



THE UNIVERSITY
OF QUEENSLAND
AUSTRALIA

αεδα

Applied Environmental Decision Analysis
A Commonwealth Environment Research Facility
smart science for wise decisions

MARXAN 101 Course Manual

Eddie Game Dan Segan
egame@tnc.org d.segan@uq.edu.au

Vancouver, BC
May 28-29 2009

Day 2

Before creating a new ZC project it is good practice to create a back up copy of all of your work. This way if something happens or you make changes you want to roll back you'll have a clean copy.

- ❖ In the Marxan101 folder, create a new folder and name it backup.
- ❖ Copy the entire contents of the Marxan_database folder into the backup folder.

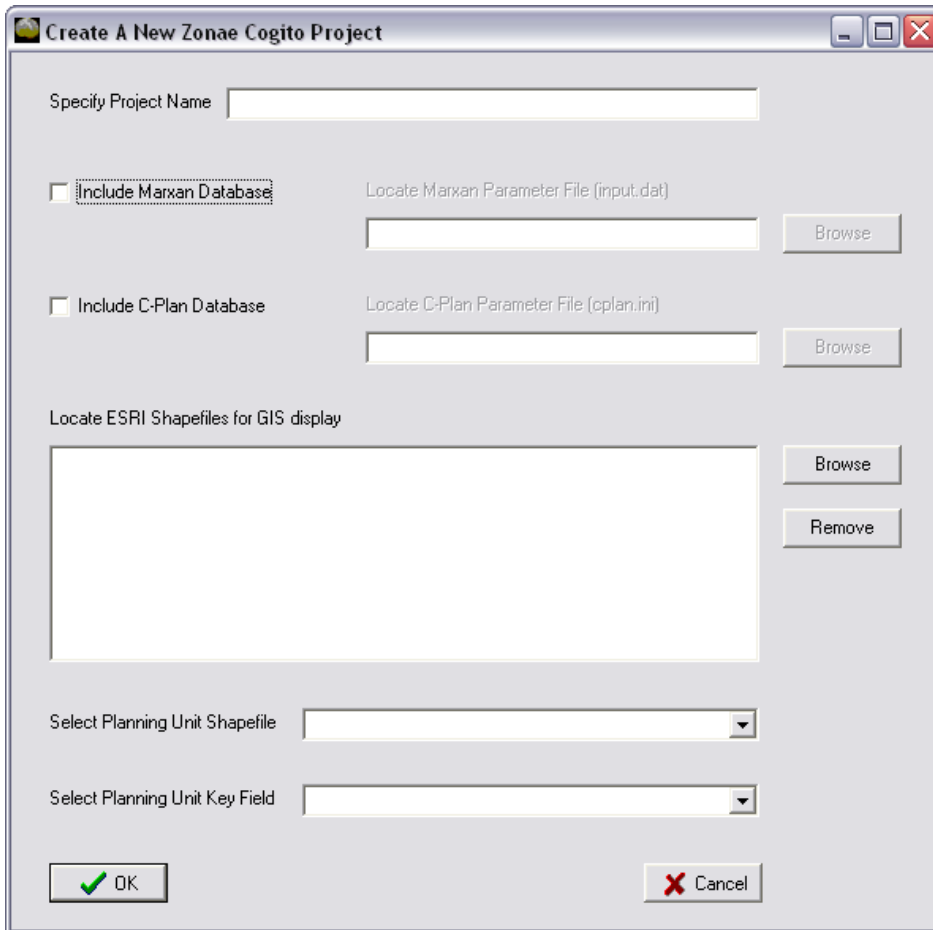
Creating a new ZC project

Start Zonae Cogito (ZC) from the windows menu system like this:

- ❖ Create a new folder, name it “exercise1”
- ❖ Copy the entire contents of the Marxan_database folder into the Exercise1
- ❖ Start > All Programs > Zonae Cogito > Zonae Cogito



- ❖ From the ZC main menu select File > New to create a new ZC project.



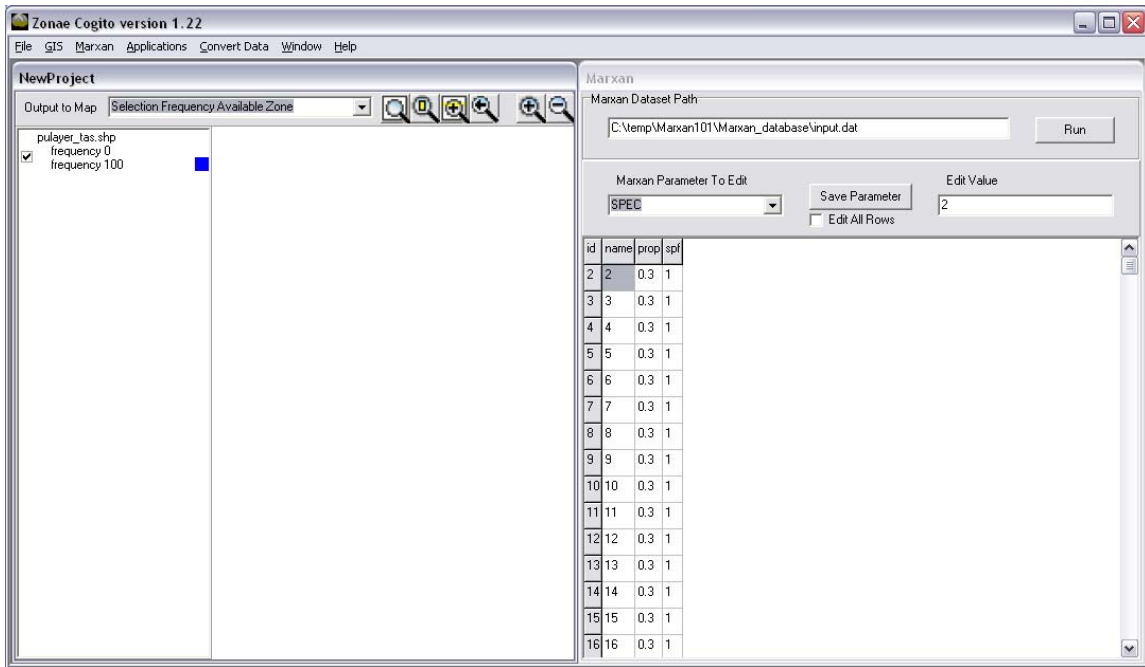
- ❖ Give your project a name eg “TestRun1”

For now it is alright to use any name, but when you begin to develop more complex scenarios it is important to develop a naming convention that allows you to easily identify the scenario.

- ❖ Tick the box next to “Include Marxan Database” and then use the browse button to navigate to and select the input.dat file in C:\temp\Marxan101\MarxanDatabase\

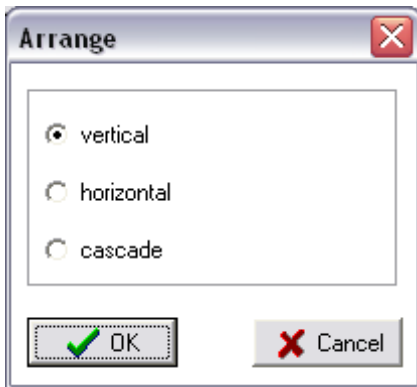
We will not be including a c-plan project in our initial database.

- ❖ Use the browse button to browse next to the “Locate ESRI shapefile for GIS display” window to navigate to the pulayer folder, and select the pulayer_tas.shp
- ❖ Confirm that the pulayer_tas.shp is the file listed in the “Select Planning Unit Shapefile” drop down.
- ❖ Select “PUID” from the drop down menu next to “Select planning unit key field”
- ❖ Click OK to generate the new ZC project.



When you first open ZC, you will see two windows, the GIS display window and the Marxan window. You might also notice that ZC does not fill your entire desktop.

- ❖ To resize ZC, double click on the maximize window
- ❖ After maximizing, from the ZC menu select Window > Arrange



- ❖ Select “vertical” to re-arrange in the same manner, or horizontal to change the arrangement of the models.

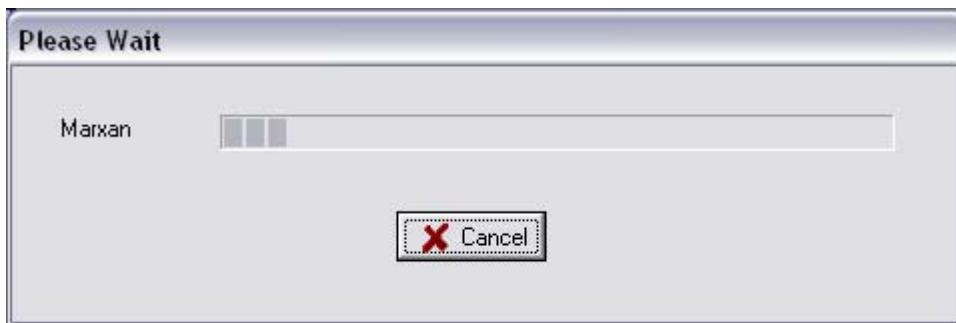
You will probably also have noticed the GIS window in ZC is currently blank. Whenever you create a new project, the GIS window appears blank until you have run Marxan for the first time. At this point it is also a good idea to save the Marxan project you have just created.

- ❖ To save the project, select File > Save from the main ZCP menu.

You will notice that whenever you create a new ZC project it will create a file projectx.zcp inside the Marxan_database folder. This file can also be used to reopen a scenario, but it is best if you save the scenario with a name reminds you what the scenario is. After saving the scenario we are ready to run marxan from ZC.

- ❖ To run Marxan, click “Run” in the Marxan Box

After clicking run you should see a process



After the run is complete, your planning unit layer will appear in the GIS window.

- ❖ Results from an individual run can be displayed by selecting the run number from the drop down menu next to “Output to Map” in the GIS display
- ❖ From the main menu select, Marxan > View Output > Summary Report. This will display the summary information for all runs allow you to view the To view the summary information of all the runs.
- ❖ From the main menu select, Marxan > View Output > Best Solution Features. This will open the target achievement report for the solution the lowest objective function.

Independent work

We suggest that you start every new scenario with the follow two steps:

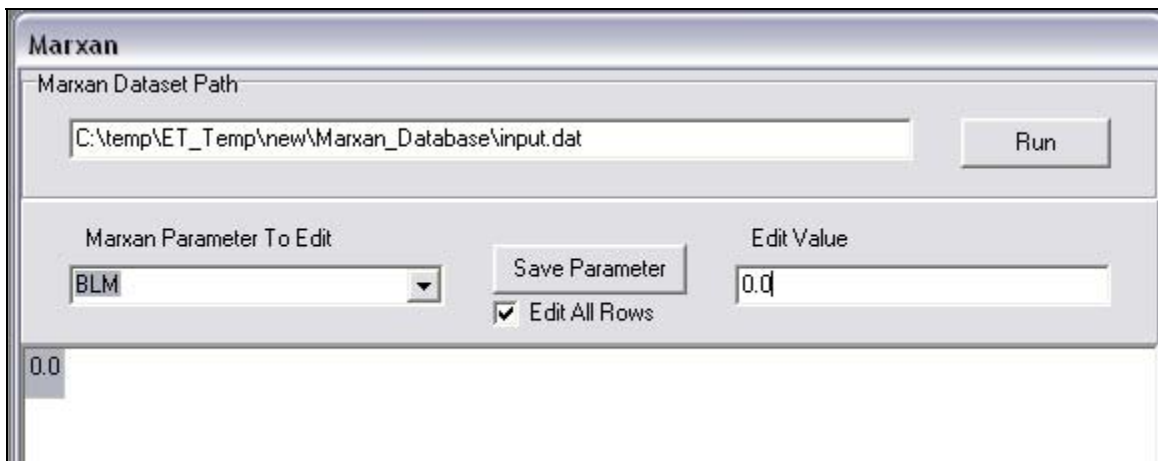
- ❖ Create a new folder with the scenario name
- ❖ Copy the entire contents of the Marxan_database folder into the scenario folder.

After you've created a new scenario you can safely edit your scenario. Most marxan parameters can be access through the Marxan window in ZC.

Scenario 1 – Variable BLM

Here we will explore how increasing the emphasis on compactness effects marxan results.

- ❖ In the marxan window, select BLM from the “Parameter to edit” drop down menu.
- ❖ The parameter can be edited by changing the value in the “Edit Value” field, and then saving the change by click “Save Parameter”



Compare the results to your original run with a blm of 0. Experiment with a higher levels of BLM

Scenario 2 – Changing Targets

Increase targets to all features to 50%.

Scenario 3 – Updating planning unit status

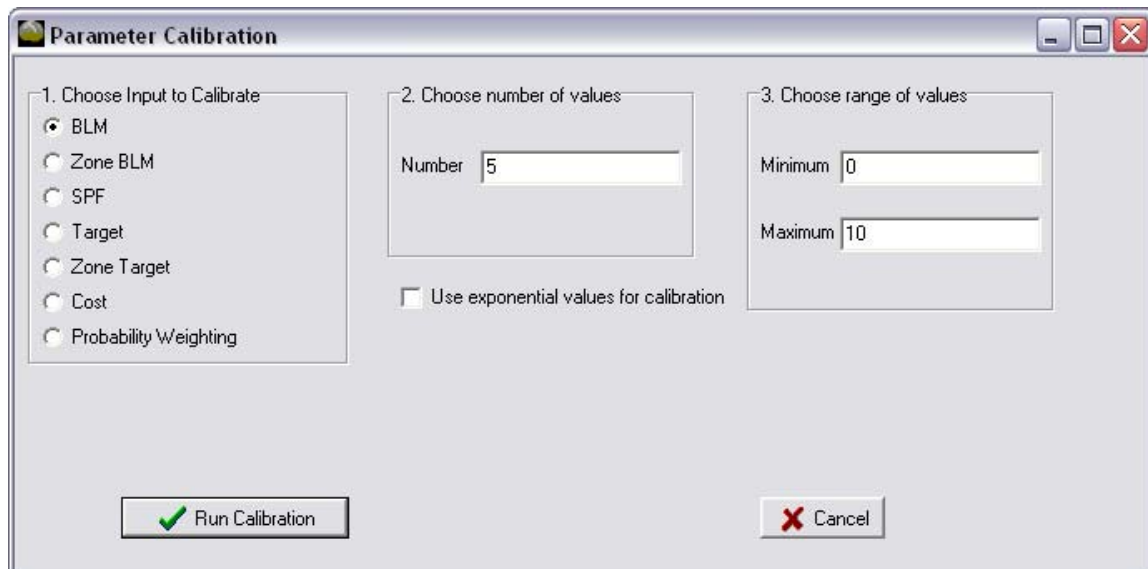
Change the locked in status of the planning units you locked in yesterday. Hint: planning unit status information is contained in the pu.dat file.

After trying the analysis with all planning units available, try locking out (setting the status to 3) a number of planning units and re-running the analysis. Explore the output files to see if files are still achieving targets after you have locked out a group of planning units.

Scenario 4 – Calibration

In this scenario we will be looking at the calibration of the BLM within marxan. The calibration tool allows you to easily explore a range of values for each parameter. After copying

- ❖ From the main menu select Marxan > Calibration

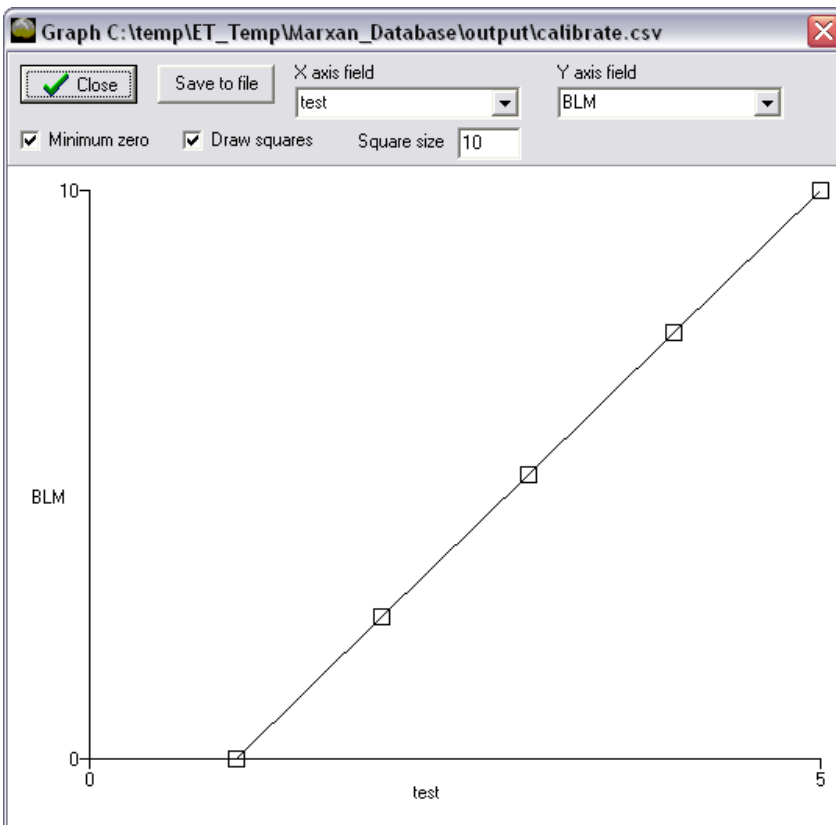


- ❖ Select BLM from the parameter to input menu
- ❖ Specify 5 values in the “Choose number of values” box
- ❖ In the range of values, try 0 as a minimum value and 100 as a maximum value.

The “number of values” specifies the number of complete runs to completed, with different values selected in equal intervals from the range specified. After the calibration runs are complete you will see a summary table similar to the table below.

test	BLM	Score	Cost	Planning Units	Boundary Length	Penalty	Shortfall	Missing Values
1	0	1216438897.88711	1208432328.02	871.14	7946106	8006569.86710922	46922120	25.24
2	2.5	1234465160.68576	1208095962.74	861.52	7624385.54	7308234.0957561	40474620	25.68
3	5	1254803668.28494	1210661429.7	854.3	7354215.42	7371161.4849415	37262060	25.26
4	7.5	1271989524.02017	1211633360.54	847.52	7120791.24	6950229.18017108	35267600	24.66
5	10	1289729679.87744	1213372007.36	844.08	6921326.52	7144407.31744374	35096380	23.86

- ❖ To use the graphing functions built into ZC select Text Table > Graph Table .
- ❖ Graph Cost on the X-axis and Boundary Length on the Y-axis.

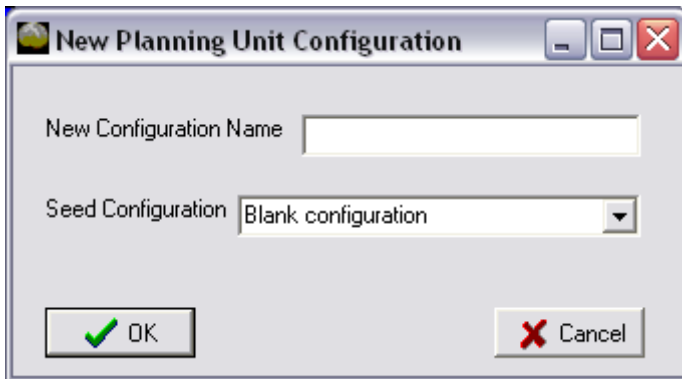


If you'd like to experiment more with the calibration tool, try changing some of the targets, and recalibrating the SPF.

Scenario 5 – Interacting with output

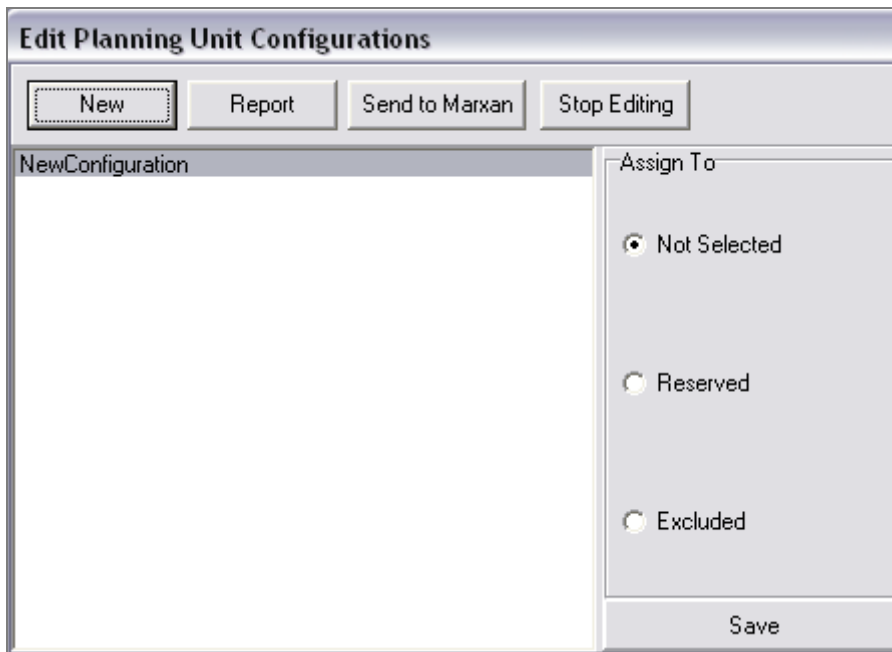
The configuration editor in ZC allows users to make changes to Marxan solutions, and then generate target/cost summary reports based on the new configuration. New configurations can also be sent back to marxan for additional analysis.

- ❖ From the Main menu select GIS > Edit Configurations



- ❖ Enter a name for the new configuration
- ❖ From the Seed configuration drop down select “Marxan Solution 1”

The seed configuration allows you to load a marxan result into the configuration editor.

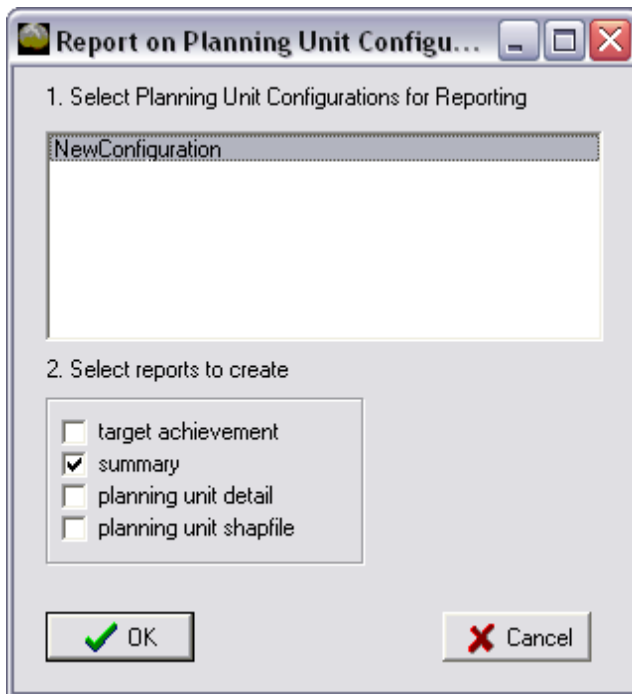


- ❖ From the main menus select GIS > Select with > Mouse

- ❖ Use the mouse to highly a group of planning units on the map.
- ❖ Change the assign to status to “Reserved” and Click Save

You have just changed the status of these planning units to reserved.

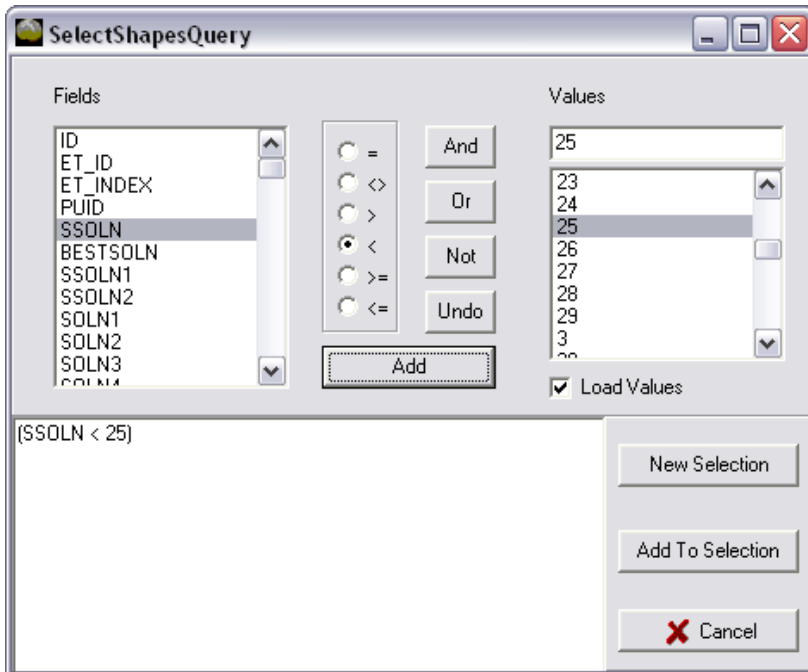
- ❖ Click “Report” to open the reporting tool



- ❖ Tick the box next to all the reports you’d like to generate and click OK

You can also select planning units based on attributes of the planning unit shapefile.

- ❖ From the main menus select GIS > Select with > Query



- ❖ After creating your selection, click “new selection” to select those planning units. (the selection above, will select those planning units with a selection frequency of less than 25).

Scenario 6 – Installing R and exploring cluster analysis

- ❖ From the Install folder, install R from the r folder.
- ❖ After installing R, Launch R from the start menu
- ❖ From the main menu in R, choose: Packages > Install Packages from Local Zip files.
Select the 4 zip files from the Install\R folder to install the packages necessary to run cluster analysis.
- ❖ From the main menu in ZC select Marxan > Do Cluster analysis
- ❖ Run Marxan again, and explore analysis produced by the cluster analysis package.
- ❖ From the main menu in ZC select Applications > Run R scripts, to re-run the 3-D visualization.

The End