

Importing binary image data into ArcView & ArcGIS

Free raster data, available over the internet, is often stored in a binary image format that is not software specific. Because of this it is not always recognized by ArcGIS/ArcView. Even if it comes with a header file, it may not contain the information in a format that is acceptable. This tutorial demonstrates the process of formatting data and header for use with ArcGIS/ArcView.

Related Guides:

- Importing ASCII data into ArcGIS

Requirements:

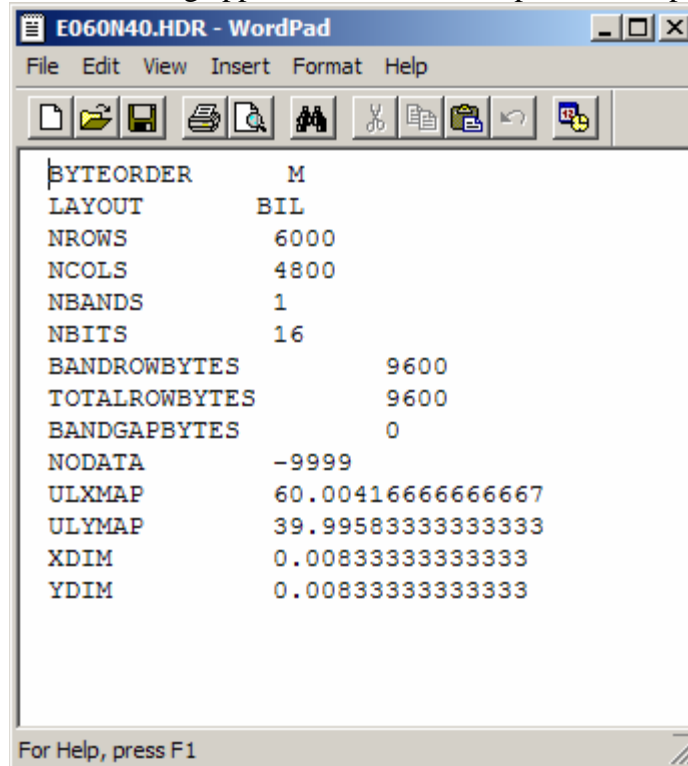
- ArcGIS or ArcView
- Binary data

Procedure:

1. Download the desired data or copy it to your local computer. In many cases the data is compressed in a gzip (.gz) format. Winzip and other archive tools can extract data in this format, but the Windows Compression Utility cannot
2. Check the file extensions of your data, common extensions include .bil, .bsq, .bip, .bin, .dat, .dem, .raw. Also check for the presence of header or metadata files, common extensions include .met, .hdr, .doc, .txt, .nfo, .xml
3. If you have a header file (.hdr) follow the instructions for Case 1, if not follow the instructions for Case 2

Case 1: Header file (.hdr) is present

- The header file should have the same name as the data file with a .hdr extension
- Open it with a text editing application such as notepad or wordpad



- Check to make sure the keywords are the same as those specified in the keyword descriptions below.
- Verify the value of the layout is the same at the extension of you data file. If they are different, rename your data file to match. If there is no layout specified assume your data is in .bil format and rename your data file accordingly.

Case 2: No header file (.hdr) but metadata is available

- You will have to create your own header file using the available metadata
- Open a text editing application such as word pad or notepad
- Create a new file with the same name as your data file, but with a .hdr extension
- Open the metadata file.
- Using the keywords below and the information found in the metadata. Be aware that the terminology might differ. For example, rows are often called lines, and pixels per line would be columns. Also pay attention to whether the coordinates are for the centre or corner of a pixel.

Header Files

The header file contains a set of entries, each of which describes a particular attribute of the data. For example, an entry can describe the number of rows or columns in the image. Each line in the header represents a keyword which represents a particular attribute which is then followed by a value. The entries in the header can be in any order, but each must be on a separate line of the file. Any line in the file that does not begin with a keyword is treated as a comment and ignored.

The following list identifies the valid keywords and describes the particular attribute they define. Several of the keywords have default values. When the default value accurately represents the image data, the keyword can be omitted from the header file.

- `nrows` – the number of rows in the image. Rows are parallel to the x-axis of the map coordinate system. There is no default.
- `ncols` – The number of columns in the image. Columns are parallel to the y-axis of the map coordinate system. There is no default.
- `nbands` – The number of bands in the file. The default is 1.
- `nbits` - The number of bits per pixel per band. Acceptable values are 1, 4, 8, 16, and 32. The default value is eight bits per pixel per band. For an image with `nbits` equal to one, `nbands` must also equal one.
- `byteorder` – The byte order in which image pixel values are stored. The byte order is important for sixteen-bit images, with two bytes per pixel. Acceptable values are
 - `I` – Intel byte order (Silicon Graphics, DEC, Alpha, PC) – also known as little endian or most significant byte first (`msbfirst`)
 - `M` – Motorola byte order (Sun, HP, etc.) – also known as big endian or least significant byte first (`l1stfirst`)

The default byte order is the same as that of the home machine executing the software.

- `layout` – The organization of the bands in the image file. Acceptable values are
 - `bil` – band interleaved by line.
 - `bip` – band interleaved by pixel.
 - `bsq` – band sequential.

The default layout is `bil`.

- `skipbytes` – the number of bytes of data in the image file to skip in order to reach the start of the image data. This keyword allows you to bypass any existing image header information in the file. The default value is zero bytes.

- `ulxmap` – The x-axis map coordinate of the center of the upper-left pixel. If you specify this parameter, set `ulymap` too, otherwise a default value is used.
- `ulymap` – The y-axis map coordinate of the center of the upper-left pixel. If this parameter is specified, `ulxmap` must also be set, otherwise a default value is used.
- `xdim` – the x-dimension of a pixel in map units. If this parameter is specified, `ydim` must also be set, otherwise a default value is used.
- `ydim` – the y-dimension of a pixel in map units. If this parameter is specified, `xdim` must also be set, otherwise a default value is used.
- `Bandrowbytes` – the number of bytes per band per row. This must be an integer. This keyword is used only with BIL files when there are extra bits at the end of each band within a row that must be skipped.

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