

# SEWQ MAP Description and Reference Manual

Prepared For: Eurobodalla Shire Council & Bega Valley Shire Council

Prepared By: WBM Oceanics Australia

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<p><b>WBM Oceanics Australia</b> Newcastle Office:</p> <p>126 Belford Street BROADMEADOW NSW 2292 Australia</p> <p>PO Box 266 Broadmeadow NSW 2292</p> <p>Telephone (02) 4940 8882 Facsimile (02) 4940 8887 www.wbmpl.com.au</p> <p>ACN 010 830 421</p>	<b>Document:</b>	R.N0938.003.00.SEWQ MAP ReferenceManual.doc
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	<b>Project Manager:</b>	Philip Haines
	<b>Author:</b>	Luke Kidd
	<b>Client:</b>	Eurobodalla Shire Council & Bega Valley Shire Council
<b>Client Contact:</b>	Debby Lenson and Danny Madigan	
<b>Client Reference:</b>		
<b>Synopsis:</b>	This manual describes the MapBasic software (SEWQMAP) used to extract water quality data from the SEWQ water quality database.	

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# 1 INTRODUCTION

Over the past 4 years, the SEWQ Project has gathered various water quality data from waterbodies within the Local Government Areas (LGA) of Eurobodalla Shire and Bega Valley Shire, with information stored on a centralised database. To assist in interpretation and reporting of the data, the existing water quality database has been linked with a geographical MapInfo interface (SEWQ MAP) to provide a graphical and easily presentable array of information pertaining to any water quality location within the LGAs of Eurobodalla Shire and Bega Valley Shire.

**Section 2** of this report describes the procedure for a local installation of the SEWQ MAP system onto a single workstation.

**Section 3** describes the directory structure required for SEWQ MAP to ensure the software executes successfully.

**Section 4** describes the MapBasic software (SEWQ MAP) developed by WBM to efficiently and consistently extract water quality information from the SEWQ database for subsequent use in the post-processing software.

**Section 5** provides a summary of the post-processing Excel macro (ExcelTrans.xls) used to generate statistical summaries and charts of the extracted water quality data.

## 2 DETAILS FOR INSTALLATION

The SEWQ MAP requires the following desktop software packages:

- MS Access 97;
- MapInfo Version 7.5; and
- MS Excel 97.

All files associated with the installation are distributed on a single CD. At this stage, only a local installation can be undertaken that maintains everything on the local C drive (C:\) of a workstation.

The following procedure needs to be performed for a local installation of the SEWQ MAP system.

### 1. Copy SEWQ MAP system to Hard Drive

- All of the SEWQ MAP structure will be contained on the CD provided in the folder “SEWQ”.
- Copy the folder “SEWQ” from the CD provided and paste it to the “C:\Program Files\” directory.
- Change the read only flag for all files within the folders under the ‘C:\Program Files\SEWQ’ directory to enable them to be written to.

### 2. Establish Interface

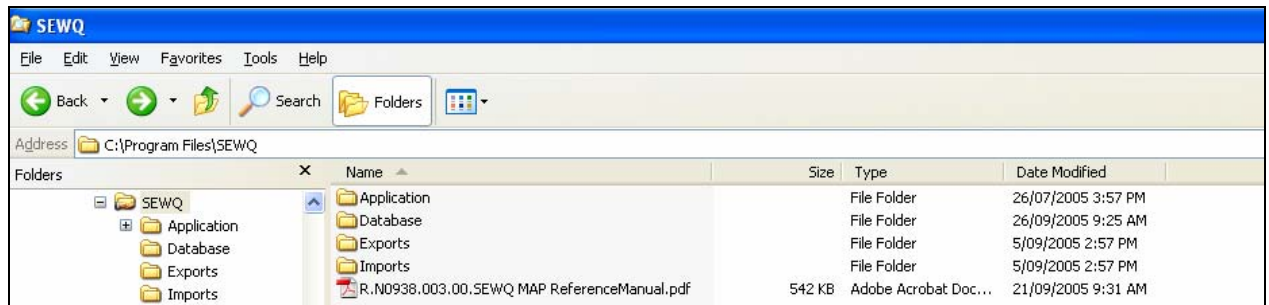
- Open the following file “C:\Program Files\MapInfo\Professional\startup.wor” in a text editor and add the following line to the end of that file:

Run Application “C:\Program Files\SEWQ\Application\MapBasic\SEWQDbase.MBX”

The Application should now be operational. However, in order for the Excel Application to properly function, it is recommended that the security setting in Excel be altered to “Medium” to ensure that macros can be run.

### 3 DIRECTORY STRUCTURE

The directory structure for the SEWQ program folder is shown in Figure 3-1. This program folder contained within “Program Files” stores the Microsoft Access database, the MapBasic executable file (\*.MBX) as well as a number of other folders used for the importing, exporting and post- processing of water quality data.



**Figure 3-1 Structure of the SEWQ program folder**

The four (4) separate folders required within the SEWQ program folder are described below:

- **“C:\Program Files\SEWQ\Application folder”** - This folder is used to store executable files and temporary files generated during the use of SEWQ MAP. The application folder contains two sub-folders named *Excel* and *MapBasic*.
  - The *Excel* folder contains the post-processing macro “ExcelProcessing.xls” and two additional files, which are written to this folder during the execution of the MapBasic program. These additional files include the Excel Transfer File (ExcelTrans.csv), which is an output file from SEWQ MAP and contains the water quality data extracted from the database, and an image file (SiteSelectionImage.jpg) containing the location of sites selected using SEWQ MAP. Both of these files are generated automatically and are used as input to the post-processing macro. The Excel folder also contains a sub folder called ‘Analysis’ which is used by the Excel post processing program to automatically save results after its execution.
  - The *MapBasic* Folder contains the MapInfo executable file for SEWQ MAP (SEWQ MAP.MBX) and a sub-folder named *Workspace*, which contains all the relevant MapInfo Table files (\*.TAB) and a workspace (OpeningView.WOR). This workspace will be opened automatically by SEWQ MAP at the beginning of program execution. Additional table files generated by SEWQ MAP are also written to this folder. These files will also be generated automatically upon execution of the program.
- **“C:\Program Files\SEWQ\Database folder”** – This folder contains the revised and upgraded Access database (WQData.mdb). The database is password protected and can only be modified by persons with an appropriate level of authorisation. New water quality data can be imported into the Access database using the new modules created by WBM. Tracking files are generated during the importation process and are automatically written to the *Imports* folder. The tracking files are in a csv format and may be opened by the user using Microsoft Excel to review the status of each data import.

- **“C:\Program Files\SEWQ\Exports”** – This folder can be used to save copies of the read-only file “ExcelProcessing.xls”. The user may save a copy of the post processing Excel file so that the results of the analysis may be viewed at another time.
- **“C:\Program Files\SEWQ\Imports”** – This folder is used to store tracking files generated automatically by the Access database. These tracking files may be opened by a user to determine the status of each data import.

## 4 SEWQ MAP

### 4.1 Starting SEWQ MAP

Starting SEWQ MAP requires the user to run the MapBasic program file “**SEWQDbase.MBX**”.

The user may run the MapBasic program by selecting **Tools>Run MapBasic Program** or via the shortcut ‘**Ctrl+U**’. A dialog box should appear similar to the one shown in Figure 4-1. Locate the correct MBX file for SEWQ MAP (should be in ‘C:\Program Files\SEWQ\Application\MapBasic’) and then double click on the selected file to run the program.

This will execute the MapBasic program within the MapInfo environment. The user is now ready to launch SEWQ MAP.

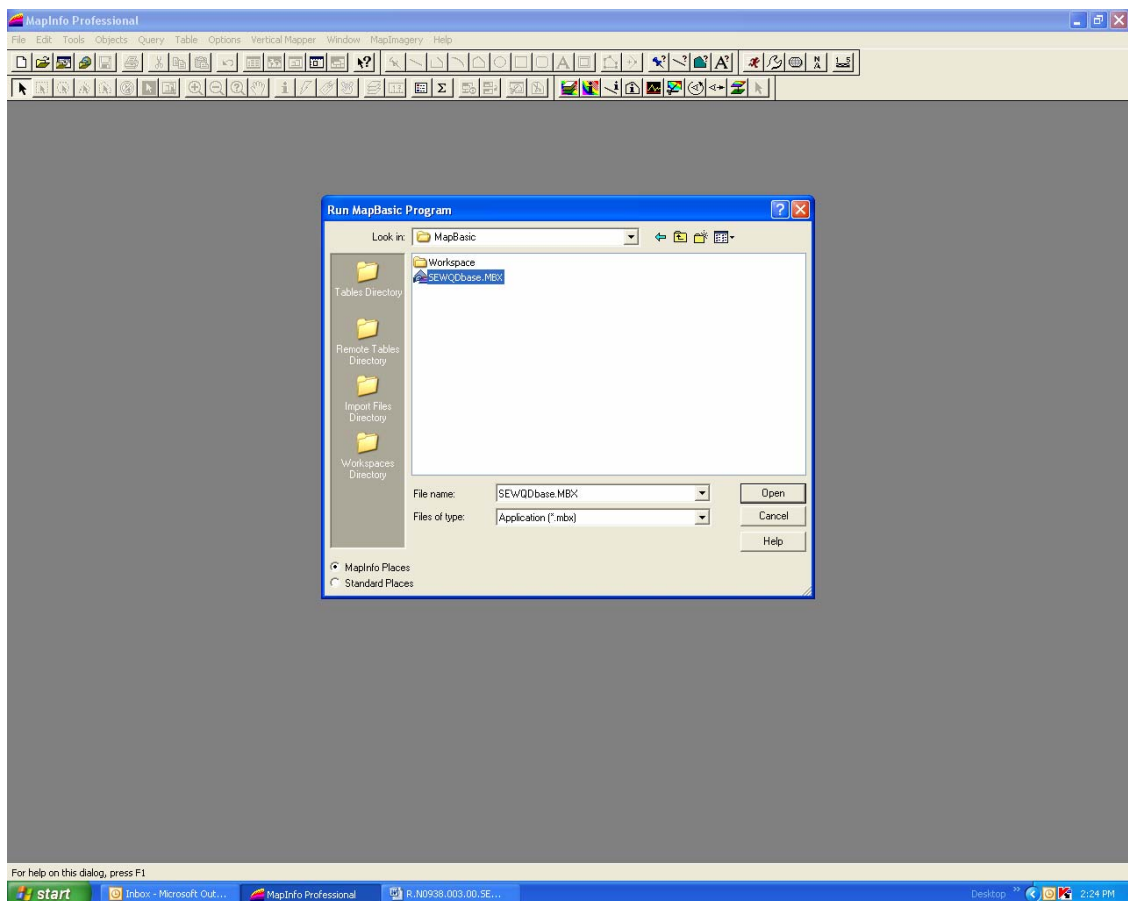


Figure 4-1 Selecting the MapBasic program

### 4.2 Launching SEWQ MAP

To launch SEWQ MAP the user must select the **Tools Menu** situated near the File and Edit menus. At the bottom of the Tools menu is a new option labelled as ‘**SEWQ MAP**’. By selecting this menu, a sub menu will appear to the right containing two new options; the first a launch menu labelled as ‘**Launch SEWQ MAP...**’ to launch the program and the second labelled as ‘**Exit SEWQ MAP**’ to close the program. The location of these sub menus is shown in Figure 4-2.

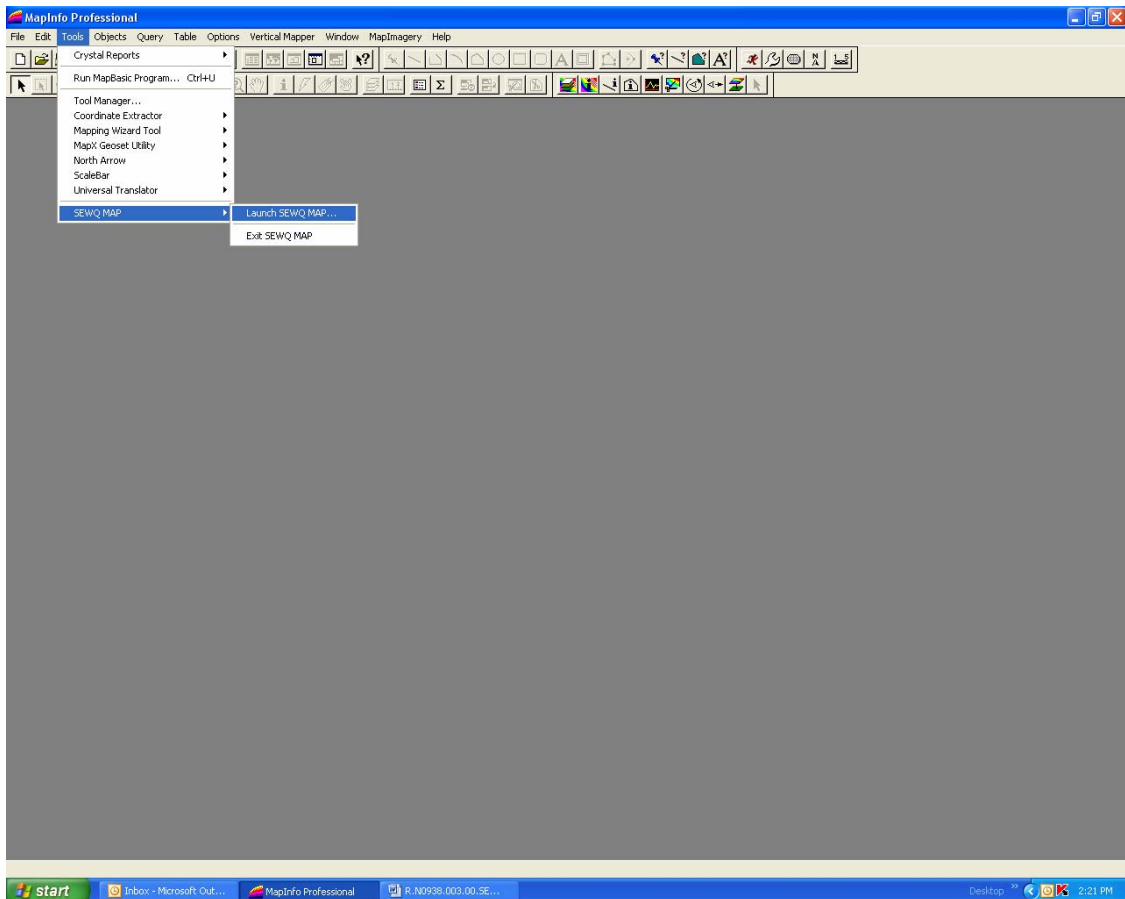


Figure 4-2 Launch menus within SEWQ MAP

To launch SEWQ MAP select the **'Launch SEWQ MAP...'** menu. Similarly, to exit SEWQ MAP, select the **'Exit SEWQ MAP'**.

### 4.3 SEWQ MAP Interface

Following the launch of SEWQ MAP, the workspace (OpeningView.WOR) is opened automatically and the application accesses the water quality database. At the same time, a series of water quality sites are created and displayed within the workspace. After a short delay, the opening screen should appear as shown in Figure 4-3.

The site code for each point can be found by hovering the mouse over each point. After a couple of seconds, the site code will appear. The site code can also be displayed by turning on the labels for the 'SitesMI' layer (accessed by right-clicking on the map and selecting 'Layer Control'). The 'WQAnalysis' toolbar also appears when the application is opened, allowing the user to launch a number of additional routines such as Auto Select Sites, Historical Analysis and Show Charts. These additional routines are discussed further below.

On the right hand side of the screen is a program status window, which provides the user with a description of the programs current status and the tasks that have been completed.

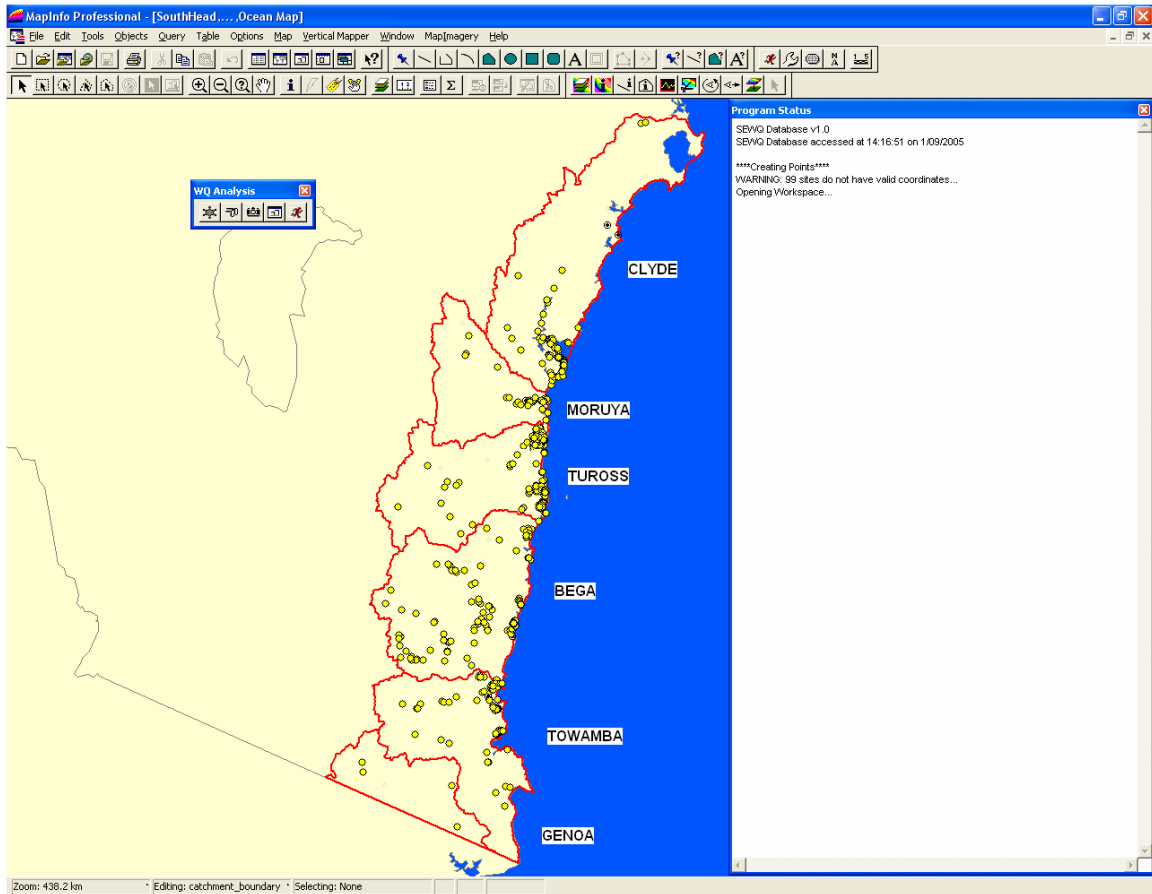


Figure 4-3 Opening Screen

#### 4.4 Description of the WQAnalysis Toolbar

The water quality analysis tool bar is shown in Figure 4-4. A description of the routines available in SEWQ MAP analysis toolbar is provided in the following sections.

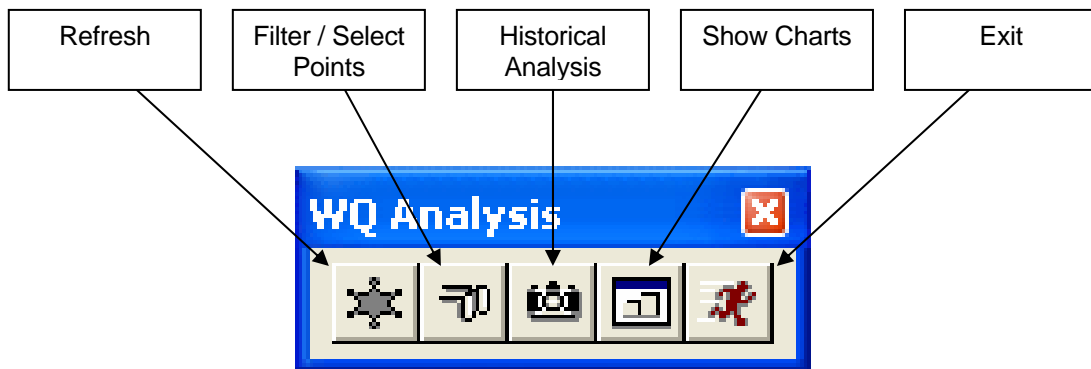


Figure 4-4 WQ Analysis toolbar

##### 4.4.1 Auto Select Sites

Auto Select Sites is undertaken as an optional step prior to historical analysis. The Auto Select Sites routine allows the user to select sites from the database with records for particular parameter(s) and

period of interest. The user must specify a start year and end year from the drop-down boxes entitled 'Start Year' and 'End Year'. The user can also select the start month and end month of the filter criteria to further refine the selection. The user is now in a position to select the parameters they are interested in reporting or analysing. The user may select multiple parameters by holding the Ctrl key (allows user to select random parameters in no particular order) or the Shift key (allows user to make a large selection at one time) whilst selecting with the mouse. It is important to note that a maximum of up to 50 parameters may be selected for each filter criteria.

For example, a user may require all sites that contain water quality records for Pyrrophyta (A7) and Total Algae (A13) for the period starting June 1999 and ending July 2004. These criteria would be specified within the dialog box as shown in Figure 4-5.

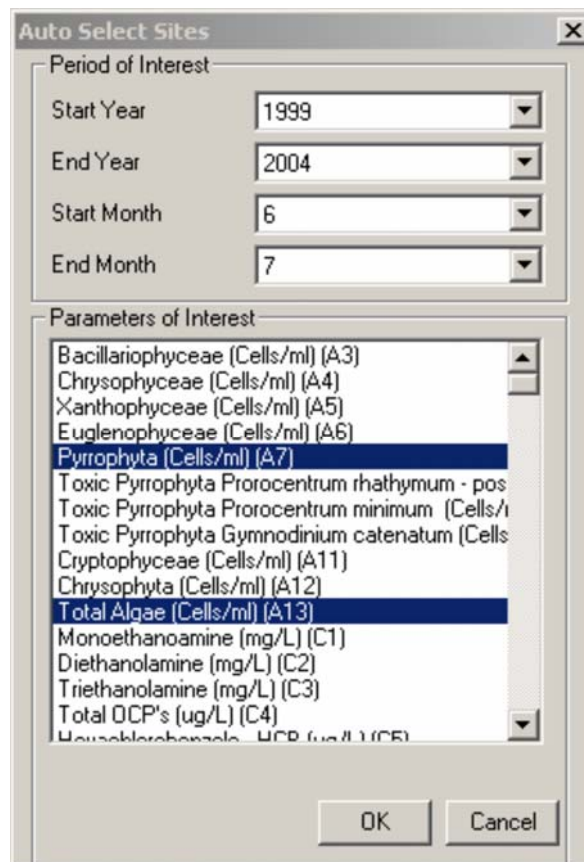


Figure 4-5 Example Filter criteria

Once the user is satisfied with their filter criteria for the auto selection they are ready to execute the routine by clicking on the 'OK' button at the bottom of the dialog. If the user is not comfortable with their selections they may make further adjustments to the filter criteria until satisfied. After clicking OK, the application accesses and filters through the database to find relevant sites. These are subsequently selected and displayed for further analysis as shown in Figure 4-6. The program status window informs the user of progress.

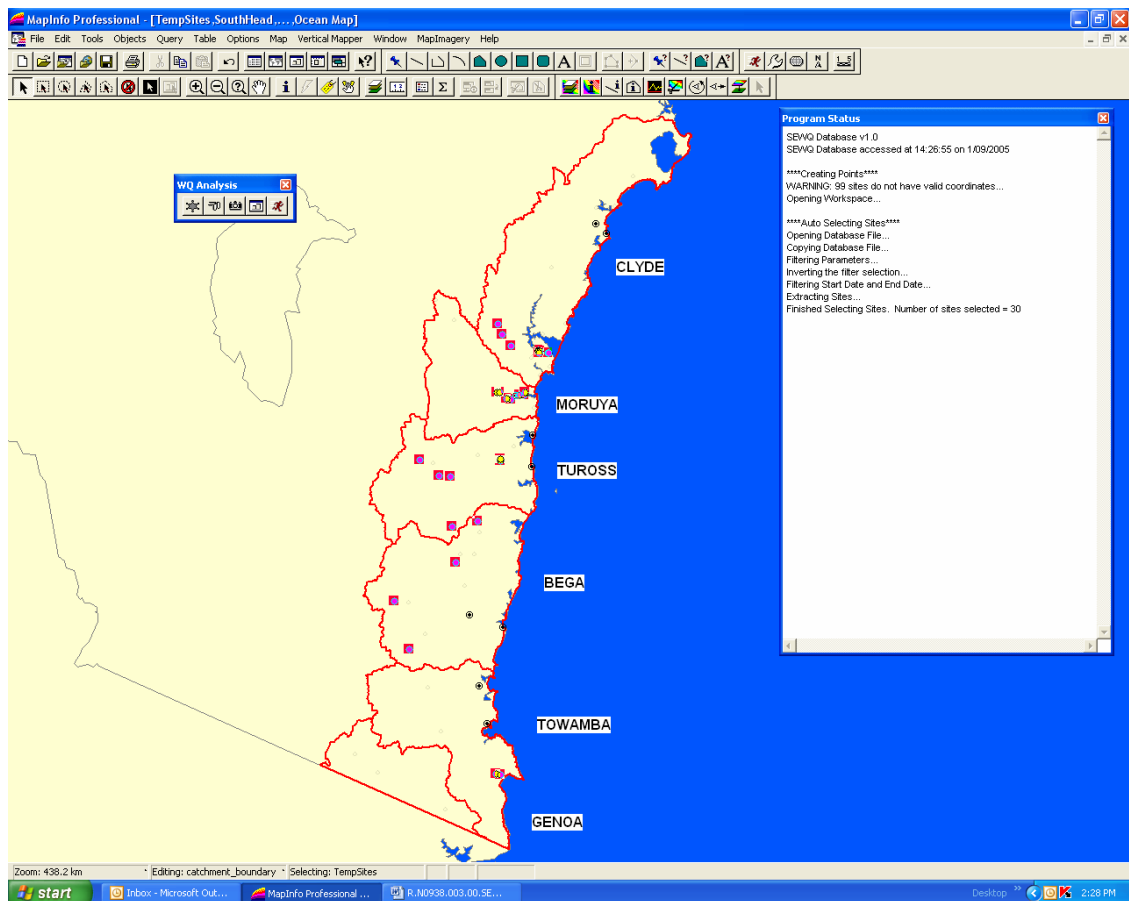


Figure 4-6 Auto Select results

#### 4.4.2 Historical Analysis

Once the required sites are selected (note that this can also be accomplished manually by using the select tool in MapInfo and clicking on the required points or using the query select features) a historical analysis can be undertaken. The Historical Analysis requires similar inputs to the Auto Select Sites dialog to indicate the extent of data you would like reported upon. When the historical analysis is complete, a message box stating “Excel transfer file written” appears on screen. This message box indicates that ‘Show Charts’ can now be validly executed to provide analysis and results.

#### 4.4.3 Show Charts

Clicking on “Show Charts” opens a specialised workbook in Excel, containing a macro that organises and analyses the water quality data. The following query appears to indicate that the workbook being opened contains Macros. Click on Enable Macros to run the analysis. Following this, the macro will run and the resulting spreadsheet saved in the following directory:

**‘C:\Program Files\SEWQ\Application\Excel\Analysis\’**



Figure 4-7 Excel Macro Query

## 5 HISTORICAL ANALYSIS OUTPUTS

When historical analysis is undertaken using 'PostProcessing.xls' an Excel workbook is created and named using a Date / Time stamp (e.g. 20050921092407.xls). The following information for each parameter chosen for analysis is contained within the workbook:

- A chart showing data from all selected sites (e.g. F4 Summary Chart);
- A worksheet summarising the raw data for sites chosen in the analysis (e.g. F4 Summary Data);
- A worksheet labelled 'Selected Sites' showing an image file of the sites selected for analysis; and
- A worksheet labelled 'Sites with zero records'. (Note: This worksheet will only appear if a manual selection has been used and no records were found for particular sites within that selection).

A sample historical analysis chart is provided as Figure 5-1.

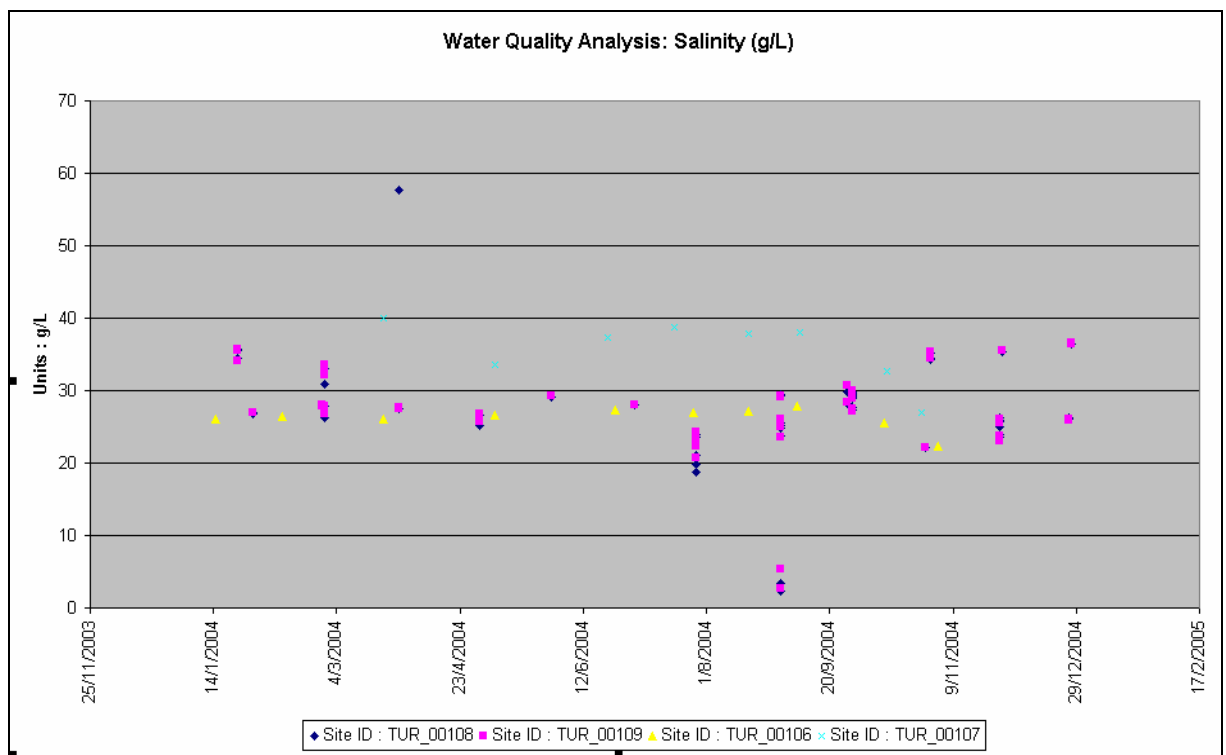


Figure 5-1 Sample Historical Data Chart

## APPENDIX A: SAMPLE OUTPUT FROM SEWQ MAP

Historical  
 2003  
 01  
 2005  
 12  
 BEG\_00002,Baragoot Lake,Creek- North,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 30/01/2003,18991230,1.3,0,,2  
 BEG\_00002,Baragoot Lake,Creek- North,Total Phosphorus - TP (mg/L) ,L12,mg/L,2  
 30/01/2003,18991230,0.04,0,,2  
 2/04/2003,18991230,0.02,0,,2  
 BEG\_00002,Baragoot Lake,Creek- North,pH,L13,,0  
 BEG\_00002,Baragoot Lake,Creek- North,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,0  
 BEG\_00001,Baragoot Lake,Stump- West,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 30/01/2003,18991230,1.3,0,,2  
 BEG\_00001,Baragoot Lake,Stump- West,Total Phosphorus - TP (mg/L) ,L12,mg/L,2  
 30/01/2003,18991230,0.03,0,,2  
 2/04/2003,18991230,0.02,0,,2  
 BEG\_00001,Baragoot Lake,Stump- West,pH,L13,,0  
 BEG\_00001,Baragoot Lake,Stump- West,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,0  
 BEG\_00004,Baragoot Lake,Middle,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 30/01/2003,18991230,1.4,0,,2  
 BEG\_00004,Baragoot Lake,Middle,Total Phosphorus - TP (mg/L) ,L12,mg/L,2  
 30/01/2003,18991230,0.04,0,,2  
 2/04/2003,18991230,0.01,0,,2  
 BEG\_00004,Baragoot Lake,Middle,pH,L13,,0  
 BEG\_00004,Baragoot Lake,Middle,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,0  
 BEG\_00005,Baragoot Lake,Bridge- Entrance,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 30/01/2003,18991230,1.2,0,,2  
 BEG\_00005,Baragoot Lake,Bridge- Entrance,Total Phosphorus - TP (mg/L) ,L12,mg/L,1  
 30/01/2003,18991230,0.02,0,,2  
 BEG\_00005,Baragoot Lake,Bridge- Entrance,pH,L13,,0  
 BEG\_00005,Baragoot Lake,Bridge- Entrance,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,0  
 BEG\_00024,Bemboka River,Parkes Street @ town water supply offtake,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 16/01/2003,18991230,0.29,0,,2  
 BEG\_00024,Bemboka River,Parkes Street @ town water supply offtake,Total Phosphorus - TP (mg/L) ,L12,mg/L,1  
 16/01/2003,18991230,0.02,0,,2  
 BEG\_00024,Bemboka River,Parkes Street @ town water supply offtake,pH,L13,,1  
 16/01/2003,18991230,7.7,0,,2  
 BEG\_00024,Bemboka River,Parkes Street @ town water supply offtake,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,1  
 16/01/2003,18991230,1.2,0,,2  
 BEG\_00027,Brogo River,Town Water Supply Intake,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 16/01/2003,18991230,0.41,0,,2  
 BEG\_00027,Brogo River,Town Water Supply Intake,Total Phosphorus - TP (mg/L) ,L12,mg/L,1  
 16/01/2003,18991230,0.02,0,,2  
 BEG\_00027,Brogo River,Town Water Supply Intake,pH,L13,,1  
 16/01/2003,18991230,7.5,0,,2  
 BEG\_00027,Brogo River,Town Water Supply Intake,Total Suspended Solids - TSS (mg/L) ,L16,mg/l,1  
 16/01/2003,18991230,3,0,,2  
 BEG\_00033,Tantawangelo Weir,Upstream of the weir wall,Total Nitrogen - TN (mg/L) ,L7,mg/L,1  
 16/01/2003,18991230,0.26,0,,2  
 BEG\_00033,Tantawangelo Weir,Upstream of the weir wall,Total Phosphorus - TP (mg/L) ,L12,mg/L,1  
 16/01/2003,18991230,0.02,0,,2