each client machine (on Windows NT choose User Manager, on Windows 2000 choose Computer Management, Local Users and Groups). In a true client-server environment, where users are all defined centrally on the server, this is not necessary.

5. Install ArcView (3.2a or 3.3)

Note: ArcView can be installed on the server instead of the client if you prefer, but will run slower.

Running Arcview 3.x on XP requires the XP patch from ESRI.

6. Install Oracle client

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The Oracle client software must be installed on each client machine. This must include at least SQL*Net (2.x or higher) and the Oracle ODBC driver.

Choose the “Administrator” installation type for machines belonging to Biotics administrators, and choose “Custom” installation type for all other (end-user) machines, ensuring the ODBC driver for Oracle is loaded.

Once Oracle is installed, you must create a “Net Service Name” that points to the database. The Net Service Name can be any value (e.g. oracle_server).

Refer to the *Oracle and MTS Installation and Configuration Guide for Biotics 4* for details about installing and configuring Oracle for your Biotics clients.

7. Establish drive mappings

Every client machine must have one or more drives mapped to the location of the Biotics Mapper software and theme data on the server. The drive letter(s) that are assigned must be the same on all the machines. For example, every user might have a drive T: pointing to the location of the themes, and drive O: pointing to the Mapper software.

Further, if you choose to have each user's workspace on the network instead of on the local hard drive, you must also establish drive mappings to the workspace. For example, each user might have an H:\ drive that points to a personal workspace. In reality, H:\ maps to \\server1\users\smith when smith is logged in, \\server1\users\jones when jones is logged in, etc.

Drive mappings are best established using login scripts. However, they can also be established manually using “My Computer” or the “Windows Explorer”.

The drive mappings must be established before installing the software, because the full path to both the software and themes is stored in several places within the Mapper program. If you install Mapper as the system administrator to one location (e.g. D:\Software\Biotics), with the intention that users will access it from a different location (e.g. O:\Biotics, where O: is mapped to D:\Software), you will run into trouble. You should install the software to the location where it will be used (e.g. O:\Biotics).

In addition, if Mapper is to access map data from an ArcInfo or ArcStorm server, NFS must be installed and operational on each computer that will run Mapper, and drive mappings established to the NFS drives.

General Notes

Existing Biotics Installations: Installing Biotics without first uninstalling a previous version of Biotics is not supported at this time.

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Please be sure to uninstall an existing Biotics installation before installing again.

Installed Files: The installation package includes some software that Biotics depends on to run. If the software already exists on the target machine it will not be installed. See Section 23 for a complete listing of software that is checked/installed during the Biotics installation.

3. CONVERSION TO BIOTICS

3.1. Run the Master Build Script

This section details the steps necessary to build the Biotics database schema from scratch, should it ever be necessary to do so. This is a time consuming and meticulous process that should only be done when absolutely necessary.

The database is built using the *master_db_script.sql* script, also known as the master build script. This is merely a shell script that executes many, many other scripts. It will automatically spool output into log files for each step taken so that you can review them for errors. As a part of each step, a commit statement is generated to save the work previously done. When the script is completed, a table tracking the version of the script used to build the database is updated, a final commit is issued, and spooling is turned off.

The master build script does not include commands to build extensible tables. If you have extensible tables, you should modify this script to include a command that will build those tables or build them separately afterwards. Where you place this command depends on what tables you are building. They must be built after the main tables and indexes have been built, since extensible tables are dependent on one or more of these tables. You should consider any other dependencies when deciding when these tables are built. Currently, the script has a commented out field to build Central only extensible tables. If there are special dependencies, you should consider placing your command at this location.

Given the nature of the database, the master build script builds the schema in a specific order so that tables linked to other tables are built at the proper time. ***You should avoid at all costs rearranging the order of any commands in the master build script.*** Doing so may cause errors that may be difficult to identify until you attempt to install and use the application.

Before you start

1. You should have already created the tablespaces in which your tables and indexes will reside. You should have these names handy because you will be prompted for them.

2. You should be logged into SQL+ as the user used by the Biotics application.
3. You have downloaded the master build script and all the scripts it executes to your hard drive. At Home Office, you would need to check out everything in the projects\hdms\sql folder from CVS in order to obtain the latest scripts.
4. You have read the master build script at least once to understand and appreciate its execution.

Running the master build script

1. Execute the script with the following command:
`@ <path where file resides>\master_db_script.sql`
2. You will be prompted to supply the path name again without the backslash. This is used to locate the scripts that are executed. The output logs that the scripts generate are also placed in this path.
3. You will be prompted to supply the names of your tablespaces. The script allows for separate tablespaces for each type of table and index. For example, you may wish to place all of your spatial tables in one tablespace, and your element data tables in another, with system tables in yet another. The script also allows you to place indexes in separate tablespaces. This is not required, so if you have just one or two tablespaces, supply them for each appropriate prompt. If you make a mistake in typing a name, you will need to hit CTRL+C to abort the script and start over.
4. The script will then drop all main tables and indexes. If this is the first time you are building the database, you may wish to comment out this command to skip this step. This step is only necessary if you are rebuilding an existing database.
5. Next, the Tracker business and system tables and indexes are built.
6. Various Tracker utilities (particularly those used in Data Exchange) are built next.

7. Views used by both Tracker and Mapper are built next.
8. Sequences, stored procedures, and functions used by both Tracker and Mapper are then built.
9. Next, the domain tables are populated using scripts that insert the values for each table. The only domain tables not populated by this method are D_MAPSHEET and D_WATERSHED. Since these are exceptionally large lists of values, they are usually populated by dump files. The set of domain table insert scripts includes scripts for both of these tables, however. So if you wish to populate them at this time with an insert script, you should modify the master build script to include a command to execute these scripts.
10. Mapper-specific tables are built next.
11. The Data Exchange tables are then built.
12. The DB_VERSION table is updated to show the version of the master build script that was used to build the database.
13. A final commit is issued and the script is exited.

After running the master build script

As noted previously, the master build script spools the output of the above steps to output logs. These files are placed in the path that you specified at the beginning prompt. You should open each of these files and search for any occurrences of the word “error” in order to see if any errors were taken during execution. This is the most tedious part of the process, as some of the logs can be quite long and searches on “error” will flag things that aren’t actually errors (like words in exception code and user messages). But this is the best way to find out if any problems were encountered while the schema was being built. Some errors will be minor, like if an index was dropped that didn’t previously exist. But all errors should be investigated before proceeding further. If it becomes necessary to start over, this can be done by merely rerunning the script. Everything built previously will be dropped and the previous output logs will be overwritten.

The log files are listed below:

- hdms_drop_indexes.log
- hdms_drop_tables.log

- tables_indexes.log
- audit_system01.log
- utilities.log
- primaryentity.log
- sec_wl_ddl.log
- create_views.log
- NAVIGATOR_TABLES.log
- DESIGNER_TABLES.log
- MAPPER_TABLES.log
- BIOTICS_TABLES.log
- seq_proc.log
- dmla.log
- dmlb.log
- dmlc.log
- data_exchange.log

The last step in building the schema is to load data from System_Working_List.Dmp file. This data is in a dmp file because some of the columns are too long to be loaded through SQL+.

1. Disable constraints so data can be loaded. Perform the following commands:

```
alter table system_working_list_menu  
modify constraint sys_wl_menu_wrk_list_type_fk disable;
```



```
alter table system_working_list_menu  
modify constraint sys_wl_menu_p_sys_wl_menu_id_fk  
disable;
```



```
alter table working_list  
modify constraint wrk_list_working_list_type_fk disable;
```



```
alter table system_working_list_base_table  
modify constraint fk_system_w_system_wo_system_w  
disable;
```
2. Edit the batch file
C:\Projects\hdms\hdms\sql\linnet_scripts\ImpData.Bat
which loads System_Working_List.Dmp.
3. Run the batch file. Verify the results by comparing the import file log (System_Working_List_IMP.log) to the export file log (System_Working_List_EXP.log)

4. Enable the constraints that were disabled with the following commands:

```
alter table system_working_list_menu  
modify constraint sys_wl_menu_wrk_list_type_fk enable;
```

```
alter table system_working_list_menu  
modify constraint sys_wl_men_p_sys_wl_menu_id_fk  
enable;
```

```
alter table working_list  
modify constraint wrk_list_working_list_type_fk enable;  
alter table system_working_list_base_table  
modify constraint fk_system_w_system_wo_system_w  
enable;
```

5. Load the following table that depends on the data loaded in step 2.

```
@ <path where the file  
resides>\dm\system_dm\System_Working_List_Base_Table.  
e.sql
```

3.2. Run the Data Conversion Software

Below are the steps needed to prepare a computer for data conversion. These instructions assume that the target database has been prepared, with core tables and stored procedures loaded. Though not included as part of this process, it might be useful to install a Windows client such as DBVisualizer to query the contents of the data conversion logs. Of course, the client doesn't need to reside on the same computer where data conversion is to take place but it does need to be able to access the target database.

Required software on the target computer:

1. Oracle client 8.1.7 or above
2. WinZip

Prepare Computer for Using Conversion Program

1. Get Oracle configured on the target computer (*if necessary*): Set up a Net Service Name to connect to the conversion database.
2. Download the latest xml2biotics.zip file from:
<http://cvs.natureserve.org/index.cgi/hdms/dataconversion/Perl/>
by clicking on Download Tarball, and save it to a directory.

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3. Un-package the Data Converter onto the target computer by double clicking on the tarball saved in the above step. When it opens in WinZip, use the 'Extract' option and set the 'Extract to' path to any valid mapped drive or path (i.e., 'c:\', 'd:\', 'c:\mypath\dataconversion', and so on).
4. Once the Data Converter is unzipped onto the Target computer, download the conversion spreadsheets from:
http://cvs.natureserve.org/index.cgi/hdms/dataconversion/conversion_spreadsheets/ and scrolling all the way down to the bottom and clicking on download Tarball.
5. Place the configuration spreadsheets in the unzipped directory structure: The conversion spreadsheets should be put in <extract drive>\<optionalpath>\projects\hdms\dataconversion\conversion_spreadsheets. For subnational data, the name is 'subnational_configuration.xls'. If edits are made, make sure that the configuration spreadsheet is also saved as a tab-delimited '.txt' version as well.
6. Get the latest data files: Place these in a local XML directory (make sure that you specify the right path when running the GUI). Note that the default path that shows up in the GUI entry box is c:\projects\hdms\dataconversion\xml_files\<version> (subnational version names here are defaulted to "<version>hp")
7. Invoke the GUI application: Using Windows Explorer to navigate to the <extract drive>\<optional path>\projects\hdms\dataconversion\Perl\bin directory and double-click on the 'xml2biotics_gui.exe' application. This action will spawn three separate "windows" that are all part of the application but before enabling the application you will be required to login to the target database where data conversion will take place. The three windows that become visible after login are:

DOS prompt: where run-time messages are spooled.

Data Conversion Application Window: used to validate files, prepare for and initiate the actual data conversion.

Warnings/Messages Window: where warnings and messages are logged during the validation, preparation, initiation phases, and after the application has been kicked off.

Initiate Data Conversion

Set the fields on the 'Data Conversion Application' window. Each step is described briefly below:

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1. Specify the output file name: File into which messages/warnings are spooled during run-time. This text may also get sent to the 'Warnings/Messages' window.
2. Pre-load conversion related tables: This step will be **bolded** as mandatory if the application detects that key tables are missing. If not explicitly recommended, skip.
3. Set the org_unit_code: For subnational data, this usually matches the state code abbreviation. To the right of the codes option menu the org_unit_id value that corresponds to the selected org_unit_code is displayed.
4. Set the version. For subnational data, this also includes sub-steps 4b, setting the nation, and 4c setting the subnation (the application will attempt to set the appropriate values).
5. Set the XML file path. If ignored, defaults to value shown. If the path is change, use the 'Validate Path' button to verify that both the new path exists and contains the necessary XML files in it.
6. Run the 'populate_ranks' script. If no data are detected in the RANKPATTERNS table this step will be bolded as mandatory and the box automatically checked.
7. Run the 'cleanup_logs' script. The application will automatically check/uncheck box as necessary.
8. Validate conversion spreadsheets: This step brings up a separate application that allows validation of one or more conversion spreadsheets associated with the current conversion (i.e., if subnational, all spreadsheets specified in the 'subnational_configuration.xls' file are displayed).
9. Set the selection mode: Setting it to 'Single' brings up the list of tables associated with the selected subject area (but restricts the run to one subject area at a time).
10. Select Areas/XML files: Selecting from one or the other scrolling list automatically finds its matching elements. These are extracted from the subnational_configuration.xls' spreadsheet).
11. Run the data converter: A pop-up box summarizing all the conversion parameters will appear allowing you to back-out if any of the displayed parameters haven't been set correctly.

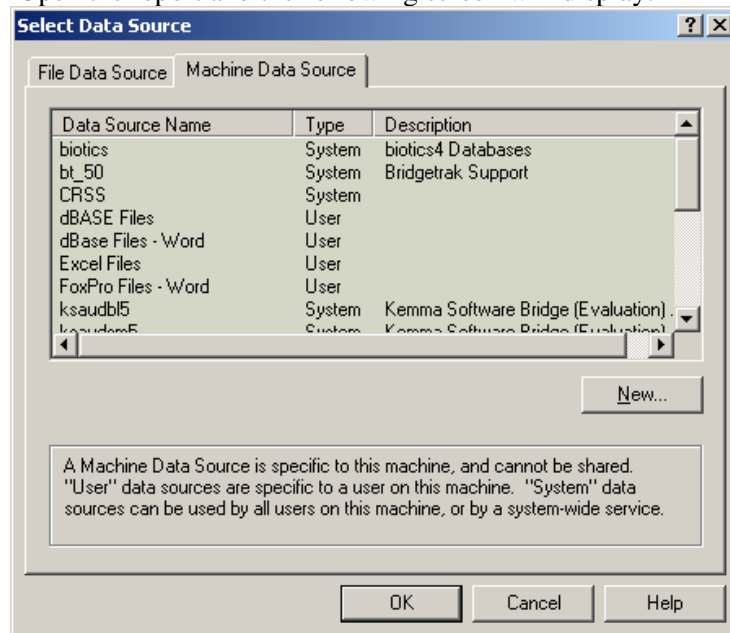
Monitoring the conversion

The easiest way to monitor the conversion is using a Database Query tool to query the tables being converted.

3.3. Generate Error Reports

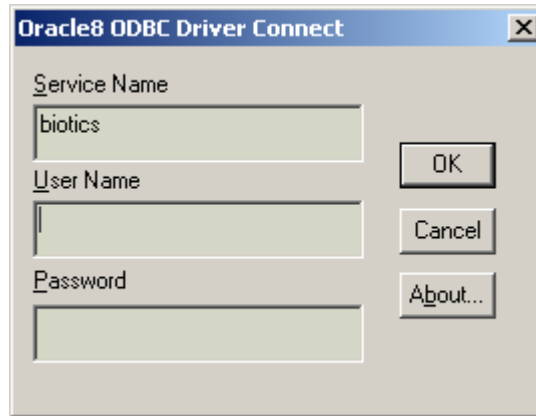
There are standard reports created in Crystal Reports for reporting errors in data conversion. These reports can be sent to the installing program with a brief document interpreting the errors after initial and final data conversion. Crystal Reports 8.5 is required to run the reports:

1. Copy the following reports onto a local drive:
\\cypress\groups\projects\Biotics\networkrollout\conversion\reports\
DataTruncation.rpt
\\cypress\groups\projects\biotics\networkrollout\conversion\reports\
DataConversion.rpt
2. Create an ODBC connection to the destination database and schema. This is most likely in the location where the conversion was initially run.
3. Open the report and the following screen will display:

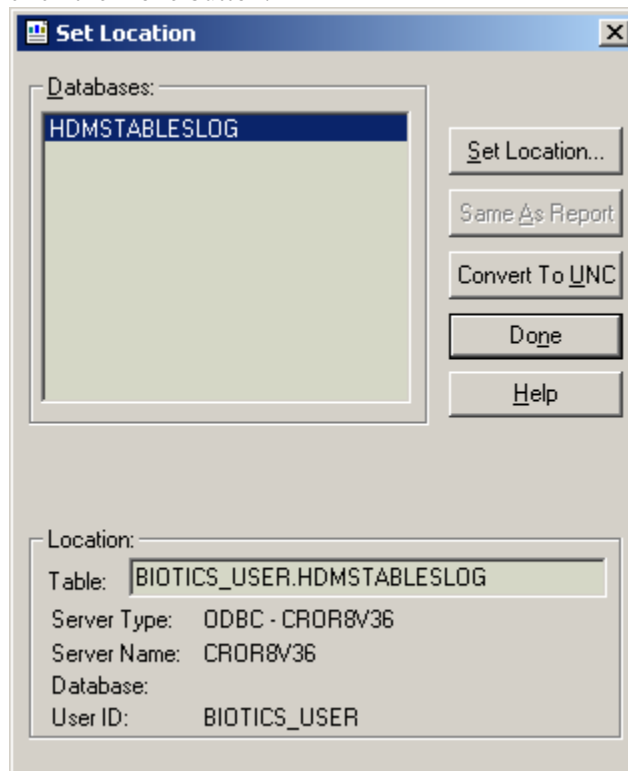


4. Choose the ODBC Driver from the Machine Data Source tab.
5. At the Oracle8 ODBC Driver Connect, type in the connection information:

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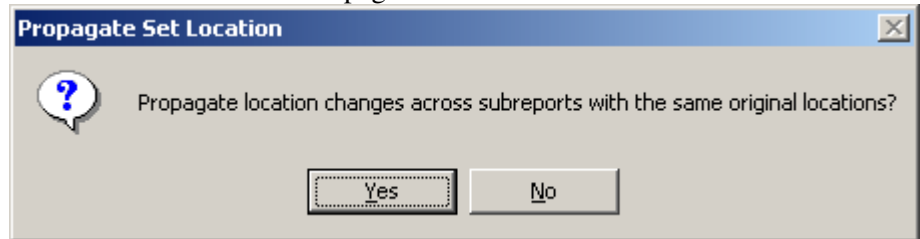
6. At Select Data Source, go to the Machine Data Source tab and Choose the correct ODBC driver again. This will open the report without any data in it.
7. Choose Database>Set Location and type in the correct user information in the Table Text box in the Location section. Then click the Done button.



8. You will then have to select the data source again from the Machine Data Source tab and fill in the connection information. (this should be the user ID for which you're trying to open the report (e.g. biotics_user_ny)).

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9. Click Yes in the Propagate Set Location window.



4. MIGRATING/RESTORING BIOTICS

4.1. Migrating Biotics 4.x to a new Server or Restoring it from a backup

Assumptions

1. Biotics 4 database already exists and is populated with data from the Biotics 4 Oracle database.
2. The Biotics 4 database is in the same Oracle instance

Migrating the Oracle database

To migrate the data you will need to take the export files (they have the *.dmp extension) from your nightly backup on the production server and import them into the new database.

To create the database users and tablespaces automatically, run the script entitled "bio4tablespace9i.sql". This script, which can be downloaded from Knowledge Base article 471, functions for Oracle 9i or 10g databases. Run the script in SQLPlus while logged in as the SYSTEM user. The Oracle 10g installation document refers to this script on page 66 - using this script to create the tablespaces and users will save you a LOT of work.

When importing biotics_user and biotics_del schemas the biotics_del schema must be imported first as the biotics_user schema needs to grant privileges to the biotics_del tables. Objects will have to be recompiled in the biotics_user schema database. The check_invalid script and directions for recompiling the biotics_user schema database can be found in Knowledge Base article 263.

The command for doing an import is similar to the command for doing the nightly export. An example of import commands follows, although you will need to replace a number of the variables in the command below as appropriate. From the dos prompt type the following commands – please note that each ‘imp’ command is on ONE single line, despite how it appears here:

```
imp biotics_del/password@oracle_server  
file=c:\your_dir\your_biotics_del_exp_file.dmp  
log=c:\your_dir\log_file_name.log fromuser=biotics_del  
touser=biotics_del
```

```
imp biotics_user/password@oracle_server  
file=c:\your_dir\your_biotics_user_exp_file.dmp  
log=c:\your_dir\log_file_name.log fromuser=biotics_user  
touser=biotics_user
```


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You will get errors compiling the views when you import the biotics_user data, this is ok as long as all the data loads. All objects should be compiled after the load using the check_invalid script, according to the attached check_invalid.readme directions regarding the script, if they do not compile you have a problem.

1. Map drives on the server as was done previously, using the same ODBC_DSN.

2. Move the entire BIOTICS directory to the new location on the server.

5. INSTALLING TRACKER

5.1. Tracker Server Installation

Before installation of the Tracker Server software, the Windows MTS application server must be configured according to the document *Oracle and MTS Installation and Configuration Guide for Biotics 4.0*.

Existing Tracker Installations: Installing Tracker without first uninstalling a previous version of Tracker is not supported. Please be sure to uninstall an existing Tracker installation before installing again.

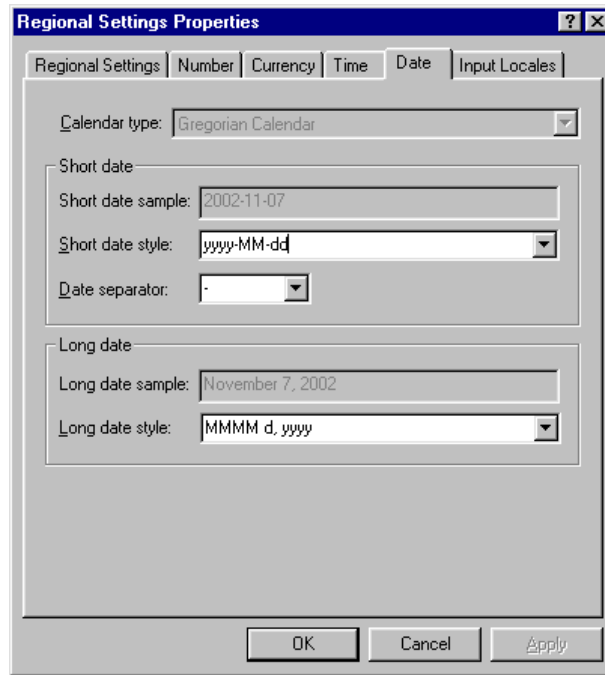
Registry Entries: Please take care to preserve the case of the keys when modifying and adding keys. Server_name is not the same as server_name.

Pre-Installation

1. Windows NT 4
 - a. Download and install Service Pack 6a
<http://www.microsoft.com/ntserver/nts/downloads/recommended/sp6/allsp6.asp>
 - b. Download and Install the NT Option Pack (this includes IIS and MTS)
 - c. <http://www.microsoft.com/ntserver/nts/downloads/recommended/NT4OptPk/default.asp>
2. Windows 2000
 - a. Download and install Service Pack 3
<http://www.microsoft.com/windows2000/downloads/servicepacks/sp3/default.asp>
3. Windows 2003 – follow instructions in section 2.2 Configuring Windows 2003 for Biotics
4. Procedures for steps 5, 6, 7 and 8 are detailed in the document *Oracle and MTS Installation and Configuration Guide for Biotics 4.0*.
5. If the server installation of Oracle is on a separate server than you are installing the Tracker and Mapper server applications, then you will need to complete the following steps:
 - a. Install the Oracle Client if Oracle is not running on the server.
 - b. Create a Net Service Name for the Oracle Client.
 - c. Set up the Transaction Server for use with Oracle.
 - d. (Optional) Use the TestOracleXaConfig.exe tool, which is included with MTS to verify that Oracle Services for MTS is configured properly.

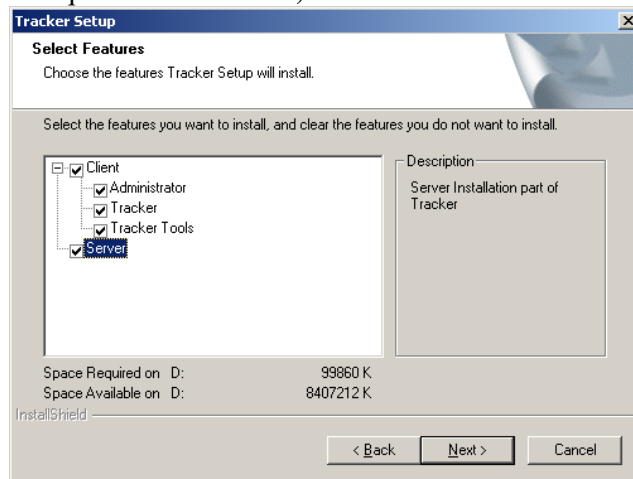
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6. In (Start, Settings) Control Panel, Regional Options, on the Date tab, change the Short Date to 'YYYY-MM-DD' and ensure that the separator is the dash (-).



Install server software

1. Run the Tracker Setup program and choose the Server component (Client should be installed as well but is not required on the server)

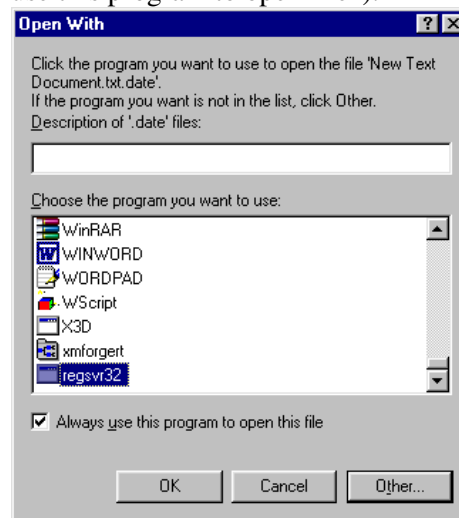


2. Note: (It is recommended to install the Tracker client as well as the Tracker server on the application server for testing purposes) However, if you do select the Server install but choose **not to**

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install the client there are a few additional steps to get the Tracker server working properly:

- a. After the installation is finished navigate to the tracker application directory using the Windows Explorer.
- b. Use the RegSvr32.exe tool (usually located in the WINDOWS\System32 or WINNT\System32 directory) to register each DLL in the *Components* and *Xceed* directories. To register one, or more, DLL's in a directory:
 - i. Highlight DLL's to be registered.
 - ii. Right-click on selection and select "Open With..." from the context menu.
 - iii. When the "Open With" dialog appears click the "Other" button.
 - iv. Using the second "Open With" dialog that pops up, browse to the Windows system directory (normally C:\Windows\System32 or C:\WinNT\System32) and select the file regsvr32.exe.
 - v. Click Ok
 - vi. Now there will be an entry in the "Open With" dialog labelled "regsvr32". It should be selected also, but make sure that it is by clicking on it. (It is recommended that you uncheck the option at the bottom of the dialog that reads "Always use this program to open file").

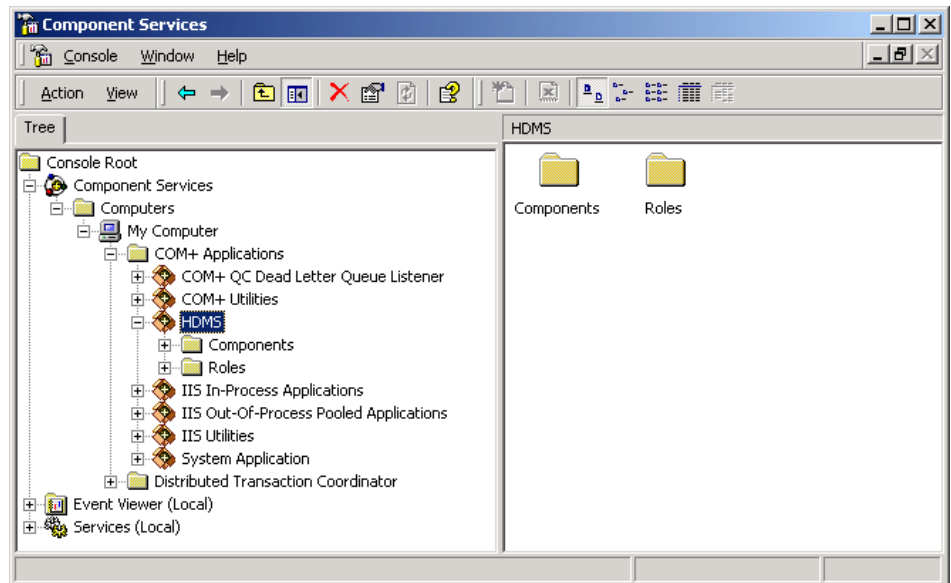


3. (Optional but recommended) Change the account that the MTS/COM+ Package Runs Under: By default the HDMS

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package is installed so that it executes under the Windows user that is currently logged in. This means that the current user must stay logged in to the server all of the time (locking the console when not in use). If the current user logs out, the package will be shutdown, and no one will be able to run Tracker. If desired, you can change the settings of the packages to run under a specified Windows user, eliminating the requirement for a user to be logged into the server at all times. To do this:

4. Open the MTS/COM+ console by choosing Settings → Control Panel from the Windows Start menu. Choose the Administrative Tools icon on the control panel, then choose Component Services. In the Component Services window, navigate to the Tracker application found in the list of COM+ Applications as shown below.



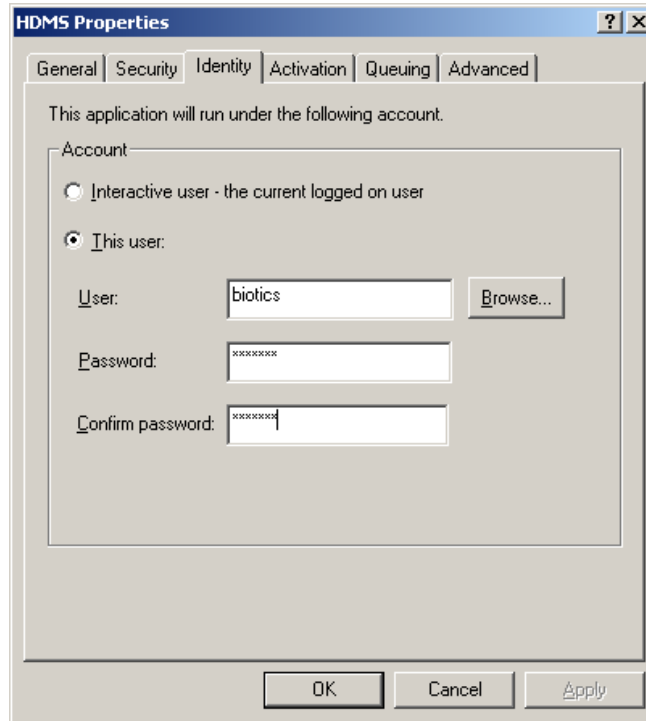
5. Select the “HDMS” package in the MTS/COM+ Console
6. Choose Properties from the Actions menu
7. Click on the Identity Tab
8. Select the ‘This User’ radio button, and enter the User and Password information. You can choose any user account that has privileges to run the application. On a Windows Domain, we recommend choosing a domain user account that has “power user” privileges. You can specify the domain user using the following format DOMAIN\user. (Example: NSNT\jw). You may want to create a user account specifically for this purpose.

For Windows 2003:



- Select the “Network Service” account and hit Okay to close the window.

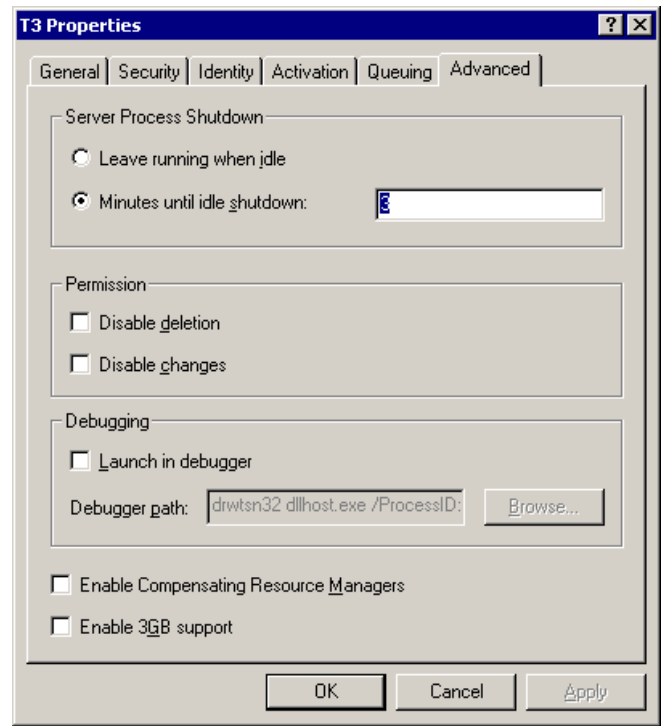
For Windows 2000:



- Select “This user:” radio button and enter the User and Password information. You can choose any user account that has privileges to run the application. On a Windows Domain, we recommend choosing a domain user account that has “power user” privileges and whose password WILL NOT change. You may want to create a user account specifically for this purpose if not already done. You can specify the domain user using the following format DOMAIN\user (Example: NATURE\biotics) or by browsing to the user.
9. Click OK.
 10. (Optional but recommended) Increase the amount of time that components remain running when idle. By default the HDMS package is installed so that components shutdown after 3 minutes of being idle – which means the next time a user does something that requires the component, the user will experience a significant delay while the component is started. Increasing the time limit will therefore improve application performance. Make sure you set the time limit to a reasonable number (e.g. 15 minutes), rather than an artificially high number (e.g. 500 minutes) to ensure that resources on the server are not used unnecessarily when no one is using Biotics. To increase the time limit:

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- a. Select the “HDMS” package in the MTS/COM+ Console
- b. Choose Properties from the Actions menu
- c. Click on the Advanced Tab
- d. Increase the value for “Minutes until idle shutdown”



- e. Click OK

11. Modify the registry key
HKEY_LOCAL_MACHINE\Software\Linnet\Framework\Database **Connection_string**
12. This is the connection string the Tracker server users to connect to the Oracle data source. This string must use the Oracle OLEDB provider for Oracle and NOT the Microsoft OLEDB provider for Oracle because the Microsoft provider does not support CLOB fields.
 - a. String should be as follows
PROVIDER=OraOLEDB.Oracle.1;DATA
SOURCE=ORACLE_SERVER;USER
ID=biotics_user;PASSWORD=your_password

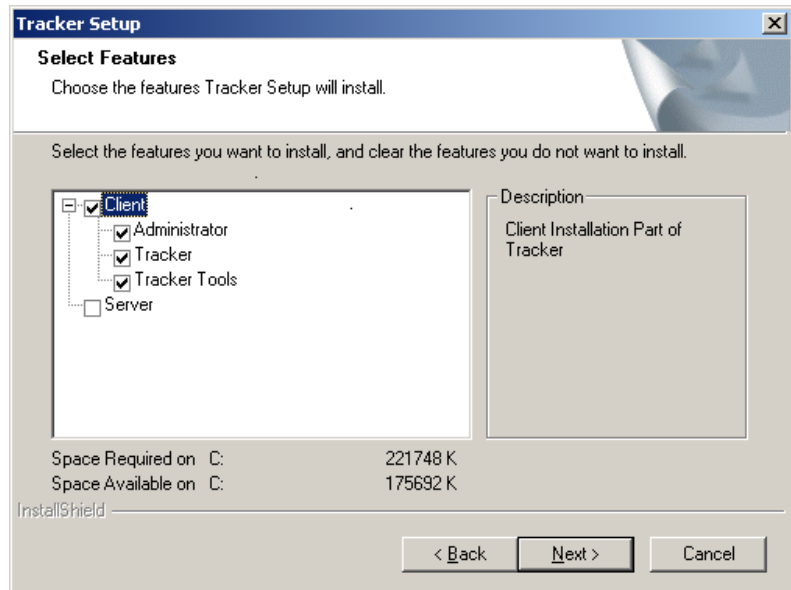
13. (Optional) A program may modify the location of the accounts.com file in order to map only one drive letter when running Biotics Mapper on the client machine.
 - a. Modify the key
HKEY_LOCAL_MACHINE\Software\Linn
et\HDMS\Logon **AuthorizationFile** to
point to a new location in a directory
underneath the Biotics mapper server
installation.
 - b. Create a new directory for the
accounts.com file in a subdirectory of
the Biotics Mapper server installation.
 - c. Note: Do not delete the C:\Program
Files\Tracker\Authorization directory,
the application checks for this directory.
 - d. Move the accounts.com file to the new
directory.

14. Go into the Biotics 4.0 Administrator program:
 - a. Choose Set Database and change the
password to match that set in the
database
 - b. Choose Users and define an “mgr” user
for Biotics.
 - c. Choose Configure System Options and
set the MA/Site prefix, Set Biotics to
Yes and set the OrgUnit.

5.2. Configure Clients & Users to Run Biotics Tracker

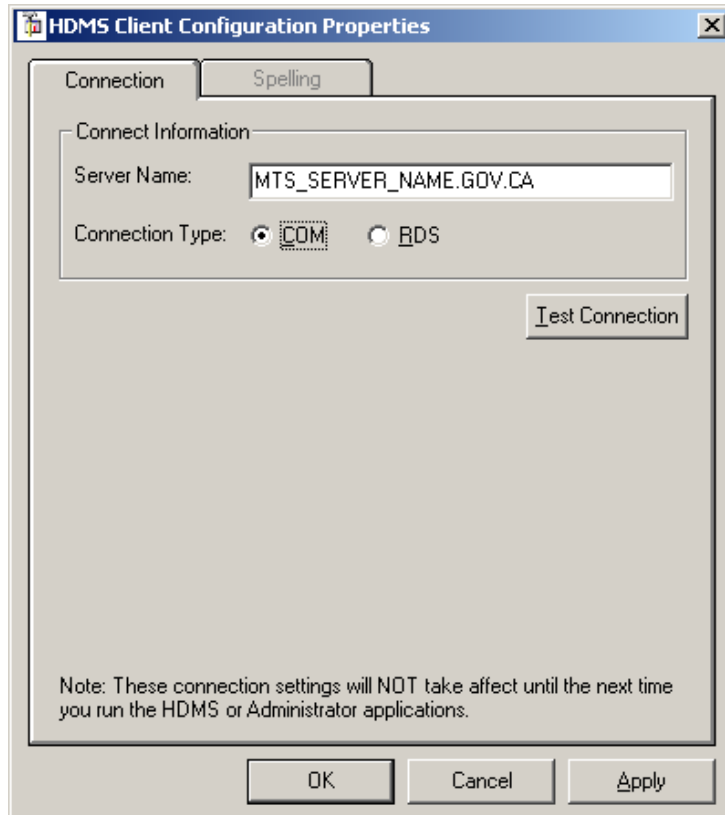
1. Run the Tracker setup.exe program on the client machine.
2. Select only the client part of the installation, the administrator component is optional.

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3. After the installation has completed successfully, run the Client Configuration application located in C:\Program Files\Tracker\HDMS_ClientConfig.exe to set the MTS Server name (the server with the Tracker server software) and Server Communication method (RDS/COM), COM is faster.

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4. If the HDMS_ClientConfig.exe does not accept the MTS server name it may have to be changed manually in the registry key `\\KEY_LOCAL_MACHINE\\SOFTWARE\\Linnet\\HDMS\\server_name`
5. Click the test connection button to make sure you are connecting to the MTS application server
6. If the test is not successful go to the troubleshooting section of this guide.
7. Please see Section 23 for information on all registry keys in Tracker.

6. BIOTICS ADMINISTRATOR

6.1. Introduction

The Biotics application was designed with features that would be configurable from installation to installation. Most of these changes can be done directly in the database but that is very cumbersome. To ease the Biotics application configuration process, the Administrator application was developed to automate many of these tasks. In most cases it uses the same iBCF framework and High-Speed Recordset objects that the Biotics application uses.

6.2. Users Area

The Users area is used to add and maintain user logons in Biotics. For more information see Section 7 of this document “Biotics Security”

6.3. User Groups Area

The User Groups area is used to add and maintain user groups in Biotics. For more information see Section 7 of this document “Biotics Security”

6.4. Applications Area

The Applications Area is used to maintain the registered applications. This area can be used to plug in new, related applications so that their security can be maintained using Administrator. For more information see Section 7 of this document “Biotics Security”

6.5. Categories Area

The Categories Area is used to maintain Categories. These categories are then used within the Functions Area to organize Functions into logical units to make the functions easier to work with on screen. For more information see Section 7 of this document “Biotics Security”

6.6. Functions Area

The Functions area is used to maintain security functions. Functions within Biotics are simply a grouping of controls to which the System Administrator can use to assign security settings. For more information see Section 7 of this document “Biotics Security”

6.7. Security Area

The Security Area is used to maintain security for all registered applications. For more information see Section 7 of this document “Biotics Security”

6.8. Database Area

The Database Area can be used to change the Oracle database User ID and Password that Biotics should use when connecting to the database. The connection string that Biotics uses to connect to the Oracle data source is located in the MTS/COM+ Server's registry at:

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```
HKEY_LOCAL_MACHINE/Software/Linnet/Framework/Database/ConnectionString
```

An example ConnectionString (without the line breaks) is:

```
PROVIDER=OraOLEDB.Oracle.1;  
DATA SOURCE=ORACLE_SERVER;  
USER ID=Biotics_lgi_test;  
PASSWORD=Biotics_lgi_test
```

This window uses a server-side object to make all changes. In addition to updating the registry it also rewrites the Authorization File. Each user in the Authorization File is updated with the new Oracle user and password. The Biotics 4 application does not use the Oracle user and password from the Authorization File, but Biotics Mapper does so Administrator updates the Authorization File so that everything is kept in sync.

Note that this area does not change any values in the database.

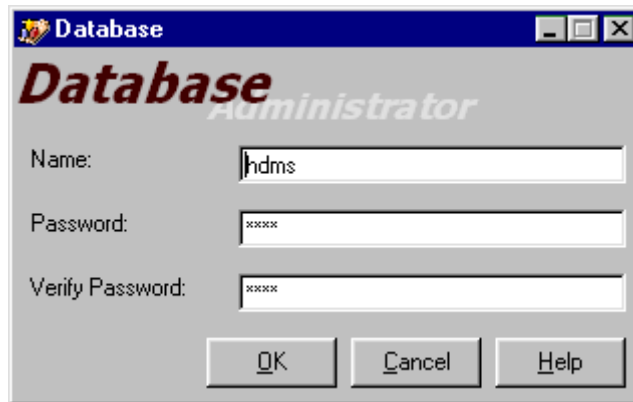


Figure 6-1 - Database Area

6.9. Function Groupings Area

The Function Groupings area is used to define Function Groupings. These Groupings are displayed on the “Subject Area” dropdown of the Functions Area window. As noted in the description of the [Functions Area](#) in Section 7.4, these Groupings are used to control the behavior of Subject Areas within the Biotics application Main Window. The Main Window working list can display many different views (Element, Contact, Element Occurrence, etc.) and requires separate security settings for each view. The Function Groupings enable this.

Important Note: These Groupings **MUST** match to the items available under the View menu in the Biotics main window that occur above the first separator line. (meaning Element, Element Group, Source Feature, etc.) The case of the Function Groupings should be all capitals. Because these items are controlled by the application code, rather than the user, it should **never** be necessary for an installation to use this function. This section is provided for general information only.

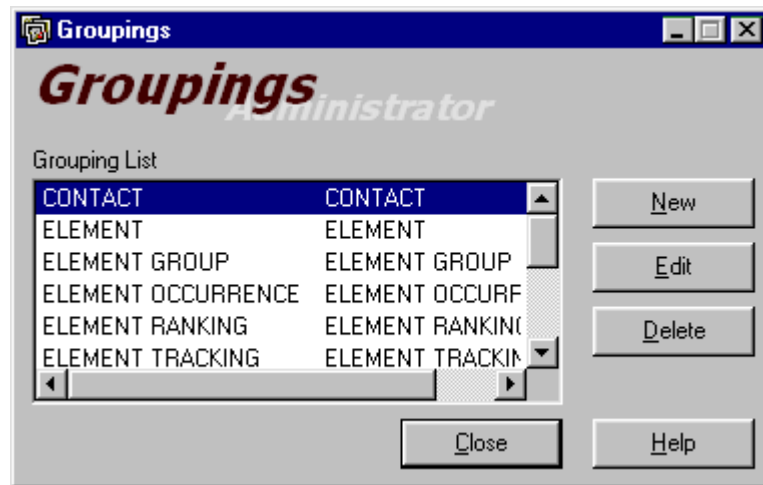


Figure 6-2 - Groupings Area

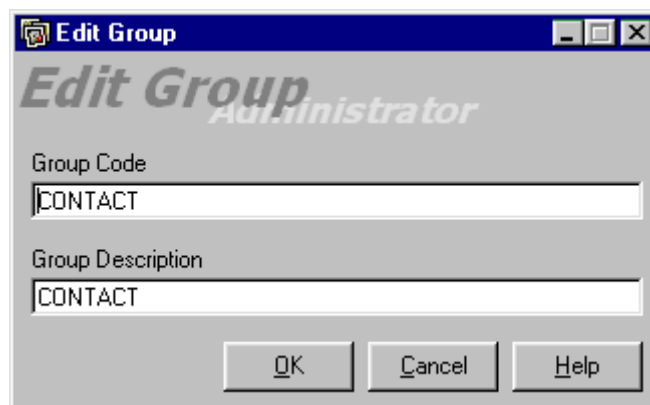


Figure 6-3 - Function Grouping Editor

6.10. Dynamic Tabs Area

The Dynamic Tabs area is used to define additional tabs for the core detail windows in Biotics. For more information see the Section 8 of this document "Creating Extensibility "

6.11. Domains Area

Biotics is driven by dozens of domain tables. Domain tables are used for a variety of functions, ranging from populating drop-down lists, to providing sophisticated instructions that control the program's behaviour. In terms of customization, some domain tables can be easily modified, either through the Administrator Domains Area tool or, in some cases, through the Tracker user interface. The degree to which these domain tables can be customized varies – some can be edited to add or remove values, others can only be edited to modify the display values or the

order in which the display values appear in the drop-down menu. See Table 5-1 at the end of this section for a list of the domain tables that can be edited (including adding/removing values) through the Domain Administrator or through the Tracker user interface. There is also a subset of domain tables that are restricted from being changed in order to maintain a controlled set of values because of methodological or other reasons. See Table 5-2 for a list of the domain tables that should **not** be edited.

The naming standard used by the Biotics data model is generally to precede domain tables with a D_ (D and an underscore). This is followed almost all of the time. There are a few exceptions, most notable the NATION and STATE tables.

All domain tables which are managed by the Domains Area are listed in the SYSTEM_DOMAIN table.

**Maintaining
Domain Tables
using the Domain
Administrator**

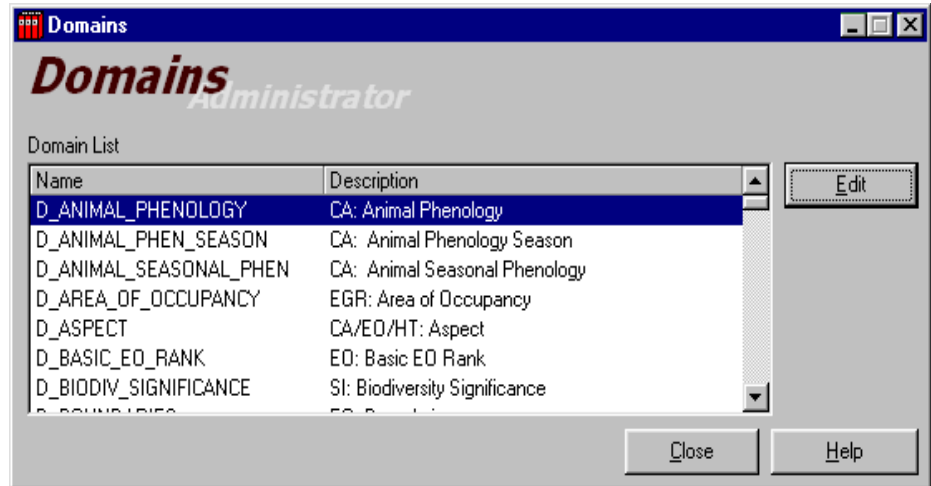


Figure 6-4- Domain Area

The Domain Manager window allows users to edit the DISPLAY_VALUE column in domains that contain this column. The DISPLAY_VALUE column is a special case that the Domain manager explicitly checks for. The DISPLAY_VALUE column is the column that is used in the drop down boxes in the application. Not all domain tables have this value. Generally, domains that contain code (“_cd”) attributes will also contain a display value that combines the code and the description (“_desc”) values into one field for display.

The Domain Manager also provides users with the ability to change the order of the items in the domain. This can be done using the following steps:

- Select a domain table and hitting the edit button. You will then see the Domain Manager window in Figure 6-5.
- Hit the “Custom” radio button. You will then see a set of up and down arrows on the right hand side.

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- Highlight the specific value you wish to change, and use the up and down buttons to change its position
- When finished, hit OK to save and close the window.

As mentioned earlier, some tables will allow you to add and delete rows through the Domain Manager. Examples of these are the NATION, D_COUNTY, AND D_WATERSHED tables. For a complete list of tables you can edit through the Domain Manager, refer to Table 5-1 at the end of this section.

If the SYSTEM_DOMAIN.CAN_ADD_ROWS field is "Y" for the domain, rows can be added, edited, and deleted using this window as well. To do this, you would open the Domain Manager window for the table and use the X key to delete rows. To add a row, scroll to the bottom and place your cursor in the blank line. You will then be able to edit the line. You can then change its position using the "Custom" sort order button.

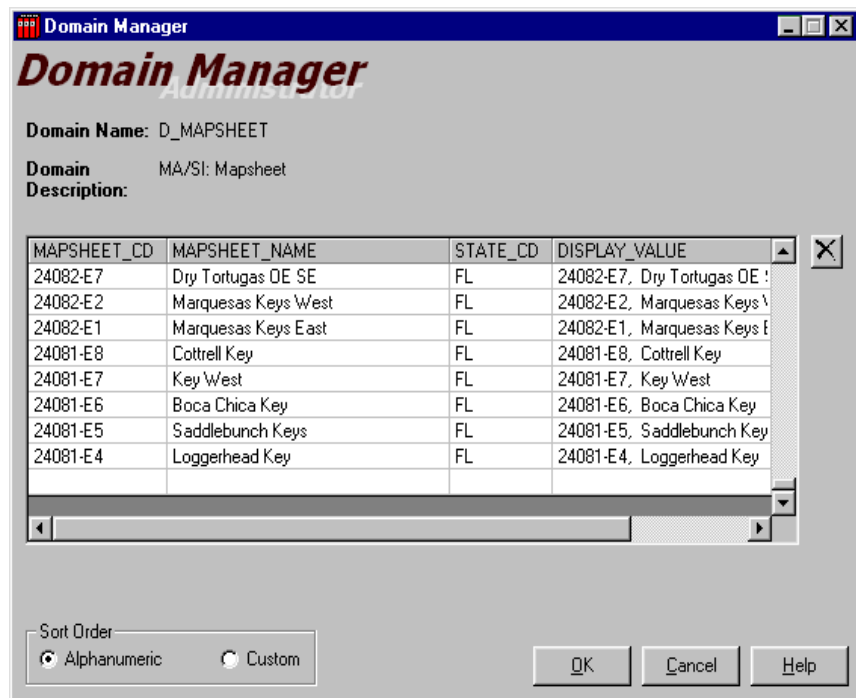


Figure 6-5 - Domain Manager

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Editable through Domain Administrator	Also Editable through Tracker Interface
D_CA_KEYWORD	D_CA_KEYWORD
D_CONTACT_KEYWORD	D_CONTACT_KEYWORD
D_COUNTY	
D_EO_KEYWORD	D_EO_KEYWORD
D_LANDFORM	D_LANDFORM
D_LOCAL_JURISDICTION	
D_MANAGED_AREA_KEYWORD	D_MANAGED_AREA_KEYWORD
D_MAPSHEET	
D_MGMT_KEYWORD	D_MGMT_KEYWORD
D_NATIONAL_ECOREGION	
D_PHYS_PROVINCE	
D_REFERENCE_KEYWORD	D_REFERENCE_KEYWORD
D_SITE_KEYWORD	D_SITE_KEYWORD
D_STATE	
D_SUBNATIONAL_ECOREGION	
D_WATERSHED	
D_WORKING_LIST_GROUP	
SUBNATION	
NATION	

Table 6-1 – Editable Domain Tables

Should NOT be Edited	Reason
D_AREA_OF_OCCUPANCY	ranking methodology
D_CIRCUMSCRIP_CONFIDENCE	global field
D_CITES	values set by external source
D_CLASSIF_MAINT_RESP	global field
D_CLASSIFICATION_FRAMEWORK	dependencies in data model
D_CLASSIFICATION_LEVEL	global field
D_CLASSIFICATION_STATUS	global field
D_COMB_RULE_MATRIX	global field
D_CONC_FEAT_LOC_UNCERT	EO methodology
D_CONC_FEATURE_TYPE	EO methodology
D_COSEWIC	values set by external source
D_CURR_PRESENCE_ABSENCE	distribution methodology
D_DIST_CONFIDENCE	distribution methodology
D_ELEMENT_REL_TYPE	global field
D_ELEMENT_REL_CONFIDENCE	global field
D_ENVIRO_SPECIFICITY	ranking methodology
D_FAMILY_SIZE	global field
D_FWS_REGION	values set by external source
D_GENUS_SIZE	global field
D_GEOG_AREA_TYPE	dependencies in data model
D_HYBRID	global field
D_INTRIN_VULNERABILITY	ranking methodology

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D_IUCN	values set by external source
D_IUCN_CATEGORY	values set by external source
D_JURIS_ENDEM	global field
D_LEVEL_CHANGE_POTENTIAL	global field
D_LIN_DIST_OF_OCCUPANCY	ranking methodology
D_LOC_UNCERT_DIST_CLASS	EO methodology
D_LOC_UNCERTAINTY_TYPE	EO methodology
D_LOCATION_USE_CLASS	EO methodology
D_LONG_TERM_TREND	ranking methodology
D_LUMP_SPLIT_POTENTIAL	global field
D_MAINTAINED_BY_STATUS	global field
D_MGMT_STRATEGY	global field
D_NAME_CATEGORY	dependencies in data model
D_NUMBER_EOS	ranking methodology
D_NUMBER_GOOD_EOS	ranking methodology
D_NUMBER_PROT_EOS	ranking methodology
D_NWI_REGION	values set by external source
D_ORIGIN	distribution methodology
D_POPULATION	distribution methodology
D_POP_SIZE	ranking methodology
D_RANGE_EXTENT	ranking methodology
D_RAUNKIAER_FORM	values set by external source
D_REGULARITY	distribution methodology
D_SHORT_TERM_TREND	ranking methodology
D_STAKEHOLDER_COMM	global field
D_STAKEHOLDER_SPECIES	global field
D_THREAT	ranking methodology
D_THREAT_IMMEDIACY	ranking methodology
D_THREAT_MATRIX	ranking methodology
D_THREAT_SCOPE	ranking methodology
D_THREAT_SEVERITY	ranking methodology
D_TNC_ECOREGION	values set by external source
D_USESA	global field
D_USFS_ECOREGION_LEVEL	values set by external source
ORG_UNIT	dependencies in data model
USFS_ECOREGION	values set by external source

Table 6-2 – Domain Tables Restricted from Editing

6.12. Rich Text Area

The Rich Text Manager provides an interface that allows the Administrator to enable and disable rich text support for all LinnetRichTextbox controls in Biotics. All controls on the right side have Rich Text support enabled. The left list box contains ALL LinnetRichTextbox controls in Biotics.

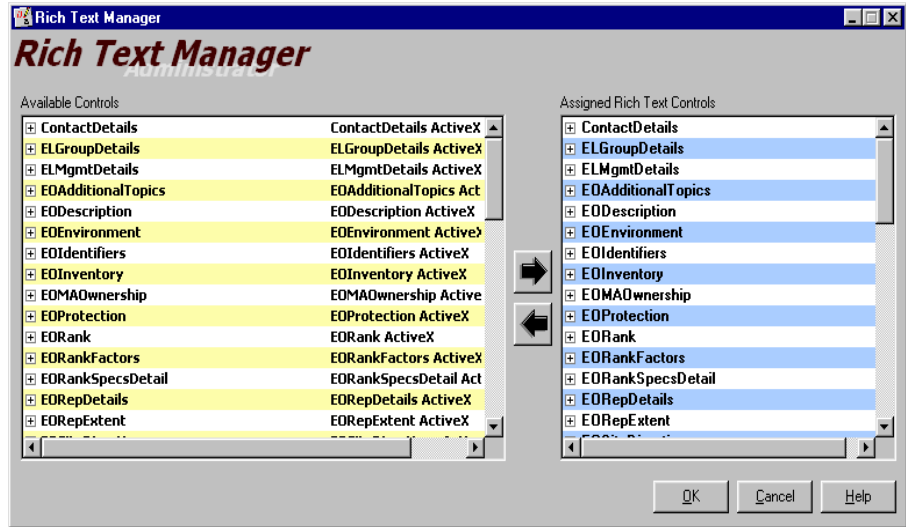


Figure 6-6 - Rich Text Manager

6.13. System Options Area

The System Options area provides an interface for the Administrator to adjust miscellaneous Biotics system options.

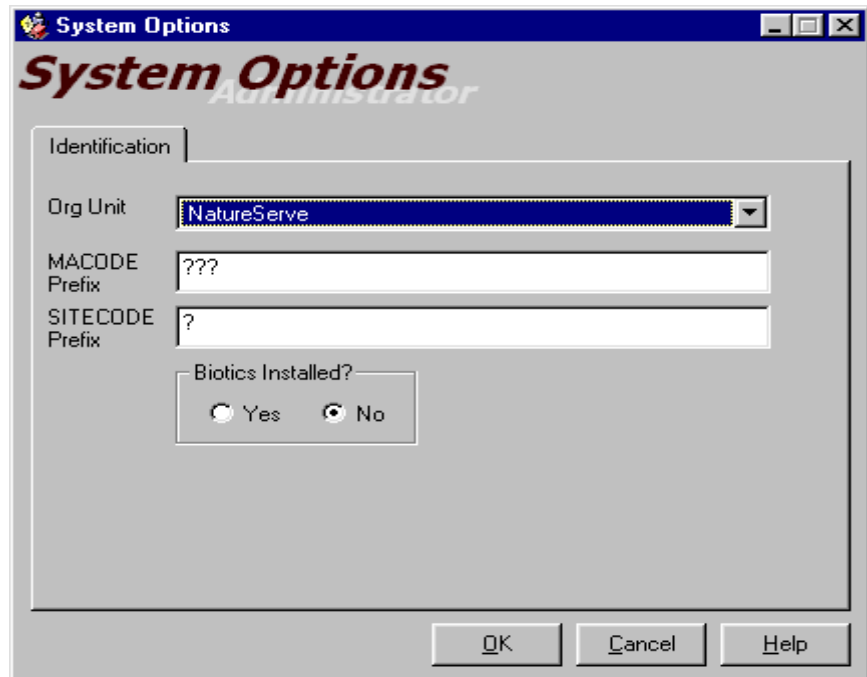


Figure 6-7 - System Options

System options are as follows

Org Unit (Biotics_EOCODE_SUFFIX)	The code that is appended to the ELCODE and the EONUM to form the EOCODE. Typically this is the abbreviation for the province/state and	BC
-------------------------------------	---	----

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	<p>can be found in the drop down list.</p> <p>There is no default for this setting.</p>	
<p>MACODE Prefix (Biotics_MACODE_PREFIX)</p>	<p>The code that is prefixed to the MA_COUNTER to form the MACODE. Typically, this is a combination of nation, province/state, and installation code.</p> <p>There is no default for this setting.</p>	M.CABCCDC
<p>SITECODE Prefix (Biotics_SITECODE_PREFIX)</p>	<p>The code that is prefixed to the SITE_COUNTER to form the SITECODE. Typically, this is a combination of nation, province/state, and installation code.</p> <p>There is no default for this setting.</p>	S.CABCCDC
<p>Biotics Installed</p>	<p>Indicator as to whether Mapper is installed.</p>	

7. BIOTICS SECURITY

7.1. Introduction

This section provides an overview of the security components used in the Biotics application, information regarding the standard security configuration provided with each installation, and instructions on how to customize and maintain that configuration using the Administrator application.

Biotics provides two levels of security/access control:

- Database Level Security - used to control access and permissions to the physical data in the DBMS (i.e. Oracle). This security is applicable both inside and outside the application. In other words, if the user accesses the data using other software (e.g. Microsoft Access), the security will still apply.
- Application Level Security - used primarily to control access to the Biotics program (i.e. ensures that a valid user ID and password is entered before the program will start), and to a lesser extent to control which functions are available to particular users (currently the only functions that can be restricted are the Admin functions). This security is applicable only when the application software (i.e. Biotics) is used.

Note: To provide read-only access to Mapper data, it is recommended that data be replicated to a separate warehouse area, and/or Oracle views be created. There is no way to restrict users from modifying data within Mapper (since Mapper is largely a data entry/maintenance application).

The Security Database controls the Application Level security, and associates each application user with an Oracle user (i.e. integrates the Database Level Security). The Security Database consists of a number of Oracle tables and an encrypted file.

The Administrator application tools allow you to populate a security database with information, including:

- Applications
- Windows
- Window controls

You then create a matrix of users and groups, controlling access to these items. At execution time, Biotics selectively enables, disables, or hides secured items, as specified in the security database.

7.2. Security Concept and Components

Security on the Biotics application is based on granting functionality to a User or Group. This is done through the Administrator application where you are able to create and setup all the components of the security concept.

Security by inclusion:

The security capability provides security by inclusion. By default, the security system uses the database current entries. This means that it modifies settings specified explicitly in the security database and if a setting does not exist (i.e. a control entry) then it disables the control by default.

Components of Security are:

- **Users** – a person (e.g. jsmith)
- **User Groups** – consist of one or more *Users* that are logically grouped together (typically because the users have similar job functions and therefore similar security access rights). Examples could include “Botany”, “Ecology”, “Zoology”, “Read-Only”, “Data Manager”, “Mapper User”, etc.

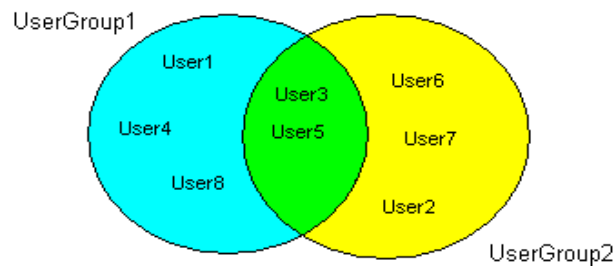


Figure 7-1 – Users and User Groups

- **Applications** – an executable program (Biotics, Administrator, etc).
- **Controls** – a *Control* on the User Interface (menu item, tool, button, radio button, checkbox, dropdown list, textbox, grid, etc). Forms themselves are also controls. Each Control belongs to one or more *Functions*.
- **Functions** – a group of Controls that are logically related. Typically Functions relate to windows (Element Tracking, Scientific Name, Managed Area, etc.). It is functions that users and/or user groups are granted access to. Each function belongs to a *Category* and can be set to a Grouping (see later in this section).

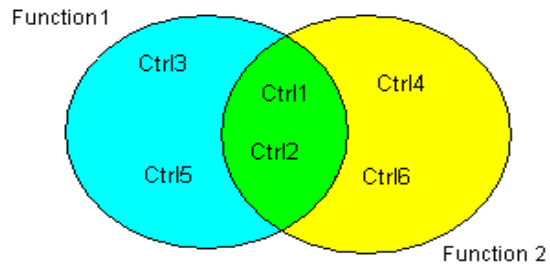


Figure 7-2 – Controls and Functions

- **Function Groups** – a group definition that can be applied on Functions to allow the application of security on the same controls, but in different functions.

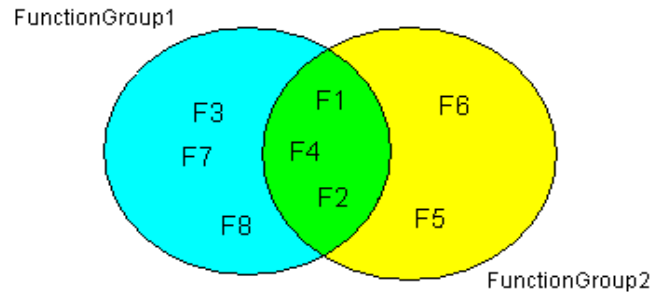


Figure 7-3 – Functions and Function Groups

- **Categories** – a group of *Functions* that are logically related. Typically Categories relate to the different types of Views in Biotics (Elements, Contacts, References, etc.). The main purpose of Categories is to make it easier to work with the functions in the Administrator program (it allows the user to filter the long list of functions to make it easier to find the functions of interest). Each category belongs to an *Application*.

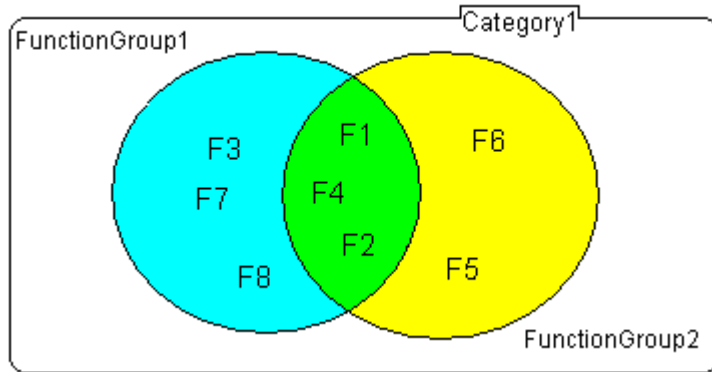
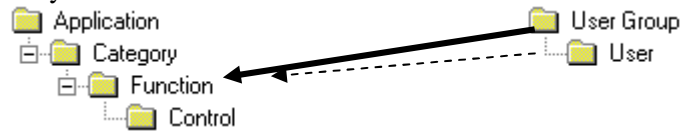


Figure 7-4 – Function Groups and Categories

In summary there are two hierarchies:



Access is most commonly granted to User Groups for Functions. However access can also be granted to individual Users if necessary. Since Functions can consist of a single Control, this gives total flexibility over the granularity of the grants. That is, access for a specific Control can be granted to a specific User if desired (but keep in mind the access is not granted directly to the Control – it is granted to the Function that the Control belongs to).

Access Levels

There are three levels of access that can be granted:

- Hidden – the user does not have any access to the Function (i.e. cannot even see the GUI for that Function). This can be used to hide buttons and entire windows.
- Read – the user has read-only access to the Function. The user will be able to see the Function, but Controls within the Function will be disabled (greyed out) on the window.
- Full – the user has full access to the Function. The user will be able to see the function, and all Controls within the Function will be enabled.

When a User is first created, that User has access to nothing (cannot even run the application) until the User is made a member of a Group (or grants are made specifically for that user).

At the database level, users and user groups are handled as records within a single table named **security_users**. Individual users are assigned the **user_type** “U”. Meanwhile, user groups are assigned the **user_type** “G”. Group memberships are recorded in the **security_groupings** table by adding a new row into this table, every time a user is assigned to a group.

When the Administrator’s **User Manager** window is launched the system displays only those users with user_type “U”. Likewise, when the Administrator’s **User Group Manager** window is launched, the system displays only users of type “G”.

7.3. Biotics Standard Security Configuration

Each Biotics installation will have varying security requirements, and will therefore need to tailor the security configuration to suit their needs. However, to save installations the effort of having to create an entire security configuration from scratch, Biotics will deploy with a “standard” configuration that can be used to get an installation up and running. This configuration can then be customized as necessary to meet the installation’s needs. The standard deployment will consist of User Groups, Applications, Categories, Functions, and Controls. The standard security configuration uses the design depicted below:

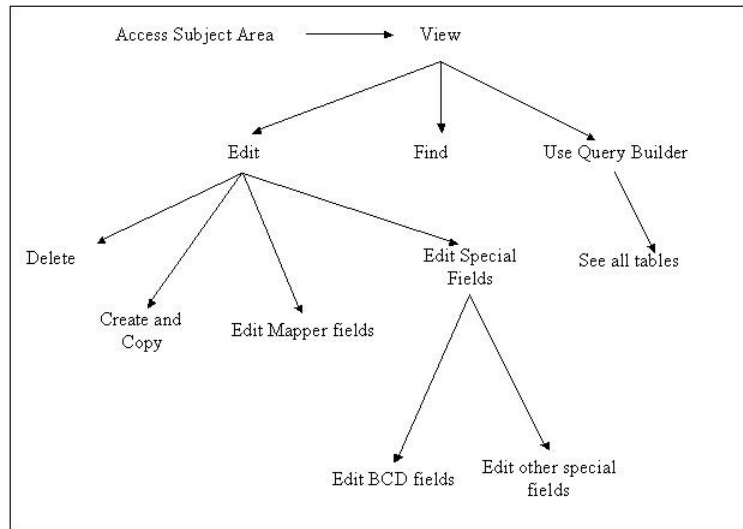


Figure 7-6 – Biotics Standard Security Configuration

Each subject area in Biotics has a security function that allows users to access it. This is the View function. If a user (or user group) does not

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have full access to this function, they will not be able to view anything in that subject area. Having view access means that you can look at records, but not make any changes. All controls in this window will be grayed out. Only minimal actions, such as Close, Help, Open Record/Attribute Maintenance, and the Text Editor will be enabled. The View function is the starting point for each subject area. In order to do anything else in a subject area, the user must have View capability.

The next level of access is Edit capability. Each subject area has at least one Edit function. Most of the controls on a window are in the basic Edit function. Fields that require special control, such as Mapper fields, have been placed in separate functions. Having Edit capability allows the user to modify fields (except those placed in separate functions), cut, copy, paste, spell check and save. The basic Edit function is the starting point for all editing done in a subject area. In order to do any other editing, such as creating or deleting records, the user must have Edit capability.

Each subject area has a Delete function to delete records from the database. This function contains the controls for the Delete option and icon on the window.

Most of the subject areas have a separate Create/Copy Record function. This function contains the New option and icon on the working list as well as the detail window. It also contains the 'Copy Data from' option in the detail window. However, the windows for Element Characterization Abstract, Element Rank, Element Management, EO Specs, and EO Rank Specs do not have this function. New records of these types are created when retrieving a record that doesn't already exist. For this reason, it is not possible to separate edit capability from create capability for these records. These areas do have a separate Copy function, however.

Certain Mapper fields have been placed in separate security functions. These are found in the Mapper category. Create functions for Source Features and EOs are also in this category. Programs that use Mapper should have read-only access to these functions since these fields should be edited in Mapper, instead of Tracker. Non-Mapper programs would have full access to these functions. Users that have only view access to EO, Managed Area, Sites, and Source Feature subject areas would not need to have any access to Mapper functions, since they will only have view access to all fields anyway. To control access to these fields, two user groups have been defined, Mappers and Non-Mappers.

Several other fields have been identified as needing special control. These include the legacy BCD fields and the Inactive checkboxes for Elements and Alliances. During the prototype review phase, the users indicated that only specially designated users should edit these fields,

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not everyone with edit capability. The fields having special security functions are as follows:

- Element Tracking: Inactive checkbox, Elcode, Taxon Stat BCD, Intcode
- Alliance: Inactive checkbox, Alliance Key
- Higher Class Units (including Alliance): Name, Higher Taxonomy Code, Sequence Number
- Contacts: Concode BCD
- EO Rank Specs: A Rank Specs BCD, B Rank Specs BCD, C Rank Specs BCD, D Rank Specs BCD
- EO Specs: EO Specs BCD
- Element Characterization Abstract: Sbreed_BCD, Sirregapp_BCD, Smigtrans_BCD, Swinter_BCD
- EOs: Eotype_BCD, CDREV_BCD, Precision_BCD, OwnerInfo_BCD
- Element Rank: Threat_BCD
- Managed Areas: MACode_BCD
- Sites: Old Sitecode_BCD, Sitecode_BCD

In addition, several actions have been identified as needing special control. The menu options and icons for these actions have been placed in separate security functions. They are as follows:

- Classification: Change Higher Class Unit/Taxonomy Code
- Element Occurrence: Change Associated Element

Standard User Groups

The standard configuration contains several user groups that you can use in your installation. These were designed to cover the most common types of users found in an installation. These groups already have the appropriate security functions assigned to them. Like everything else in the standard configuration, these user groups can be customized as you feel necessary. These groups and the kind of access they have are listed in the table below.

User Group	Access	Type of Data	Notes
Administrators	Everything in Mapper, Tracker, Administrator and DX tools	Everything	Every installation will need one user in this group, and probably one backup, to set up users and perform maintenance. This person should also be allowed to perform SQL on the Oracle database.
Super Data Manager	Everything in Tracker and DX tools; access to special fields	Everything	Can do everything in Tracker and DX tools
Botany DM	Everything in Tracker and DX tools; access to special fields	Botany	Can create, delete, and inactivate records.

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User Group	Access	Type of Data	Notes
Ecology DM	Everything in Tracker and DX tools; access to special fields	Ecology	Can create, delete, and inactivate records.
Zoology DM	Everything in Tracker and DX tools; access to special fields	Zoology	Can create, delete, and inactivate records.
Super User	Basic fields in Tracker	Everything	Can edit basic fields, but not special fields. Can't create, delete, or inactivate records.
Botany User	Basic fields in Tracker	Botany	Can edit basic fields, but not special fields. Can't create, delete, or inactivate records.
Ecology User	Basic fields in Tracker	Ecology	Can edit basic fields, but not special fields. Can't create, delete, or inactivate records.
Zoology User	Basic fields in Tracker	Zoology	Can edit basic fields, but not special fields. Can't create, delete, or inactivate records.
Researcher	View only access to all Tracker fields	Everything	Look but not touch. View only access
Guest Reader	View only access to limited fields	Everything	Can't use Query Builder to view any tables in QB_EXCLUSION table.
Mappers	Biotics Mapper module and disables selected fields within Tracker to prevent editing outside the GIS.	Everything	Mapper Users can add, delete, and edit any EO, MA, or Site in the Mapper system. Does not give access to Tracker – that is granted by including the user in one of the other groups. ALL users should be assigned to this group, whether they are actually a Mapper user or not, to ensure that selected GIS-calculated fields are disabled in Tracker for all users to prevent manual editing of them.
Non-Mappers	Enables editing within Tracker for selected Mapper fields.	Mapper fields	Can edit Mapper fields in Tracker. Use ONLY in conjunction with an installation that does not include Mapper.
Data Exchangers	Access DX tools		Can access DX tools. Used in conjunction with other user groups.

These user groups have been defined without regard to whether a program is using Mapper or not. Access to Mapper fields and functions are granted separately, with the Mappers or Non-Mappers user groups. As an example, a user given full access to all Zoology data, including special fields, in a program that uses Mapper, would be assigned to the Zoology Data Manager group **and** the Mappers user group. Another example would be a user given access to only basic botany data in a program that does not use Mapper. They would be assigned to the Botany User group **and** the Non-Mappers user group. View only users would be assigned to **just** the Researcher group, regardless of whether their program uses Mapper.

Another consideration is that assignment of users to either the Mappers or Non-Mappers user group is determined by whether the installation uses Mapper, **not** the individual user. If an installation uses Mapper, but only a few of its users actually use that application, all users will need to be put in the Mappers user group (except for those in the Researcher and Guest Reader groups).

7.4. Maintaining the Security Configuration

The main window provides access to each area in Administrator. Note that security is applied to the controls on this window. Therefore, items may appear in this window but may be inaccessible because of security.

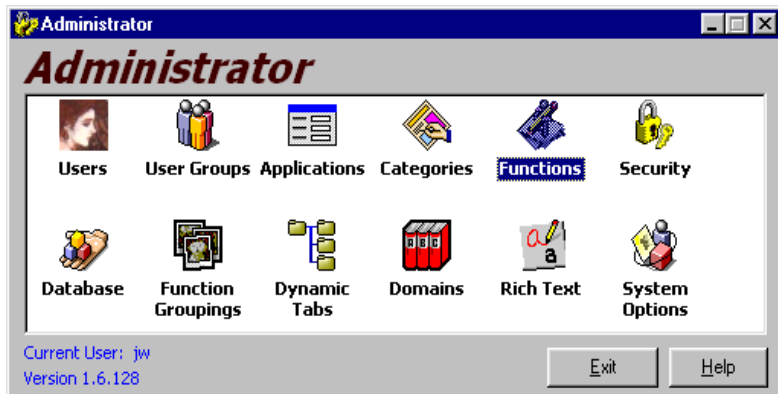


Figure 7-7 - Administrator Main Menu

Users Area

This window is used to create and maintain the user logons for the Biotics application. It is important to note that these are Biotics application users and not Oracle database users. Users cannot be deleted using Administrator. Instead they should be deactivated if they are no longer to be used. The User window can display Active, Inactive, or All users by selecting the appropriate radio button.

The User Manager window provides a standard data entry window where the User information can be maintained. The Data Access checkboxes at the top-right corner of the User Manager window are for security to the different types of Element data (Plant, Animal, Community). If a user does not have access to one of the checkboxes they will not be able to save data to any of that type of element, or data related to that element. The same rules apply for groups that a user is a member of (see [User Groups Area](#)).

Basic Procedure

The basic procedure to create a user is as follows

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1. Start the Administrator program.
2. Double click on the 'Users' icon on the main window.
3. Click on 'New' on the Users window

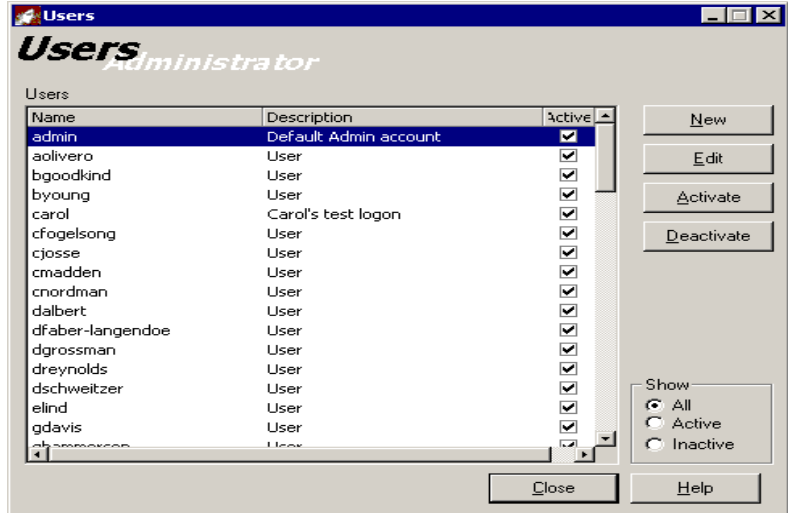


Figure 7-8 – Users Window

4. Complete the New User window as follows:



Figure 7-9 – User Manager window

- Enter the user ID in the 'Name' textbox. User IDs should be lower case and no more than 15 characters.
- Enter the user's password in the 'Password' and 'Verified Password' textboxes. Keep in mind that users cannot

change their own passwords, so you should either ask them in advance what they want their password to be, or else have them type in their password at this time.

- Enter the user's full name in the Description textbox.
- Leave the e-mail textbox blank (this is not used in Biotics).
- Assign the user to the appropriate user group(s) by selecting the group(s) in the 'All groups' list box, and then clicking the 'Add ->' button (see the User Groups Area section for User Group definitions).

5. Click OK.

User Groups Area

The User Group area is very similar to the Users area. The User Group window contains a list of all User Groups within Biotics. Just as with the Users, a User Group can be deactivated, but not deleted using Administrator. Also a User Group has data access rights based on the type of Element (Plant, Animal, Community) just like the Users.

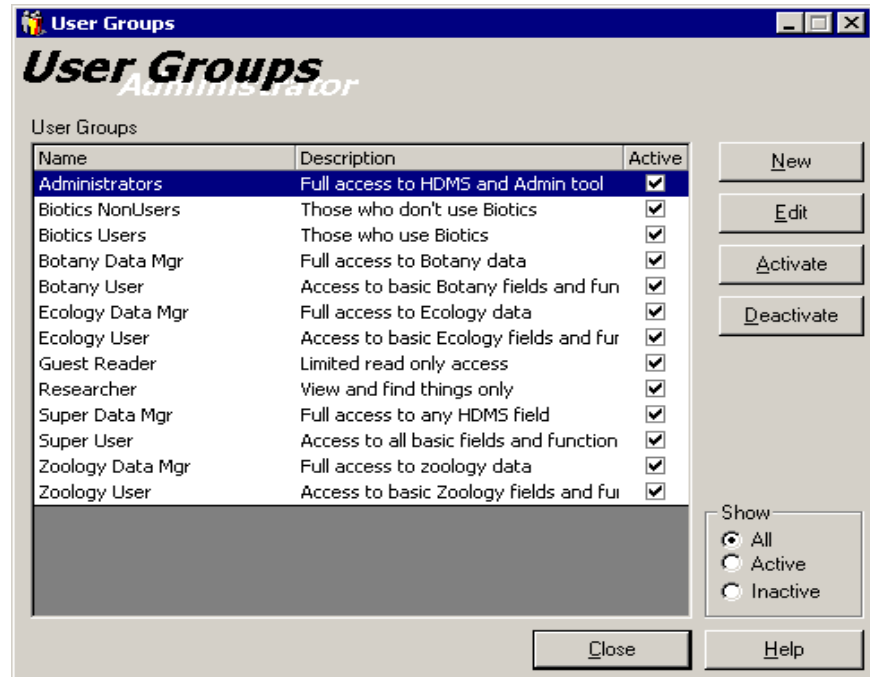


Figure 7-10 - User Groups Area

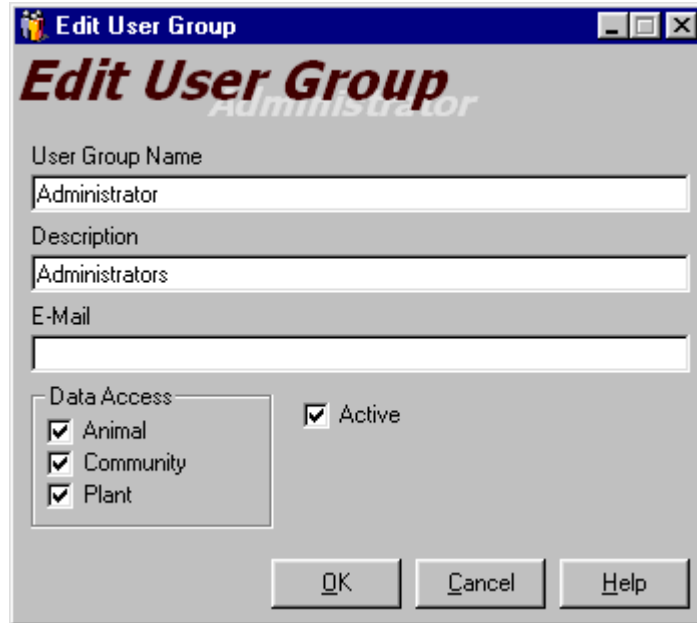


Figure 7-11 - User Group Editor

Applications Area

The Applications Area is used to maintain the registered applications. This area can be used to plug in new, related applications so that their security can be maintained using Administrator. Note that all applications share the same Users and Groups.

The Application Area maintains the SECURITY_APPLICATION table.

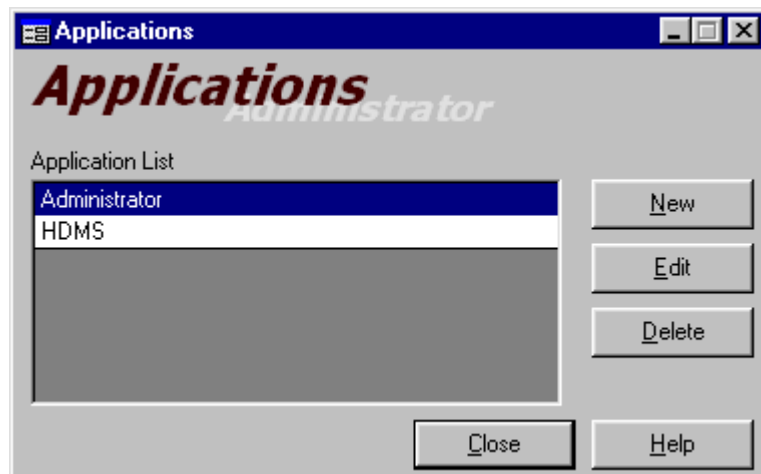


Figure 7-12 - Application Area

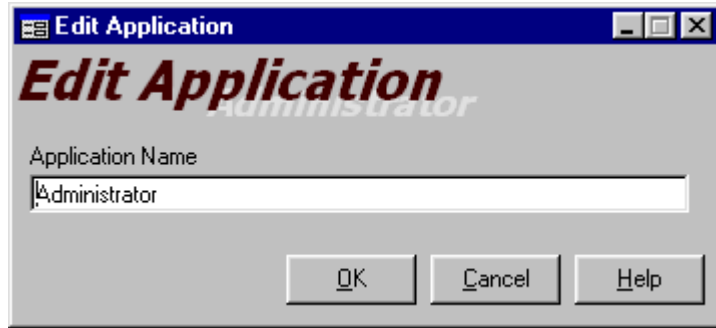


Figure 7-13 - Application Editor

Categories Area

The Categories Area is used to maintain Categories. These categories are then used within the Functions Area to organize Functions into logical units to make the functions easier to work with on screen.

These categories are also used for security on the Main Window. When creating a function, if the MainForm form is included it is required that you select the Category that the function is for. The Categories coincide with the Subject Areas available in Biotics. (The categories are matched to the subject area by the menu text.)

The Categories Area maintains the SECURITY_CATEGORY table.



Figure 7-14 - Categories Area

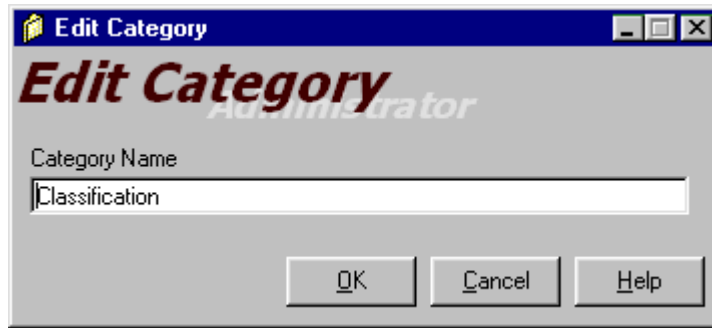


Figure 7-15 - Categories Editor

Functions Area

As mentioned above, Functions relate to windows. Functions within Biotics are simply a grouping of controls that the System Administrator can use to assign security settings to. Instead of setting security for each control the System Administrator can group related controls into a function and apply security at the Function level. See section 7.3 [“Biotics Standard Security Configuration”](#) for details regarding how these functions have been designed.

The Function Area main window has two dropdown lists: Application and Category. After selecting the Application and Category the user is presented with a listing of Functions. Now the user can create, edit, and delete any of the listed Functions.

Each Function requires a Function Name. A subject area can be defined, if needed. (Subject areas affect the behavior of Subject Areas within the Main Window of Biotics. Because the Main Window can display various “Subject Areas”, it is necessary to define a separate function for each Subject Area you wish to control using security.)

Once the function has been assigned a name the user can select any number of controls from the "Control List" grid (the top one). Items can be added by double-clicking on them or by selecting them and then clicking on the down arrow.

Similarly items can be removed from the "Selected Controls" grid by double-clicking them or selecting them and then clicking the up arrow.

When creating a new function the Apply button will be visible on the Function Manager screen. This button will save the current Function and reset the window to accept another new Function.

The Function area maintains the **SECURITY_FUNCTION** and **SECURITY_FUNCTION_CONTROL** tables. The **SECURITY_FUNCTION** table contains the list of Functions as well as each Function's Subject Area. The **SECURITY_FUNCTION_CONTROL** table contains the mapping of controls (from **SYSTEM_CONTROL**) to Functions (from

SECURITY_FUNCTION). See Figure 7-5 – Section of Data Model showing Security Tables.

Creating Functions Example

When creating functions there are a few things to consider.

- Does the window have multiple mode settings (i.e. Contact View, Scientific Name view)? Then it will require a grouping
- Does the window have multiple functionalities for the users to access (New, Edit, Delete)? Then it will require multiple functions.

The following example will setup a user to have permission to edit contacts in the Contacts window.

This will be accomplished by:

- We will create a new function for this in the functions window.
- We will click the New button to do this. This will open the Function Manager window.



Figure 7-16 – Functions Window

- We will name the new function ***Edit Contracts***.

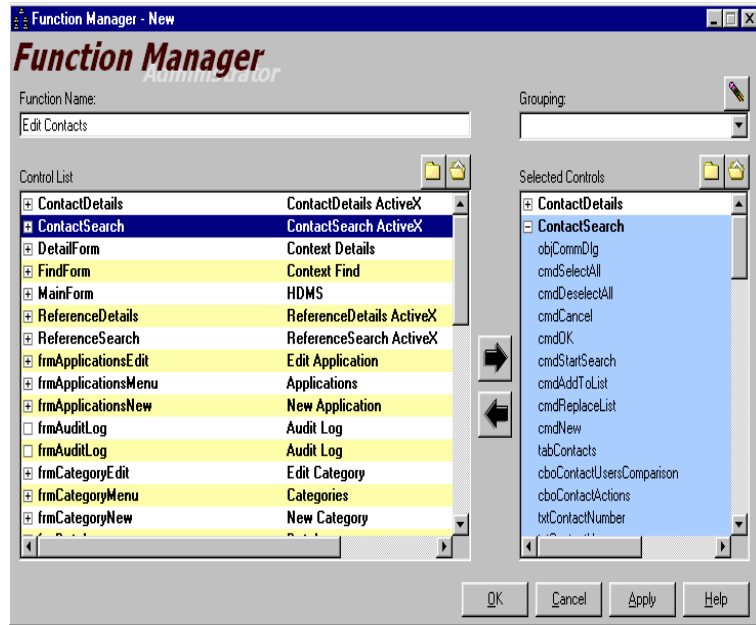


Figure 7-17 – Function Manager Window

- We will then select both the **Contact Details** Window and the **Contact Search** Window and add them to our selected controls.
- Since we only want to allow the function to have the ability to edit contacts, we will remove the New button (cmdNew) and the Delete button (cmdDelete) from our selected controls.
- We will then click OK to save our new function.

To create other functionality as New Category or Delete Category, we would do the same steps but remove the Command buttons (New, Edit, Delete) that we don't want the function to have access to.

Now that we have our **Edit Contracts** Function, let's assign it to our user.

We will now need to open the **Security Manager** Window to assign this function to a user.

Security Area

The Security Area is used to maintain security for all registered applications. It is possible to assign security rights to a user or a group.

Initially the Security Manager displays only Security Categories in the lower portion of the window. These Categories can be expanded by clicking on the folder icon at the left edge of the window. Within these

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Categories are the security functions that are defined in the Functions Area. Security can be set at one of three levels: Full, Read, or Hidden. Note that if none of these are checked the default security setting is Read.

To assign security for accessing a given function to a user we will need to:

- Select a user (e.g. “admin”).
- Select the application. Once you select one, the Function List tree view should populate with the appropriate categories and functions.
- Find the function under the appropriate category (e.g. “*Contacts*”) you will want to assign permissions for the user (e.g. “*Edit Contact*”).
- You will then have three options. You can assign full access, read-only or hide the controls in that function.
- Once you have made your selections, click ok to save the settings.



Figure 7-18 – Security Manager

8. CREATING EXTENSIBILITY

8.1. Introduction

Extensibility provides the ability to dynamically add new attributes to Biotics Tracker. New tabs and data entry controls may be added to most detail windows. Implementation requires several steps including the creation of new Oracle tables and configuration using the Administrator application.

This document describes the steps needed to implement extensibility. Worksheets and scripts referenced in this document can be found in the Documentation directory of your Biotics 4.0 installation CD.

Step 1: Document Requirements

A worksheet (ExtensibilityWorksheet.xls) has been developed to document the information required to configure and convert the extensible data.

To fill out the worksheet you will need to:

- Document each extensible field
- Relate each field to a window in Biotics Tracker
- Determine the relationship that a field has to the subject area (1 to 1; 1 to many)
- Define the Oracle tables that will store the extensible data
- Design the Biotics Tracker extensible tabs and user interface controls
- Think through data conversion of existing data

Read through the remainder of this section prior to starting the worksheet.

Here are some general guidelines for thinking through extensibility:

- Carefully review the detail windows to determine where your extensible data should be added. For example, since the Element Tracking and Characterization detail windows are substantially different for communities versus taxa, it is possible to add an “optional” tab to a community Element Tracking window that will not appear on a species Element Tracking window, and vice versa. However, on other types of detail windows, a new tab will be visible on all records of that type. For example, the addition of a field to Element Ranking that only applies to plants, the new tab containing that field will show up on animal and community Element Ranking records as well.

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- The Biotics Tracker data model contains new fields as compared to BCD. See if your optional data can be mapped to these new fields in the core data model. For example, there are now fields specific to community element occurrences.
- Make sure that each field you are configuring is absolutely necessary. Converting to a new data management system is a good time to review data management requirements. Some questions to think about include: Is the field being actively maintained? Was the field put in place for a specific project that has been completed? Perhaps the data are best archived instead of carried over to Biotics.
- The maximum text field length is 4,000 characters. The Oracle CLOB data type is not supported.

Step 2: Create Oracle Script

If you are already up and running with Biotics and have previously configured some extensible data, you may be able to alter existing tables you created. Always, consider this possibility prior to creating new tables and configuration settings. See section 8.8 for information on adding to or modifying existing tables.

Extensible data will be stored in user defined Oracle tables that relate to the core Biotics data model. An example script (ExampleOracleScript.sql) has been developed to guide the process and can be found in the Documentation directory of your Biotics 4.0 installation CD. Extensive documentation exists within the script.

Tip: If you plan to create extensible tables for converting associated multi-valued fields from BCD, include fields in your table for each of the associated fields, as well as a temporary field for initially importing the associated multi-valued fields as one concatenated string.

An extensible table must link to a parent table within the core Biotics data model. The following table shows the “granularity” at which optional fields can be configured and defines which tables should be used for which windows.

Detail Window (Defines the granularity for which extensibility can be configured)	Parent Table (Extensible table should link to this table)
ELEMENT TRACKING – GLOBAL – SPECIES	TAXON_GLOBAL
ELEMENT TRACKING – GLOBAL - COMMUNITY	COMMUNITY_GLOBAL
ELEMENT TRACKING – NATIONAL – SPECIES	TAXON_NATIONAL
ELEMENT TRACKING – NATIONAL – COMMUNITY	COMMUNITY_NATIONAL
ELEMENT TRACKING –	TAXON_SUBNATIONAL

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SUBNATIONAL - SPECIES	
ELEMENT TRACKING – SUBNATIONAL - COMMUNITY	COMMUNITY_SUBNATIONAL
ELEMENT RANKING - GLOBAL	ELEMENT_GLOBAL_RANK
ELEMENT RANKING - NATIONAL	ELEMENT_NATIONAL_RANK
ELEMENT RANKING - SUBNATIONAL	ELEMENT_SUBNATL_RANK
ELEMENT CHAR – GLOBAL - SPECIES	TAXON_GLOBAL*
ELEMENT CHAR – GLOBAL – COMMUNITY	COMM_CAG
ELEMENT CHAR – NATIONAL – SPECIES	TAXON_NATIONAL*
ELEMENT CHAR – NATIONAL – COMMUNITY	COMM_CAN
ELEMENT CHAR – SUBNATIONAL – SPECIES	TAXON_SUBNATIONAL*
ELEMENT CHAR – SUBNATIONAL – COMMUNITY	COMM_CAS
ELEMENT CHAR – LOCAL – COMMUNITY	COMM_CAL
ELEMENT MANAGEMENT	ELEMENT_MANAGEMENT
EO SPECS	EO_SPECS
EO RANK SPECS	EO_RANK_SPECS
ELEMENT SITE	ELEMENT_SITE
ELEMENT ECOREGION - GLOBAL	EL_GLOBAL_ECOREGION
ELEMENT ECOREGION - NATIONAL	EL_NATL_ECOREGION
ELEMENT ECOREGION - SUBNATIONAL	EL_SUBNATL_ECOREGION
EO ECOREGION	EO_ECOREGION
ALLIANCE ECOREGION	ALLIANCE_ECOREGION
ELEMENT GROUP	ELEMENT_GROUP
ELEMENT OCCURRENCE	EO
SOURCE FEATURE	SOURCE_FEATURE
MANAGED AREA	MA
SITE	CONSERVATION_SITE

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SCIENTIFIC NAME	SCIENTIFIC_NAME
REFERENCE	REFERENCE
CONTACT	CONTACT

* Due to the way the characterization windows were programmed, the species characterization extensible tables cannot be related to ANIMAL_CAx or PLANT_CAx. Instead, they must be related to the TAXON_x table. This means that if a cascading delete is set up in the database, the characterization record delete will not result in the extensible characterization information being deleted. If a new characterization record is created after a delete, it will pick up the old extensible information if it exists in the database. This can be avoided if the BIOTICS_TABLE_ACTIONS table (stores deletion rules used by Biotics) is used for deletion instead of cascading delete constraints.

Step 3: Data Conversion

This step is optional. It is only necessary when you are migrating existing data into the extensible tables. There are two methods to load the extensible tables with data. You may either use the Biotics Data Conversion Application or use Microsoft Access (or other database).

8.2. Using the Biotics Data Conversion Application

Note: it is anticipated that only NatureServe staff will need to run the Biotics Data Conversion Application.

Prepare Symbolics for Associated Multi-Valued Fields

Associated Multi-Valued fields in BCD are best converted by exporting a symbolic which concatenates all the associated fields, using a "\$" as a separator character (or any other character that is unlikely to occur in the actual text of the field) as follows. This is preferable to exporting each field separately, as this is the best way to ensure that the associated values stay together.

Field1\$Field2\$Field3

Export the optional data from BCD to XML

There are two files contained in the BCD XML program that you will have to adjust: HDMS_OPT.INI and the EXPORT.BCD.

Create a **HDMS_OPT.INI** file with the following section:

```
[EOR.OPT]
;* Michigan Element Occurrence Optional Fields
dosfile=XEOOPT.XML
```

Step 1: Create HDMS_OPT.ini file

```
path=HDMS\OUTPUT\  
xmlpath=HDMS\OUTPUT\  
dtdpath=HDMS\OUTPUT\  
REVFILES=EOR.OPT  
ORA_TABLE=MI_EO_OPT  
;PARENT_TABLE=  
BCD_FIELDS=EOCODE,NESTNUM,UPDATA,PLANTLIST  
;GETLIST=  
WITH_CLAUSE=WITH VALID_KEY AND (WITH NESTNUM OR  
WITH UPDATA OR WITH PLANTLIST)
```

Step 2: Create Batch file for Conversion

Create a batch file under hdms\java called TO_CONV.BAT with the following four lines (without the line numbers):

```
1 set CLASSPATH=hdmsconv.zip;hdmsExchange.jar  
2 cd hdms\java  
3 java org.abi.util.FileEncodingUtil -iCP437 -oISO-8859-1  
  ./output/X%1.xml ../output/conv/%1.xml  
4 exit
```

Step 3: Edit the EXPORT.BCD file

Add the following two lines to the EXPORT.BCD file (without the line numbers):

```
1 BIOTICS NS_EXPORT  
  PROPERTIES=HDMS\IN\HDMS_OPT.INI,EOR.OPT  
2 UNPROTECTED.PC EXIT CMD /C START  
  HDMS\JAVA\TO_CONV.BAT EOOPT
```

Note the following:

1. If you are dumping from the ET or ESR files, you must include the ESTCODE for lookup of the ELEMENT_SUBNATIONAL_ID in the ESTCODE_BCD table.
2. You do not *have* to dump the optional data from the *.opt revfile. You may find it more convenient to dump it from the main file as all the optional fields can be seen in the main file. For example you can see all EOR.OPT fields from the EOR file but you cannot see all EOR fields in the EOR.OPT file.

Step 4: Setup of Conversion Spreadsheets

The data conversion application requires a conversion spreadsheet for each file that gets converted from BCD. Standard spreadsheets are available from NatureServe, however, you must create spreadsheets for each optional file from which you want to convert data. Optional spreadsheets should be set up as follows:

Primary Key Lookup

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The first row of the spreadsheet must contain the Foreign Key from your optional table in the Biotics column (I) and the parent table from the Biotics 4 data model in the Notes column (K). The best place to check for primary key lookup is in the parent spreadsheet. Since you are bringing the primary key from the BCD table the extended table will have the same primary key as the table you are linking to. Remember to put the word 'parent' in column O. See the spreadsheet (ExtensibleSpreadsheet_PKs.xls) in the Documentation directory of your Biotics 4.0 installation CD for sample entries for this row for each BCD file with optional fields.

Domain Table Lookup

1. Add a row with the new domain table name to the DomainTables.xls spreadsheet and use the dropdown to choose the conversion type as follows:
 - a. Conversion Type 1: Perform a lookup during conversion. If the value does not exist in the domain table, insert it as a new value in the table.
 - b. Conversion Type 2: ID column in domain table is a non-nullable column. Perform a lookup during conversion. Reject all records whose values are not already in the domain table
 - c. Conversion Type 3: ID column in domain table is a nullable column. Records whose values are not in the table are not rejected, but the new value is not inserted into the table.
2. Save the DomainTables.xls as a text file.
3. In the notes column (column K) of the optional spreadsheet, add the domain table name and the code value field in the following format: DOMAIN_TABLE_NAME.code_field.
4. Make sure the domain table has an entry in the hdms_table.
5. Make sure the domain table has an entry in the next_seq table.

Direct Migration

The following rows in the spreadsheet should be filled in with each field to be converted. Only columns D, E, H, I, J, K, M and O are relevant for conversion. However, the data conversion program looks for certain data in specific columns, so they must always contain the right type of data (e.g., BCD File name always has to be in column D). The rest of the columns are not used in the conversion process and are just used as place holders, so their contents do not matter. The relevant columns are defined below:

D (BCD File) – Name of BCD file

E (BCD Field) – All the fields in that file, including hidden fields, but not including symbolic fields that appear in the windows. It does include

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the names of symbolics written for conversion. Often, these have the same name as the Biotics field they map to. The XML files have a value ora_column which substitutes periods for underscores. Do not use this column, use the BCD names.

Note that the conversion will fail if:

1. The BCD fields are not spelled correctly in the spreadsheet.
2. A BCD field is listed in the spreadsheet but is not in the XML file

H (Biotics table) – The name of the Oracle table to which the attribute maps

I (Biotics column) – The column name in that table

J (Conversion type) – There is a dropdown list of choices to indicate how the conversion is going to happen. The values are:

1. Direct migration - no modification of Data are needed to get it into Biotics.
2. Convert to date - date in BCD text field will be transformed into Oracle date datatype.
3. Convert to number - number in BCD text field will be transformed into Oracle number datatype. If the BCD field contains non-numeric data, it will fail conversion and an error message will be generated.
4. Convert using domain table - BCD value will have to be matched up with a value in a Biotics domain table. How to match them is indicated in column K. Non-matching values will generate error messages during data conversion.
5. Convert using business rules - some conversion logic needs to be applied. Details are usually recorded in a separate document, but if the rules are simple, they may also be in column K.
6. Not being migrated - there should be nothing filled in for Biotics table or column
7. New attribute - In some cases, data from BCD will be used to populate a new Biotics field through some sort of conversion logic. In other cases, a new attribute is entered on the spreadsheet, but no data will be put into it from BCD, so the BCD File and field columns are blank. The later type of new Biotics attributes didn't need to be on the spreadsheet, but were often included for "bookkeeping" to make sure everything was accounted for. They have no impact on conversion.
8. Other-see notes - Usually refers to an ID lookup or special conversion shown in Column K or M.

K (Notes) – For domain conversions and foreign key lookups, the data entered here must be in a certain format. For other types of conversions the notes can be free-form.

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M (Action) – Directives read by the data conversion program to perform some transformation of the data. Syntax must be exact, and some directives are very similar.

O (Table type) – Must be set to “parent” to load optional table, otherwise the program will think it is a child table and not load it.

Other things to note:

The lines that are gray and contain "-" in column H were "commented out" because they were replaced by symbolics. (We decided not to delete any rows from the spreadsheet.)

A single BCD field may map to more than one Biotics field – for example, one by direct migration and another by some conversion logic. In that case, the BCD file and field names are repeated on multiple lines.

Step 5: Setup of Subnational Conversion Spreadsheet

The subnational_configuration.xls spreadsheet in the conversion spreadsheets directory is where you will add a row for each additional spreadsheet you have created. Columns are defined below.

Column A – The XML file the Data are coming from.

Column B – The name of the spreadsheet you have created (No spaces in name)

Column C – The name of the area. Example: “BC SBR Optional”

Column D – Should not be needed

Column E – Should not be needed

Note: If you change this spreadsheet you will need to restart the data conversion program.

BUG : Do not use the word “Species” or “Community” in Column B or Column C.

Step 6. Running the Data Conversion Program

See procedures in Section 3.2 for running the data conversion program.

Step 7. Splitting out Concatenated Fields

If you imported associated multi-valued fields as concatenated strings (i.e. “2001-12-01\$Eric Smith\$Prescribed burn, exotics control”) you now need to split the string into its original fields. In the following example, the first string is converted to a date field.

Update First String (As Date)

```
select to_date(substr(surveydata,1,10), 'yyyy-mm-dd') from site_ilext2
where rownum < 2;
```

```
select surveydata from site_ilext2 where instr(surveydata, '$') = 11;
```

```
select to_date(substr(surveydata,1,10), 'yyyy-mm-dd') from site_ilext2
where instr(surveydata, '$') = 11;
```

```
update site_ilext2 set survey_date =
to_date(substr(surveydata,1,10), 'yyyy-mm-dd') where instr(surveydata,
'$') = 11;
```

Update Middle String (between \$..\$)

```
select substr(surveydata, (instr(surveydata, '$')+1), ((instr(surveydata,
'$',1,2)-(instr(surveydata, '$')+1))))
from site_ilext2 where rownum < 10;
```

```
update eo_ilext2
set observation_data = substr(obseodata, (instr(obseodata, '$')+1),
((instr(obseodata, '$',1,2)-(instr(obseodata, '$')+1))));
```

Update Last String (from \$ to end)

```
select substr(surveydata, (instr(surveydata, '$',1,2)+1)) from site_ilext2
where rownum < 20;
```

```
update site_ilext2 set actions =
substr(surveydata, (instr(surveydata, '$',1,2)+1));
```

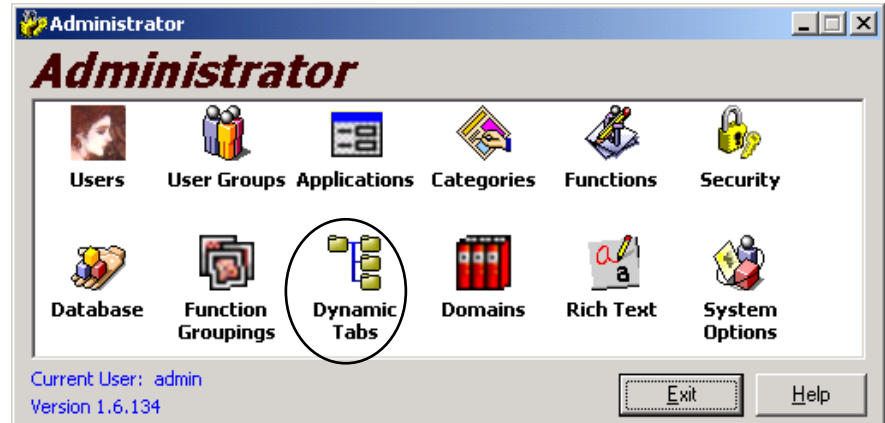
```
update eo_ilext2 set observation_source =
substr(obseodata, (instr(obseodata, '$',1,2)+1));
```

8.3. Using Microsoft Access

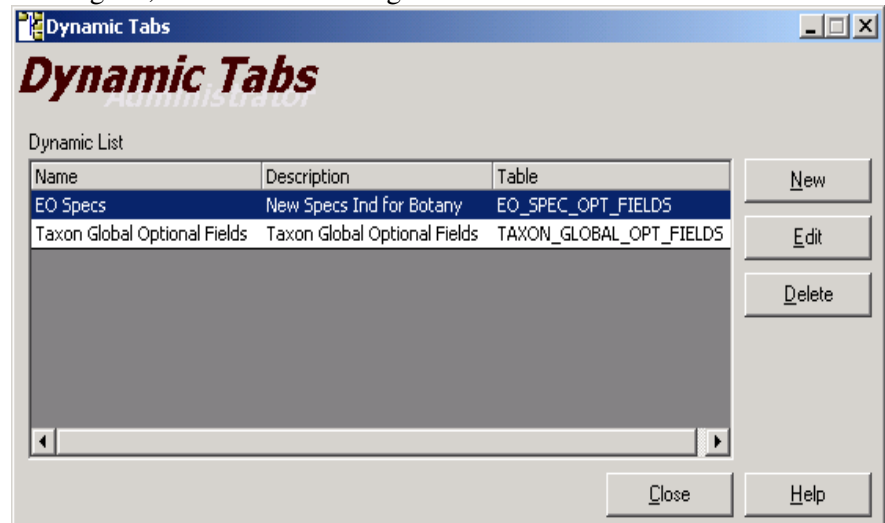
NatureServe used Microsoft Access to manipulate the data into the correct format to populate their extensible data from central BCD. Any method will work. It's the end result that matters. If you go this route, make sure the NEXT_SEQ table is updated with the correct values for your tables. There is information on creating a ODBC/JDBC bridge to export data from Access into XML for use with the conversion program. For more information see the Biotics Knowledge Base item "Connecting to Oracle from MS Access via ODBC"

8.4. Configure Dynamic Tabs

The Administrator -> Dynamic Tabs interface allows the user to link the Oracle objects and data to the Biotics Tracker application. Double-click on the Dynamic Tabs icon to bring up the Dynamic Tabs window.



The Dynamic Tabs main window allows you to create a new tab, edit an existing tab, or delete an existing tab.



Click the New button will to create a new tab.

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Dynamic Tab Manager Administrator

Object:

Name:

Description: Tab Caption:

Table Name:

Window to extend:

Is Grid Layout?

Table Column Information

Seq Order	Column Name	Column Type	Size
-----------	-------------	-------------	------

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

OK Apply Cancel Help

Name and **Description** will appear on the Dynamic Tabs main window. Select the **Table Name** that you created in Oracle to store your extensible data. Select the **Window to Extend** that corresponds to the selected table. A list of the detail windows for which extensibility is supported appeared earlier in Section 8.1. Enter a **Tab Caption** that will appear as the tab label in the extended Biotics Tracker window. If the selected table has a 1 to many relationship with the subject area you are extending then check the **Is Grid Layout** box.

You must associate a user interface control to each column. You may also choose whether or not to display the data in Biotics Tracker by checking or unchecking the **Visible** check box. You will probably not want to display the primary key (EO_EXT_1_ID in the example) or the foreign key from the extensible table area (EO_ID in the example). Note that one column must be checked as the **Primary Key** (EO_EXT_1_ID in the example) and one column must be checked as the **Foreign Key from Extensible Table** (EO_ID in the example).

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Dynamic Tab Manager

Object Name: EO Example 1
Description: A 1 to 1 relationship with the EO Window
Table Name: EO_EXT_1
Window to extend: Element Occurrence
Tab Caption: 1:1 Example
 Is Grid Layout?

Table Column Information

Seq Order	Column Name	Column Type	Size
1	EO_EXT_1_ID	NUMBER	27
2	EO_ID	NUMBER	27
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for EO_EXT_1_ID
Control Type: TextBox
Label Text:
 Primary Key Foreign Key from Extensible Table Visible

OK Cancel Help

Control Type – Control types are defaulted to TextBox. The available control types are:

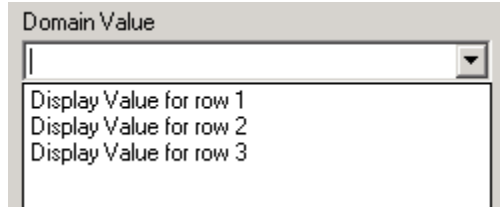
- TextBox – A standard textbox control.

Short Text Field

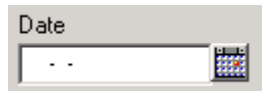
- CheckBox – a standard checkbox control. Values in the database are stored as 1 for true, 0 for false.

Check Box

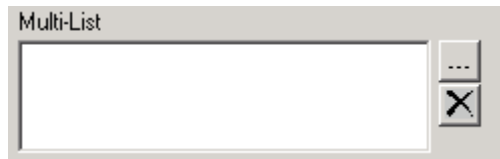
- ComboBox – a standard combobox control. A Domain table must be selected along with its selected Data Column (the data that will be stored in the database) and Display Column (the data to show in the ComboBox). Values in the domain table will appear in the natural order of the data (i.e. what you'll get if you just select * from the domain table with no order clause) – therefore make sure values are inserted into the domain table in the order you want them to display.



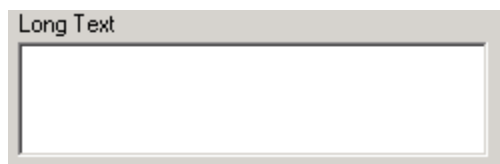
- DateControl – a custom date control. Default value must be of date format. This type of control cannot be used in a dynamic tab in a grid layout.



- Multi-List – a custom Listbox control. A Domain table must be selected along with its selected Data Column (the data that will be stored in the database) and Display Column (the data to show in the Multi-List). This type of control will allow you to select multiple values for a given field, however, the values will be stored in the database as a single semi-colon-delimited record (i.e. “value 1; value 2; value 3”). This type of control can be stored in a field in a table with SINGLE-valued fields. This type of control cannot be used in a dynamic tab in a grid layout.



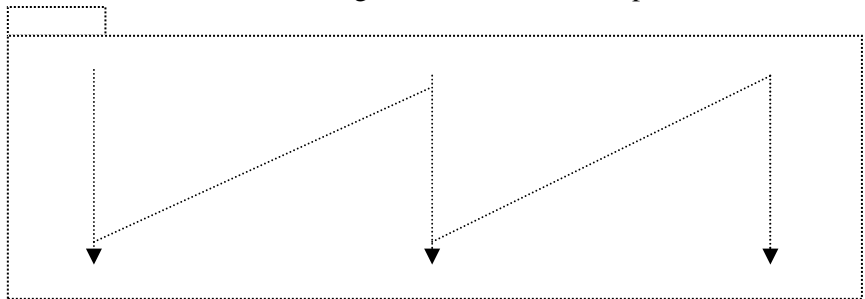
- RichText Control – a custom textbox control that will allow rich edit format for the text. This rich text mode will only occur for this control if it is set in the administrator application under Rich Text option, otherwise the default behavior is a plain textbox control. This type of control cannot be used in a dynamic tab in a grid layout.



The Oracle data type for the selected column will limit the control types.

Column Type	Available Control Types
DATE	DateControl
NUMBER	TextBox, ComboBox
CHAR	TextBox, CheckBox
VARCHAR2	All Types

There are two ways to rearrange the order of how the controls are created and tabbed on the new tab. The first is to select a column (row) from the **Table Column Information** grid and then use the right-sided arrow buttons to move a column up or down. The second is to select a column (row) from the Table Column Information grid and then use the mouse to drag the selected column up and down.



The sequence order in the grid is the order that the controls will be created.

Within a grid (1 to many relationship), display columns are created from left to right starting with the smallest sequence number going in ascending order. Controls on a freeform (1 to 1 relationship) are created using the smallest sequence number going in ascending order as well, but are drawn as the following graphic depicts:

If there are more controls to be created than there is space on the tab display, you will have to physically subdivide your table into two or more tables, and create more than one dynamic tab for the detail window.

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The following screen captures complete the example configuration.

Table Column Information

Seq Order	Column Name	Column Type	Size
1	EQ_EXT_1_ID	NUMBER	27
2	EQ_ID	NUMBER	27
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for EQ_ID

Control Type:

Label Text:

Primary Key Foreign Key from Extensible Table Visible

Table Column Information

Seq Order	Column Name	Column Type	Size
1	EQ_EXT_1_ID	NUMBER	27
2	EQ_ID	NUMBER	27
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for A_SHORT_TEXT_FIELD

Control Type:

Label Text:

Primary Key Foreign Key from Extensible Table Visible

Table Column Information

Seq Order	Column Name	Column Type	Size
1	EQ_EXT_1_ID	NUMBER	27
2	EQ_ID	NUMBER	27
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for A_CHECKBOX

Control Type:

Label Text:

Primary Key Foreign Key from Extensible Table Visible

Table Column Information

Seq Order	Column Name	Column Type	Size
1	EQ_EXT_1_ID	NUMBER	27
2	EQ_ID	NUMBER	27
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for A_DATE

Control Type:

Label Text:

Primary Key Foreign Key from Extensible Table Visible

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Table Column Information

Seq Order	Column Name	Column Type	Size
3	A_SHORT_TEXT_FIELD	VARCHAR2	30
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27
7	A_LONG_TEXT_FIELD	VARCHAR2	4000
8	D_EXT_EXAMPLE_ID	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for A_NUMBER

Control Type:

Label Text: Primary Key Foreign Key from Extensible Table Visible

Table Column Information

Seq Order	Column Name	Column Type	Size
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27
7	A_LONG_TEXT_FIELD	VARCHAR2	4000
8	D_EXT_EXAMPLE_ID	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for A_LONG_TEXT_FIELD

Control Type:

Label Text: Primary Key Foreign Key from Extensible Table Visible

Domain for A_LONG_TEXT_FIELD

Domain Table:

Data Column:

Display Column: Display Width:

Table Column Information

Seq Order	Column Name	Column Type	Size
4	A_CHECKBOX	CHAR	1
5	A_DATE	DATE	0
6	A_NUMBER	NUMBER	27
7	A_LONG_TEXT_FIELD	VARCHAR2	4000
8	D_EXT_EXAMPLE_ID	NUMBER	27

Note: To rearrange rows, hold down the shift-key and drag row to new position or use the Arrow Buttons on the right hand side of the grid.

Extended attributes for D_EXT_EXAMPLE_ID

Control Type:

Label Text: Primary Key Foreign Key from Extensible Table Visible

Domain for D_EXT_EXAMPLE_ID

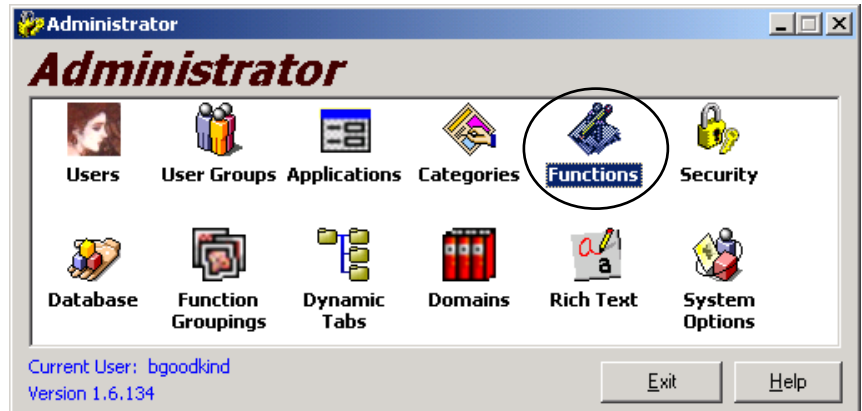
Domain Table:

Data Column:

Display Column: Display Width:

8.5. Security for Dynamic Tabs

Upon completing the Dynamic Tabs configuration, the new tabs and fields will be visible in Biotics Tracker but they will be disabled. You must add them to the security configuration in order for them to be editable.



When you define a Dynamic Tab in the Administrator application, it inserts new records into the SYSTEM_CONTROL table. You must use the Function Manager in the Administrator application to add these new controls to a new or existing security function. In Function Manager, the new controls will appear under the detail form to which they were added. The following table relates each window to its Function Manager detail form.

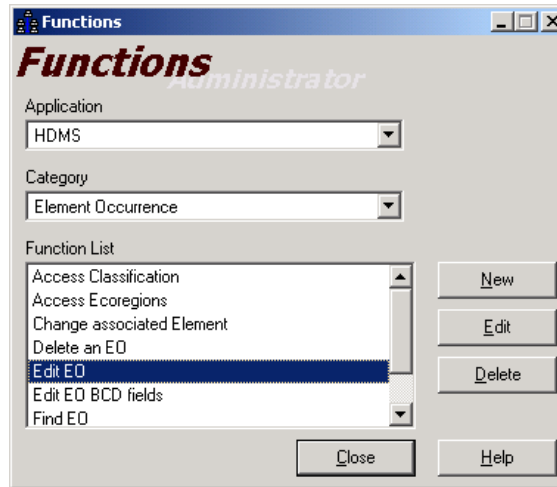
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Detail Window (Defines the granularity for which extensibility can be configured)	Function Manager Detail Form
ELEMENT TRACKING – GLOBAL – SPECIES	ctIETDetailsTabs
ELEMENT TRACKING – GLOBAL - COMMUNITY	ctIETCommunityTabs
ELEMENT TRACKING – NATIONAL – SPECIES	ctIETDetailsTabs
ELEMENT TRACKING – NATIONAL – COMMUNITY	CtlELCommunityTabs
ELEMENT TRACKING – SUBNATIONAL - SPECIES	ctIETDetailsTabs
ELEMENT TRACKING – SUBNATIONAL - COMMUNITY	CtlELCommunityTabs
ELEMENT RANKING - GLOBAL	RankDetails
ELEMENT RANKING - NATIONAL	RankDetails
ELEMENT RANKING - SUBNATIONAL	RankDetails
ELEMENT CHAR – GLOBAL - SPECIES	ctrTaxonomy
ELEMENT CHAR – GLOBAL – COMMUNITY	ctrCommunity
ELEMENT CHAR – NATIONAL – SPECIES	ctrTaxonomy
ELEMENT CHAR – NATIONAL – COMMUNITY	ctrCommunity
ELEMENT CHAR – SUBNATIONAL – SPECIES	ctrTaxonomy
ELEMENT CHAR – SUBNATIONAL – COMMUNITY	ctrCommunity
ELEMENT CHAR – LOCAL – COMMUNITY	ctrCommunity
ELEMENT MANAGEMENT	ELMgmtDetails
EO SPECS	EOSpecsDetail
EO RANK SPECS	EORankSpecDetails
ELEMENT SITE	ElementSiteDetails
ELEMENT ECOREGION - GLOBAL	EcoRegionELDetails
ELEMENT ECOREGION - NATIONAL	EcoRegionELDetails
ELEMENT ECOREGION - SUBNATIONAL	EcoRegionELDetails
EO ECOREGION	EcoRegionEODetails
ALLIANCE ECOREGION	EcoRegionALDetails
ELEMENT GROUP	ELGroupDetails
ELEMENT OCCURRENCE	EODetails
SOURCE FEATURE	SrcFeatDetails

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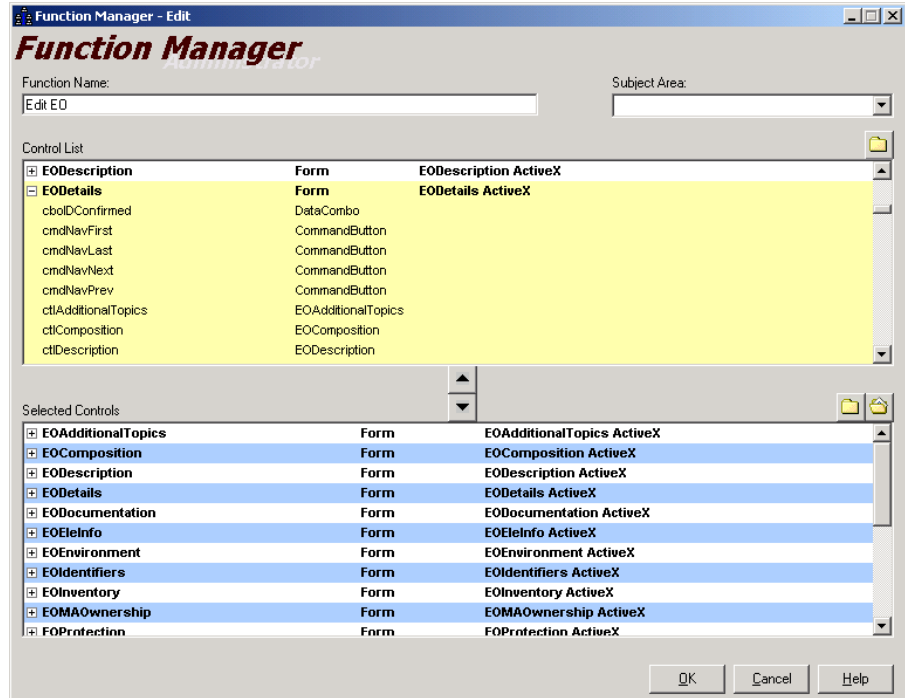
Detail Window (Defines the granularity for which extensibility can be configured)	Function Manager Detail Form
MANAGED AREA	ManagedAreaDetails
SITE	SiteDetails
SCIENTIFIC NAME	ScientificDetails
REFERENCE	ReferenceDetails
CONTACT	ContactDetails

Biotics comes pre-configured with a standard security configuration. The most common scenario for extensibility is that it will be added to the edit function for a given window. By doing this, users who have edit access to the core fields will also have edit access to the extensible fields. The other option is to create a new category so that security access could be granted to that category independently. The rest of this section will complete the example by adding the extensible fields to the Edit EO Function within the Element Occurrence Category.



Edit the “Edit EO” Function and use the down arrow to move from the Control List to the Selected Controls.

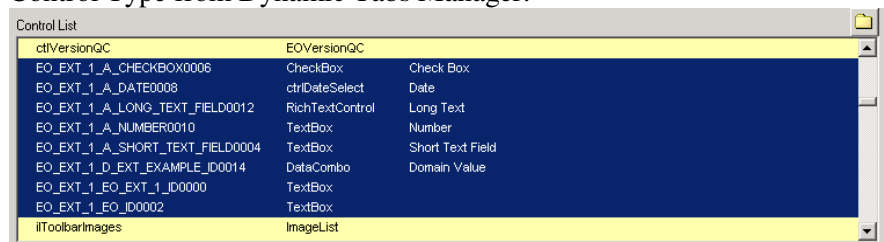
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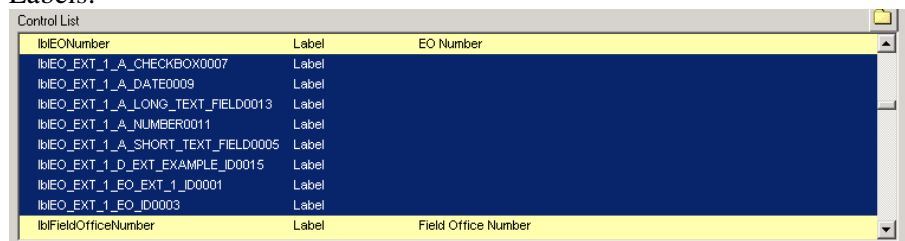
From the Control List, select the extensible controls. The names will be based on the extensible table and column name. Visual Basic has a limitation of 39 characters for control names so some combinations of extensible table and column name will exceed this. To work around this limitation, all extensible control names are truncated to 36 characters and then concatenated with a 4-digit number. This number is generated sequentially as the controls are being created in Administrator.

Each tab will have three sets of controls:

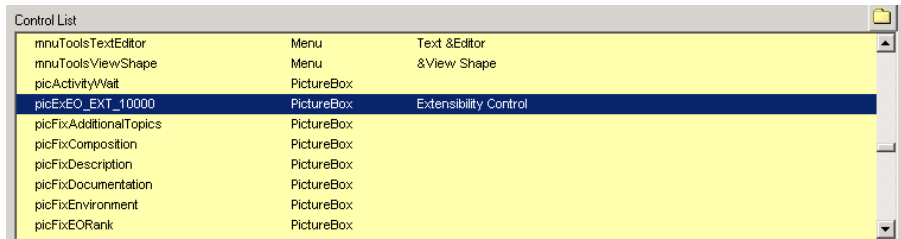
Control Type from Dynamic Tabs Manager:



Labels:



PictureBox:



Control Name	Control Type	Control Description
mnuToolsTextEditor	Menu	Text &Editor
mnuToolsViewShape	Menu	&View Shape
picActivityWait	PictureBox	
picExEO_EXT_10000	PictureBox	Extensibility Control
picFixAdditionalTopics	PictureBox	
picFixComposition	PictureBox	
picFixDescription	PictureBox	
picFixDocumentation	PictureBox	
picFixEnvironment	PictureBox	
picFixEORank	PictureBox	

A dynamic tab with a grid will only have three entries: one for the grid, one for the grid label, and one for the picture box.

After saving you are ready to use your extensible fields. If you created a new category you will first have to use the Administrator -> Security manager to assign the proper access rights to users and/or groups. If you are in Biotics Tracker, you must exit and log back in prior to the security taking effect.

8.6. General Notes

- Extensibility may decrease performance for two reasons. More visual basic controls are added to the window and data for dynamic tabs is loaded when the record is loaded (i.e. not on-demand when the user clicks on the tab).
- Records are inserted into the extensible tables only when the user modifies a field on the extensible tab. This means that there will only be records in the extensible table for records where the user has actually added/modified data.
- There is a limit to the number of extensible controls that can be added to a detail window. Visual Basic does not allow more than 255 controls on a window. It is not possible to give a specific number of extensible controls that can be added, as it depends on the number of controls already on the detail window.

8.7. Read Only User

After extensible tables have been created, the BIOTICS_REPORT user in the Oracle database requires select access on all tables and views in the database, primarily for running Crystal Reports. To grant BIOTICS_REPORT select access on all the tables, run the script report_grant.sql, available on the installation CD. Additional tables or views created after this script is run will require the script to be run again

8.8. Modifying Existing Extensible Tables

If you want to add additional extensible fields to your database and have determined that there is an existing table to which they can be added, you will need to modify the existing table(s) to accommodate the new field. You should always, consider this possibility of modifying an existing table prior to creating new tables and configuration settings.

Note: you may make modifications to the structure of your extensible tables, however, you should NEVER modify the structure of standard database tables.

Adding an Attribute

You must use SQL*Plus or SQL*Plus worksheet to add the new column to the existing table. For example, below is a SQL command that adds a column called “my_data” to the EXT1 table:

```
alter table EXT1 add (MY_DATA varchar2(100));
```

Below is a command that increases the width of the “my_data” column to 200 characters:

```
alter table EXT1 modify (MY_DATA varchar2(200));
```

Once you make the change to the table in SQL*Plus, it is a good idea to make the change in the oracle script that was originally used to create the extensible table. This ensures that if the table is ever dropped and recreated for any reason, your edits will be preserved. Use a text editor to make the change to the script and be sure to add detailed comments indicating what you changed in the header for the table, and in the header of the script for later reference. If this table was created for you at installation, the original script should have been provided to you by your installer at installation.

Deleting an Attribute

If you want to remove an extensible field from one of your extensible tables you must manually remove the target column from the target table. You must use SQL*Plus or SQL*Plus Worksheet to remove the column. For example, below is a SQL command that removes a column called “my_data” from the EXT1 table:

```
alter table EXT1 drop column MY_DATA;
```

However, keep the following in mind:

Only one column can be dropped at a time.

The table must have at least one column remaining in it after it is altered.

Once a column is dropped, it cannot be recovered.

Adding a Constraint

In some cases it may be useful to restrict an extensible field to a specific format beyond the restriction imposed by its data type. This is done in SQL*Plus or SQL*Plus Worksheet by adding a constraint to your extensible table. In the example below, a constraint is added to a column that forces the length of the data to be 6.

```
alter table EXT1
add constraint NAME_OF_CONSTRAINT
check
(length(NAME_OF_FIELD) = 6);
```

Tracker will refuse to save the record if the constraint is violated, and an Ora-02290 Error will be displayed. The name of the constraint will appear in this error message, so you should choose a name that will alert the user to his or her error. Also keep in mind that constraints do not apply to null values, so in the previous example you could still save the record even if the "NAME_OF_FIELD" field is empty.

Any condition may be checked in your constraint. In this second example, the constraint checks that the data entered are capitalized.

```
alter table EXT1
add constraint MUST_BE_UPPERCASE
check
(upper(NAME_OF_FIELD) = NAME_OF_FIELD);
```

Once you make the change to the table in SQL*Plus, it is a good idea to make the change in the oracle script that was originally used to create the extensible table. This ensures that if the table is ever dropped and recreated for any reason, your edits will be preserved. Use a text editor to make the change to the script and be sure to add detailed comments indicating what you changed in the header for the table, and in the header of the script for later reference. If this table was created for you at installation, the original script should have been provided to you by your installer at installation.

After you have renamed the table or column, you may also have to modify any Oracle views that reference the field.

Note: Another way to remove a column is to drop and re-create the table entirely. However this is considerably more complicated. See the 'Dropping a Table' section below for details on how to do this.

A third option is to just to null out all existing values in the column and leave it there. For example, in SQL type:

```
update EXT1 set my_data = null;
```

Renaming a Table or Attribute

To rename an Oracle table, you must drop and recreate the table – see the 'Dropping a Table' section below for details. You must also update the corresponding keyword in the HDMS_TABLE and the NEXT_SEQ table using SQL*Plus.

Unfortunately columns cannot be renamed in Oracle format – you must drop and re-create the column. See the 'Deleting an Attribute' and 'Adding an Attribute' sections above for more information on how to do this. **Note:** Once you drop a column, you have also dropped all the data that are in it.

Once you make the change to the table in SQL*Plus, it is a good idea to make the change in the oracle script that was originally used to create the extensible table. This ensures that if the table is ever dropped and recreated for any reason, your edits will be preserved. Use a text editor to make the change to the script and be sure to add detailed comments indicating what you changed in the header for the table, and in the header of the script for later reference. If this table was created for you at installation, the original script should have been provided to you by your installer at installation.

After you have renamed the table or column, you may also have to modify the Oracle views if they reference the table or column.

Dropping a Table

It should be rare that you need to drop an extensible table. However, should this become necessary, the procedure is as follows:

Use the SQL 'drop' command. You should be connected to the database as the Oracle user that owns all the tables (usually "biotics_user") when you drop the table. For example:

```
drop table my_table;
```

Note: Some of your extensible tables may have constraints that make dropping them difficult (the constraints must be disabled).

If necessary, modify any Oracle views that reference fields from the dropped table

**Viewing Extensible
Table Modifications**

Once you have made modifications to an existing table by:

- adding a column
- changing the table name
- changing a field name

you must drop and recreate the dynamic tab in order to view the modifications on the dynamic tab. However, if you have simply:

- deleted an attribute
- altered the width of an existing attribute

you may edit the existing tab to reflect your edits.

You must also re- run the report_grant.sql script (see section 8.7) in order to grant access to the new/modified table to the BIOTICS_REPORT read-only user.

Finally, you must add the new/modified field to the tab's security in order to make the new fields editable (see section 8.5).

9. COMPLETE DATABASE CONFIGURATION

9.1. Create Triggers and Deleted Schema

Prior to running the scripts it is assumed that the sequences for the audit tables have been created and that the table HDMS_TABLE has been populated. Each of these items should take place during the Biotics database creation process described in prior steps.

Retrieve Scripts

Creating the tables for the deleted data and compiling the triggers have been split into 2 steps. Retrieve the following from version control:

```
..\hdms\sql\ddl\db_objects\triggers\create_del_objects.sql
..\hdms\sql\ddl\db_objects\triggers\CompileTriggers.sql
..\hdms\sql\ddl\db_objects\triggers\WORKING_LIST_trigger.sql
..\hdms\sql\ddl\db_objects\triggers\TriggerScripts-8-8-2202.zip (or the
zip file containing the latest triggers)
```

1. Unzip the TriggerScripts...zip file. This will unzip into a directory called TriggerScripts. It is recommend that it be put somewhere with a short path (i.e. directly at the root of the C drive).
2. Then place the remaining three scripts (listed above) into the TriggerScripts directory.

Create Objects for the Deleted Data

Data deleted in Biotics are moved to a mirrored set of tables that have a naming convention [table name]_DEL. When you configure the Biotics Oracle environment, you may choose to create these tables under a separate Oracle user (this is the recommended configuration). The script that creates these tables is driven by the data contained in HDMS_TABLE.

1. Login to SQL Plus (not worksheet) as the Biotics 4.0 user and run the create_del_objects.sql script:
 - a. Choose **Spool / Spool File...** from the File menu
 - b. Navigate to the local directory where the script is located
 - c. Create a file in that directory with any name (e.g. x.lst) – the purpose of this is to set the current directory
 - d. Choose **Spool / Spool Off** from the File menu
 - e. Type **@create_del_objects.sql** at the “SQL>” prompt and press <enter>

2. The script will prompt you for the name and password of the deleted schema user and the name and password of the source schema user as well as the service name you are using to connect to the database.
3. Log files will be created in the TriggerScripts directory. Check the log files for errors before proceeding.

Compile the Triggers

The triggers in the Biotics 4.0 database were created programmatically. The trigger program is driven by the data contained in HDMS_TABLE. A trigger is created for every value in the TABLE_NAME field with a TABLE_TYPE = 'B'.

Note: There are no triggers for extensible tables since these are installation specific. If you want these tables to be audited then you will have to create triggers by copying the logic in the existing triggers.

1. Make sure your TriggerScripts directory contains the trigger files from the zip file, WORKING_LIST_trigger.sql, and CompileTriggers.sql
2. Still in SQL Plus, run the script CompileTriggers.sql:
 - a. Type **@CompileTriggers.sql** at the “SQL>” prompt and press **<enter>**
3. Log files will be created in the TriggerScripts directory. Check the log files for errors before proceeding.

Analyze Schema

The following statement will create a series of statements to compile the invalid objects in your database. This should be run after compiling the triggers for a new installation, and any time the database is re-imported for any reason (i.e. move to a new server)

1. Log into SQL Plus or SQL Plus worksheet and run the following statements:
 - a. **Spool <path>\compile_objects.sql;**
 - b. **select ' alter '||OBJECT_TYPE||' '||object_name||' compile;' from user_objects where status='INVALID';**
 - c. **spool off;**
2. Edit the script created from the above statement to remove all but the statements.
3. Run the compile_objects.sql script
4. Repeat steps 1 – 3 until no more statements are created from the statement in step b.

The following procedure will tune the database and should be run after the invalid objects are compiled as well as periodically:

```
exec
dbms_utility.analyze_schema('BIOTICS_USER','COMPUTE')
;
```

9.2. Trim Domain Tables

The following Biotics 4.0 Domain tables should be reduced or populated to contain only the desired values for subnational programs.

- D_county (county name, BCD countycode, 5-digit FIPS code)
- D_watershed (8-digit Huc code with leading 0 and Huc name)
- D_mapsheet (BCD quadcode, USGS code and quad name)
- D_localjuris
- D_physprov

For County, Watershed, and Mapsheet domain tables, the initial database used for converting subnational programs includes all values used by NatureServe central and should be trimmed to contain only the rows needed for calculating attributes in Designer. This will increase performance by eliminating unnecessary values. **Note:** Check with the heritage program and find out if they want additional values (i.e. for neighboring jurisdictions) or use the spatial attribute themes to create a complete list of possible values that could be calculated. For LocalJuris and PhysProv domain tables, the initial database used for converting subnational programs is empty and gets populated based on the values found during the BCD conversion. For these tables, additional values may need to be inserted to ensure all possible values found in the spatial attribute themes are included in the domain tables.

Either trimming or populating values for each of the above listed domain tables can be done using Access:

1. Create tables in Oracle to hold heritage program values. Refer to the scripts in `..hdms\sql\Data Conversion\Trim Domains to Correct Values.txt` for the SQL for creating these tables.
2. Export all the values in the spatial attribute theme to a .dbf file (including the fields listed below) and import into access.
 - a. Open the attribute table in ArcView and make sure nothing is selected.
 - b. File > Export to dbf file and save with a name using 8 or fewer characters

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- c. Open a new Access database and File > Get External Data > Import to bring in the .dbf files created in the above step.
3. Create duplicate tables in Access by copying and pasting each imported table. When prompted, choose structure only and give the table a new name.
4. Populate the new table with distinct values.
 - a. Choose Create a Query in Design View.
 - b. At Show table, choose the original table that contains the domain table values and close the Show table window.
 - c. Choose Properties from the right-click menu from the Query window.
 - d. Double click on Unique Values in the Query Properties window to change the Unique Values property to Yes.
 - e. Choose Query > Append Query and choose the name of the new table created in the copy step in the Append window. Use the Current Database default radio button and click OK.
 - f. Execute the Query (Exclamation point button) and choose Yes to append the records to the new table.
5. Delete null rows if they exist from duplicate tables.
6. Insert distinct values from Access into Oracle. Link to the oracle table (x_hp) from access:
 - a. File > Get External data > Link Tables.
 - b. In the Link window, choose ODBC Data Source.
 - c. In the Select Data Source window, choose the Machine Data source tab and choose the connection to your oracle database from the list.
 - d. Enter your connection information to the biotics_user in the Driver connect window
 - e. Choose the x_hp table from the link Tables window.
7. Create an append Query in Access (as above) to populate the x_hp table from the no duplicates table. Note that the field names in your no duplicates table must exactly match those in the x_hp table in order for the append to work. Resolve any required field issues first.
8. Refer to the scripts in ..\hdms\sql\Data Conversion\Trim Domains to Correct Values.txt trim the values in the domain tables based on the values in the temporary x_hp tables.
9. Once you have verified that the scripts worked, you may drop the x_hp tables from the oracle database

9.3. Reset Managed Area and Site Sequences

The Managed Area and Site sequences must be set to the next available number based on the Managed Areas and Sites converted from BCD.

1. Retrieve the `..\hdms\sql\dataconversion\site_ma_seq_update.sql` script from version control and copy it to a local directory. This script will reset the counter for Managed Areas and Sites to the highest number
 - a. Before running this script, make the edits indicated in the script to find the highest number for the Site and MA code the program uses for creating new features.
 - b. Choose **Spool / Spool File...** from the File menu
 - c. Navigate to the local directory where the script is located
 - d. Create a file in that directory with any name (e.g. `x.lst`) – the purpose of this is to set the current directory
 - e. Choose **Spool / Spool Off** from the File menu
 - f. Type `@site_ma_seq_update.sql` at the “SQL>” prompt and press `<enter>`.

9.4. Populate Spatial Attribute Table (NEW install ONLY)

For a new Biotics 4 installation, the conversion to BCD will populate the business tables with spatial attributes from the EOR, MABR and SBR files, however, the spatial attribute table will remain empty. The stored procedure which copies populates the business tables from the spatial attribute table during an update requires that the spatial attribute table be fully populated in order to function properly. For upgrades from Biotics 3.1, the spatial attribute table will be ported from the old database. For new installations, you must run a script to populate this table.

1. Retrieve the `hdms/sql/DataConversion/populate_spatial_attribute.sql` from version control and copy it to the local directory used above.
2. Type `@populate_spatial_attribute.sql` at the “SQL>” prompt and press `<enter>`.

9.5. Parse TRS Note configuration (Optional)

- a. Do not run this script unless you need to parse trs note data from the gis layer to the `trs_note` column in the TRS business tables.

- b. Retrieve the
hdms/sql/ddl/db_objects/stored_pro/populate_trs_note.sql from
version control and copy it to the local directory used above.
- c. Type @ populate_trs_note.sql at the “SQL>” prompt and press
<enter>.
- d. This script will add a record to the db_upgrade_history table to
allow support personel to determine if a program is using this
feature.
- e. This parse trs note procedure may be discontinued by running
the hdms/sql/ddl/db_objects/stored_pro/biotics.sql script.

9.6. Installing Mapper

Mapper installation is done in two parts:

- Installing Mapper software onto the server - executables, help files, and other various support files are installed onto the server
- Configuring each client machine to run Mapper – shortcuts and registry settings are established on each client machine, for multiple users per machine if necessary.

If errors occur during any step of the installation, contact technical support immediatly. Do not proceed to the next step until the problem has been corrected.

9.7. Install Mapper on the Server

Migrating the Mapper Installation

Assumptions

- Biotics 4 database already exists and is populated with data from the Biotics 4 Oracle database.
1. Map drives on the server as was done previously, using the same ODBC_DSN.
 2. Move the entire BIOTICS directory to the new location on the server.

Creating a NEW Mapper Installation

Assumptions

- This is a NEW Biotics 4 installation – Biotics has NEVER been used previously

***** IMPORTANT *****

When installing Mapper on the server, be sure to install it to the same network drive letter that client machines will use to access the server. For example, if Mapper is being installed into D:\Software\Biotics on the server, but client machines will access it from O:\Biotics where O: is mapped to D:\Software, then be sure to map drive O to that same location before installing the software on the server. The full path to both the software and themes is stored in several places within the Mapper program.

1. Insert the Biotics CD into your CD-ROM drive.
2. Using “My Computer” or the “Windows Explorer”, run the **MapperSetup.exe** program on the CD.
3. Choose **Server Setup** from the list of choices, and then follow the prompts.
 - a. In the “Select Setup Option” window, choose “Server”
 - b. In the “Destination Directory” window, choose the path to which Biotics should be installed. Make sure this path is **identical** to the one used by the client machines to access the application.
 - c. Click “Next” in the Themes directory window, and the ODBC setup window.
 - d. Click “Install” to install the server portion.

9.8. Configure Clients & Users to Run Mapper

In this step, shortcuts and registry settings are established on each client machine. In the case of a shared Mapper client, the installation must be run multiple times, once under each user’s system login.

Workspace

While installing the client software, you will be prompted to select the location of the user’s workspace (GIS_WKSP) directory.

The workspace is a location on disk where personal and temporary files generated by Mapper will be placed. This includes:

- The user’s ArcView project file (biotics.apr)
- Mapper shapefile clones
- Log/Report files
- Themes copied from CD-ROM

Some of these files are deleted automatically (e.g. themes from CD-ROM), while others are left there permanently (e.g. Mapper shapefiles).

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Mapper works fastest when the workspace is located in a directory on the local machine. However, if a user needs to be able to run Mapper from multiple machines, the user's workspace must be placed in a location accessible from the network. The location of the workspace does not have to be the same for all users.

The workspace must be unique to each Mapper user. There are two situations where setting up the workspaces can be tricky:

- Multiple Mapper users sharing a client machine
- "Floating Users"

Shared Machine

A shared machine is a Mapper client used by more than one person. In this situation:

- Each person must have their own Windows logon (unless multiple users logon to Mapper using the same user id).
- Each Windows user must point to a separate workspace.

For example, you might have three Windows users on the machine: SMITH, JONES, and BROWN. SMITH's workspace points to c:\users\smith, JONES' workspace points to c:\users\jones, and BROWN's workspace points to c:\users\brown.

Floating User

A floating user is a person who needs to be able to run Mapper from multiple client machines. In this situation:

- The workspace should be on a network drive, so that no matter which machine the user is sitting at, they are using the same workspace.

For example, Windows user "GREEN" needs to be able to use more than one machine. So GREEN's workspace might be set to K:\Biotics\WKSP\GREEN where K: is a network drive.

Recommendation: Create a workspace directory under the same parent directory of Biotics on the server; this will require only one mapped drive letter.

Setup Instructions

Note: In order to install the Mapper client, the Mapper user's Windows user profile must include the ability to write to the registry. The Install program will not run correctly without this ability. In some cases, this requires that the Windows User profile be bumped up to "Power User" or "Administrator" to perform the installation. However, once the

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installation has been completed, the User can be returned to the previous security level, and Mapper should run normally.

To configure a client machine to run Mapper:

1. If necessary, grant PowerUser/Administrator privileges to the Windows user that will run Mapper (see note above).
2. Log into the client machine as the Windows user that will run Mapper. If multiple Windows users will run Mapper on the machine, then you need to repeat these steps for each Windows user.
3. Map drives (as persistent) to the Biotics directory, the Authorization directory and the workspace directory (if necessary). **Note:** if all these directories are stored at the same level on the same server and the directory above is shared, they can all be accessed through the same drive letter.
4. Insert the Biotics CD into your CD-ROM drive.
5. Use “My Computer” or the “Windows Explorer” to navigate to and run the **MapperSetup.exe** program on the CD.
6. In the “Select Setup Options” window, choose “User Setup.”
7. In the “Select Biotics Directory” window, choose the location where the application is housed on the Server. The /Biotics folder must be included in the path.
8. In the “Select Authorization File” window, navigate to the Accounts.com file on the server. For its location see Section 5.1 of this document, “Tracker Server Installation.”
9. In the “Select Workspace Directory” window, choose the path to the user’s workspace directory (\GIS_WKSP). If the user’s workspace already exists, you will receive a warning. Click Yes to install into that directory anyway.
10. In the “Oracle Database Access Options” window, leave the Data Source Name as “Ora_Server.” The Alias, by default “oracle_server,” is the Net Service Name with which you connect to Oracle. If the service name is not oracle_server, enter the correct value here and click OK.
11. In the “Program Group Options” window, choose the Program Group where Biotics should be installed. By default it is included in a group called “Biotics.” Here you may also choose to have a shortcut created on the User’s desktop (recommended).
12. In the “Confirm Setup Options” window, review your choices, and if satisfied, click “Install” to begin the installation.
13. If an “Oracle ODBC Driver Setup” window appears, verify it contains the correct Service Name, and click OK to continue.

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14. If prompted to “Replace Existing Project File,” Click Yes to replace it, or No if you do not want to overwrite the existing project.
15. When the installation is complete, you can review the actions performed on the machine by opening “install.log” (located in the user’s workspace) in a text editor.
16. If security privileges were added to the Windows user, be sure to change them back.
17. Repeat for additional Biotics users on the same machine.

Please refer to Section 23.1, “Workstation Configuration” for details on what is installed during the Client setup.

Additional Upgrade Configuration

Additional Configuration Steps for Installation (upgrading from version 3.1 only)

This step only needs to be done once – this step is generally done by NatureServe Staff only during configuration of your database.

1. Set Index Map from Admin menu in Biotics so that preferences can be changed (the conversion script does not do this because the structure is too different).
2. Go into the filters and delete any filter that references an attribute no longer in the views attached to that theme. These filters could cause errors.
3. Get the Biotics 4.0 legends from <\\cypress\groups\projects\Biotics\NetworkRollout\Installation\Biotics4Legends>. Apply the new legends to the EO Representation and Source Feature Themes.
4. MA Name/Site Name cannot be calculated in designer if there are apostrophes in the MA/Sitename field in Biotics 4.0. Since MA Name/Sitename are optional attributes for spatial attribute calculation, an alternative should be used if apostrophes exist.

10. DEFINING THE COORDINATE SYSTEM

The coordinate system specifies the map units and projection for all theme data. For example, the coordinate system may specify that your theme Data are in UTM - ZONE 14 - NAD83, with map units of METERS. The most common coordinate systems are State Plane and Universal Transverse Mercator (UTM). However, there are many others. Biotics supports all the coordinate systems that ArcView supports.

All theme data must be in the same coordinate system. Biotics Mapper does not support multiple coordinate systems within an installation.

Many times the Heritage Program/CDC (or the government they are affiliated with) will already have a standard coordinate system. If so, using the standard coordinate system as the Biotics coordinate system will save data conversion headaches and make more reference data available to the Program.

10.1. Zones

If a Member Program (HP/CDC) spans two or more State Plane or UTM “zones”, only one of the zones can be selected as the coordinate system. Data in the other zone must be “forced” (projected) into the zone that is selected using ArcInfo.

Forcing zones causes some distortion (and therefore map inaccuracy), and should only be done if the Heritage Program extends slightly into another zone.

If the Heritage Program extends significantly into another zone (e.g. several hundred miles), or spans more than 2 zones, then a non-zonal coordinate system should be used.

10.2. Datum

Beware of different datums (NAD27 v. NAD83) in:

- Reference theme data
- Paper maps used in the Heritage Program
- Coordinates for EOs typed into the BCD System

If you are not sure what datum certain reference layers are in, compare them to something you are sure of (e.g. see if rivers and lakes line up). If map features seem shifted, you may have a datum problem. In Mapper, all reference layers must be in the same datum. If you must perform

some datum shifting, ArcInfo tools are generally considered more accurate than the ArcView projection utility.

There can be confusion if the datum of the digital reference maps is different from that of the paper maps used in the Member Program. This may be particularly important if staff continue to read coordinates off the paper maps and use these to input shapes in Mapper. Please be aware of the datum of your paper maps, as compared to your chosen Mapper projection.

By default, Mapper will use the NAD83 datum to compute centroid UTM coordinates for the EO / MA / SITE shapes. If a Program wants all mapping done in NAD27, a change must be made to the Powerpack: System Settings in Mapper.

1. Start Biotics Mapper and login as a user with administrator privileges (e.g. “mgr”).
2. From the Admin menu, choose **Powerpack System Settings**.
A dialog box will display.
3. Set ‘Datum of Calc. UTM Coord.’ To NAD27.
4. Click **OK**.

10.3. To define the coordinate system

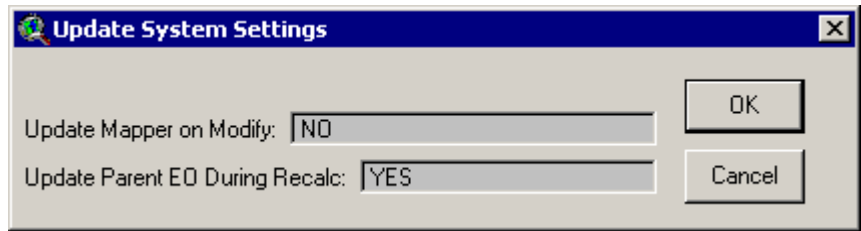
1. Start Biotics Mapper and login as a user with administrator privileges (e.g. “mgr”).
2. **Important:** If the default projection units are anything other than Meters, set the Map units in the View>Properties dialog.
3. From the Admin menu, choose **Define Coordinate System**.
A dialog box will display prompting you to specify the map units.
4. Specify the map units and click OK.
The Projection Properties dialog box displays.
5. Define a projection (for more help, press <F1> when the dialog is open). Any projection available in ArcView should be available here.
6. **Tip:** Make a screen capture of the projection definition window for your installation documentation before closing this window. Once you close this window, you will not be able to view the projection information if you have defined custom parameters.
7. Click **OK**.
8. Confirm the coordinate system definition.

11. SYSTEM SETTINGS

11.1. Biotics Mapper System Settings

In addition to the Biotics system options that are set through the Administrator application, there are two system settings that control aspects of the updating of shape attributes in Mapper. You should review both settings to see if the setting is applicable for the current Member Program (HP/CDC). System settings are stored in the USER_PREFERENCES view in Oracle.

These settings are set and maintained within the Biotics Mapper application using the "Biotics System Settings" option on the Admin menu. For example:



Settings are as follows:

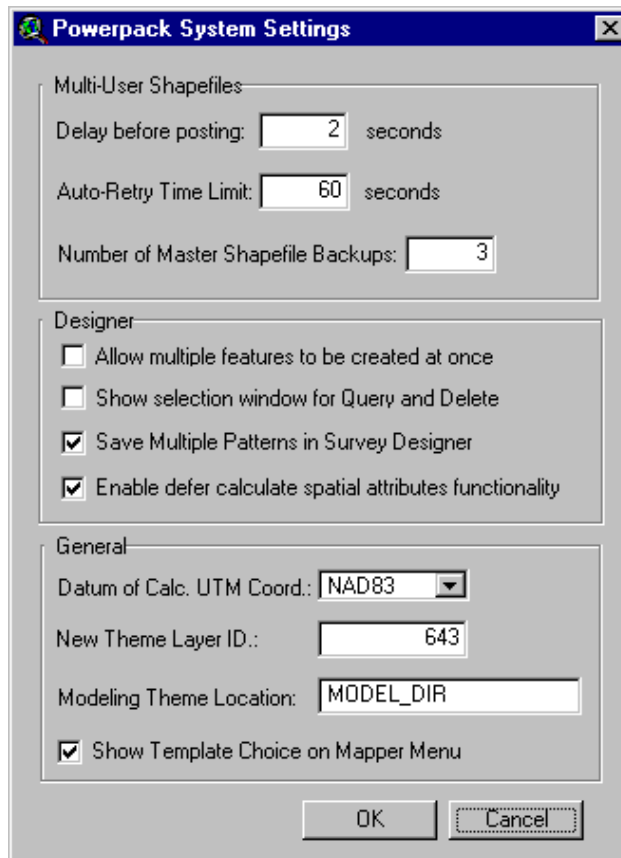
Name (Biotics FIELD)	Description	Default
Update Mapper on Modify (BIOTICS_UPDATE_MAPPER_ON_MODIFY)	<p>If set to YES, SHAPE table attributes DIGITAL_MAPPING_BY and DIGITAL_MAPPING_DATE will be updated to contain the current user and current date, and MAP_QC_STATUS will be updated to "Incomplete," whenever the shape of an EO Rep (Polygon), MA, or SITE changes, or when spatial attributes are manually recalculated.</p> <p>If set to NO, SHAPE table attributes DIGITAL_MAPPING_BY, DIGITAL_MAPPING_DATE, and MAP_QC_STATUS are set when EO Reps, MAs, or SITES are first created, and are not modified after that.</p> <p>This setting is not applicable to source features.</p> <p>The default for this setting is NO.</p>	NO
Update Parent EO During Recalc (UPDATE_PARENT_EO_DURING_RECALC)	<p>If set to YES, the parent-sub EO relationship will automatically be updated and recorded during a spatial attribute recalculation.</p> <p>If set to NO, the parent-sub EO relationship will not be updated during a recalculation (but changes that are not made will display in a log window, so that</p>	YES

Name (Biotics FIELD)	Description	Default
	<p>you know which EOs should be changed, and can manually implement the change if desired).</p> <p>If set to PROMPT, you will be asked if you wish to update the parent-sub EO relationship for all applicable EOs, one at a time, during the recalculation process.</p> <p>The default value for this setting is YES.</p>	

11.2. Powerpack System Settings

Many Powerpack system settings are generic and not applicable to Mapper. Changing some of these values can cause Mapper to malfunction – refer to the table below for details. For most installations, the default settings will be adequate. However you may wish to refine the settings once you are familiar with the system. Powerpack system settings are stored in the USER_PREFERENCES view in Oracle.

These settings are set and maintained within the Biotics Mapper application using the "Powerpack System Settings" option on the Admin menu. For example:



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The Powerpack System Settings are as follows:

Name (Biotics FIELD)	Description	Default
Delay before posting (EDIT_DELAY)	<p>The amount of time (in seconds) that the system will wait after successfully locking the master shapefile before proceeding to update the shapefile. The time delay allows another process that just finished updating the shapefile to release all holds on the files.</p> <p>Reducing this time will speed up posting. However if there are ever corruptions, you should increase this time. Never set this time less than 1 second.</p> <p>The default for this setting is 5 seconds.</p>	5
Auto-Retry Time Limit (MU_RETRY_TIMEOUT)	<p>The amount of time (in seconds) that the system will keep trying to lock a shapefile when it is already locked. If the shapefile becomes unlocked before the time is up, the system will proceed. Otherwise the user will be asked if they wish to continue retrying.</p> <p>The default for this setting is 60 seconds.</p>	60
Number of Master Shapefile Backups (MASTER_GENERATIONS)	<p>The number of backup copies that are kept for each master shapefile. Backup copies are made whenever a post occurs. Each copy is named the same as the original file with a numeric suffix (1, 2, 3, etc.). When the maximum number of copies has been reached, the system begins overwriting the oldest copy (i.e. starts back at 1).</p> <p>The default for this setting is 3.</p>	3
Allow multiple features to be created at once (DESIGNER_MULTI_ADD)	<p>*** Must not be checked or Biotics will not function properly ***</p>	DISABLED
Show selection window for Query and Delete (DESIGNER_SHOW_SELECT_DIALOG)	<p>When checked, a dialog will display when more than one feature within a theme is queried using the ? tool, or deleted using the X tool. Since Biotics has similar windows, this is normally not checked (otherwise two very similar dialogs will display). However there are two advantages of the dialogs that display when this setting is checked: (1) the dialog has a flash shape function which the Biotics dialogs do not; (2) the dialogs will show all of the Oracle attributes currently joined to the theme's attribute table (if any) compared to the Biotics dialogs which show preset attributes.</p>	F

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Name (Biotics FIELD)	Description	Default
Save Multiple Patterns in Survey Designer (SD_SAVE_MULTI_PATTERNS)	Not applicable to Biotics	N/A
Enable defer calculate spatial attributes functionality (DESIGNER_DEFER_ATTSES_ENABLED)	When checked, the Defer Calculation of Spatial Attributes checkbox appears on the Edit/Finish/Cancel dialog when features are created and edited. This should always be checked in Biotics to ensure that relationships between features (e.g. parent/sub-EOs) are properly maintained.	YES
Datum of Calc. UTM Coord. (NAV_CALC_COORD_UTM_NAD)	Indicates which datum UTM coordinates for the EO/MA/SITE centroid should be calculated in. These show up as UTM_EASTING and UTM_NORTHING in the Spatial Attribute tab. Change this setting only if all reference theme data (and the coordsys) is in NAD27. The default for this setting is NAD83. Also see section 10.2, "Datum".	NAD83
New Theme Layer ID (NEW_THEME_LAYER)	Not applicable to Biotics	N/A
Modeling Theme Location	Not applicable to Biotics	N/A
Show Template Choice on Mapper Menu (MAPPER_TEMPLATE_CHOICE)	This option indicates if the Template choice should be visible on the Mapper menu. Uncheck this box if you do not want users to be able to modify map templates.	ENABLED

12. INTEGRATING REFERENCE THEME DATA

During the configuration process, as much reference theme data as possible should be integrated with Mapper (e.g. roads, rivers, towns, counties, etc.). The more reference theme data there are, the more useful Mapper will be.

Supported data formats

Navigator supports almost every type of data supported by ArcView, with two exceptions:

- SDE
- Some of the extended (3rd party) image formats

General guidelines

Here are some general guidelines that you should keep in mind as you integrate the reference theme data:

- Themes that are the source of spatial attributes are most important, and should be done first.
- Don't ignore small scale datasets (e.g. 1:2,000,000) – they are ideal for producing simple province/state-wide maps.
- Watch for datum differences.

Overview of steps to integrate reference theme data

Integration of reference theme data can be broken down into the following steps:

- Acquire data
- Import data
- Restructure data
- Define data to Navigator
- Define legends
- Convert (digitize) data

12.1. Acquire Data

Find out what Data are available

There is data available from government and private organizations. It just takes a little research to find it! As you are digging for data, try to find out as much about each dataset as possible from the provider of the data. Many datasets may not be worth the time or effort to integrate. Questions you should ask are:

- is there a fee for the data?
- what is the geographic coverage of the dataset?
- what is the source of the data? (e.g. 1:2,000,000 paper map, GPS, etc.)
- how accurate are the data (e.g. +/- 250 meters)
- how current are the data?
- are the data being maintained (i.e. updated)?
- are there any attributes for the data?
- what format are the data available in? (e.g. DXF, E00, SIF, etc.)
- what media can the data be provided on? (e.g. FTP, 4mm tape, etc.)
- what coordinate system are the data in? (e.g. UTM, state plane, etc.)
- how big is the dataset? (e.g. 1 MB, 10 GB, etc.)
- are the data topologically structured? (e.g. centroids in polygons)

Decide which datasets you are going to acquire

Decisions will be based on the information gathered previously. Only those datasets that will be useful, and are affordable, should be acquired.

Make requests for the data

Write letters, make phone calls, issue purchase orders, etc. to get the data. In some cases, you might be able to get the data yourself over the Internet.

Load the data onto your system

Make sure that you can read the data from whatever media it was provided on. It is not unusual to have difficulties reading tapes that were generated by a different operating system, in which case you will have to make another data request.

12.2. Import Data

If necessary, import the data into a format readable by ArcView (for more information, search the ArcView help on “Supported Data Formats”). ArcView is capable of reading several vector formats, including E00, MIF, DXF, DWG, and DGN. In addition, many raster formats are supported (TIF, LAN, etc.).

If the data come in a format that ArcView does not support, ArcInfo will be required. In addition, if the Data are going to require restructuring, the data should be converted into ArcInfo format, since ArcInfo has more data manipulation tools than ArcView.

Once you can view the data in ArcView or ArcInfo, assess its quality and content before proceeding any further— you may find the theme is less useful than you thought.

12.3. Restructure Data

In many cases, it will be necessary to restructure the data so that they are useful in a GIS environment. This may include:

- Changing the projection/datum (e.g. converting lat/long to UTM).
- Subdividing into more specific themes (e.g. splitting a “transportation” theme up into highways, roads, railways, etc.).
- Merging map sheets together to form a “seamless” theme - surprisingly a massive non-tiled shapefile will outperform a tiled theme in every aspect. Although it may take a lot of machine time to merge all the tiles together and create the shapefile, it may be worth it on the long run as long as the data are very static and never needs to be edited.
- Attaching attribute data to the theme from external data files (e.g. Oracle).
- Adding attributes to the theme (manually).
- Building topology (e.g. polygons).
- Reorganizing the data on the disk (often necessary for tiled themes which have to be structured in a particular way to work with Navigator).
- Creating “world” (georeferencing) files for image themes.
- Converting ArcInfo coverages to shapefiles – this can improve performance dramatically.

- Compressing image data into MrSID format – this can improve performance and save a ton of disk space. For example, a 25 MB TIF image compresses to 2.5 MB with no noticeable loss of quality.

Most of the restructuring described above will require ArcInfo.

Having said that, keep in mind that you should try to use as much data as possible “as is” – in its current location and current format. Any restructuring that you do may have to be re-done whenever a new version of the dataset is received. Further, once you make a copy of a dataset, you introduce the potential for someone to forget that there are now two copies of the same data on the network. Sooner or later someone might make a change to one of the copies, and forget to make the change to the other copy, thus introducing data integrity problems.

You must analyze each data set individually and make a judgement call whether the benefits that will be realized from restructuring the data outweigh the potential maintenance and integrity problems.

12.4. Define Data to Navigator

To make the data easy to access, it must be defined to Navigator. This is done using Navigator Admin (available on the Admin menu). For complete details on how to use Navigator Admin, refer to the on-line help.

Here are some general guidelines:

- Whenever you make changes to the data warehouse using Navigator Admin, click on the “Update Users” button in Navigator Admin when you are finished to update every user’s “Working Data” list (their view of the Data Warehouse). Otherwise they may not see your changes.
- Be sure to add each and every theme you define to the view (using Navigator or the View button in Navigator Admin), to ensure that you have defined it properly.
- Organize themes by subject matter, rather than by the source of the data. For example, rather than having a “1:24,000 topo data” library containing roads, rivers, contours, land cover, etc., create several libraries for transportation, hydrography, hypsography, etc. (see Figure 12-1 – Navigator Example). Users tend to find this type of data organization more intuitive.
- Use proper or title case to name libraries, datasets, layers, and themes rather than all upper case or all lower case. This makes everything look better and easier to read.

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Example of how theme data can be organized into libraries, datasets, layers, and themes in Navigator:

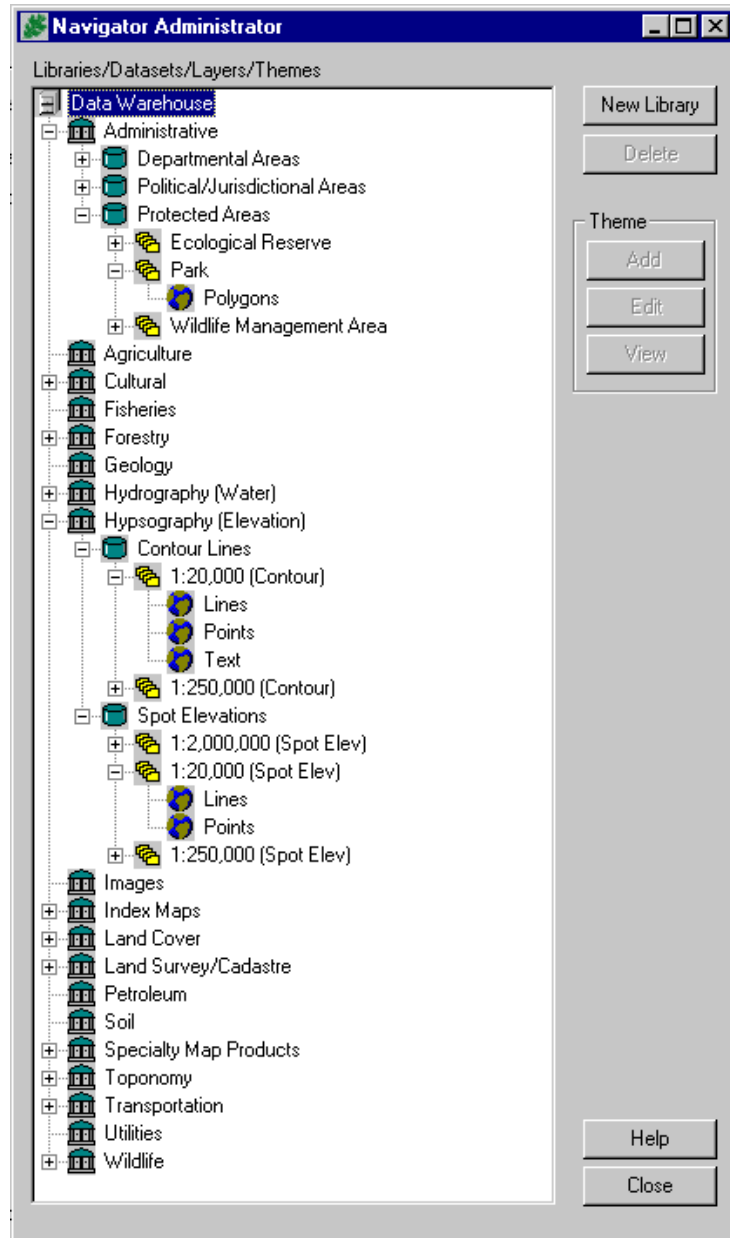


Figure 12-1 – Navigator Example

- The name that shows up in the Table of Contents is Layer.Theme, so:
 - a) Make Layer Name singular
 - b) Make Theme Name plural

For example, “Park.Polygons” (Layer Name = “Park”, Theme Name = “Polygons”) instead of “Parks.Polygons” or “Parks.Polygon”.

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- Theme name is usually the feature class (Points, Lines, Polygons, Text, or Image).
- Make sure the Layer.Theme name is unique. For example, consider the following:

```
Hypsography
  Contours
    1:20,000
      Lines

Hydrography
  Rivers/Streams
    1:20,000
      Lines
```

Both themes will show up in the Table of Contents as "1:20,000.Lines". You can solve this problem by repeating the dataset name in the layer name:

```
"1:20,000 Contour" + "Lines"
"1:20,000 River/Stream" + "Lines"
```

- If you define the themes while sitting at the server, be sure to define the themes from the drive mapped letters rather than the physical device letters. For example, drive D: on the server may be accessed as drive N: from client machines, so make sure you define the themes using N: not D:.
- In the unlikely event that all of your theme data reside on drive D: (and is accessed using drive D:), you need to reset the CD-ROM drive letter preference before you define any themes (the default CD-ROM drive letter setting is D:). This is normally done using the Preferences option on the File menu. However, at this point in the configuration process, you cannot use the preferences option, because you have not yet defined an "index theme" (see section 13). Therefore, you must set the CD-ROM drive letter setting using SQL*Plus or SQL*Plus Worksheet:

```
update preferences
set value = your CD-ROM drive letter [e.g. 'G']
where key = 'CDROM_LETTER' ;
commit ;
```

Then you must exit and restart Biotics Mapper.

12.4.1. Themes Based on Mapper Shapefiles

You can define a theme based on the Mapper shapefiles. For example, you might define a theme based on the EO Repts (Polygons) with a special Oracle view joined to it, suitable for conversion to a shapefile for distribution to external parties. However, you must be careful how you define the theme:

- The source for the theme should be the CLONE in the WKSP, not the master.
- The “multi-user” property should not be checked for the theme.

12.4.2. Defining Core Spatial Attributes

Core spatial attributes in Biotics include those displayed on the Locators tab of the Element Occurrence, Managed Area and Site detail windows in the Tracker application. Core spatial attributes are stored in the spatial_attribute table as well as in the business tables for EOs, Managed Areas, and Sites. Oracle stored procedures copy these values from the spatial_attribute table after calculation to the business tables for display in Tracker. For example, the mapsheet spatial attributes are copied to the EO_MAPSHEET table for EOs. There are three stored procedures: pop_eo_data, pop_ma_data, and pop_site_data. In order for the stored procedures to work properly, these attributes must be defined with standard names in Designer Admin (see section 16) and joined to the proper domain table in Navigator. Core spatial attributes include:

- County
- Mapsheet
- Watershed
- Local_Jurisdiction
- Town_Range_Section
- Physiographic_Province
- Managed_Area
- Major_MA
- Site
- Min_Elev_Feet
- Max_Elev_Feet
- Min_Elev_Meters
- Max_Elev_Meters

Note: the above listed values are the complete list of core spatial attributes. However, it is not necessary for all of the above attributes to be used.

Prepare Spatial Attribute Themes

Each of the core spatial attributes calculated in Mapper must contain an attribute that matches that found in the corresponding domain table in order to properly define the theme to Navigator. The following table describes content and format of the field required (the name of the field is optional) for each attribute and the oracle view to which the theme must be joined in Navigator in order to obtain the domain values.

Attribute Name	Required Field Content	Target Join Table
County	County Code (e.g. NYXXXX) or State_County_Fips Code	D_county_vw

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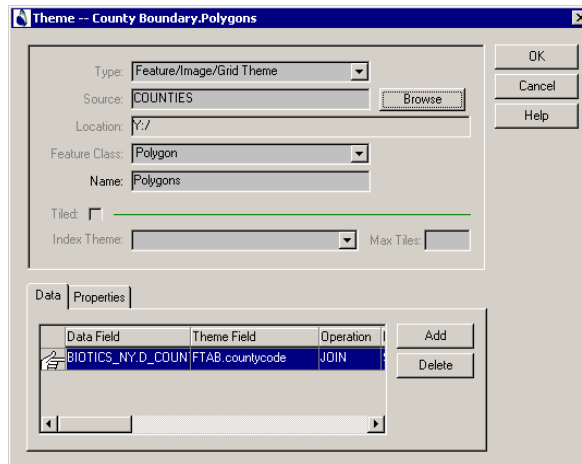
Attribute Name	Required Field Content	Target Join Table
Mapsheet	USGS Code (e.g. 42076-D3)	D_mapsheet_vw
Watershed	Huc (e.g. 02040301)	D_watershed_vw
Local_Jurisdiction	Local_Jurisdiction_Desc	D_local_jurisdiction_vw
Town_Range_Section	TownRange – Section – Meridian (e.g. 001N001E – 12 – 4P)	N/A
Physiographic_Province	Phys Province Code (e.g. LV)	D_phys_province_vw
Managed_Area	Managed Area ID	Managed_area_vw
Major_MA	Managed Area ID	Managed_area_vw
Site	Conservation Site ID	Conservation_site_vw

Define Core Attribute themes in Navigator

Once the core spatial attribute themes are defined in Navigator, an additional step must be taken to achieve the join to the domain table. Once the join is configured, it will be performed each time the theme is added to the view from Navigator. For this reason, it is critical that Navigator is used to add these themes to the view. You should never use the standard ArcView add theme button for any themes that are defined in Navigator.

Configure the join in Navigator:

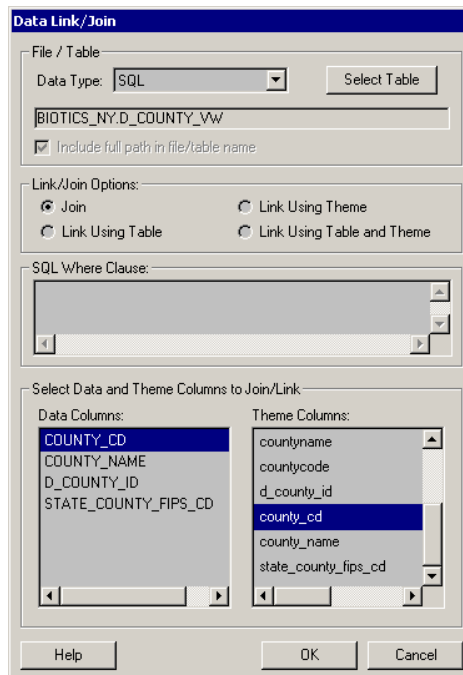
1. Define the theme to Navigator and click the Add button on the data tab at the bottom of the window:



2. The Add button will bring up the following window, which should be filled in as follows:
 - a. Choose SQL from the Data Type dropdown.
 - b. Click the Select Table button.
 - c. Choose the appropriate domain table (from the Target Domain Table column of the above table). Note that you will see both your Biotics data schema as well as

your deleted schema in the window, so each table will be listed twice. Make sure you choose the domain table that corresponds with your Biotics data schema. This will correspond with the oracle user who owns the Biotics data. For installations using NatureServe's default user names, this user is biotics_user. The view will be listed with the Biotics data user owner and the view name (i.e. BIOTICS_USER.D_COUNTY_VW).

- d. Choose the Join option from the Link/Join Options section.
- e. SQL Where Clause should be left blank.
- f. Choose the join fields from the Data and Theme columns. In order for the join to work properly, the Theme column you choose must contain data in the correct format, as described in the table above to match up with the appropriate data from the Data column (data from the domain table).
- g. Click the OK button.



12.4.3. Defining Tiled Themes

Overview

A tiled theme is one that is made up of multiple physical data files. The data files normally do not overlap, and when viewed together, form a continuous map.

Tiled themes are used for themes that have a very large number of features (e.g. more than 100,000 points, lines, or polygons), and also for very large image themes (e.g. aerial photos). Creating a single physical data file can result in very poor performance, particularly for image themes. Sub-dividing the data file up into multiple physical data files ensures that the features in the theme can be drawn on the screen very quickly. In the case of feature themes, a massive non-tiled shapefile can display as quickly as a tiled theme; however editing the shapefile will be extremely slow. If editing is not an issue, then consider using tiled themes only for image themes.

In installations where ArcInfo is used, these themes can be managed using Map Libraries or ArcStorm Libraries. Since ArcInfo takes care of the tiling, these are not considered tiled themes to Navigator. Tiled themes are therefore only applicable for installations where ArcInfo libraries are not used.

Multi-user shapefiles and SQL Event Themes cannot be tiled.

Step 1: Physically Organize Data on Disk

Tiled themes must be physically organized on the disk in a specific way to make them usable in Navigator. The way they are organized depends on the type of theme.

Event Themes and Image Themes

- All files must be located in the same directory.
- The filename (without the extension) corresponds to the value entered into the TILENAME field in the index theme in step 2.
- Example: a tiled “aerial photo” theme consisting of 4 images:

N:\Data\Photos\sw.tif
N:\Data\Photos\nw.tif
N:\Data\Photos\ne.tif
N:\Data\Photos\se.tif

Coverages, shapefiles, and Grids

- Each coverage, grid, or shapefile must exist in a sub-directory. The name of the sub-directory corresponds to the value entered into the TILENAME field in the index theme in step 2.
- The name of the coverages, grids, or shapefiles within each subdirectory must all be the same.
- Example: a “rivers” theme, tiled by watershed, made up of coverages:

N:\Data\Hydrography\wshed1\rivers
N:\Data\Hydrography\wshed2\rivers

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N:\Data\Hydrography\wshed3\rivers
N:\Data\Hydrography\wshed4\rivers
etc.

Use Windows tools (e.g. Windows Explorer) and/or ArcInfo to physically reorganize the data on disk.

Step 2: Create Index Theme

Tiled themes are always accessed through an “index theme”. The index theme is a polygon coverage or shapefile, where the boundary of each polygon represents the physical subdivision of the data on the disk. The polygons can be any shape. For example, if rivers were physically divided up into one data file per watershed, the watershed boundaries would become the index theme.

The attribute table for the index theme must contain two columns:

TILENAME (Char 8 or more)	This contains either: - a directory name for coverages, shapefiles, and grids - a filename (no extension) for event themes and images
PRESENT (Char 1)	This contains either: - “Y” if the physical data file for the tile is available. - “N” if the physical data file for the tile is not available

Using ArcView or ArcInfo:

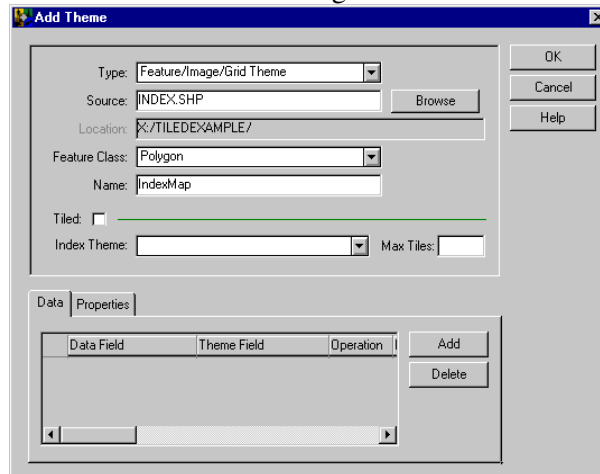
1. Create the index theme coverage or shapefile.
2. Add the TILENAME and PRESENT columns to the index theme’s attribute table.
3. Populate the TILENAME column manually based on the information provided in step 1 above.

Step 3: Define Index Theme to Navigator

Define the Index Theme to Navigator using Navigator Admin. The theme is defined in the same way as any normal polygon theme:

1. From the Admin Menu select ‘Navigator Admin’.
2. Select the layer in the tree view that will contain the Index Theme.
3. Click Add.
4. Click Browse, navigate to the location of the index theme on the network, select it, and click OK.
5. Give the theme a meaningful name (e.g. ‘IndexMap’).
6. Click OK.

For example, if your index theme was a shapefile called “INDEX.SHP”, the Add Theme window might look as follows:



Step 4: Define Tiled Theme to Navigator

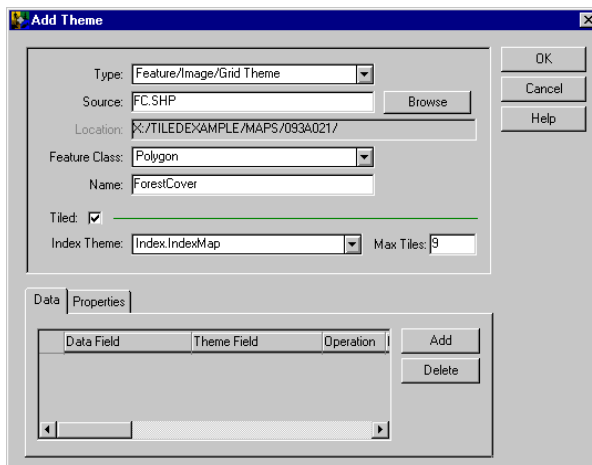
Define the Tiled Theme to Navigator using Navigator Admin:

1. From the Admin Menu select ‘Navigator Admin’.
2. Select the layer in the tree view that will contain the Tiled Theme.
3. Click Add.
4. Click Browse, navigate to the location of any one of the tiles (it does not matter which) on the network, select it, and click OK.
5. Give the theme a meaningful name (e.g. ‘ForestCover’).
6. Click the Tiled checkbox.
7. Select the Index Theme created in step 3 from the Index Theme drop down list.
8. Enter a number into the Max Tiles text box. This number is used as a safety check, to warn the user when a request is made to open an exceedingly large number of tiles. The number entered should reflect the number of features in each tile. For example, for tiles that contain less than 1,000 polygons each, you might enter 15. For tiles that contain 10,000 polygons each, you might enter 4.
9. Click OK.

Consider the following example:

- Your tiled theme consisted of shapefiles called “FC.SHP”
- Subdirectory names are 093A021, 093A042, 093A051, etc.

The Add Theme window might look as follows:



Step 5: Define Tiles that are Physically Present

It is not unusual to have tiles defined in the index theme with no corresponding physical data file. For this reason, the index theme contains a PRESENT column that defines whether the data file is physically on-line. An admin function is provided to automatically update this column in the index theme. To use this function:

1. From the Admin menu select 'Update Tiled Index Data...'.
 2. Select the Index Theme in the list that was created in Step 3 and click OK.

The system will make a list of data files that are physically present, and then update the index theme accordingly. Tiles that are physically present will be assigned a value of Y for the PRESENT column.

12.4.4. Entering Metadata

The metadata used in the Data Warehouse cannot be entered using Navigator Admin. You must manually insert records into the NAV_METADATA table using SQL.

Note: At the current release, there are still some problems with the display of metadata in the Data Warehouse window. You may want to experiment with attaching metadata to libraries, datasets, layers, and themes before you go to all the work of entering metadata for the entire Data Warehouse.

The following table describes the NAV_METADATA table:

Column	Description
ID (N 7,0)	The ID of the library, dataset, layer, or theme that the metaData are for.
Data_Type (C 20)	Indicates which entity the ID is related to. Must be one of the following: LIBRARY

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Column	Description
	DATASET LAYER THEME
Dataset_Desc (C 250)	A general description of the data.
Revision_Date (C 60)	The date of the most recent additions or alterations to the data.
Base_Map (C 200)	The name or type of base map used for initial data collection. Base maps may be any surface representation used as a foundation for thematic data (e.g. topographic maps, planimetric maps, orthophoto maps, digital orthophotos, rectified photo-mosaics).
Collection_Date (C 60)	The specific time, day, month, year, etc. for data that was not collected over a span of time. Ranges of dates should be identified by the earliest and most recent dates for data that was collected over a period of time.
Methodology (C 300)	The methodology that was used to collect the data (e.g. digitizing, vectorization, etc.).
Data_Sources (C 300)	The primary data source. Data taken directly from measuring mechanisms (e.g. remote sensing Data are typically obtained from satellite-based observations, aerial photographs, airborne electromagnetic surveys, etc.). This may be raw sensor data in digital form, enhanced sensor data in digital form, enhanced sensor data in combination with map data in digital form, interpretations of digital or hard copy images by either image analysis or human inspection, or both, to yield thematic data. Conventional photography may be in black and white or colour, infrared, or other categories. Field measurements refer to data resulting from measurement of phenomena made by field surveys such as wildlife counts, survey measurements, gravity observations, timber cruising, weather station observations, topographic surveys, hydrographic measurements, etc.
Secondary_Data_Sources (C 300)	Data obtained from second-hand sources, such as maps, reports, and other documents.
Coverage_Desc (C 300)	A general description of the geographic area covered by the data.
Que_Scientific_Content (C 300)	The person to whom questions about the scientific content of the data should be addressed.
Maintenance_Agency (C 300)	The details of the agency that is responsible for maintaining the data.
Scale (C 300)	The scale or resolution at which the information was collected. This information provides some indication

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Column	Description
	of the accuracy of the data and the degree of generalization.
Data_Structure (C 300)	The way in which data elements are arranged within the data (e.g. vector, raster, topological, etc.).
Update_Frequency (C 300)	Indicates whether updates are ongoing, carried out at regular intervals (e.g. once a year), or carried out irregularly.
Absolute_Accuracy (C 300)	The estimate of error in the location of features in the data with respect to published geodetic control survey station coordinates or elevations for a specific geodetic datum. Expressed as a plus-or-minus error (standard deviation) of the feature location.
Vertical_Accuracy (C 300)	Same as Absolute_Accuracy, except with respect to elevation (Z) instead of planar (XY).
Data_Quality (C 300)	If quality studies have been carried out, or if there is regular evaluation of the data, reference is made to the relevant reports. Comments about the quality will provide a guideline to the value of the data for future use.

12.5. Define Legends

When themes are initially defined to Navigator, they have no legend. Each time they are added to the view, they will be assigned a random colored legend. This tends to confuse new users, so legends should be defined for most, if not all, of the themes. The intent is not to make the legends perfect, but rather to create a consistent environment that users can get familiar with. Once the users get familiar with the system, they can adjust the legends to suit their own requirements and preferences.

It is also important to define legends for themes that contain more than one type of feature. For example, if you have a contour theme that contains various types of contour lines (index, intermediate, depression, etc.), you should assign a different color and/or line style to each type of contour line. This will make it easier for the user to interpret the theme on the screen.

To define a legend for a theme:

1. Add the theme to the view using Navigator or Navigator Admin
2. Use the standard ArcView Legend Editor to adjust the legend
3. Use the Legend Manager to save the legend as the “default” legend

For more information, refer to the on-line help.

12.6. Data Conversion (Digitizing)

Most often, a small data conversion effort will be required to complete the following themes:

- Managed Areas - the Managed Areas recorded in the BCD System that do not have a matching polygon in the existing protected areas themes may be digitized.
- Sites - Sites recorded in the BCD System that do not have a matching polygon in the existing Sites theme may be digitized.
- EO Lines & Polygons - EOs that are represented more accurately by a line or polygon (instead of a point), have to be digitized. Specialists may have to hand draw the EO line or polygon on the paper map before they can be digitized.
- Others - themes that are considered essential, but are not available, may have to be digitized, depending on the complexity of the themes.

The data conversion can be done in a number of ways, including:

- Heads up digitizing within Biotics (optionally, you could scan and georeference the paper source maps, and trace over the lines on the screen, rather than just “free-handing” it).
- Table digitizing within Biotics.
- Digitizing using other software, such as "raw" ArcView, ArcInfo or AutoCAD. If you choose this option, make sure you type in the MACODE, SITECODE, or EOCODE for each shape in the attribute table as you digitize it.

Data conversion can be done during the installation/configuration phase, or after Biotics is completely operational. It is strongly recommended that you do as much of the conversion work in advance (that is, during, or even before installation/configuration). This makes everything, such as the Quality Assurance process, go much more smoothly.

The data conversion can be done by the users. However, if there is a significant amount of work involved, it is probably better to contract the work out, to ensure that it gets done as soon as possible.

13. DEFINING INDEX THEMES

Overview

Index themes are used to set the “work area” in Biotics Mapper. The work area is used to access tiled themes. When the user’s Index Style preference is ‘Put index map in a separate index view’ or ‘Put index map in active view’, the work area will be drawn from the assigned index theme. When the user’s Index Style preference is ‘Use extents of active view’ (which is the default), the index theme does not apply. However, one index theme must always be defined for users to access the Preferences window.

To establish a work area, the index theme is added to the user's view (if their Index Style preference is ‘Active View’ or ‘Index View’). The user then uses the “Set Work Area” tool to select polygons in this theme. The selected polygons are used to select the appropriate tiles to open, based on the tiled theme's index theme.

Note: Do not confuse this type of Index Theme with a "Tile Index Theme" - the two are different.

- The index theme used to set the work area does not have any relationship with physical data files. For example, a county boundary theme could be used as an index theme. A user then selects certain polygons (in this case, counties), for which the system adds the appropriate layers.
- On the other hand, Tile Index Themes contain polygons that represent the physical boundaries of individual data files. Typically this is a map sheet grid. The tile index theme is consulted whenever a tiled theme is added to the view to determine which data files need to be opened. See section 12.4.3 for more information on Tile Index Themes.

The index theme is used to select polygons in the Tile Index Themes. For example, you might have topographic data, tiled by 1:24,000 map sheets. A Tile Index Theme, containing the 1:24,000 map sheet polygons is required to access the individual themes. Your index theme might be counties. When you set the work area, you are actually selecting counties. When one of the topographic themes is added to the view, Navigator selects all the 1:24,000 map sheet polygons that intersect the counties that are currently selected.

In Biotics, the index theme is typically set to a Quad or County theme.

To define index themes

To define an index theme in Biotics Mapper:

1. From the Admin menu, choose "Maintain Index Maps."

2. Click “New.”
3. Select a theme (e.g. Quads or Counties) from the list and click OK.
4. Select any column as the Key Column (it doesn’t really matter).
5. Select any column as the Description Column (it doesn’t really matter).
6. Click Close.

The Index Themes that you define using the “Maintain Index Maps” function will display in the Theme list on the INDEX MAP tab in the Preferences window.

Index View

If the users plan to use the 'Index View' index style, you should create a scene called "Index View" in a public catalog using Navigator (Save As Scene). This scene will be loaded into the "Index View (Navigator)" view document when the user selects 'Navigator Index View' from the view menu. Users can eventually create their own Index View scene, in a private catalog, if they want a different Index View scene than the one you create.

14. CONFIGURING ZOOM BY

Overview

Navigation in Mapper can be made easier by configuring and using the Zoom By function. This function allows the user to zoom to a particular geographic area simply by making a selection from a list, or typing in some search criteria.

Themes to be used in Zoom By must have attribute information attached to the graphics.

Examples of themes that can be made available to the zoom by function are:

- a gazetteer layer (point locations)
- a map sheet grid (e.g. 1:24,000 quads or 1:50,000 NTS maps)
- a county map
- a watershed map
- an ecoregions map

Generally, only themes that contain uniquely named features are used in the Zoom By function. For example, if a streams layer with many segments is configured to Zoom By, there could be hundreds of matching segments for any one Stream name value that the user picks from the list.

Themes can be set up in Zoom By to display a list of values from a given attribute; to search on a single attribute in a theme; to search on multiple attributes in a theme; or to search on an indexed attribute.

To make a theme available in Zoom By

To make a theme available in the Zoom By function:

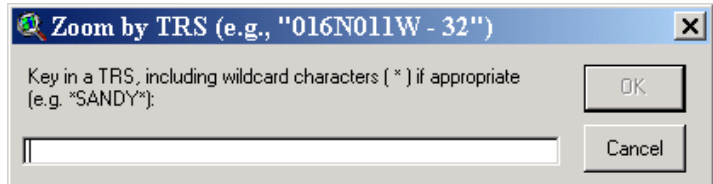
1. From the Admin menu, choose "Configure Zoom By...".
2. Click New
3. Type in a Description.

Tip: Some themes that are defined in Zoom By require the user to type in a search string in a specific format, so that the search string matches the format of the data in the theme's attributes. To help users know what format they need to type in, include the format or a sample value in the name of the Zoom By Entry. This will show up on the title bar of the window.

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For example, consider a Zoom By entry based on TownshipRange - Section. The user must type in a search string in the form "016N011W - 32" to find a match. Spaces, leading zeroes, and hyphens in this example are critical.

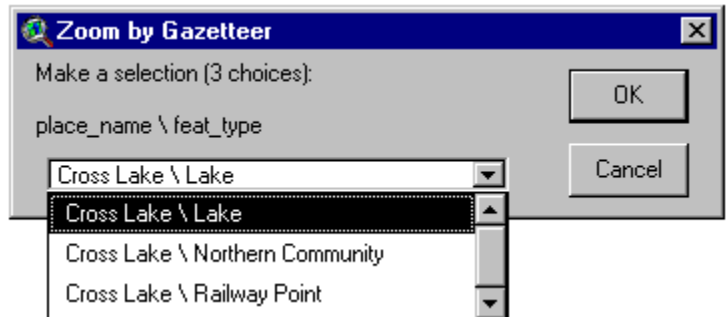
If you include a sample value in the Description, the Zoom By window will appear as follows:



4. Choose the theme from the Theme Name list.
5. Select one or more Search Fields.

Tip: For themes which contain features with duplicated names, it often helps to include more than 1 field from the theme's attribute table. The user can then search on more than one field. Even if the user won't search on the additional fields, the additional fields can sometimes help narrow down the selection when multiple matches are found.

For example, in a gazetteer layer, the Zoom By definition could include the Feature Type. A search for the place "Cross Lake" could return several records, but the feature type could help determine which record is the desired one.



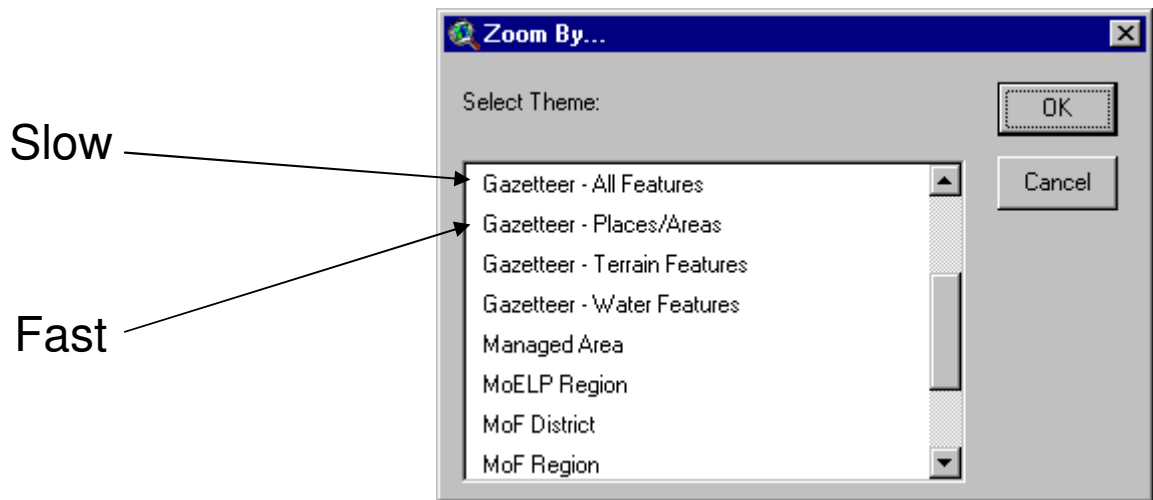
6. Set the Search Method. The Search Method used for each Zoom By entry can be chosen based on the number of records available:
 - SEARCH – use this when the theme contains a lot of records (e.g. > 1,000). The user types in a search string to be matched against the attribute(s) in the theme.

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- LIST – use this when the theme contains a few records (e.g. < 100). The user is presented with a list of attributes, and chooses one to zoom to.
 - <NOT SET> - use this when the theme contains a moderate number of records (e.g. 100 – 1000). The user will be given the choice of searching or picking from a list.
7. Click OK.
 8. If the theme is tiled, click Update Index (see Tiled Themes below for more information).
 9. Click Close.

Performance Tuning

If the theme being searched is moderately large (e.g. 25,000 – 50,000 records), consider splitting the theme up into many themes to improve performance:



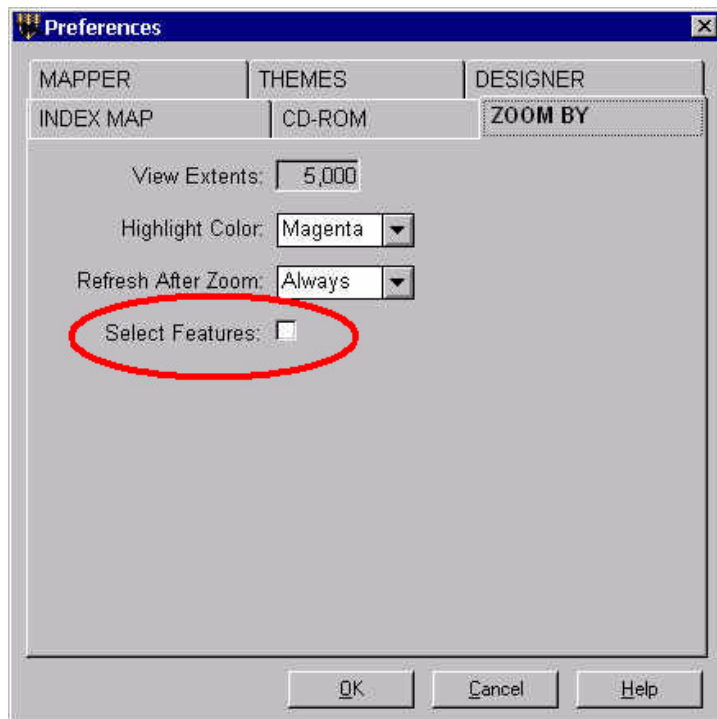
Include the original, undivided theme in case the user wants to search every record.

If the theme being searched is massive (e.g. 500,000 records), but not tiled, searches will be slow. To improve performance, define the theme as a tiled theme containing only 1 tile. The theme can then be indexed in Oracle, and searches will be nearly instantaneous:

1. Create a new polygon theme using Navigator Admin (New Theme button—for more information see Section 12.4, “Define Data to Navigator”).
2. Add the new theme to your view, start editing it, and digitize a large rectangle covering the entire province or state.

3. Add TILENAME (char 8) and PRESENT (char 1) fields to the theme's attribute table. Set the value of tilename to the name of the folder containing the massive theme, and set present to "Y". For instance, if the large theme is located at K:\Data\Statewide\trs.shp, the tilename column should read "Statewide".
4. Stop editing the theme.
5. Redefine the massive theme in Navigator Admin using the Add Theme function, this time as a tiled theme, whose index is the theme you created in step 1. For more information see Section 12.4.3
6. Define a new Zoom By entry based on the massive theme.

To maximize performance when zooming by a tiled theme, make sure users have their "Select Features" preference turned off:



Tiled Themes

Tiled themes can be used with Zoom By. They should be indexed for effective searching. The indexing procedure stores the coordinates of every shape in Oracle (in the Zoom_by_index table), and makes searches extremely fast.

After you create the Zoom By entry, click on the Update Index button. The choose one of the following options:

- CENTROID – calculates and stores the coordinate of the centroid of the feature. When the zoom is performed, it will behave the same as

zooming by a point (even though you may be zooming on a polygon theme). The zoom extent will be applied (from Preferences). Use this option if the users want to zoom to the vicinity of the feature, not to the extent of the feature.

- **EXTENT** – calculates and stores the coordinates of a bounding box that encompasses the feature. Use this option if the users want to zoom to the extent of the feature.

Indexing large themes can take a long time. You can drastically reduce the amount of time it takes to build the index by temporarily dropping the index on the table using SQL*Plus before you click on the Update Index button:

```
DROP INDEX I_ZOOM_BY_INDEX_THEME_ID;
```

After the indexing process is complete, re-create the index:

```
CREATE INDEX I_ZOOM_BY_INDEX_THEME_ID ON  
ZOOM_BY_INDEX (THEME_ID, SRCH_FIELD_VALUE);
```

Note that you may have to index a massive tiled theme in batches (e.g. 20 tiles at a time) to avoid errors.

Default Zoom By Preference

You can set the default Zoom By preferences for all users (or only new users) using SQL*Plus. For example, to set the 'View Extents' preference you would type:

- For ALL users:

```
UPDATE PREFERENCES SET VALUE = '15000' WHERE  
KEY = 'ZOOM_PORTAL_SIZE';
```

- For NEW users:

```
UPDATE PREFERENCES SET VALUE = '15000' WHERE  
KEY = 'ZOOM_PORTAL_SIZE' AND USER_ID =  
'$DEFAULT';
```

15. MODIFYING INPUT/EDIT SCENES

Overview

In Biotics Mapper, themes can be grouped into Scenes, which can be created and added in Navigator. The order in which the themes are drawn, the legends associated with the themes, and even the scale can be saved in a Scene and added when a specific group of themes is desired.

There are certain system Scenes which are used during the Input/Edit sessions in Mapper. Whenever a user enters Input/Edit mode, a Scene is loaded into the view, containing the theme(s) to be edited, and a limited number of other layers for reference. The scene loaded depends on what the user selects (Element Occurrences, Managed Areas, or Sites). For example, the scene loaded when the user selects Managed Areas might contain:

- the Managed Area theme
- jurisdictional boundary themes (e.g. counties)
- land ownership themes
- road themes

Biotics comes with one standard scene that is used for all three types of features (element occurrences, managed areas, and sites). This scene contains:

- EO Source Points
- EO Source Lines
- EO Source Polygons
- EO Reps (Polygons)
- Managed Area Polygons
- Site Polygons

You can modify the contents of this scene, and/or you can create new (separate) scenes that are specific to the three types of features (Element Occurrences, Managed Areas, and Sites).

Input/Edit Scene Guidelines

Here are some general guidelines that you should follow when modifying the Input/Edit scenes:

- Keep scenes as minimal as possible (use only the necessary layers).
- Scenes should contain themes that are of interest to all users all the time. Additional scenes can be created that contain themes that are used some of the time, or are of interest to only some users. These scenes can be accessed in an ad-hoc manner using Navigator. In

addition, users can always add other themes as usual with Navigator once inside Input/Edit.

- Always overwrite an existing scene instead of deleting and re-creating it (because scenes are referenced in Designer Admin).
- Don't include the EO Point Reps theme in the input/edit scene—it is slow and not critical to see while creating and editing data.
- Make sure every theme on the palette is included in the scene. For example, the scene for the EO palette must include Source Points, Source Lines, Source Polygons, and EO Reps (Polygons).
- By default, the input/edit scene will always replace (rather than add to) the current themes in the view. This can prove annoying in some cases. Users can change their “Load Scene” preference if they wish (available on the Designer tab in the Preferences window). Or, you can change the setting for all users at once using SQL*Plus:

```
UPDATE preferences SET value = 'ADD'  
WHERE key = 'DESIGNER_LOAD_SCENE';
```

To Modify an Existing Scene

1. Logon to Biotics Mapper as “mgr” (since this is the user that owns the scenes, and only the owner can change the scene).
2. Open Navigator, choose the Scenes tab, select the scene to be modified in the tree view, and click OK. This will load the scene into the view.
3. Open Navigator, choose the Themes tab, and add/remove themes as desired. Take care to ensure that the themes are in a logical order. Click OK to preview the scene.
4. Open Navigator again, make any final changes that are required, and then click on the Save As Scene button.
5. Choose the “Biotics – Input/Edit” catalog from the drop-down list.
6. Choose the scene that you are modifying from the scene drop-down list.
7. Click OK. The existing scene will be overwritten with the new scene.
8. Click OK or CANCEL to close Navigator.

Note: Always overwrite an existing scene, instead of deleting the scene and creating a new one. Scene IDs are referenced in Designer Admin. Overwriting a scene preserves the scene ID, whereas deleting a scene and recreating will result in a new scene ID.

**To Create a New
Input/Edit Scene**

1. Logon to Biotics Mapper as “mgr” (since this is the user that owns the catalog that the new scene will be created in).
2. Open Navigator, choose the Themes tab, and add/remove themes as desired. Take care to ensure that the themes are in a logical order. Click OK to preview the scene.
3. Open Navigator again, make any final changes that are required, and then click on the Save As Scene button.
4. Choose the “Biotics – Input/Edit” catalog from the drop-down list.
5. Type in a name for the scene.
6. Click OK. The new scene has now been created.
7. Click OK or CANCEL to close Navigator.
8. Start Designer Admin (available on the Admin menu in long menus).
9. In the “palettes” section of the dialog, select the row that you want to associate the scene with.
10. In the “palettes” section of the dialog, click on the Edit button. The “Edit Palette” dialog displays.
11. In the Edit Palette dialog, click on the Select button, choose the new scene from the drop-down list, and then click OK.
12. Click OK on the Edit Palette dialog to save the changes and return to the main Designer Admin dialog.
13. Click Close to leave Designer Admin.

16. DEFINING SPATIAL ATTRIBUTES

16.1. Introduction to Spatial Attributes in Biotics 4

Overview

Spatial Attributes are an integral part of Biotics Mapper, which take advantage of the power of GIS to determine locational properties of Heritage data. Whenever an Element Occurrence, Managed Area, or Site shape is created or altered, numerous attributes are automatically determined by doing a geographic overlay of the new shape with defined theme layers.

For the core spatial attributes which have standard fields in Tracker, the system will pass the calculated values from Mapper to Tracker. Thus a new Element Occurrence created in Mapper will start out in Tracker with its Locator values (County, Mapsheet, TRS, Watershed, etc.) already populated.

In order for a theme to be eligible as a source of spatial attributes, it must be properly defined in Navigator (see Section 12.4).

Basic Spatial Attributes

Mapper calculates a number of basic spatial attributes for EO Representation, Managed Area and Site Polygons. These attributes should not be removed from Designer.

The basic spatial attributes included with Mapper are:

Element Occurrences:

- Acreage
- Centroid¹
- Hectares
- MA_Code
- PARENT_EO_ID²
- Site_Code

Managed Areas:

- Acreage
- Centroid

¹ The "Centroid" spatial attribute is a keyword, that results in the calculation of the following spatial attributes:

- LATITUDE_DD
- LONGITUDE_DD
- LATITUDE_DMS
- LONGITUDE_DMS
- UTM_NORTHING
- UTM_EASTING
- UTM_ZONE

² "Parent_EO_ID" is used to determine when an EO is a "sub-EO"

- Hectares
- MA_Code
- Site_Code

Sites:

- Acreage
- Centroid
- Hectares
- MA_Code
- Site_Code

**Core Spatial
Attributes**

Core spatial attributes must be defined to Navigator with standard names in order for the stored procedures to properly copy values from the spatial_attribute table to the business tables (i.e. eo_county, site_watershed, etc.).

Core spatial attributes include:

Element Occurrences:

- County
- Mapsheet
- Watershed
- Local_Jurisdiction
- Town_Range_Section
- Physiographic_Province
- Managed_Area
- Site
- Min_Elev_Feet
- Max_Elev_Feet
- Min_Elev_Meters
- Max_Elev_Meters

Managed Areas:

- County
- Mapsheet
- Town_Range_Section
- Managed_Area
- Major_MA
- Site
- Min_Elev_Feet
- Max_Elev_Feet
- Min_Elev_Meters
- Max_Elev_Meters

Sites:

- County

**Guidelines for
Defining Additional
Spatial Attributes**

- Mapsheet
- Local_Jurisdiction
- Town_Range_Section
- Watershed

Here are some general guidelines that you should follow when defining spatial attributes:

- When calculating core spatial attributes, the system uses the ID value of the domain table to insert the attribute in the business table so that it can be displayed in the Tracker detail window. Core attributes should be defined exactly as they appear in the above lists with multiple fields, with the domain ID value first and another field second. Note that the second field is optional and only for descriptive purposes. For instance, for a County attribute, you could define the attribute to return D_COUNTY_ID + CountyName.
- **Do not edit or remove any of the standard spatial attributes.** Many of these are required by the system (e.g. to calculate parent/sub-EO relationships). Some of the names are also pre-defined (e.g. MA_Code and Site_Code), and renaming them will cause the system to malfunction.
- Normally all spatial attributes for EOs are calculated based on the EO Reps (Polygons), not the Source Features. By default, Source Features have only basic spatial attributes (AREA and LENGTH). Additional spatial attributes can be defined for Source Features, but will not be inserted into Tracker fields.
- Not all geographic relationships need to be calculated as spatial attributes; standard ArcView spatial functions such as Select By Theme can be used to determine spatial relationships for other attributes of interest (e.g. soil type) in an ad-hoc manner.
- For maximum performance, index the SHAPE field of all themes that are used as the source of spatial attributes:
 1. Open the theme attribute table for the source theme,
 2. Select the SHAPE field column heading,
 3. Select Create Index from the Field menu.
- Changes made to spatial attribute definitions are not automatically propagated to existing data records. If you add a new attribute, or change the definition of an existing attribute, you must use the Recalculate Spatial Attributes function (available on the Admin menu when you are in Input/Edit mode) to explicitly (re)calculate the spatial attribute for all existing features. If you delete an attribute, you should use SQL*Plus to remove it from all existing features as follows:

```
DELETE FROM SPATIAL_ATTRIBUTE WHERE  
ATTRIBUTE_NAME = '<deleted attribute name>';  
  
COMMIT;
```

Central Quad

If the Member Program files their EO Records in the Manual Files by Central Quad, an attribute can be configured in Mapper to calculate the quad that the centroid of the Rep Polygon falls in.

Because this spatial attribute will become an index to a filing system, it should not be recalculated when EOs are changed. Therefore, users must manually uncheck the “Recalculate When Shape Edited” checkbox beside the attribute in the Spatial Attribute tab whenever a new EO is created (this can also be done in batch using SQL).

This solution can be implemented using the `IsCenterContainedIn` spatial comparison.

16.2. Defining Spatial Attributes

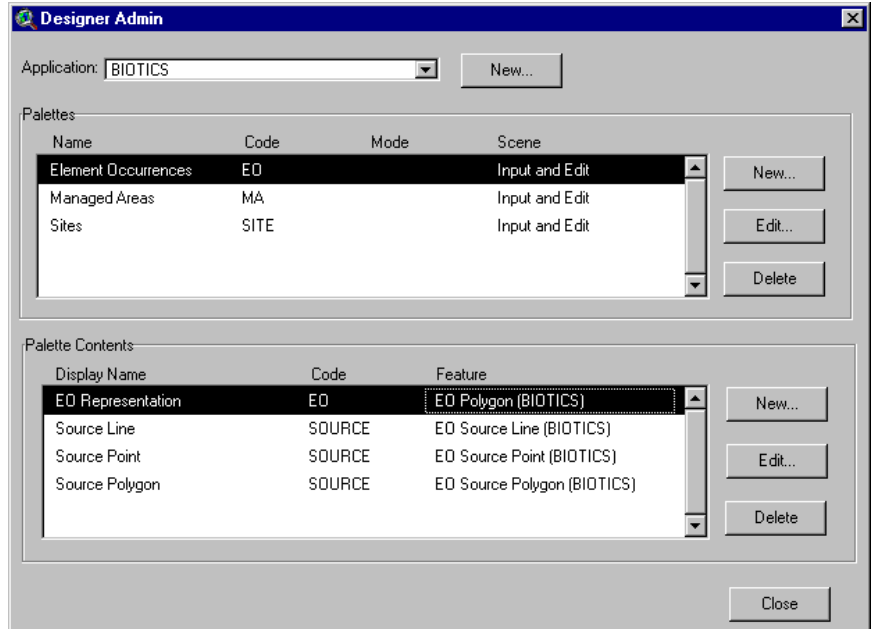
To configure spatial attributes, use Designer Admin, which is available on the Admin menu. Use Designer Admin to:

- Define a new spatial attribute to be calculated
- Remove a spatial attribute (so that it is no longer calculated)
- Change the source and/or definition of a spatial attribute (for example, specify a different theme or field within the theme that is to be used as the source of the spatial attribute).

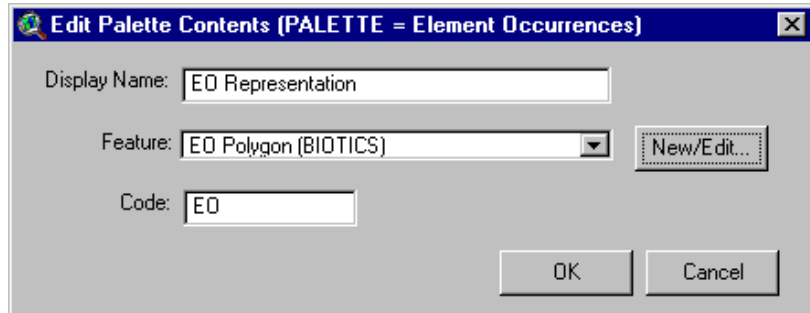
The basic steps to access the spatial attribute definitions (so you can define, remove, or change them) are as follows:

1. From the Admin menu, choose Designer Admin. The following dialog will display:

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2. Select the appropriate palette in the “Palettes” section of the dialog (e.g. Element Occurrences in the example above). The contents of the palette will display in the lower window.
3. Select the appropriate feature in the “Palette Contents” section of the dialog (e.g. EO Representation in the example above).
4. Click the Edit button in the Palette Contents section of the dialog. The following dialog will display:



5. On the Edit Palette Contents dialog, click the New/Edit button. The Feature Details dialog will display:

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Feature Details

Name: Key Field:

Destination Theme:

Auditing/History

Delete Theme:

Edit Theme:

Baseline Theme:

Snapshot Theme:

Default Tool:

Event/Script:

Link View:

Spatial Attributes

Order	Attribute Name	Source Theme	Source Field	Spatial Comparison	Update Shp	SQL	
	Mapsheet	1:24,000.Quadrangles	d_mapsheet_i	Intersect	F	T	<input type="button" value="New..."/>
	PARENT_EO_ID	EO.Reps (Polygons)	feature_id	IsContainedIn	F	T	<input type="button" value="Edit..."/>
	Site_Code	Site.Polygons	FEATURE_ID	Mostly Within	F	T	<input type="button" value="Delete"/>
	Town_Range_Section	TRS.grid	town_range+s	IsCenterConta	F	T	

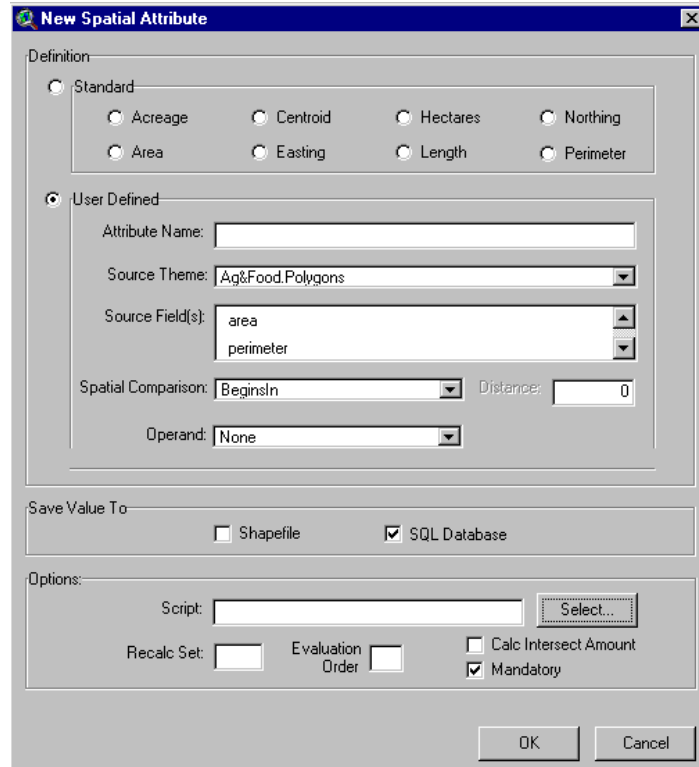
Spatial Validation

Order	Attribute Name	Oper.	Value	Handling	Script Name	
						<input type="button" value="New..."/>
						<input type="button" value="Edit..."/>
						<input type="button" value="Delete"/>

Note: If you receive a segmentation violation at this point, remove all themes from your view and try again.

Existing Spatial attribute definitions for the feature are listed in the Spatial Attributes section of the dialog. You can now create, edit, or delete spatial attribute definitions using the buttons to the right of the list. Edit and Delete require you to select a spatial attribute in the listbox before clicking the button.

- When you click New or Edit in the Spatial Attributes section of the dialog, the Spatial Attribute details dialog will display:



7. Complete the Spatial Attribute details dialog (see the information below for complete details on each property on the dialog). When you are finished, click OK. The new or updated spatial attribute will display in the list on the Feature Details dialog.
8. When you are finished defining spatial attributes, click OK or Close on all the open dialogs until you are out of Designer Admin.

16.3. Using the Spatial Attribute Window

The various fields and options in the spatial attribute window are explained below.

Attribute Name

- Maximum 30 characters
- No spaces
- Will appear to the user in the Spatial Attributes tab, so:
 - Make the name descriptive
 - Use “proper case” or “title case” (i.e. not all upper case and not all lower case)
 - Use underscores to improve readability (e.g. Town_Range_Section, TNC_Ecoregion)

Source Theme

- A source theme is the theme that contains the spatial attributes (e.g. the theme containing the watershed polygons).
- Must be defined to Navigator (see Section 12.4).
- Can be tiled or non-tiled.
- Must be a feature theme (images and grids are not supported).
- Make sure you create a spatial index on the SHAPE field in the source theme to maximize performance (add the theme to the view, open the attribute table, make the SHAPE field active, and choose Create Index from the FIELD menu).

Source Fields

- The field(s) in the source theme that contain the spatial attribute value (e.g. Huc in the watershed theme). A single field, or multiple fields, can be used as the attribute value.
- To specify a single field, choose it from the dropdown menu at “Single.”
- To specify multiple fields, click the “...” button to choose the fields from those available in the chosen theme. The fields will be listed in the order in which you choose them, and each field is separated from the next by a dash (“-”).
- If you wish to define a spatial attribute that is a combination of values from two or more themes, use ArcInfo to merge the themes together (using the “union” command), and then specify the resulting coverage as the source theme.

Spatial Comparison Definitions

Spatial Comparison	Definition	Example
Intersect	Report the features in the source theme that the newly digitized feature touches (overlaps or adjacent). If you do not want adjacent features included, use IsWithin - see Eliminating Adjacent Values note below.	Find all the Rural Municipalities that the newly digitized road feature passes through.
IsWithin	Report the features in the source theme that are within the specified distance from the newly digitized feature.	Find all wells that are within 100 meters of the newly digitized road.
Contains	Report the features in the source theme that are	Find all of the wells that are completely contained

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Spatial Comparison	Definition	Example
	completely contained within the newly digitized feature.	within the newly digitized plot of land.
ContainsCenter	Report the features in the source theme that have their center point within the newly digitized feature.	Find all of the sub-division lots whose center point is inside the newly digitized school district polygon.
IsContainedIn	Report the features in the source theme that the newly digitized feature is completely contained within.	Find the name of the Park that the newly digitized owl habitat polygon is completely within.
IsCenter ContainedIn	Report the feature in the source theme that the center of the newly digitized feature falls in.	Find the quarter section that the center of the newly digitized watershed falls in.
Mostly Within	Report the feature in the source theme that contains the majority of the newly digitized features.	Find the name of the Rural Municipality which contains most of the newly digitized owl habitat polygon.
Dominant	Report the source field value that contains the majority of the newly digitized features. Area is used to determine majority.	Find the dominant tree species in a cut block considering there are many intersecting polygons of the same tree species.

Eliminating Adjacent Values

Occasionally you may copy and paste a shape from a theme that is a source of spatial attributes into one of the Biotics themes. For example, you may copy and paste a Section to form an EO, and the Section theme is a source of spatial attributes (Town_Range_Section).

If an Intersect spatial comparison is used, all of the surrounding (adjacent) sections will be included as spatial attribute values for the shape (e.g. EO), which usually is not desirable (since the shape does not overlap with the surrounding sections – it is only adjacent to them).

There are two possible solutions to this problem:

1. Users can manually delete the spatial attribute values in the EO window after the EO has been created. However this is time consuming and also makes subsequent modifications to the EO problematic (since TownRange will not be updated when the shape is edited).
2. Use the IsWithin spatial comparison instead of Intersect, with a small negative distance (e.g. -1). This will calculate spatial attributes of all features within (i.e. inside) the bounds of the

polygon (in this example, the Section polygon). Note that you may have to experiment with the distance, as occasionally very small distances do not provide correct results (a quirk of ArcView). For example, you might have to increase the distance to -10 before it will work properly.

Operand

- Normally Operand is 'None'.
- One example where it might be set is to calculate Minimum and Maximum Elevation - which would be two separate spatial attributes based on the same source theme (e.g. a DEM) and with the same source fields (e.g. Z), but with different Operands.

Save Value To

This indicates where the calculated value will be saved. Always:

- Check **SQL Database**
- Do not check **Shapefile**

Options

- Always leave **Recalc Set**, and **Evaluation Order** blank.
- Do not check **Calc Intersect Amount**.
- Normally you should leave **Mandatory** unchecked. When unchecked, the calculation of this attribute can be deferred (i.e. if the user has the 'Defer Calculation of Spatial Attributes' checkbox checked on the Edit/Finish/Cancel dialog, they will not have to wait while this attribute is calculated). If you want this attribute calculated right away (e.g. because you want the user to review and possibly edit the calculated values at the time the feature is created), then check the Mandatory checkbox.
- The **script** box will always be empty, except when setting up a centroid calculation. For representations it will be set to LGL.BioticsGetSelectedSourcesAndEORepEdited for Source Features, Sites and MA's it will be set to LGL.BioticsCalcCoordinates

17. MODIFYING DATABASE VIEWS

Very little data are stored in the Biotics shapefiles other than the shape itself; the majority of the data are stored in the SQL database. To facilitate functions such as thematic mapping and labelling, data from the SQL database must be joined to the shapefiles.

Typically, the data joined to a shapefile comes from more than one table in the SQL database. For performance reasons, all the SQL tables are combined into a single view in the database, and the view is joined to the shapefile. This results in a single join within ArcView instead of multiple joins.

Three different types of views are created when Biotics is installed:

- Standard Views
- Full Views
- Other Views

Standard Views

Standard Views are joined to the shapefiles by default. That is, these are the views that are defined as “Theme Data” in Navigator Admin. These views are joined when the shapefiles are first added to the view, and whenever the user chooses the “Re-establish standard Oracle attributes” option in the “Add/Remove Oracle Attributes” dialog.

The names of the standard views are as follows:

- SOURCE_VIEW_STD_ATT – joined to the EO Source Point, EO Source Line, and EO Source Polygon themes.
- EO_VIEW_STD_ATT - joined to the EO Reps (Polygons) theme.
- EO_REF_PT_VIEW_STD_ATT – source of the "EO Point Reps - Std Attributes" theme.
- MANAGED_AREA_VIEW – joined to the Managed Area Polygon theme. Since the MA table has very few attributes, this view also doubles as a Full View (see below).
- SITE_VIEW – joined to the Site Polygon theme. Since the Site table has very few attributes, this view also doubles as a Full View (see below).

These views contain only essential attributes to ensure maximum performance. You should only modify these views if it is absolutely critical that an additional attribute must be joined to the shapefile at all times. If the attribute is not critical, add it to the Full View instead.

Full Views

Full Views are views that contain all possible attributes. These are intended to be joined to the shapefiles on an as-needed basis using the Add/Remove Oracle Attributes function. Typically this is done to perform a specific task, and then the Standard View is re-established to maintain performance (since these views contain all possible attributes, they tend to be very slow).

The names of the full views are as follows:

- SOURCE_VIEW_ALL_ATT – joined to the EO Source Point, EO Source Line, and EO Source Polygon themes.
- EO_VIEW_ALL_ATT – joined to the EO Reps (Polygons) theme. By default, this view is also the source of the "EO Point Reps - All Attributes" theme. If desired, a separate view can be created for this theme (suggested name EO_REF_PT_VIEW_ALL_ATT), and the definition of the theme changed in NavAdmin.
- MANAGED_AREA_VIEW – joined to the Managed Area Polygon theme. Since the MA table has very few attributes, this view also doubles as a Standard View (see above).
- SITE_VIEW – joined to the Site Polygon theme. Since the Site table has very few attributes, this view also doubles as a Standard View (see above).

Full Views can be modified to suit each installation's requirements.

Other Views

In order to minimize the code changes necessary to the Mapper application to integrate it with Tracker, several other views were created that would allow Mapper to access tables that had been renamed in Tracker, but still use the original name. These views and the tables they reference are listed below:

- ELEMENT_OCCURRENCE references EO table
- MANAGED_AREA references MA table
- SITE references CONSERVATION_SITE table
- FEATURE references SHAPE table
- SOURCE references SOURCE_FEATURE table
- ELEMENT_OCCURRENCE_SOURCE references EO_SOURCE_FEATURE table
- D_CONC_FEAT_SPAT_UNCERTAINTY references D_CONC_FEAT_LOC_UNCERT table
- D_CONCEPTUAL_FEATURE_TYPE references D_CONC_FEATURE_TYPE table

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- D_DISTANCE_CLASS references
D_LOC_UNCERT_DIST_CLASS table
- D_SPATIAL_UNCERTAINTY_TYPE references
D_LOC_UNCERTAINTY_TYPE table
- D_UNIT_OF_MEASURE references D_UNIT table
- BCD_ET references ELEMENT_GLOBAL,
ELEMENT_SUBNATIONAL, and SCIENTIFIC_NAME tables
- BCD_EOR references EO table

These views have been constructed to allow the Mapper application to work using the same tables and column names as in Biotics 3.1. Because of this, any modification of these views may cause Mapper to fail. Deleting and renaming any columns from these views will definitely cause problems in Mapper. Adding columns can be done, but should be tested thoroughly in Mapper before implementing. Please consult with the Biotics Help Desk before attempting to modify any views.

18. CREATING THE MANAGED AREA AND SITE THEMES

In most provinces and states, there will be existing themes showing protected areas (parks, reserves, wildlife management areas, etc.) and or conservation sites. These themes will have been discovered during the data integration phase of the configuration.

Creating the Managed Area or Site theme is broken down into three steps:

- Preparing polygons
- Joining polygons to attribute data from Tracker
- Load MA/Sites into the managed theme in Mapper

Once the Managed Area or Site theme is configured, Biotics will accommodate data entry origination of Managed Area and Site records from both the Mapper and Tracker interfaces.

18.1. Prepare Managed Area or Site Polygons

The goal of this step is to combine all of the polygons from the existing protected area or conservation site themes into a single shapefile. This shapefile will then be matched to the tabular data, and eventually loaded into the Biotics Managed Area theme (ma.shp) or Biotics Site theme (site.shp).

To prepare the polygons:

1. Make the attribute table structure identical for all of the protected area /conservation site themes. That is, make the field names and field data types the same. This can be done using ArcView as follows:
 - a) Add the protected area/conservation site theme to the view
 - b) Make the theme active, and open the attribute table
 - c) Choose **Properties** from the Table menu. Hide extraneous fields. If necessary, assign aliases to the fields that are to be preserved, so that the names of these fields are the same as the field names in the other protected area themes.
 - d) Return to the view, and choose **Convert To Shapefile** from the Theme menu. This will create a new shapefile using the current table property settings.

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Note: You can use other software to alter the structure of the attribute tables, such as ArcInfo or FoxPro.

2. Merge the themes into a single shapefile:
 - a) Add all the themes to be merged into a view
 - b) Make the themes active
 - c) Choose **Merge Themes** from the Edit menu (long menus)
 - d) Assign a name and location to the new shapefile (e.g. ma_polys.shp).

Note: The "Geoprocessing Wizard" extension that comes with ArcView 3.2 can also be used to merge shapefiles together.

3. Verify that all the shapes were merged, and that all the attributes were maintained, by opening the attribute table for the new shapefile and visually examining it.



Note: Make sure you name the shapefile something other than "ma.shp" or "site.shp", otherwise you will encounter errors when you try to link the shapes in later steps.

4. Make sure that each polygon contains an MA Code or Site Code, as appropriate, as this field will be used as the join field in the following step.

18.2. Join Biotics Feature-ids to Polygon Data

The goal of this step is to join the feature-id (shape-id) of the managed area or site records from the Biotics Shape table to the polygon shapefile from which the Managed Areas or Sites are to be loaded.

Create Text file with feature-ids

1. Open Tracker and choose Tools>Query Builder.
2. From the Query Builder, choose Query>Mode>Free Form
3. Type the appropriate select statement below into the Query window:
Select * from biotics_unmapped_ma_vw
Select * from biotics_unmapped_site_vw
4. Click the  button to execute the Query and then the  button to view all the records.
5. Choose Result>Export to File to export to a text file, and in the Save to File window:
 - a. Fill in a file name
 - b. Choose Tab as the delimiter to separate your fields
 - c. Check the box to Include Field Names on the first row
 - d. Click OK
6. The text file can be brought directly into ArcView. From the ArcView project window, click the table icon and click the Add button, then browse to your new table and click OK.

7. Open the attribute tables for both the polygon theme prepared above and the table just added to the project, and arrange them so that you can see both on the screen.
8. Highlight the field with the MA Code (or Site Code) in both tables.
9. With the polygon theme attribute table active, choose Table>Join.
10. You now have the feature-id field from the Biotics database associated with your polygons. Choose Theme>Convert to Shapefile.

Note: Again, make sure you name the shapefile something other than “ma.shp” or “site.shp”, otherwise you will encounter errors when you try to link the shapes in later steps.

18.3. Load into the MA or Site Theme

You are now ready to load the MAs or Sites into the managed theme (either ma.shp or site.shp) in Biotics Mapper.

Warning: All user-defined spatial attributes (i.e. all attributes except Centroid, Acres and Hectares) should be NOT mandatory when configured in Designer Admin. Confirm this before using the Batch Match-link function as described below, otherwise spatial attributes will be automatically recalculated using an inefficient process, which may not be the desired outcome.

Batch Match/Link MAs

1. If you do not wish to load all the polygons in the shapefile, then you must select the polygons that you do want to load.
2. Choose Input/Edit from the Biotics menu.
3. Choose Managed Areas or Sites, as appropriate.
4. Choose Batch Link Shapes to Data Records from the Admin menu.
5. At Choice, choose the theme (created in step 18.2) that contains the data to be processed from the list and click OK.
6. At Choice, choose the feature-id field from the list of fields and click OK.
7. At Warning, confirm the number of records to be processed by clicking Yes. If this number does not match the expected number of records, click No, and determine the reason for the discrepancy before continuing.
8. Click the Post button to exit Input/Edit mode.

Note: You will be asked if you want to calculate deferred attributes. ALL non-mandatory attributes will be calculated if you choose to calculate deferred attributes at this point. If you choose YES, all defined spatial attributes will be recalculated, and your MA/Site Load is

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complete. If you had spatial attributes in your MAs or Sites that were converted from BCD that you DO NOT want recalculated, choose NO and continue with step 9.

9. If you do not want to calculate spatial attributes, choose NO at the calculate deferred attributes prompt.
10. Quit out of Mapper.
11. Enter SQL Plus or SQL Plus Worksheet and execute the following statement: delete from ad_defer_calc_spat_att_loc where user_id = 'xxx'; (where xxx = your login).
12. Commit your changes.

Note: *Mapped By* and *Mapped Date* will retain the values that were converted from BCD. *Digital_Mapping_By* and *Digital_Mapping_Date* will be left blank. You will need to determine with the program, how these fields should be populated. Recommended options are as follows:

- a. Populate digital mapping fields with data from paper mapping fields
- b. Populate digital mapping fields with “mgr” user and date of installation

New Records

There is currently no functionality to bulk load Managed Area or Site records that do not have existing tabular records in Tracker. If shapes exist for new records, they can be created manually using the copy-past function. When the Exchanger tool is released, tabular records may be able to be uploaded into Tracker to create the tabular records.

Calculate Spatial Attributes

You may choose to recalculate spatial attributes for some or all MAs at this point.

Using Navigator, bring all the non-tiled themes that are the source of spatial attributes into the view, and turn them off. This will improve speed, and reduce the likelihood of the NO FREE CHANNELS error. Also, open the attribute table for each of these themes and make sure the SHAPE field is indexed (make the SHAPE field active, and pull down the Field menu; if it says Create Index there is no index – so click on Create Index; if it says Remove Index then there is an index).

1. Make sure your Load Scene preference (available on the Designer tab in the Preferences window) is set to ‘Add To View’.
2. Enter Input/Edit mode. Select the Managed Areas or Sites palette.

3. Use the Add/Remove Oracle Attributes function (available on the Biotics menu) to 'Remove all Oracle attributes' for all Biotics themes. This will speed up processing considerably.
4. Select the Managed Area or Site polygons that you want to calculate spatial attributes for. If you want to calculate spatial attributes for all polygons, then select all the records in the Managed Area or Site Polygons theme.
5. Choose Recalculate Spatial Attributes from the Admin menu.
6. Click the Custom radio button.
7. Click the Select All button (or select the attributes you want to calculate).
8. Click OK.

Processing will now begin, and may take a very long time (many hours) to complete.

18.4. Quality Assurance

General Checks

Some data checks were done in earlier steps. However, after the data has been loaded into the MA and Sites themes, there are a few additional checks that you should perform:

1. Check the number of records in the MA theme. The number of records should be the same as the number of records that were loaded from the shapefile.
2. Check the number of records in the Sites theme. The number of records should be the same as the number of records that were loaded from the shapefile.

19. CREATING THE ELEMENT OCCURRENCE THEME

All of the EO records that exist in the Biotics database must be linked to shape features by importing existing features into the EO Source feature and EO Reps (Polygons) themes, or by creating point features from coordinate values. This is done in four steps:

- Convert coordinates
- Prepare Shapefiles
- Link Source Features
- Generate EOs

19.1. Convert Coordinates

This step is only necessary if the datum of the coordinates needs to be changed. For example, if coordinates brought into Biotics from the BCD System are "NAD27", and all reference mapping is "NAD83", then the coordinates from the BCD System need to be transformed.

ArcView cannot be used to do datum transformations. ArcView uses general algorithms instead of country or province/state specific coordinate shift files, which can lead to errors of several hundred meters. Therefore, some other software program must be used to do the conversion, such as ArcInfo, PC ArcInfo (3.5), the Geographic Calculator, programs from NGS, etc.

Tip: It is recommended that an event theme (rather than a coordinate file) be used to load EOs that do not have previously digitized source features.

Note: Some programs have a combination of NAD27 and NAD83 coordinates in their BCD. If this is the case, and the distinction can be made by a logical query (i.e. certain quads are in NAD27 and others in NAD83), then the data can be transformed accordingly. If the program cannot discern the NAD27 from the NAD83 data, then the program should tell you how they want their data represented in Biotics.

19.2. Prepare Shapefiles

The goal of this step is to create Source Features and EO Representation shapes to match the tabular data stored in Oracle and displayed in Biotics Tracker.

Tip: It is a good idea to make a copy of the log files that are created by the Link Source Features program. These can be useful for QC and error checking. The logs are saved into the GIS_WKSP folder, and are overwritten every time the Load EO program is run. Copy the log files into a permanent location.

Prepare Source Feature Themes

For EOs that do not have previously digitized source features:

1. Export EOCODE, LAT, LONG and PRECISION values from BCD into an ascii file.
2. Create an Event Theme in ArcView and convert to a shapefile
3. Project to match the coordinate system defined in the system and perform any necessary Datum transformation.
4. Add fields to the shapefile for DISTANCE and DISTANCE UNITS and populate with values as determined by the program (usually based on precision value).

For EOs that have been digitized into shapefiles or coverages (themes), prepare these as follows:

1. The projection and datum of the themes must match the coordinate system defined in the system.
2. The shapefile(s) must contain SOURCE FEATURES and the following fields:
 - EOCODE
 - Conceptual Feature Type (exact string required)
 - Point
 - Line
 - Polygon
 - Locational uncertainty Type (exact string required):
 - Areal – Estimated
 - Negligible
 - Areal – Delimited
 - Linear
 - Distance (if areal-estimated)
 - Distance Units (if areal-estimated)

QC Shapefiles



You must QC the data across all themes for:

- Duplicate EOCODES - every record in the theme must have a unique EOCODE (combination of ELCODE and EONUM). Use the Summarize function to confirm this. You may load source features from multiple themes, which means you can load an EO that consists

of different types of shapes – points, lines, polygons. However, if you plan to do so, you must make sure that all “duplicate” EOCODES across themes are legitimately part of the same EO.

Join Shapefiles to shape-ids

In order to load Source Features to be loaded into the Source Feature themes, they must contain the shape-id from the shape table in the database.

1. Open Tracker and choose Tools>Query Builder.
2. From the Query Builder, choose Query>Mode>Free Form
3. Type the following select statement into the Query window:
Select * from eocode_source_vw
4. Click the  button to execute the Query and then the  button to view all the records.
5. Choose Result>Export to File to export to a text file, and in the Save to File window:
 - a. Fill in a file name
 - b. Choose Tab as the delimiter to separate your fields
 - c. Check the box to Include Field Names on the first row
 - d. Click OK
6. The text file can be brought directly into ArcView. From the ArcView project window, click the table icon and click the Add button, then browse to your new table and click OK.
7. Open the attribute tables for both the theme prepared above and the table just added to the project, and arrange them so that you can see both on the screen.
8. Highlight the field with the EOCODE in both tables.
9. With the shapefile attribute table active, choose Table>Join.
10. You now have the feature-id (shape-id) field from the Biotics database associated with your shapefile. Choose Theme>Convert to Shapefile.
11. Repeat for each theme containing source features.

19.3. Link Source Features

Now Load the Source features into the source feature themes:

1. Choose Link Source Features from the Admin menu.
2. In the Link Source Features window:
 - Select the theme radio button

- Select the All records radio button.
- Select the field you populated with the source_feature's shape_id in the feature_id box
- Select the Conceptual Feature Type field from the dropdown list
- Select the Locational Uncertainty Type field from the dropdown list
- Select the distance field from the dropdown list
- Select the distance units field from the dropdown list
- Click OK

If you need to link sources of a different type(ie you have source lines and polygons for one EO) you will have to load the sources into the database manually. Download the file
CVS:\hdms\sql\dataConversion\addSources.zip for procedures.

19.4. Generate EOs

EO Rep polygons will be automatically generated for all EOs where all shapes are present (shape.has_shape_ind = 'Y') in one or multiple source feature themes. If all source features have not been loaded, an error will be generated. If there are multiple source features for a single Element Occurrence, records will be generated in the shape table for the new source features.

Tip: Before completing this step, confirm that all user-defined spatial attributes are set to NOT mandatory in Designer Admin.

1. Select Generate EOs from the Admin menu.
2. Click Yes to confirm that the number of EOs to be generated is correct and Click Yes. If the number is not correct, click Cancel and determine the reason for the discrepancy before continuing.
3. Check the log file for errors after the EOs complete generation.
3. Calculation Centroid.

Post Themes

You will need to post the themes explicitly at this point. To do this:

1. Make the EO Rep (Polygons) theme active.
2. Choose Post Features from the Admin menu.
3. Repeat for all Source Feature themes that were updated.

Note: *Mapped By* and *Mapped Date* will retain the values that were converted from BCD. *Digital_Mapping_By* and *Digital_Mapping_Date* will be left blank. You will need to determine with the program, how these fields should be populated. Recommended options are as follows:

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- a. Populate digital mapping fields with data from paper mapping fields
- b. Populate digital mapping fields with “mgr” user and date of installation

Unmappable EOs

If there are Unmappable EOs in the database, these records will maintain the has_shape_ind = 'N' in the shape table. When shapes are created for these records, they can be linked and generated as above.

Calculate Spatial Attributes

Unless you have chosen to maintain the spatial attributes values that were manually entered into the BCD System and not use any values calculated by Biotics, you must calculate spatial attributes for all EOs at this point. **If you want to maintain the values that were entered in BCD, then do not recalculate those attributes.**

Using Navigator, bring all the non-tiled themes that are the source of spatial attributes into the view, and turn them off. This will improve speed, and reduce the likelihood of the NO FREE CHANNELS error. Also, open the attribute table for each of these themes and make sure the SHAPE field is indexed (make the SHAPE field active, and pull down the Field menu; if it says Create Index there is no index – so click on Create Index; if it says Remove Index then there is an index).

1. Make sure your Load Scene preference (available on the Designer tab in the Preferences window) is set to ‘Add To View’.
2. Enter Input/Edit mode. Select the Element Occurrences palette, and EO Representation feature.
3. Use the Add/Remove Oracle Attributes function (available on the Biotics menu) to ‘Remove all Oracle attributes’ for all Biotics themes. This will speed up processing considerably.
4. Select the EO Rep polygons for which you want to calculate spatial attributes.
5. Choose Recalculate Spatial Attributes from the Admin menu.
6. Click the Custom radio button.
7. Choose the attributes to be calculated. If you are calculating all attributes (which can only be done on a subset of your EOs), click the Select All button. If you are calculating one attribute (which can be done for all EOs), select the attribute in the list.
8. Click OK.

Processing will now begin, and will likely take a very long time to complete. Depending on your hardware, the number of attributes being calculated, the number of EOs being processed, and the themes used in the overlays, it may take several hours to complete processing.

19.5. Quality Assurance

The goal of this step is to ensure that all of the data from the BCD System has been loaded properly into Biotics. In addition, Biotics can be used to compare spatial attributes that were manually entered into the BCD System with attributes calculated from reference theme data.

General Checks

Extensive data checks were done in the QC / Reformatting step (17.2). However, after the data has been loaded into the EO themes, there are a few additional checks that you should perform:

1. Check the number of records in the EO Source Point and EO Reps (Polygons) themes. The number of records should be the same as the number of EORs in the BCD System (less the number of unmappable EORs).

Coordinate Checks

The greatest potential for error during the creation of the EO themes lies in the coordinates. It is impossible to tell if the coordinates are accurate by visual examination alone, and mistakes made at this point can be very costly. Great care therefore needs to be taken to confirm that the coordinates are correct.

1. Randomly select a few records, and do as much as you can to confirm that the position is correct. For example, you can use the data in the *surveysite* and *directions* fields in conjunction with reference theme data (e.g. a gazetteer) to confirm the location.
2. If the coordinates were converted from one coordinate system to another, it is wise to confirm the final coordinates using another software program. For example, if ArcInfo was used to convert the coordinates, then type the original coordinate into another program (e.g. Geographic Calculator), and see if the resulting coordinate is exactly the same as the coordinate that ArcInfo produced. Confirm that the coordinate of the shape in ArcView matches the coordinate in the original table too.

20. CONFIGURING POWERPACK MAPPER

Mapper includes Powerpack Mapper, a product used to produce ad-hoc or pre-defined map products (i.e. paper maps). When Biotics is installed, there is only one map type - "Ad-hoc" - and only one template - "Ad-hoc".

Map types and templates can be defined for the most commonly produced types of paper maps. For example, you might create a map type and template for a province/state-wide Rare/Threatened/Endangered Species (RTES) map.

The map type can include details such as:

- the themes to be included in the map
- themes to be labelled on the map
- the scale of the map

The template can include details such as:

- paper size
- cartographic content (titles, north arrows, scale bars, etc.)
- the Member Program icon or logo

Once map types and templates are defined, users can create standard paper maps with a few clicks. Variables can be created to accept input for the Date of the map, the map Title, and so on.

To configure Powerpack Mapper, use the "Mapper Admin" option on the Admin menu. For more information, refer to the on-line help.

21. PUTTING BIOTICS INTO PRODUCTION

Note: the content in this section is intended primarily for NatureServe staff and includes links to NatureServe's internal network for supporting material.

21.1. Installing Biotics Off-Site

Overview

To configure Biotics off-site, it is possible to work through the entire installation/configuration guide from start to finish, performing the work in NatureServe's support environment instead of directly on the client's network.

The installation that you are creating—converted data, shapefiles, configuration details—will be packed up and delivered to the Member Program in its entirety. Therefore, it should replicate the environment of the Member Program, as detailed in the Installation and Configuration Worksheet, on the support network (see Creating Biotics Environment section below).

The most important consideration when configuring Biotics off-site is to make sure that your technical environment matches the client's technical environment in several key areas:

- Name of Oracle Tablespace and Oracle user
- Name of the ODBC data source
- Drive path to the directory (or directories)

Otherwise, it will make the delivery process considerably more complicated.

A checklist overview of the steps to Configure and Deliver Biotics off-site can be found on the NatureServe network at:

\\cypress\groups\projects\Biotics\NetworkRollout\Installation\Installation_Checklist.doc.

Creating the Biotics Environment

To replicate the Member Program environment, the local environment must be configured identically to the destination environment:

- The Oracle tablespace names should match those in the destination Oracle environment. If the tablespace names differ in any way from the standard format (BIOTICS_DATA, BIOTICS_INDEX, BIOTICS_AUDIT, BIOTICSDEL_DATA) extra steps are required to import the Oracle database (see details below).

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To create a non-standard Oracle environment:

If the standard tablespace naming will be used, skip these steps. Scripts referenced below can be found on the NatureServe network at \\Cypress\groups\projects\Biotics\Database\UtilityScripts\move_tablespace.e.

1. Using DBA Studio, create tablespaces as they will be named in the destination environment.
2. Create the schema owner as it will be named in the destination environment.
3. Import the latest biotics_user database from the DMP file (containing the refresh from NatureServe's production database for references, higher classification and scientific name data) to the destination user in your local environment. Importing the database and running the XML2BIOTICS conversion software in the new environment, will take advantage of the fact that the tables containing CLOB data will be empty before conversion.

To import the database, use a variation of the following command at a DOS prompt:

```
imp <destination biotics
user>/<password>@<SQL*Net alias> file=<DMP
file path and name> log=<log path and name>
fromuser=<biotics_user> touser=<destination
biotics user> commit=y ignore=y
```

4. Tables with large object fields will not import correctly to a tablespace with a different name. To create these tables, listed below, run script "clob_tables.sql".

ALLIANCE
ANIMAL_CAG
ANIMAL_CAN
ANIMAL_CAS
COMMUNITY_GLOBAL
CONSERVATION_SITE
ELEMENT_GLOBAL
ELEMENT_GLOBAL_RANK
ELEMENT_GROUP
ELEMENT_MANAGEMENT
ELEMENT_NATIONAL_RANK
ELEMENT_SUBNATL_RANK
EO
HIGHER_CLASS_UNIT
PLANT_CAG
PLANT_CAN
PLANT_CAS

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5. Once the tables have been created, run the batch file `import_clob_tables.bat` to populate the `HIGHER_CLASS_UNIT` table.
6. Run the XML2BIOTICS conversion as usual, in the replicated Oracle environment.

- Drive Mappings

Based on the Member Program's responses in the Installation and Configuration Worksheet, recreate the network drive mapping in your local environment.

You can create a BAT file (using a text editor) to map your drives. For example:

```
net use G: /delete
net use G: \\my_machine\biotics_ny /persistent:yes
pause
```

Preparing for Delivery

To deliver the configured version of Biotics:

1. Check the Oracle privileges on the user to be exported using DBA Studio. Convert the user's access to connect and resource (if they are not already). You **should not** export the user with DBA privileges due to the possibility of reduced permissions on-site leading to import problems.
2. Export the Oracle database using the **exp** command (run from a command prompt). For example, if the Oracle user is "biotics_user", the password is "password", the SQL*Net alias is "oracle_server", you want to name the export file "biotics.dmp", and you want to name the log file "biotics_exp.log", you would run:

```
exp biotics_user/password@oracle_server file=biotics.dmp
log=biotics_exp.log owner=biotics_user compress=N
```

The data will now be exported. The export file will be created in the current directory.

3. Make a data CD with materials to bring to the installation. Copy the following onto the CD:
 - ❑ The Oracle .dmp file of the BIOTICS_USER
 - ❑ The Oracle .dmp file of the BIOTICS_DEL user
 - ❑ The entire "Biotics" application directory

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- ❑ Scripts (located on NatureServe network at <\\Cypress\groups\projects\Biotics\Database\UtilityScripts>):
 - ❑ Create_mtssys.sql
 - ❑ Mtssys_roles_privs.sql
 - ❑ Invalid_obj_check_and_analyze.txt
 - ❑ Disable_trigger_script.sql
 - ❑ Enable_trigger_script.sql
 - ❑ Any Database patches or upgrade scripts
 - ❑ BAT files for Oracle database backups

- 4. Create a Biotics Installation CD by adding the following items (located on the NatureServe network at \\Cypress\groups\projects\Biotics\NetworkRollout\Installation\Biotics_4_CD_Contents):
 - ❑ Executables
 - ❑ BioticsMapperSetup.exe
 - ❑ BioticsTrackerSetup.exe
 - ❑ ConnectionTest.exe
 - ❑ Powerpack.exe
 - ❑ Documentation
 - ❑ Biotics_MTS_Oracle_Config.doc
 - ❑ Creating_new_OracleDB.doc
 - ❑ Install_Config_Guide.doc

Installing On-Site

To install the configured version of Biotics at the client's site:

1. If necessary, create and configure the Oracle database to match exactly the one on which you prepared the configuration.
2. Import the Oracle database using the **imp** command (run from a command prompt; for help on the IMP command, type “imp help=y”). If the standard tablespace and Oracle username configuration is used, you can run the following import command:

```
Imp biotics_user/<password>@<SQL*Net alias>  
file=<path and name of DMP file> log=<path and  
name of log file to create> fromuser=biotics_user  
touser=biotics_user
```

If the standard configuration has not been used, replace biotics_user above with the appropriate Oracle user name.

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Note: If you arrive on site expecting to use the standard user and tablespace names, but find that is not possible, the data can be imported as described above in “Creating the Biotics Environment.”

3. Copy the entire Biotics Mapper directories from the CD to the appropriate location on the server.
4. Remove the read-only attribute from all files and folders copied from CD.
5. Edit the INSTALL.INI file (located in the \biotics folder) and change any settings that were specific to your network. This might include:
 - Name of the SQL*Net database alias
 - Path to the Biotics application directory
 - Tablespace names
6. Install the Tracker application to the server, following Section 5.1 (Tracker Server Installation). It is recommended that the Authorization file be moved to the same file share as the Biotics directory, and the Tracker server registry altered accordingly.
7. Install and configure Tracker and Mapper on the client machines, following Sections 5.2 and 9.8.
8. Start Mapper, and do the following as necessary:
 - Do a database integrity check.
 - Set a Tiled Theme Index to allow modification of Preferences.
 - Alter Navigator definitions (if necessary).
9. Perform a brief test in Mapper to make sure everything is working properly:
 - Start Mapper and login.
 - Add all the themes defined to Navigator to the view using Navigator.
 - Test all of the entries in Zoom By.
 - Create a Source Feature, EO, MA, and Site – make sure all spatial attributes are calculated properly.
 - Delete the features created above.
10. Perform a brief test in Tracker to make sure everything is working properly:

- Start Tracker and login.
- Search for Elements and add them to a Working List.
- Click through all the tabs on Element and Element Occurrence records.
- With Mapper open, click the View Shape button in an Element Occurrence record.

Some of these tests may seem redundant since you will have tested the configuration on your network. However you should never assume that because everything works on your network there will be no problems on-site. All kinds of problems can surface such as insufficient privileges, read-only attributes on a master shapefile, reference theme data that is not located where it should be, etc.

21.2. Training

End-User Training

Two separate training courses are recommended for Biotics users. Biotics Mapper training for programs new to the spatial methodology and the Mapper application should take place on-site during the installation week. The Biotics Tracker and Administrator training course should take place about a month following installation, to give the users a chance to get familiar with the system. The Tracker training is usually provided via the web over Citrix link and accompanied by a conference call.

The Mapper course will typically require 3 days to complete, and should focus on the essential information (Revised EO Methodology, the basics of creating and editing EOs, using Mapper functions). Tracker functionality should be demonstrated briefly so that users get a feel for what Biotics' capabilities are, but otherwise should be left for the on-line course.

The Mapper course should include as much "hands-on" training as possible. This is best achieved using a combination of exercises at regular intervals (e.g. after an hour or two of instruction), and a one day "applied workshop" at the end of the course, where the users apply the knowledge they have learned over the past three days to do real work (enter EOs, edit EOs, answer data requests, etc.). Students should bring typical or simple work examples, not overly complex ones. The workshop is a very effective way to make sure that users practice what they have learned.

It is essential that all users have Windows training and experience prior to the Biotics course. It is also extremely helpful if users have basic ArcView training in advance. This allows them to focus more on the Biotics-specific functionality.

Administrator Training

A separate ½ - 1 day training session should be held with the people who will administer Biotics (typically the data manager). Topics covered in this course include backing up the system, creating new users, defining new themes to Navigator, installing Biotics on a new client machine, etc. It is also helpful to walk through where everything is installed on the server, and the configuration that has been completed.

22. MAINTAINING THE SYSTEM

Important Note: This section originated with the Biotics 3.1 Installation and Configuration Guide. As of the publication date of this document, this has not been reviewed and revised for Biotics 4. It will be revised in the next version of this document. However, there is still a lot of useful information in this section that may still apply. Please keep this in mind as you read this section. Thank you.

22.1. Accessing the ADMIN Menu from Biotics Mapper

Within Biotics, there is an “admin” menu that is used to perform various administrative functions. This menu will only appear to users who belong to the "Administrators" group. Other users will not see this menu.

To access the admin menu, log into Biotics as an administrative user (e.g. mgr). If you enter the correct password, a menu titled “**Admin**” will appear when a view document is active.

Note: To remove the admin menu, exit and restart Biotics as a different user.

Detailed help for all of the options on the Admin menu is available online.

22.2. Creating and Recovering Project Files

ArcView project files can occasionally become corrupted for a variety of reasons. When this happens, users will be unable to start Biotics Mapper.

Generally speaking, project files are expendable, since they do not contain any actual data. Therefore, in most cases, the corrupt project file can simply be replaced with a new (empty) project file. The one exception to this is if a user has spent a lot of time creating custom layouts within the project. In this case, it is desirable to recover the project file, so that no work is lost.

Creating a New Project File

1. Create a shortcut that starts ArcView with the /LOGON /APP=Biotics parameter. Do not specify the name of a project file. For example:

```
c:\esri\av_gis30\arcview\bin32\arcview.exe /LOGON /APP=Biotics
```
2. Double click on the shortcut to start ArcView. The logon window should appear.
3. Logon. The ArcView window will then appear.
4. Select Extensions from the File menu. The extensions dialog will appear.
 - If you wish to use additional extensions, load them now before loading the Biotics extension (i.e. select the extension and click OK on the Extensions dialog). See section 22.3 for more information on using other extensions with Biotics.
5. Click the checkbox next to the Biotics extension.
6. Click OK. The Biotics program will now load. This will take a few minutes.
7. Save the project to the GIS_WKSP directory as "biotics.apr". If there is an existing project file there, overwrite it.
8. Remove the shortcut created in step (1).

Recovering a Project File

A backup of the project file is made every time the user exits Biotics. Backup files are created in the same directory the project file is located in (usually the GIS_WKSP directory), and are named based on the day of the week. The first part of the backup filename will be the same as the first part of the project filename. However, the first three letters of the current day of the week are used as the file extension instead of ".apr". For example, biotics.apr is backed up to biotics.mon, biotics.tue, biotics.wed, etc.

If the project file becomes corrupted, replace the project file with the most recent *valid* backup project file. For example:

1. *rename* biotics.apr to biotics.bad
2. *copy* biotics.fri to biotics.apr

Note that regular backups of the entire system should also be made, as an additional fail-safe measure.

22.3. Using Other Extensions with Biotics Mapper

Other extensions can be used with Biotics (e.g. the Geoprocessing Wizard, MrSID, etc). However there is a potential that other extensions

could conflict with Biotics depending on how they have been programmed. For example if another extension manipulates the object tags of themes in the view, Biotics will not function properly. Generally extensions provided by ESRI (e.g. Spatial Analyst, Network Analyst, sample extensions, MrSID, etc.) are compatible with Biotics.

If the extension has a user interface (i.e. it adds items to the menus, button bar, and/or toolbar), it must be loaded before the Biotics extension is loaded (otherwise you will not see the menus/buttons/tools). Therefore you must create a new project file, and load the extension before you load the Biotics extension. See section 22.2 for information on how to create a new project file (pay particular attention to the bullet in step 4).

Note: The presence of other extensions may cause Biotics menu items, buttons, and/or tools to become misplaced (e.g. shifted to the right). This can be corrected using Project Customize if necessary.

If the extension does not have a user interface (e.g. the MrSID extension), it can be loaded at any time (there is no need to create a new project file).

Once the project has been saved, the other extension will be automatically re-loaded the next time Biotics is started.

If you wish to make other extensions available within Biotics to all users in your organization without having to go through all the steps to create a new project for every user, create the project once, and then just copy it to each user's GIS_WKSP directory using Windows Explorer, overwriting the existing file (just make sure the project file is completely empty when you do this).

22.4. Moving the Application and/or Data

Biotics Mapper maintains several pointers to the location of application files and data. In addition, the project files contain complete paths to all data contained in the project. For this reason, care must be taken when moving the application and/or data.

Moving the Biotics Application

If the Biotics Mapper software (i.e. \biotics\gis_app) is moved to a different server, a different drive, or a different location on the drive, you will have to make the following changes on each client machine:

1. Update the following Registry keys:

[HKEY_Local_Machine\Software\Linnet\Biotics\Logon\AuthorizationFile]

[HKEY_Local_Machine\Software\Linnet\Biotics\Logon\LogonBitmapFile]

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[HKEY_Local_Machine\Software\Linnet\Biotics\Logon\LogonDLLPath]
[HKEY_Local_Machine\Software\Linnet\Biotics\Powerpack\Navigator\GIS_APP]
[HKEY_Local_Machine\SOFTWARE\Linnet\Biotics\Powerpack\Navigator\EXE]

2. Modify the PATH (... \biotics\gis_app\exe)
3. Modify the shortcut in the Biotics folder on the Start menu for the Biotics Help.

Note: If the software is moved, but the drive mapping to the software remains the same, then these steps can be omitted. For example, the application is in N:\Biotics, but N:\ has changed from \\server1\apps to \\server2\apps.

Moving the Biotics Workspace

If the user's workspace (GIS_WKSP) is moved to a different drive, or a different location on the drive, you will have to make the following changes:

1. The GIS_WKSP registry key needs to be updated to point to the new location on the client machine:

[HKEY_Current_User\Software\Linnet\Biotics\Powerpack\Navigator\GIS_WKSP]

2. The user's project file must be corrected. This can be done in one of three ways:
 - Start Biotics, select the CANCEL ALL button when it starts asking you where all the data files are, and then save the project. The themes that were moved will be removed from the project, and re-loaded from the new location the first time they are needed.
 - Edit the project file using a text editor such as Notepad, and replace the old path with the new path using search/replace. Remember that ArcView stores all paths with forward slashes (/) instead of back slashes (\).
 - Create a new project file (see section 22.2).
3. Modify the target in the Biotics shortcuts in the start menu and the desktop to point to the new drive.

Note: If the workspace is moved, but the drive mapping to the workspace remains the same, then all these steps can be omitted.

Moving Theme Data

1. If a large amount of theme data has been moved (e.g. an entire directory containing dozens of themes), it is easiest to update the values in the *location* column in the THEME_LOCATION table directly using SQL. You can do this using tools provided with the DBMS (e.g. SQL*Plus). Note that *location* values are typed in upper case.

If only a few themes have been moved, it is easiest to use Navigator Admin to re-browse for the theme location (edit the existing theme definition, click BROWSE, and point to the new theme location).

2. The users' project files must be corrected (assuming they contain the theme data that was moved). This can be done in one of three ways:
 - Start Biotics, select the CANCEL ALL button when it starts asking you where all the data files are, and then save the project. The themes that were moved will be removed from the project, and re-loaded from the new location the first time they are needed.
 - Edit the project file using a text editor such as Notepad, and replace the old path with the new path using search/replace. Remember that ArcView stores all paths with forward slashes (/) instead of back slashes (\).
 - Create a new project file (see section 22.2).

Note: If the theme Data are moved, but the drive mapping to the data remains the same, then both steps can be omitted.

Moving the SQL Database

If the SQL database is moved to a different host computer, you simply reconfigure the SQL*Net database alias to point to the new server using the utilities that come with Oracle (e.g. Net8 Configuration Assistant). Assuming the name of the alias and ODBC data source remains the same, no further action is required.

If a new alias must be created for the new server, then you must update the registry:

```
[HKEY_Local_Machine\Software\Linnet\Biotics\Database\ServerName]
```

If a new ODBC Data Source must be created for the new server, then you must update the registry and two Oracle tables:

```
[HKEY_Local_Machine\Software\Linnet\Biotics\Powerpack\Navigator\ODBC_DSN]
```

- DATA_LOC table:

```
UPDATE DATA_LOC SET PATH_ODBC = '<new DSN>'
WHERE PATH_ODBC = '<old DSN>'
```
- THEME_DATA table:

```
UPDATE THEME_DATA SET ODBC_DSN = '<new DSN>'
WHERE ODBC_DSN = '<old DSN>'
```

In addition, ArcView stores data source names in the project file when SQL Data are present in the project (which is usually the case in Biotics). You will therefore have to correct the users' project files. This can be done one of three ways:

- Start Biotics, and select the CANCEL button when it starts asking you to login to Oracle. Then, remove all the themes from

the view, and save the project. The SQL data will be re-loaded from the new data source the first time it is needed.

- Edit the project file using a text editor such as Notepad, and replace the old data source name with the new data source name using search/replace.
- Create a new project file (see section 22.2).

22.5. Software Upgrades

Always contact technical support before upgrading Windows, ArcView, or Oracle software on a computer that runs Biotics. In many cases, a new version of Biotics will be required to work with the new software.

22.6. Backing Up Biotics Data

What to Backup

The following should be backed up on a regular basis:

- Oracle Database
- Biotics theme data (e.g. \themes\biotics\...)
- The Biotics Mapper application directory (many data files stored in the \gis_app sub-directory, such as legends, are modified when the application is used).
- Other volatile theme data (e.g. \themes\user\)

In addition, you should backup each user's personal workspace. Technically, the "cloned" shapefiles in this directory are normally expendable. However, the user may have created other data in their workspace directory, and therefore these directories should be included in the regular backup.

How Often to Backup

In environments where data entry is being done on a daily basis, backups should be done daily (usually a full backup once a week, and incremental backups Monday through Friday). In environments where data entry is less frequent, weekly backups may suffice.

Backing up the Oracle Database

As long as Oracle is running, the database is "in use" and will be skipped by most tape backup software. There are several different approaches to backing up the Oracle database such as (a) shutting down

Oracle while the backup runs; (b) using the backup tools that come with Oracle; and (c) dumping (exporting) the database.

The last approach (dumping the database) is the preferred approach for several reasons: (1) Oracle stays running the whole time, which is helpful in cases where processes are left running over night; (2) it is simple (no worries about Oracle not being restarted after the backup completes); and (3) it gives you a lot of flexibility in restoring data (e.g. you can pick and choose which tables/records you would like to restore, or you can restore the entire database).

You can set up the server to automatically dump the database using the Windows Scheduler (the Windows “at” service). A batch file (.BAT) can be created to run at a set time (typically just before the nightly tape backup runs).

For example, if your oracle user is “biotics_user” and the deleted data is in biotics_del and your Oracle net service name is “oracle_server”, the following commands will dump the database to file s:\biotics.dmp and s:\biotics_del.dmp:

```
exp biotics_user/thepassword@oracle_server file=biotics_user.dmp  
log=biotics_user.log owner=biotics_user compress=N
```

```
exp biotics_del/thepassword@oracle_server file=biotics_del.dmp  
log=biotics_del.log owner=biotics_del compress=N
```

The dump files can then be scooped up by the regular tape backup (it is just an ordinary file, and will not be “in use”).

Since the BAT file contains the Oracle password, make sure it is in a secure location where only Administrators can access it.

For more information on the Oracle export command (exp), type “exp help=Y” at a DOS prompt, or refer to your Oracle documentation.

22.7. Recovering Deleted Data

Although there is no 'undelete' function in Biotics, it is possible to recover deleted records from both the SQL database and the shapefiles (provided delete archiving has not been deactivated in Designer Admin).

Recovering a Record from the SQL Database

Generally, records in the SQL database are never deleted. Instead, they are simply moved into the deleted schema. Please consult the Biotics Help Desk for assistance with recovering data from your Oracle deleted schema.

Recovering a Record from a Shapefile

Records in shapefiles are physically deleted when the shape is deleted. However, when delete archiving is activated in Designer Admin (which is the default setting), a copy of the shape is made to an archive shapefile before the shape is deleted from the original shapefile. Therefore, by copying the shape from the archive shapefile into the original shapefile, the shape can essentially be undeleted.

To undelete a shape:

1. Go into "long menus" within Biotics Mapper.
2. Make sure both the original theme and the archive theme are in the view (if they aren't, use Navigator to add them).
3. Start editing the archive theme (make the theme active, and choose Start Editing from the Theme menu).
4. Locate and select the shape to be undeleted.
5. Choose Copy Features from the Edit menu.
6. Stop editing the archive theme - do not save the changes (choose Stop Editing from the Theme menu).
7. Start editing the original theme.
8. Choose Paste from the Edit menu - the shape will be pasted into the shapefile.
9. Open the attribute table for the original theme (choose Table from the Theme menu).
10. Locate the row in the table that is highlighted (e.g. yellow), choose the edit tool on the toolbar, and then type in the same values that were in the archive theme for the following columns:
 - Feature_id
 - Feat_code
 - MappedBy
 - MappedDate

Do not type values in for:

- Record_num
- Mod_By
- Mod_Date

Tip: to see what the original values were, you can do an Identify on the shape in the archive theme, or open the attribute table for the archive theme.

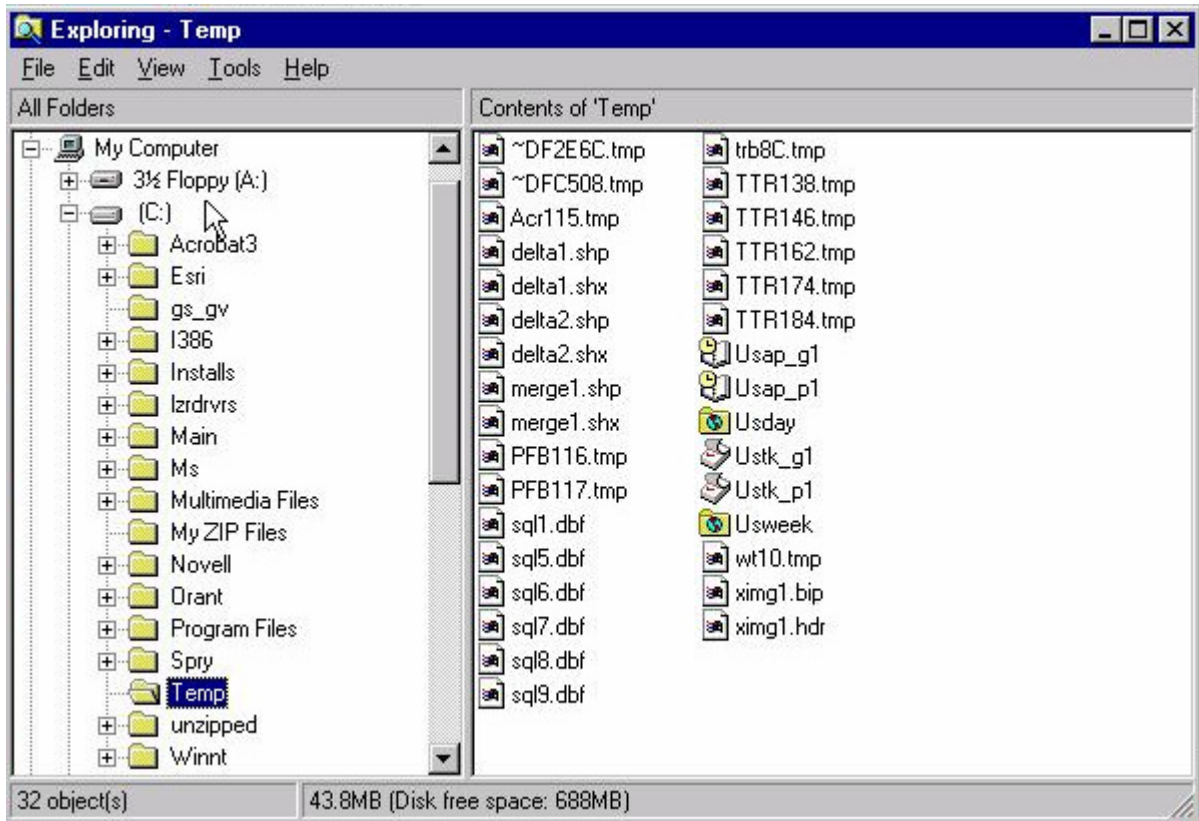
11. Close the table document (be sure to press <enter> after typing in the last data value).
12. Stop editing the original theme.
13. (optional) choose Post Features from the Admin menu (if you don't post the shape now, the shape will be posted the next time you start Biotics Mapper).

22.8. Change Associated Element for EOs (Code Changes)

From time to time, it is necessary to change the associated element for existing element occurrence records. This process was known as a "code change" in BCD. Since the element record no longer relies on the ELCODE as the primary key, this procedure has changed in Biotics 4. Detailed help for the "change associated element" procedure is available in the Biotics on-line help.

22.9. Temporary SQL Files

Whenever ArcView queries data from Oracle, it creates a temporary SQL dbf file in the temp directory:



These files are supposed to be deleted automatically. However, sometimes they are not, and they can be quite sizeable. If there are hundreds of them, the C: drive could fill up.

The best way to ensure these files are removed regularly is to create a BAT file that runs at startup on every Biotics Mapper client. Depending

on the operating system of the client machine, the default temp directory location may vary.

For Windows NT clients, the BAT file should contain the following command to delete these temporary files from the default temp directory:

```
del c:\temp\sql*.dbf
```

For Windows 2000 clients, adjust the BAT file for the following default temp directory location:

```
del c:\Documents and Settings\c-datill\Local Settings\Temp\sql*.dbf
```

(where c-datill=your user profile name)

Put the BAT file in the Windows Startup folder of each user's profile: .../profiles/username/start menu/programs/startup. Alternatively, you may put the file in the "All Users" profile. This will execute every time you logon to Windows, and will automatically clean these files up.

22.10. Purging Features from Archive Themes

At times, it may be desirable to permanently remove features from an Archive theme. This procedure is as follows:

1. Log into Biotics Mapper as a user with administrator privileges.
3. Add the archive theme to the view using Navigator.
4. Choose Long Menus from the File menu.
5. Select the records you wish to remove using any standard ArcView selection function (query builder, select feature tool, etc).
6. Choose Lock Features from the Admin menu.
7. Choose Start Editing from the Theme menu.
8. Re-select the records to be deleted. A quick way to do this is to open the attribute table for the theme (choose Table from the Theme menu), choose Select Locked Features from the Table menu, and then close the attribute table document.
9. Choose Delete Features from the Edit menu.
10. Choose Stop Editing from the Theme menu.
11. Choose Post Features from the Admin menu.

22.11. Administering Multi-User Shapefiles

Overview

Multi-user shapefiles work on the following principle: *a user never views or edits the original shapefile; they always view/edit a copy of the shapefile*. The original shapefile is referred to as the 'MASTER', and the copy is referred to as the 'CLONE'.

In general, multi user editing works as follows:

- The user adds a multi-user shapefile to the list of open themes using Navigator. When they click on the OK button in Navigator, the user's workspace (GIS_WKSP) is searched for a Clone version of the shapefile, and then inserts the Clone into the view. If it is the first time loading this particular multi user theme, a Clone version of the theme will not be found in the user's workspace. In such a case, Navigator will create a Clone by copying the Master version of the shapefile to the user's workspace. This is all transparent to the user.
- If the user simply wishes to add new features to the shapefile, they may do so now using either standard ArcView tools and/or custom application tools.
- If the user wishes to modify or delete an existing feature in the shapefile, they must first lock the feature, and then make the edit. When features are locked, no other users can edit them.
- When all the new features have been added, and any desired edits made, the changes are posted to the Master shapefile.
- Viewing changes made by other users that have been posted to the Master shapefile, is accomplished by performing a refresh on the theme.
- When a theme is refreshed, all changes posted to the Master by other users since the last refresh will be copied to the Clone shapefile. The refresh options are available in menus, and are run automatically when the user exits Designer, or starts the application.
- The shapefile is only viewed and edited using Navigator and multi-user editing tools.

Edit History

Every time a change is made to a multi-user shapefile, it is logged in Oracle. You can view this history option using the History... option on the Edit menu.

From time to time (e.g. every few months) it is a good idea to purge the history information to maintain performance.

Trouble-Shooting and Further Reading

Please refer to the document - *Multi-user Shapefile Administration* for more information multi-user shapefiles. This document is provided on the Biotics Installation CD-ROM.

Database Integrity Check

It is good practice to check the integrity of the database regularly (e.g. once a week). This will help catch inconsistencies that might occur between the multi-user shapefiles and the Oracle database. Biotics includes a function on the Admin menu that checks the integrity of the Element Occurrence database automatically.

22.12. Error Messages in Biotics Mapper

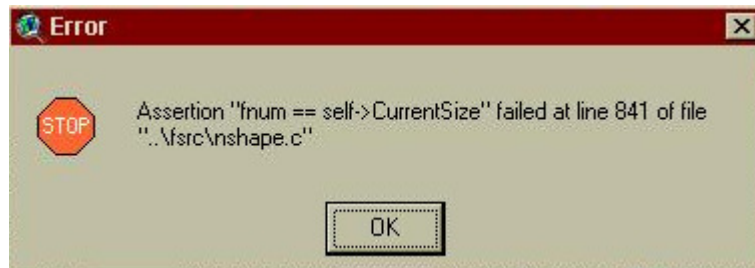
There are two basic types of error messages:

- Uncontrolled error messages – errors that the software does not trap and handle – often leading to a crash.
- Controlled error messages – errors that the software does trap and handle – often informing the user of a problem or an invalid action that has been performed.

Uncontrolled Error Messages

Uncontrolled error messages are typically characterized by cryptic/meaningless titles and message text. For example:

Typical uncontrolled ArcView error message:



Typical uncontrolled PowerBuilder error message:



Controlled Error Messages

Controlled error messages on the other hand usually provide a more meaningful message. For example:



Error messages almost always have the red **X** icon (or a red stop sign).

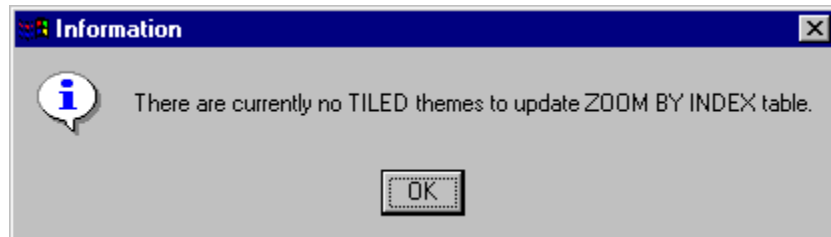
Warning and Information Messages

In addition to error messages, there are also Warning and Information messages. These are non-severe messages that are displayed to alert or inform the user of a particular situation. Warning messages display with a yellow **!** icon, and Information messages display with a blue **i** icon.

Typical warning message:



Typical information message:



Common Error Messages

Dr Watson

Means either the ArcView or PowerBuilder portion of Biotics has crashed. Close any parts of the Biotics program that are open and restart Biotics.

Application Terminated

Means the PowerBuilder portion of Biotics has crashed. Close the ArcView portion of Biotics and restart Biotics.

Null Object Reference

Means the PowerBuilder portion of Biotics has crashed. Close the ArcView portion of Biotics and restart Biotics.

Fatal Error

Means the ArcView portion of Biotics has crashed. Close the PowerBuilder portion of Biotics and restart Biotics.

Shapefile may be corrupt

A very serious error requiring immediate attention. Could mean one of the clone and/or master shapefiles is corrupted. Make backup copies of all master shapefiles, have all users stop using Biotics and perform a database integrity check immediately.

Assertion "self->IsOpen" failed

A serious uncontrolled ArcView error. Close & restart Biotics.

Assertion "fnum == self > CurrentSize" failed

A serious uncontrolled ArcView error. May be an indication of corruption. Close & restart Biotics.

AVArray: Index ##### not in range

An ArcView error, usually non-fatal. May or may not be an indication of corruption. Usually Biotics will continue to function properly. If not, exit and restart Biotics.

Number of shapes does not match number of table records

A very serious error requiring immediate attention. Means one of the clone and/or master shapefiles is definitely corrupted. Make backup copies of all master shapefiles, have all users stop using Biotics and then identify which shapefile is corrupt and then correct the shapefile.

Unable to establish DDE connection

Usually means part of the Biotics application has crashed, often because of one of the above errors. Close any parts of the Biotics program that are open and restart Biotics

Unable to save changes

PowerBuilder was unable to save the record to Oracle (most likely because Oracle is not responding). Biotics will usually continue functioning.

Invalid Object for Describe Error

The error message shown in Figure 222-1 may occur when using trying to run a query in Biotics Mapper. One possible reason may be that someone had recently created some oracle view objects, which may need to be recompiled.

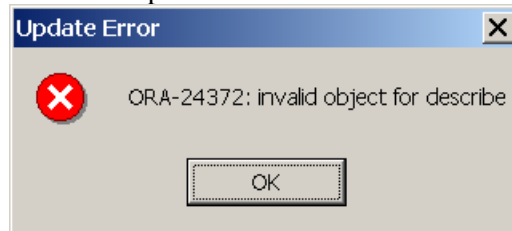


Figure 222-1 - Invalid Object Error

Using SQL*Plus or SQL*Plus Worksheet, run the following two commands (connected to Oracle as the application use, typically “biotics_user”):

```
Spool bio4invalid.sql
select ' alter '||OBJECT_TYPE||' '||object_name||' compile;' from
user_objects where status='INVALID';
spool off
@bio4invalid
exec
dbms_utility.analyze_schema('BIOTICS_USER','COMPUTE');
REM
```

Continue running this procedure until you have no more errors.

22.13. Error Messages in Biotics Tracker

Active User by Name Error

If the error in Figure 22-2 occurs during the launch of Administrator or Tracker, the application is not able to communicate with the database via the COM objects on the application server. This may happen with Oracle 8i when the application server is rebooted or when installing on a new server with Oracle 9i but not applying the dll patch. (See Oracle and MTS installation guide for 9i for information on how to install patch).

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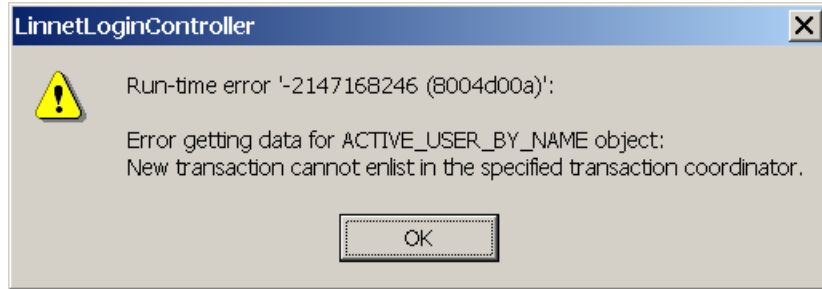


Figure 22-2 – Active User by Name Error

To remedy this you will have to restart the Oracle service for Microsoft Transaction Manager (MTS) and the Distributed Transaction Controller (DTC) on the Microsoft Management console on the application server.

First stop and restart the DTC by going to your control panel then administrative controls then component services. Right click on MyComputer and stop and restart the DTC as shown in Figure 222-3.

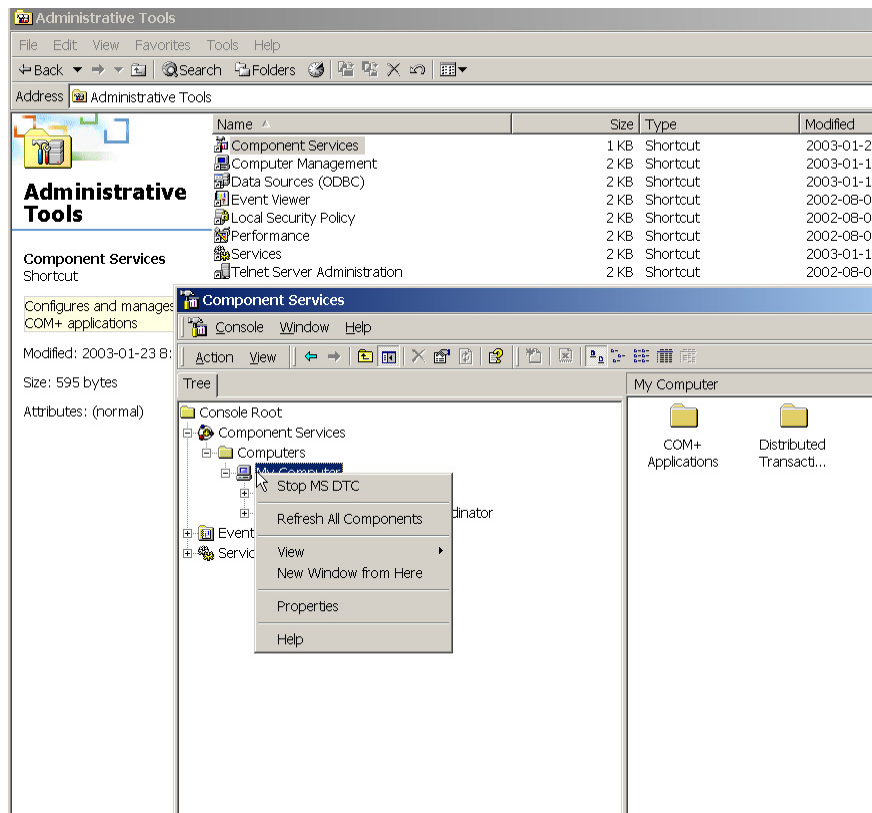


Figure 222-3 – Stop and Restart DTC

Next restart the Oracle MTS service (Oracle 8i only). Go to Start -> Oracle Home -> Application Development -> Oracle Manager for Microsoft Transaction Manager and right click on the service as shown in Figure 222-4. If the service is already started then stop the service and restart.

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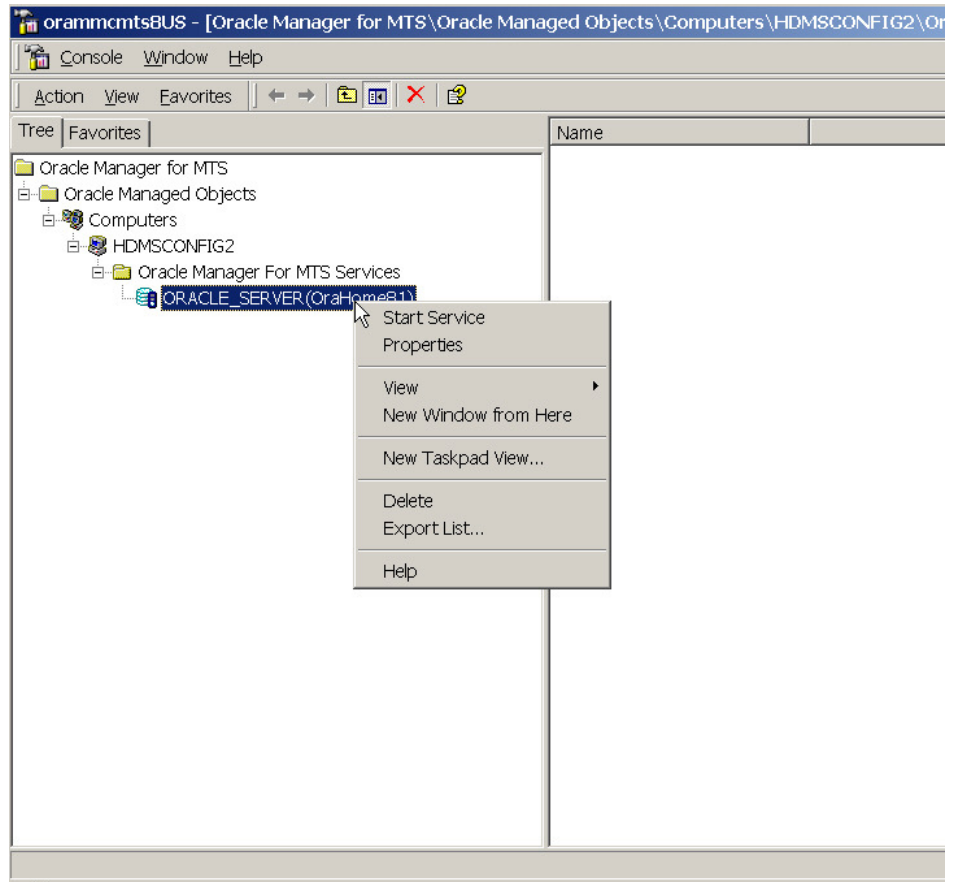


Figure 222-4 – Restart Oracle MTS Service

Test Connection Errors

The following errors can appear when clicking the "test connection" button in the HDMS_ClientConfig.exe program.

Incorrect Username and Password

Check the following registry key:

\\KEY_LOCAL_MACHINE\SOFTWARE\Linnet\framew
ork\Database

Make sure the USER ID and PASSWORD entries in this key match the database user. Note that case matters and the server may have to be rebooted after changing this key.

Configured Identity is Incorrect

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On the server go to control panel -> Administrative tools -> Component services -> My Computer -> COM+ Applications -> HDMS. Right click on HDMS and select properties and click the identity tab. Account radio button must be set to 'this user' and the user entered must have administrative privileges on the server. The user may be a local user on the server.

For the most up to date solutions to Biotics errors please consult the Biotics Knowledge Base located at <http://support.natureserve.org/customer/default.htm>

23. INSTALLATION DETAILS

23.1. Workstation Configuration

Summary of Changes

On each client that will run Biotics (Tracker **or** Mapper), changes are made to the Windows Registry. The Biotics Mapper setup program makes the required registry edits automatically. The Biotics Tracker installation requires that some registry edits be made manually.

The following changes are also made on each client that will run Biotics Mapper:

- Path
- Shortcuts/Program Groups
- Database Aliases
- ODBC Data Sources
- ArcView "default project"

The Biotics Mapper setup program makes all these changes for you when Mapper is first installed. If for some reason the workstation configuration is lost, re-run the setup program to re-establish all the settings (choose the User Setup option).

Path

The PATH must include the ...\Biotics\GIS_APP\EXE directory. For example, if Biotics is installed in N:\Biotics, the PATH must include "n:\Biotics\gis_app\exe".

Shortcuts/Program Groups

A shortcut must be created to start Biotics Mapper. You cannot start Mapper by double clicking on a project file (.apr) using "My Computer" or "Windows Explorer", or by starting ArcView and then opening the project file.

The properties of the shortcut are usually as follows:

C:\ESRI\AV_GIS30\ARCVIEW\BIN32\arcview.exe
Q:\GIS_WKSP\biotics.apr /LOGON /APP=BIOTICS

Name: Mapper

Target: C:\ESRI\AV_GIS30\ARCVIEW\BIN32\arcview.exe ~
Q:\GIS_WKSP\biotics.apr /LOGON /APP=BIOTICS

Start In: Q:\GIS_WKSP\

Icon: Q:\Biotics\gis_app\exe\biotics.exe

Usually you create the shortcut without the project file (Q:\Biotics\GIS_WKSP\Biotics.apr) in the target, start the application,

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load the Biotics extension, save the project file to Q:\Biotics\GIS_WKSP\Biotics.apr, and then modify the shortcut to include the project file.

Alternatively, you can have a 'blank' Biotics.apr that you can simply copy into each user's GIS_WKSP folder.

Mapper Registry Keys

The Mapper setup program for client installation adds the following keys to the Registry:

[HKEY_LOCAL_MACHINE\SOFTWARE\Linnet\Biotics\ArcView]

WaitTime The amount of time (in seconds) PowerBuilder will wait for a DDE transaction to complete. Value should be "30".

[HKEY_LOCAL_MACHINE\SOFTWARE\Linnet\Biotics\Database]

DBMS Identifies the DBMS being used. Value must be "O84 ORACLE 8.0.4".

DbParm Database parameter. Value must be DisableBind=1,DelimitIdentifier='No'

SEQUENCES Indicates whether Oracle sequences are to be used instead of seed tables. Value must be "YES".

ServerName The connect string that PowerBuilder uses to connect to the database. This is the Oracle Net Service name. The value for this is installation specific (default = "oracle_server").

[HKEY_LOCAL_MACHINE\SOFTWARE\Linnet\Biotics\Logon]

LogonDlgStyle Window style of the logon dialog. Value should be "2".

AuthorizationFile Path to the authorization file (accounts.com). The first part of the path value is installation specific; the last part must be "\gis_app\etc\accounts.com".

LogonBitmapFile Path to the bitmap to be displayed on the logon dialog (Biotics.bmp). The first part of the path value is installation specific; the last part must be "\gis_app\icons\Biotics.bmp".

LogonDLLPath Path to the location of LinnetLogon.dll. The first part of the path value is installation specific; the last part must be "\gis_app\exe\linnetlogon.dll".

[HKEY_LOCAL_MACHINE\SOFTWARE\Linnet\Biotics\Powerpack\Navigator]

DATE Specifies where the current date should be obtained from. Value must be "DBMS".

DBMS Specifies which database is being used. Value must be "ORACLE".

EXE Path to the Biotics.exe application. The first part of the path value is installation specific; the last part must be "\gis_app\exe\Biotics.exe".

ExeDelay This is the number of seconds the Avenue code will wait before launching BIOTICS.EXE; value is 1.

GIS_APP Specifies the location where Biotics is installed on the server. This value is installation specific. For

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	example, if Biotics is installed on drive "N:" in a directory called "Biotics", the GIS_APP value will be "N:\Biotics\".
ODBC_DSN	Name of the ODBC data source that ArcView will use to connect to the database. This value is installation specific (default = "ORA_SERVER").
RestoreAfterLogon	Indicates if the ArcView window should restore after a successful logon. Value must be "YES".
SQLConnectionString	The complete connect string Biotics will use to connect to the database. Value must be "dsn=[ODBC_DSN];uid=[USERNAME];pwd=[PASSWORD]".
[HKEY_CURRENT_USER\SOFTWARE\Linnet\Biotics\Powerpack\Navigator]	
TabIndex	ID of the last tab that was active in the Navigator window. This is a system maintained value.
CatalogType	Last setting for the 'Show Catalog' option in Navigator. This is a system maintained value.
UserLibrary	Last setting for the 'Show Library' option in Navigator. This is a system maintained value.
GIS_WKSP	Specifies where the current user's <i>workspace</i> is located. The workspace is a location on disk where temporary files generated by Biotics will be placed. This value is installation specific. The workspace can be located on a network drive (e.g. K:\USERS\SMITH) or on a local drive (e.g. C:\USERS\SMITH).

Tracker Registry Keys

Tracker server and client installation requires the following keys in the Registry. While the Tracker setup program automatically creates these Registry keys, some of them must be manually edited by the installer. Care must be taken to preserve the case of the keys when modifying/adding these keys. For example: `server_name` is not the same as `Server_Name`. If the key uses different case than is outlined in the "Registry" sections, Biotics may not function correctly.

Tracker Client Registry Entries:

[HKEY_LOCAL_MACHINE\Software\Linnet\BIOTICS]

server_name: Specifies the MTS server that the Biotics client should connect to. This can be either a valid IP address or URL if using RDS or the name of a computer on the local network if using COM.

Note: If using RDS it is recommended to prepend the URL or IP address with "http://" (of course without the double quotes).

server_type: Specifies the communication method to use between the Biotics client and MTS server. Valid values are COM or RDS and are case insensitive.

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[HKEY_LOCAL_MACHINE\Software\Linnet\BIOTICS\RichText\Dictionary]

Main: Specifies the path to the dictionary that the Linnet RichTextControl should use as its main dictionary. The contents of this dictionary never change.

Custom: Specifies the path to the dictionary that the Linnet RichTextControl should use as its custom dictionary. This is the dictionary file that is added to when the user elects to Add words to the dictionary during spell checking.

Tracker Server Registry Entries:

[HKEY_LOCAL_MACHINE\Software\Linnet\Framework\Components]

This key contains one key for each iBCF class. Within each key is a string value:

ComponentPropertiesFile: This value specifies the location of the XML Property File for the given class.

[HKEY_LOCAL_MACHINE\Software\Linnet\Framework\Data base]

ConnectionString: This is the connection string that Biotics uses to connect to the Oracle data source. This string must use the Oracle OLEDB provider for Oracle and NOT the Microsoft OLEDB provider for Oracle because the Microsoft provider does not support CLOB fields.

Unless there is a valid reason to change it, the string should be as follows (of course with the USER ID and PASSWORD changed):

```
PROVIDER=OraOLEDB.Oracle.1;DATA SOURCE=ORACLE_SERVER;USER ID=Biotics_lgi_test;PASSWORD=Biotics_lgi_test
```

[HKEY_LOCAL_MACHINE\Software\Linnet\Framework\Logging]

LogFileName: Specifies the file to log framework information to. *Caution: This file can grow quite quickly if logging is set to its most verbose setting.*

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LogLevel: Specifies the level of framework logging. Valid values are between 0 and 15. 0 = Logging off, 15 = Most information.

Note: Only turn logging on for debugging. Use of the log file is not intended for use when multiple users are accessing Biotics and could cause instabilities in the system.

[HKEY_LOCAL_MACHINE\Software\Linnet\BIOTICS\Logon
]

AuthorizationFile: Specifies the file that the Logon.dll should use for user authentication. Since authentication in Biotics uses an authentication file and values in the database, care must be taken that the authentication file remains in sync with the database. To ensure this always use the Administrator application to make changes to user names/passwords and never edit the authentication file by hand.

[HKEY_LOCAL_MACHINE\Software\Linnet\BIOTICS\Server
]

PersistenceType: This is only used by the High-Speed Recordset object and the Working List object. It identifies which persistence type that ADO should use when transferring ADO Recordsets between the client and the server. Valid values are "adtg" and "xml". Adtg is significantly faster!

Note: The installation program does not create this key. If the key does not exist Biotics will default to using adtg.

Database Alias

Biotics Mapper requires a database alias (Oracle Net Service Name) to be defined in order to communicate with the database. The name of this alias can be any value (default is "oracle_server"). The database alias is referenced in the following places:

- ODBC Data Source
- Registry:
[HKey_Local_Machine\Software\Linnet\Biotics\Database\ServerName]
- \Biotics\GIS_App\Install.INI

ODBC Data Sources

Biotics Mapper requires an ODBC (Open DataBase Connectivity) data source to be defined in order to communicate with the Oracle database. The data source name references the database alias (e.g. "oracle_server"). The name of the data source name can be any value (default is "ora_server"). The data source name is referenced in the following places:

- DATA_LOC
- THEME_DATA
- THEME_LOCATION
- The registry
[HKey_Local_Machine\Software\Linnet\Biotics\Powerpack\Navigator\ODBC_DSN]
- \Biotics\GIS_App\Install.INI
- ArcView project files (if SQL Data are in the project)

ArcView Default Project

The standard ArcView "system default project file" (default.apr) in the ArcView "etc" directory is replaced when Biotics Mapper is installed (the original project file is renamed to "default_av.apr").

23.2. Server Configuration

Biotics Mapper creates the following directories and files:

\Biotics\GIS_APP	This directory (and all the sub-directories within it) contain the Mapper program files, and a variety of ancillary files required by the program.
\Biotics\GIS_APP\Data	This directory contains a few database files (DBFs) required by Mapper. Users require READ and WRITE access to this directory.
\Biotics\GIS_APP\Etc	This directory contains miscellaneous files required by Mapper, including the definition of the coordinate system (coordsys.odb). Users require READ access to this directory; and the Mapper administrator requires WRITE access.
\Biotics\GIS_APP\Exe	This directory contains executable programs and batch files required by Mapper. Users require READ access to this directory.

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\Biotics\GIS_APP\Ext32	Five extension files are added to this directory when Mapper is installed: <ul style="list-style-type: none">• Biotics.avx• Designer.avx• Mapper.avx• Navigator.avx• Nav_Grid.avx
\Biotics\GIS_APP\Help	The Biotics User's Guide is stored in this directory. Users require READ access to this directory.
\Biotics\GIS_APP\Icons	This directory contains files used as icons and banners within Mapper. Users require READ access to this directory.
\Biotics\GIS_APP\Incoming	This directory is used as a temporary storage area during software installation and upgrades. Users require READ and WRITE access to this directory.
\Biotics\GIS_APP\Incoming\SQL	This directory contains database scripts that are used to initially create, and subsequently modify the Oracle tables and views.
\Biotics\GIS_APP\Legends	Legends saved for themes using the Legend Manager within Mapper are stored in this directory. Users require READ and WRITE access to this directory.
\Biotics\GIS_APP\Outgoing	Data exported from Mapper to other systems, such as a data warehouse, is placed in this directory. Users require READ and WRITE access to this directory.
\Themes	Some or all of the theme data used within Mapper (including the Mapper themes themselves) are located in sub-directories within this directory. This will vary with each installation, but as a minimum, will contain the "Biotics" and "USER" sub-directories. If the default location is accepted, the THEMES directory will be created in the location specified by the GIS_APP environment variable. However, the person installing the software can choose to install the THEMES directory anywhere on the network.
\Themes\Biotics	All map data captured and maintained by Mapper is stored in this directory. This includes the "master" shapefiles for Element Occurrences, Managed Areas, and Sites. Users require READ and WRITE access to this directory.
\Themes\Biotics\Archive	Archive shapefiles for the Mapper themes (Element Occurrences, Managed Areas, and Sites) are stored in this directory. Archive shapefiles are updated whenever a shape is edited or deleted. Users require READ and WRITE access to this directory.

\\Themes\User

All shapefile themes created using Navigator are placed in this directory. The shapefiles are named starting with “U” followed by a unique number (e.g. U403.shp\shx\dbf). Users require READ and WRITE access to this directory.

23.3. General Data Model Information

The Biotics 4 Physical Data Model is a comprehensive data model consisting of all the business tables and views used in the Tracker, Administrator, and Mapper applications. In the future, this model will also contain the tables and views used for the Exchanger application.

The data model can be viewed and downloaded at the following location: <http://whiteoak.natureserve.org/hdms/HDMS-DataModel.shtml>. There is an html document and a MS Word document that can be downloaded and printed. There is also an Excel spreadsheet that contains a listing of all tables and columns with their data types. The model contains some introductory material that explains the notation and how to use the model. This is the definitive source for information about the data model. However, here are some points of general information:

- Tables starting with “D_” are domain tables. The values in these tables can be altered during installation / configuration.
- Oracle “sequences” are used to generate the next ID for feature_id, spatial_attribute_id, ma*counter, and site*counter.
- There are many more Security and Powerpack tables in the database that are not shown in the Physical Data Model. These are all maintained through Administrative tools, and very rarely have to be accessed directly using SQL.
- There are many referential integrity constraints between tables. This means that operations must be done in a certain order.
- Views (shown only in the PDM) are joined to the shapefiles in ArcView.

23.4. Shapefiles

The following window displays the attribute table of the EO.Rep Polygons theme:

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SHAPE	Feature_id	Feat_code	Record_num	Mod_By	Mod_date	Mappedby	Mappeddate	Themefield	EOCODE...
Polygon	1101	1010	1	idf	19981030 11:17:33	LRR	19971211		AAABF02030*036*BC
Polygon	1103	1010	2	idf	19981030 11:17:33	CMV	19971211		C1A9CPMMS1*012*B
Polygon	1105	1010	3	idf	19981030 11:17:33	CMV	19971211		C1A9CPMMS1*013*B
Polygon	1107	1010	4	idf	19981030 11:17:33	LRR	19971211		ABPBXA90*0*004*BC
Polygon	1109	1010	5	idf	19981030 11:17:33	LRR	19971211		AFCJB3705*011*BC
Polygon	1111	1010	6	idf	19981030 11:17:33	CMV	19971211		CEBC000876*001*BC
Polygon	1113	1010	7	idf	19981030 11:17:33	AC	19971212		C5B2BATICR1*001*BC
Polygon	1115	1010	8	idf	19981030 11:17:33	LRR	19990113		ABNJB02030*004*BC
Polygon	1117	1010	9	idf	19981030 11:17:33	LRR	19990113		ABNJB02030*005*BC
Polygon	1119	1010	10	idf	19981030 11:17:33	LRR	19990113		ABNJB02030*006*BC
Polygon	1121	1010	11	idf	19981030 11:17:33	LRR	19990114		ABNJB02030*007*BC
Polygon	1123	1010	12	idf	19981030 11:17:33	LRR	19990114		ABNJB02030*009*BC
Polygon	1125	1010	13	idf	19981030 11:17:33	LRR	19990115		ABNSB01020*036*BC
Polygon	1127	1010	14	idf	19981030 11:17:33	LRR	19990115		ABNSB01020*037*BC

Real Attributes
 (physically in the shapefile)

Virtual Attributes
 (joined from Oracle View)

Real Attributes

All attributes to the left of the vertical line shown on the previous page are physically in the shapefile (the DBF that accompanies the SHP/SHX). These attributes are as follows:

- **SHAPE** – contains the actual shape (point, line, polygon)
- **FEATURE_ID** – the primary key; matches a shape_id in the SHAPE table in the Oracle database; should always have a number > 0, and must be unique across all shapefiles.
- **FEAT_CODE** – indicates what type of feature the record is (EO Rep, Source Line, etc). All records within a shapefile should have the same (non-zero) value.
- **RECORD_NUM** – a sequential number within each shapefile; unrelated to feature_id. Used by the multi-user shapefile code. New records have a value of 0 until they are posted. Values > 0 must be unique within the shapefile. ** This field is hidden by default. **
- **MOD_BY** – the user id of the last person who modified the record. Usually blank when the record is first created, and then populated when the record is posted.
- **MOD_DATE** – the date when the record was last modified. Usually blank when the record is first created.
- **MAPPEDBY** – the user id of the person who initially created the record.
- **MAPPEDDATE** – the date when the record was initially created.
- **THEMEFIELD** – a “scratch” field, used for multi-field legends in Legend Manager

Virtual Attributes

All attributes to the right of the vertical line shown on the previous page are joined to the shapefile from an Oracle view. The attributes that are present depend on what view is joined to the theme – see section 17 for more information on Oracle views. Refer to the data model report on the Biotics CD-ROM for a complete description of Oracle attributes.