Data conversion for MCAS-S v3 using ArcGIS 10

Overview

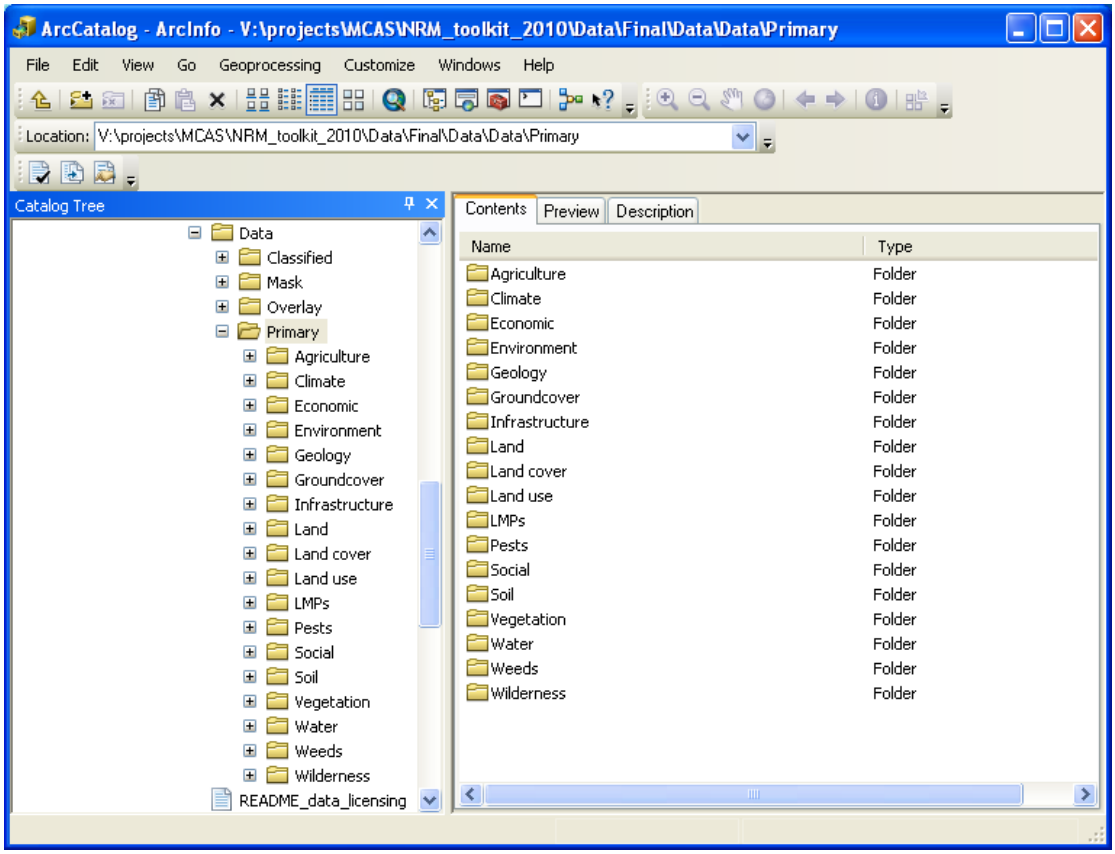
This document describes how to convert data for input into MCAS-S. Users should refer to the MCAS-S User guide for more details on MCAS-S functionality and use. The data conversion techniques are demonstrated in ArcGIS 10 using the MCASS data conversion toolbox.

MCAS-S is a spatial software shell which can display spatial data but does not have full GIS functionality. So data held within MCAS-S must conform in:

- spatial extent and
- projection.

The 2011 Toolkit data is currently in Albers projection with a datum of GDA94. The data are at 2 km resolution with 2005 columns and 1919.

The data are in a folder called **Data** which has the following sub-directories: **Classified**, **Mask**, **Overlay** and **Primary** (see below).



Software and hardware requirements

System requirements

The minimum requirements for running MCAS-S is Windows NT, 2000, XP or Vista, 2 GB RAM, 1 Ghz CPU and 1 GB of disk space for the program.

Software requirements

The recommended software for converting data for MCAS-S is ArcGIS – the current version is 10. A standard ArcGIS for Desktop with Spatial Analyst extension are required to run the tools.

Other software may be used to convert data but are not described in this document.

Data formats

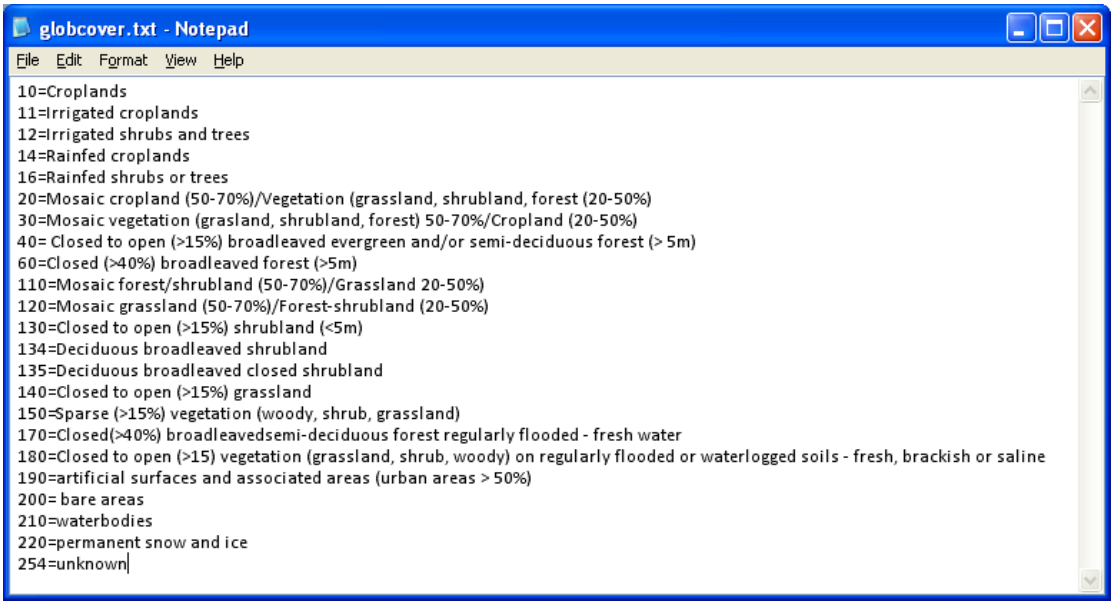
MCAS-S software is currently at version 3 (version 3..0.1.0) and supports the following formats:

1. Raster for **Primary** and **Mask** data
    a. ArcInfo Grids and Float
    b. BIL
    c. GeoTIFF
    d. IDRISI
2. Vector data for **Overlays**
    a. ESRI shapefiles

Data conversion

This section describes the data conversion process for **Primary** datasets, these are used for analysis and must be in a raster format. The underlying principles of data conversion are:

- datasets must be consistently captured and complete for the region of interest
  - If data are missing for certain areas, the value of -9999 can be used as 'no data'
  - If data are inconsistently captured then it is better to create separate layers and merge them in MCAS-S
- consider whether the data should be input as **Primary** data, **Overlays** or **Masks**; the same raster data can be used for both primary and mask layers
- while GIS data formats can generally support multiple attributes, MCAS-S can only use one. The value field will be used by MCAS-S and so should contain numbers that either directly represent the dataset (continuous) or are a class code (categorical)
- data should be as "raw" as possible, if you wish to classify the data; then use MCAS-S to do this. For example, slope data should be input as percent or degrees rather than slope classes such as 'flat' or 'steep'
- categorical data such as land use or vegetation types need to have a unique numeric identifier and an accompanying text file given exactly the same name as the dataset eg Primary/Land/globcover.txt and the format:



- minimise the number of processing steps as this will lead to resampling errors.

Toolbox

MCASS data conversion toolbox is a collection of tools for converting data. The Tool box and Arc project **data_conversion.mxd** with sample data are zipped up in MCASS Tools_Arc10.zip. This should be and unzipped.

- MCASS Tools.tbx should be:
  - copied from the DVD onto your software directory e.g. C:\Program Files\ArcGIS\Desktop10.0\ArcToolbox\Toolboxes
  - added in ArcCatalog by right-clicking on ArcToolBox> Add toolbox and navigating to the C:\Program Files\ArcGIS\Desktop10.0\ArcToolbox\Toolboxes\MCASS Tools.tbx
- Open **data conversion.mxd** and ensure that the MCASS toolbox is installed. The Mxd has:
  - environments set to Albers 2km resolution data
  - sample data for conversion.

Data	Format	Projection
towns.shp	point	Geographic WGS84
roads.shp	line	Albers GDA 1994
ibra_v61.shp	polygon	Albers GDA 1994
DLCMv1_Class.tif	raster (Geotiff)	Geographic WGS84
Mask	raster (ESRI Grid)	Albers GDA 1994

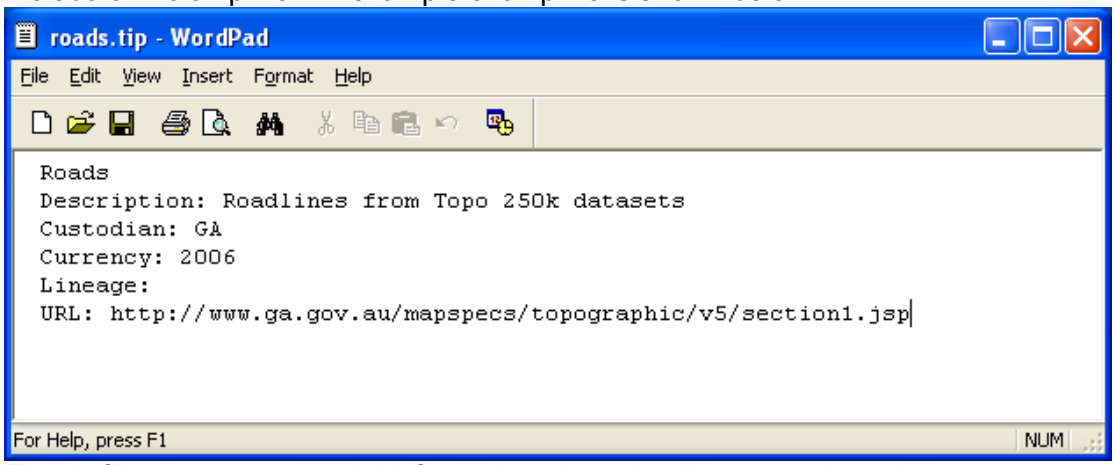
Pre-processing

This section outlines how to convert data to the same format as the data provided in the existing Datapack.

Set up a data processing folder structure, such as

- raw
- working
- final

Copy the input dataset into **raw**. Ensure the projection is defined and capture the metadata into a tip file. An example of a tip file is shown below.

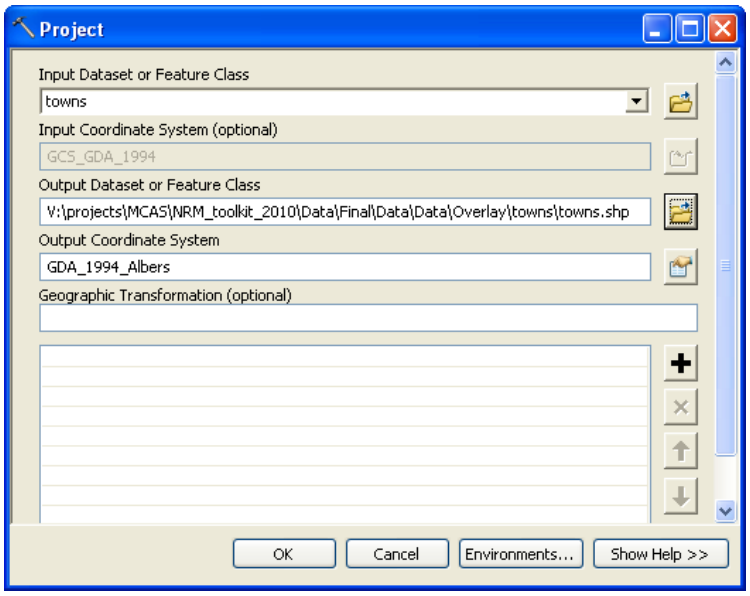


The tip file captures essential information about the dataset such as the name, currency, units, custodian and links to the metadata. A lineage field describes how the original data were processed. The tip file is created in Notepad or Word and saved as a txt file with exactly the same name of the dataset and an extension *.tip*. The first line of a tip file appears in MCAS-S when you hover the mouse over the dataset; hence ensuring that the first line holds a useful description of the data.

1) Project the data

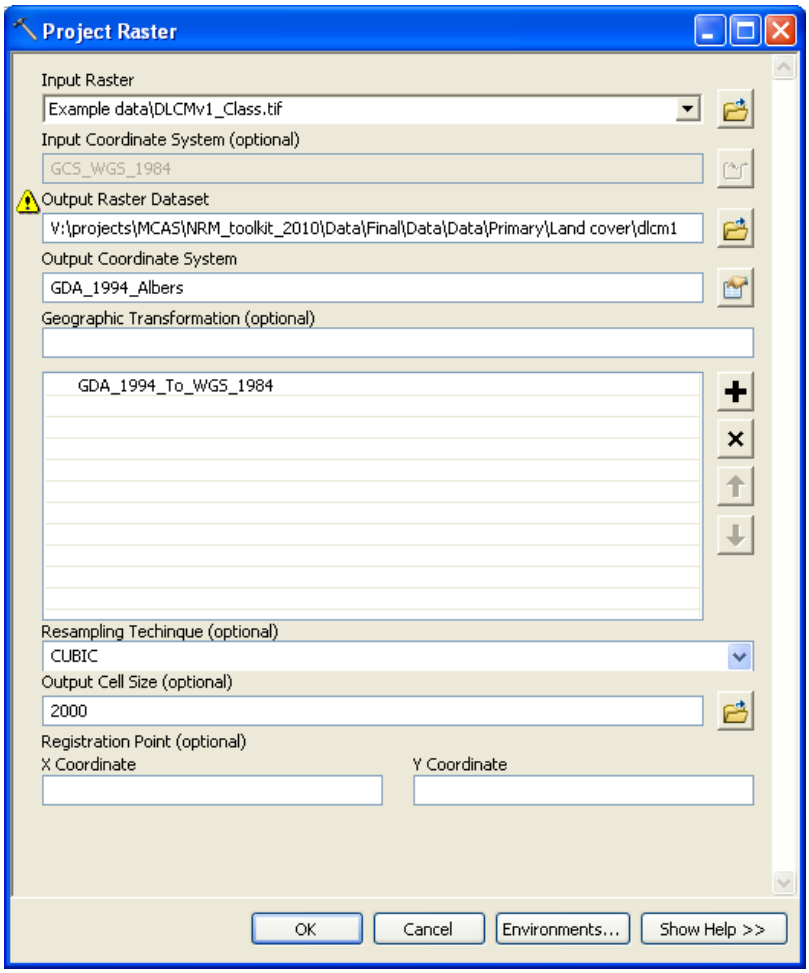
This section focuses on **Primary** data and outlines how to convert different datasets to the correct raster format. The first step in data conversion is to project the data into a common projection, in this case Albers Equal Area; datum GDA94. The ArcMap commands for re-projecting vector (Project tool) and raster (Project raster) data are as follows:

Project tool



Save to **Overlay\Towns** folder
Projection already set

Project Raster tool



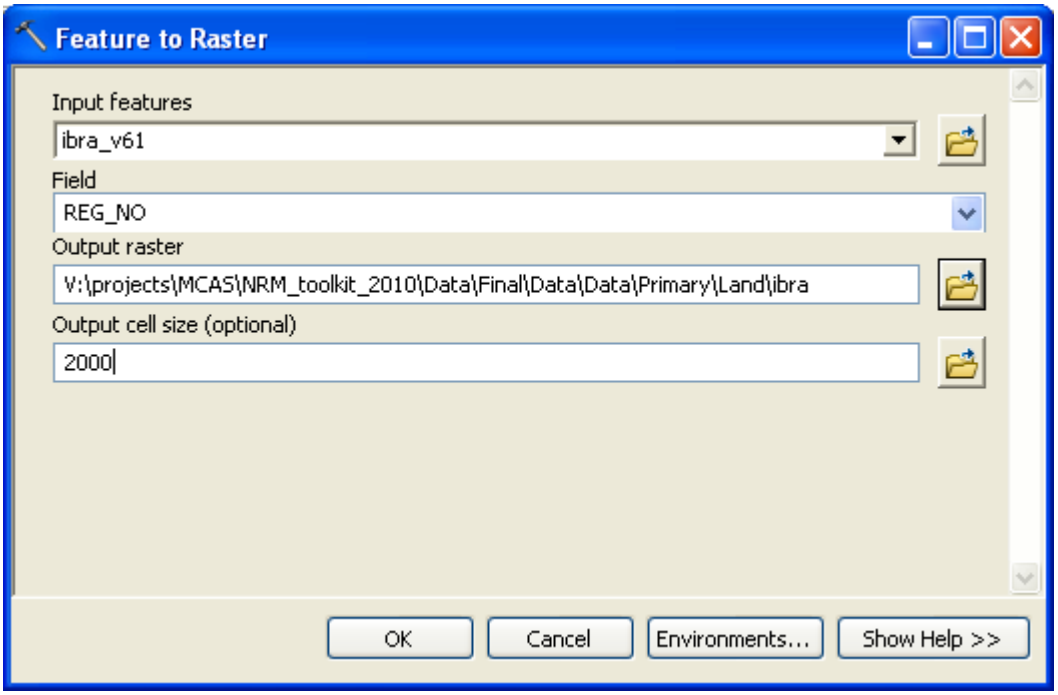
Save to **Primary\Land cover**

Select Resampling method
Set cell size to 2000

2) Convert the data to rasters

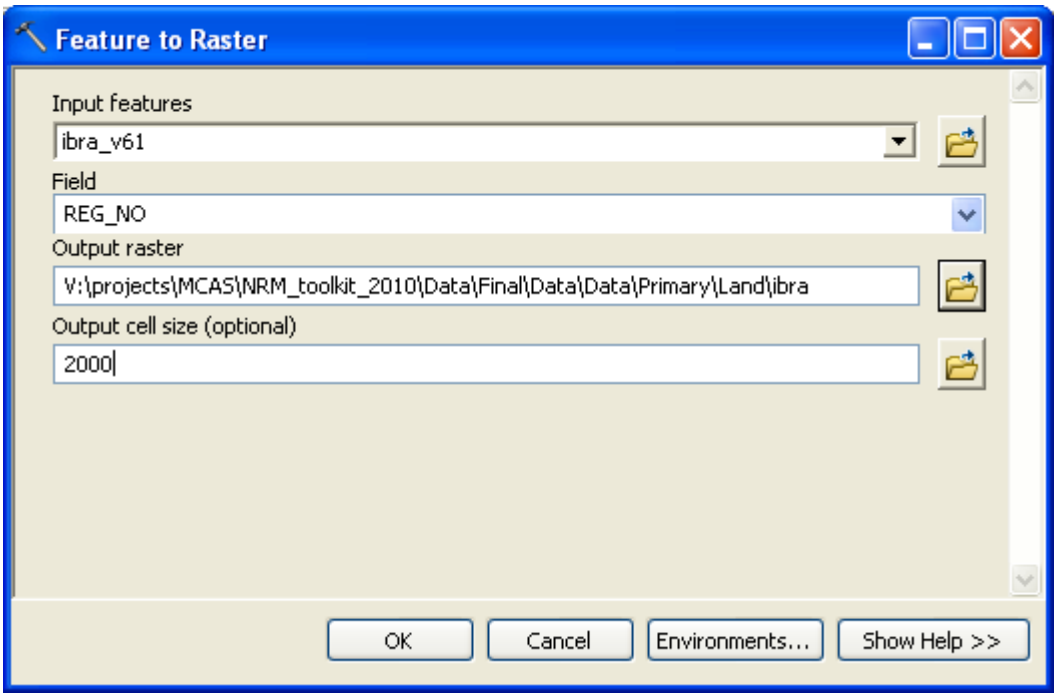
The next step is to convert the data from a vector (points, lines or polygons) or raster into another raster. Vector data such as points and lines can be converted based on their location or proximity. If the location is more important, then you should use the Feature to raster tool. If proximity is more important, then a distance function might be preferable.

Features to Raster

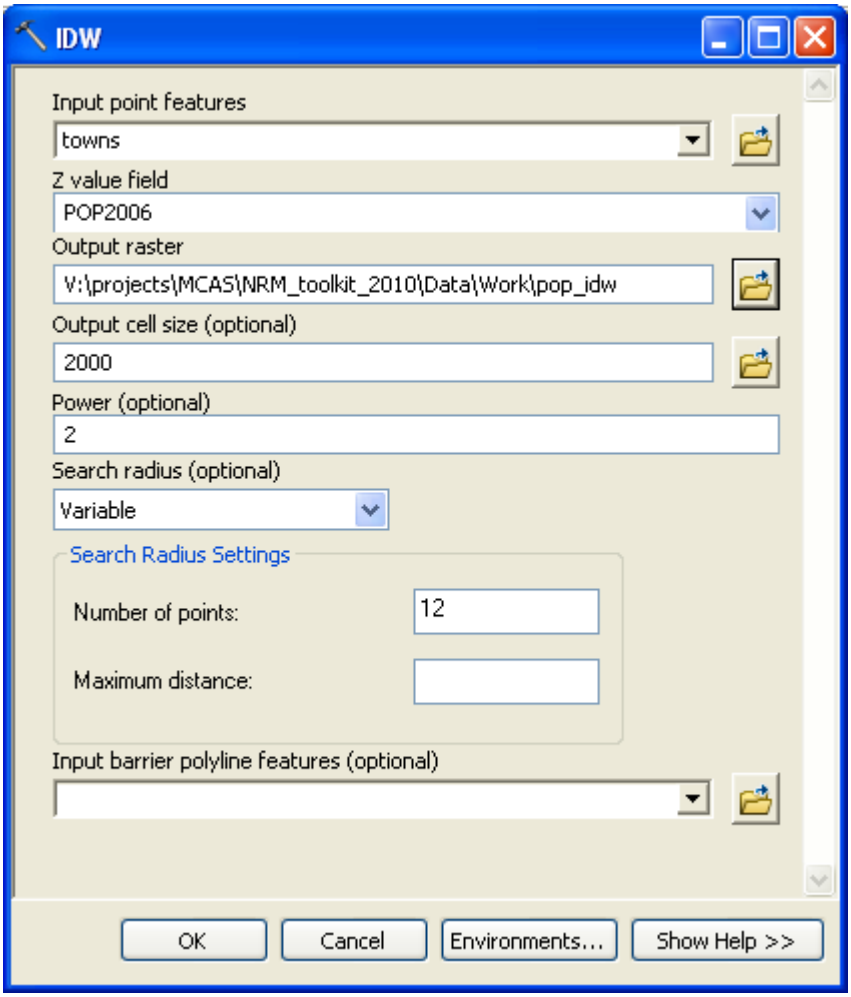


Distance

A Euclidean distance function can be used to convert sparse points such as towns into a raster.



Interpolation
This is useful when you had a dense network of points with continuous data e.g. population data for towns.

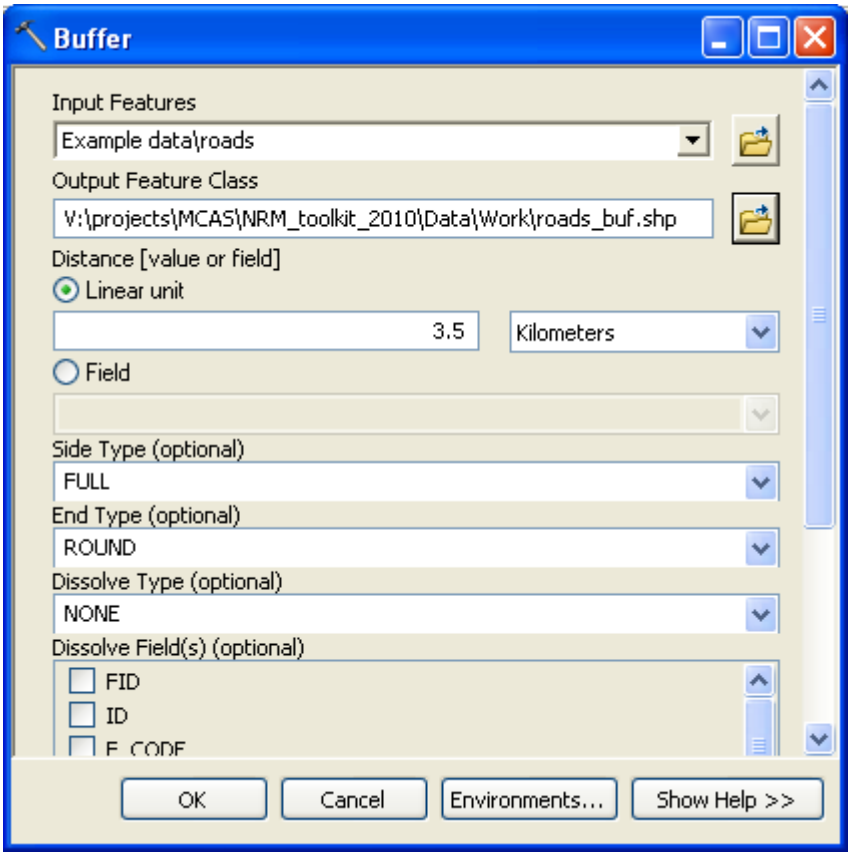


3) Converting lines or points

MCAS-S will accept point and line data as **Overlays** but not as **Primary** data and in order to see a point you will need to make the features large enough to be seen in MCASS.

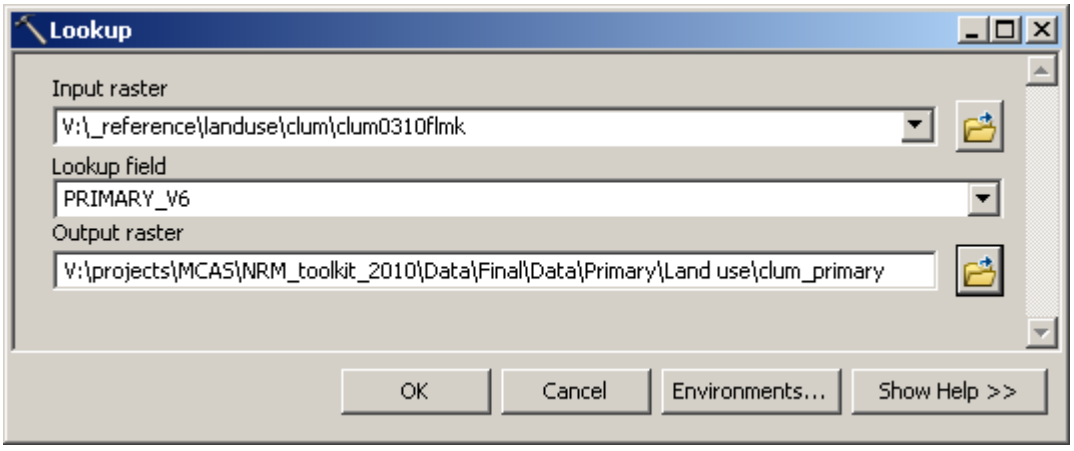
Buffer

Create a polygon around the line features at a specified distance; this could be set this to 3500.



Converting grids

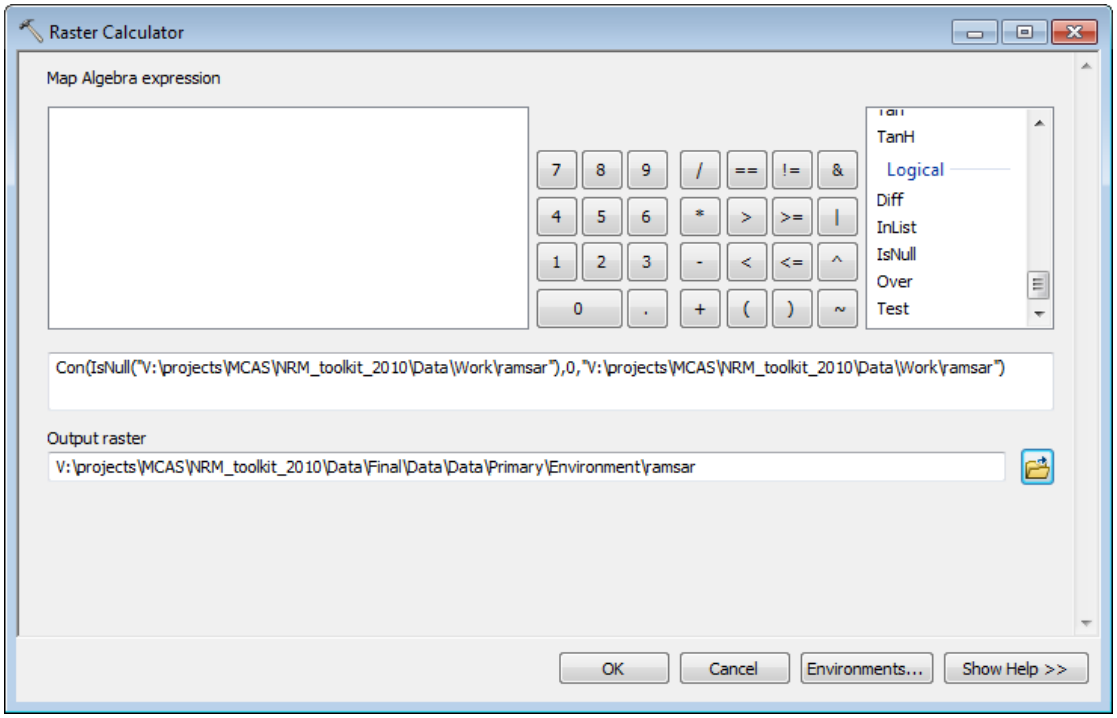
The Lookup tool enables you to create a new raster based on a field of an existing raster.



4) Managing null data

Null or missing data in any input layers will cascade Composites, 2-ways or Multiways. However changing the value to -9999 or a real value will enable the pixels to queried, classified and reported in MCAS-S.

Use the Con(Isnull) statement to change missing data to -9999 or any other value. In the example below, missing data has been set to 0.



5) Save the data

Finally copy the final data into the appropriate MCAS-S **Primary** data directories. For example the **dist_places** dataset might go in the following folder: */Data/ Primary/Infrastructure.* Alternatively, a new sub directory can be created and the dataset saved there.

Make sure to add processing information to the .tip file and save alongside the dataset. The .txt file for categorical data should also be saved alongside the associated dataset.

An alternative method is to export the data, save the raster as ESRI grid with Run Length Encoding option switched on or a GeoTiff.

Help

The most common problems in converting the data are that the extent or projection of the data in MCAS-S does not conform. If the dataset doesn't show up in the Primary, Overlay or Mask drop down menus, or is the wrong place on the mapping window then the data has different extents or projections and you will need to re-create the data.

If when you open a saved project, you get a big red X instead of a data layer – this usually means that you have moved a dataset, renamed it or the data has been corrupted. If the dataset has changed names or moved you can navigate to it by right-

clicking and selecting *Change Source…* If the dataset has been deleted or corrupted, you will need to re-create the data.

If MCAS-S slows down or freezes then you may have too much data. Try removing some of the datasets from the window. Another reason may be that your data are in floating point format, which makes the dataset very large; the solution is to convert the data to integers. For example if you have elevation data, you may wish to create integers to the nearest 1km. In Raster Calculator enter *int(elevation).*

Any technical questions can be addressed to:

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