MFworks Translators

XYZ (ASCII Point File)

▶ **Importing an XYZ Tab Delimited Point File**
▶ **Exporting to an XYZ Tab Delimited Row/Column Point File**
▶ **Exporting to an XYZ Tab Delimited UTM Point File**
▶ **Exporting to an XYZ Tab Delimited X/Y Point File**

File Type: TEXT (XYZ Point File)

Directions: XYZ<->MF

Details: This translator will import and export text files composed of a list of points. Each point is expected to have an X and Y coordinate, a Z value separated by tab characters, and be terminated with a carriage return (*i.e.*, X<tab>Y<tab>Z<return>). The X and Y coordinates may be row/column, latitude/longitude, UTM, or a user defined X/Y system. The Z value may be either fixed point/integer or floating point/real. To be recognized by the translator, XYZ files must have the ".xyz" extension.

XYZ files are produced commonly by GPS (Global Positioning System) units and other field data collection methods. The data are typically sparse points referenced to a real-world coordinate system like Latitude/Longitude or UTM. A user defined grid can also be used to reference data points within a mapped area. This is particularly useful when surveying points across UTM boundaries.

GPS units gather X/Y positional coordinates for points and any number of attributes attached to those points. One XYZ file should be generated for each attribute that you want to map. Descriptive text can be appended to your imported XYZ data by using the **Tab Delimited Text** translator to import legend text.

When you are exporting to an XYZ file you can retain the legend text by using the **Tab Delimited Text** translator to export legend text.

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Importing an XYZ Tab Delimited Point File

Import Dialog
▶ Using the translator dialog box interface
▶ Using the dialog box interface to create or edit scripts

Coordinate Range/Scan For Range
Use the **North**, **South**, **East**, and **West** fields to specify the extents of the map data. These values must reflect the coordinate system of the input file. To have these fields populated automatically, click on the **Scan For Range** button. This will determine the outermost extents of the input file and place the values in the appropriate fields.

These values can be modified to extract only a portion of the file or to specify a map layer that exceeds the extents of the input data. To do so, click in the appropriate field and enter the new value. These values may be true X-Y coordinates, UTM coordinates, or latitude/ longitude coordinates depending on the referencing system in the coverage file.

Grid Size
The **Grid size** field is used to specify the grid interval of the resulting map layer. This value will become the cell resolution of the new map layer. **The value for this option must be expressed in the coordinate system of the input file**.

If the coordinate system of the input map layer is latitude and longitude, then the value specified for the **Grid size** option should be the number of **degrees** per cell side (specify **None** for units). Future releases of this translator will allow you to specify a cell resolution in metres. For users with

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a background in programming, ThinkSpace Inc. has a C routine available to convert latitude and longitude grid sizes to metres; after you have imported a map layer with a latitude and longitude coordinate system, you can convert your degrees per cell side cell resolution to metres per cell side.

If the coordinate system of the input map layer is UTM (Universal Transverse Mercator), then the value specified for the **Grid size** option should be the number of **UTM metres** per cell side.

The smaller (*i.e.*, finer) the grid size, the higher the cell resolution (*i.e.*, the greater the number of cells).

Collision

If a coordinate point occurs more than once in the input file, a conflict results. Click on the **Replace** radio button to have the last occurrence of the point in the file replace any previous occurrences. Click on the **Add** radio button to have the Z value of coincidental points added together in the output map layer.

Origin

Use this option to identify the location of the origin of the input file coordinate system. X/Y and longitude/latitude have an origin in the lower left hand corner of the map. MFworks uses a row/column coordinate system with the origin in the upper left hand corner of the map layer.

Import Syntax

▶ Syntax and type conventions
▶ Using the Script window interface
▶ Using the dialog box interface to create or edit scripts

```
Import input file Using "Text (Point File)"
     North value South value West value East value
     GridSize value
     [ReplacePoints | AddPoints]
     [LowerLeftOrigin | UpperLeftOrigin];
```

```
North value
South value
West value
East value
```
These options specify the extent of the area in the point file to be rasterized. These values must reflect the coordinate system of the input file. The values may be modified to extract only a portion of the file or to specify a map layer that exceeds the extents of the input data. Enter appropriate values following each modifier. These values may be true X-Y coordinates, UTM

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coordinates, or latitude/longitude coordinates depending on the referencing system in the coverage file.

GridSize *value*

The GridSize modifier is used to specify the grid interval of the resulting map layer. This value will become the cell resolution of the new map layer. **The value for this option must be expressed in the coordinate system of the input file**.

If the coordinate system of the input map layer is latitude and longitude, then the value specified for the GridSize option should be the number of **degrees** per cell side (do not specify units). Future releases of this translator will allow you to specify a cell resolution in metres. For users with a background in programming, ThinkSpace Inc. has a C routine available to convert latitude and longitude grid sizes to metres; after you have imported a map layer with a latitude and longitude coordinate system, you can convert your degrees per cell side cell resolution to metres per cell side.

If the coordinate system of the input map layer is UTM (Universal Transverse Mercator), then the value specified for the **Grid size** option should be the number of **UTM metres** per cell side.

The smaller (*i.e.*, finer) the grid size, the higher the cell resolution (*i.e.*, the greater the number of cells).

ReplacePoints
AddPoints

If a coordinate point occurs more than once in the input file, a conflict results. Choose **ReplacePoints** to have the last occurrence of the point in the file replace any previous occurrences. Specify **AddPoints** to have the Z value of coincidental points added to any previous occurrences point in the output map layer.

LowerLeftOrigin
UpperLeftOrigin

Use these modifiers to identify the origin of the input file coordinate system. X/Y and longitude/latitude have an origin in the lower left hand corner of the map. MFworks uses a row/column coordinate system with the origin being in the upper left hand corner of the map layer. In a script statement, if this modifier is not specified for the input file, the origin is assumed to be the upper left hand corner, by default.

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Import

Example

Importing an XYZ Tab Delimited Point File

A set of coordinate points and attribute values were collected using a GPS (Global Positioning System) unit. The data are exported to a spreadsheet program where separate XYZ files are generated for each attribute:

	A	B	C
1	0	1	30
2	5	66	75
3	6	12	55
4	12	51	30
5	15	26	30
6	15	70	30
7	17	40	30
8	18	87	45
9	20	48	75
10	24	76	55
11	31	59	30
12	32	16	30
13	35	23	55
14	35	37	30
15	36	48	45
16	42	71	30
17	46	87	45
18	49	31	55
19	49	35	30
20	51	49	30
21	53	19	45
22	54	52	45
23	57	0	30
24	58	63	45
25	64	71	55
26	65	27	55
27	69	0	75
28	69	40	45
29	70	63	45
30	71	23	45
31	78	61	30
32	82	18	30
33	88	99	30
34	90	43	45
35	98	7	75
36	98	24	75
37	99	54	30

GPSPoints.WK3

TR-XYZ-5

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The spreadsheet files are then exported as tab delimited ASCII text files. Each line represents a point in space and an associated value:

```
GPSPoints.txt

L X · · · | · · · 1 · · · | · · · 2 · · · | · · · 3 · · · | · · · 4 · · · | · ·

   0  →   1  →  30¶
   5  →  66  →  75¶
   6  →  12  →  55¶
  12  →  51  →  30¶
  15  →  26  →  30¶
  15  →  70  →  30¶
  17  →  40  →  30¶
  18  →  87  →  45¶
  20  →  48  →  75¶
  24  →  76  →  55¶
  31  →  59  →  30¶
  32  →  16  →  30¶
  35  →  23  →  55¶
  35  →  37  →  30¶
  36  →  48  →  45¶
  42  →  71  →  30¶
  46  →  87  →  45¶
  49  →  31  →  55¶
  49  →  35  →  30¶
  51  →  49  →  30¶
  53  →  19  →  45¶
  54  →  52  →  45¶
  57  →   0  →  30¶
  58  →  63  →  45¶
  64  →  71  →  55¶
  65  →  27  →  55¶
  69  →   0  →  75¶
  69  →  40  →  45¶
  70  →  63  →  45¶
  71  →  23  →  45¶
  78  →  61  →  30¶
  82  →  18  →  30¶
  88  →  99  →  30¶
  90  →  43  →  45¶
  98  →   7  →  75¶
  98  →  24  →  75¶
  99  →  54  →  30¶
```

To convert this point data to an MFworks map layer select **Import Map** from the **File** menu. Select the file and choose **XYZ Point File (Text)** from the **Show Type** drop-down list. When the **Import XYZ Point File (Text)** dialog box appears the **Row/Column** origin radio button is clicked, then the
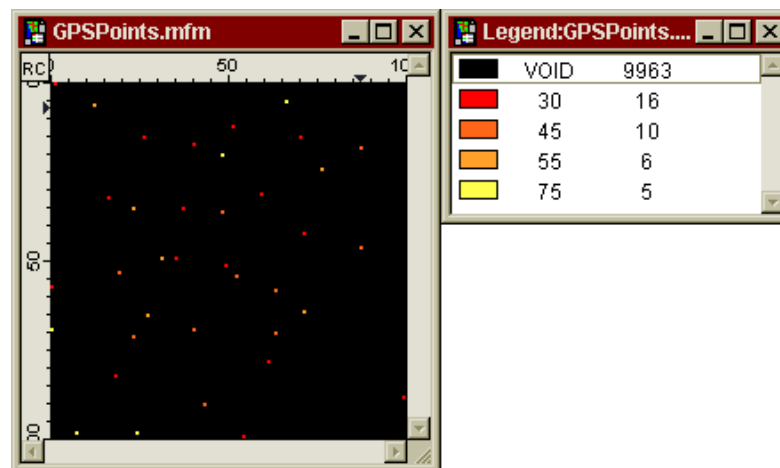
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Scan For Range button is clicked. This causes the **Coordinate Range** fields to be populated automatically. The default **Replace** option is used:
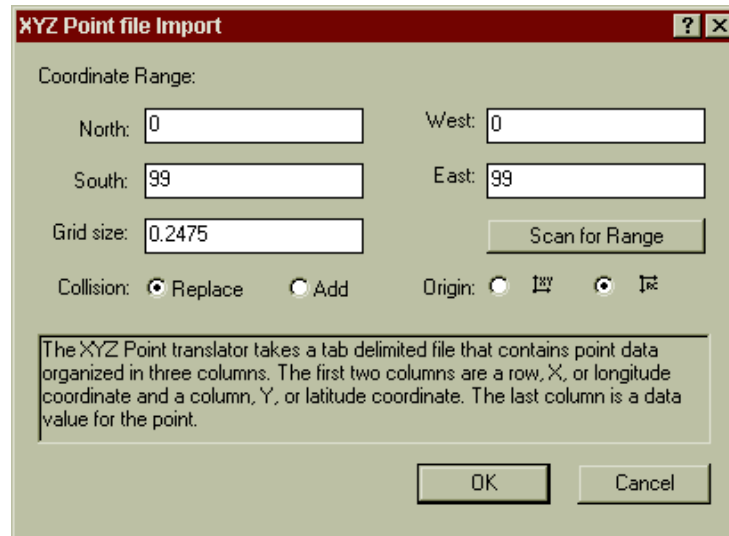
If you were to execute this operation from the Script window the statement would be:

```
GPSPoints = Import "GPSPoints.txt"
     Using "Text (Point File)"
     North 0 South 99 West 0 East 99
     GridSize .2475 ReplacePoints
     UpperLeftOrigin;
```

When the map is displayed on screen, the default colour sequence will be applied to the map zones. Z values from the input file will be assigned as zone values:
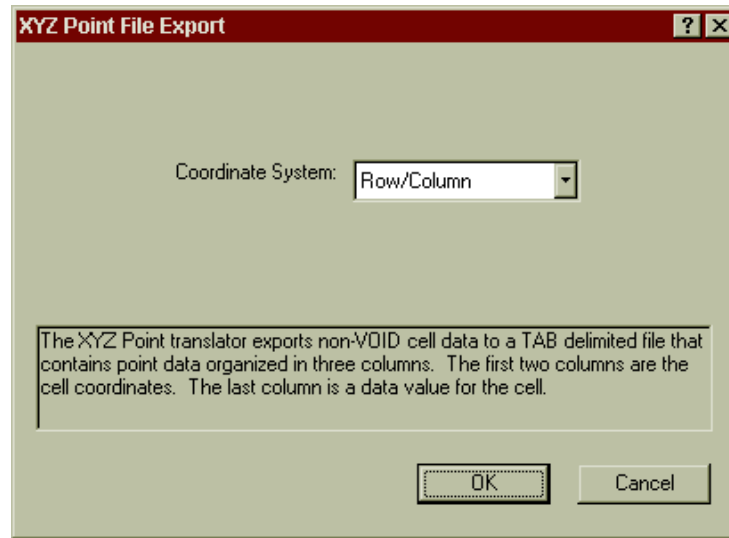
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When an XYZ Point file is imported, the geometry for the resulting map is generated automatically by the translator according to the coordinates of the original file.

Exporting to an XYZ Point File

Export Dialog
▶ Using the translator dialog box interface
▶ Using the dialog box interface to create or edit scripts

XYZ Point File Export   [?] [X]

Coordinate System: [Row/Column ▼]

The XYZ Point translator exports non-VOID cell data to a TAB delimited file that contains point data organized in three columns. The first two columns are the cell coordinates. The last column is a data value for the cell.

[OK]   [Cancel]

The **Coordinate system** drop-down list options are based on existing geometries. Each built geometry will appear in this menu automatically. If no geometry exists for the map layer, then **Row/Column** with the origin in the top left hand corner appears by default.

Export Syntax
▶ Syntax and type conventions
▶ Using the Script window interface
▶ Using the dialog box interface to create or edit scripts

```
ExportMap map To output file
     Using "Text (Point File)"
     [Reference map [with geometry]];
```

Note: You must enclose the name of the referenced geometry with square brackets.
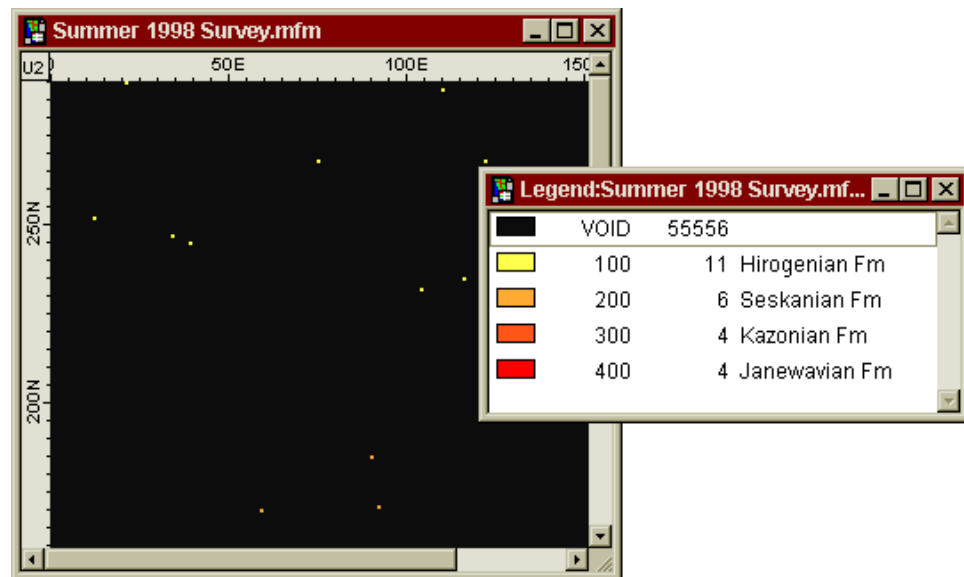
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Reference *with geometry*

Use this modifier to specify the name of a geometry that has been built for the map layer to be exported. You can also specify a geometry from an alternate map layer. If no geometries have been built or this modifier has not been specified, then the Row/Column geometry with an origin in the top left hand corner of the map is assumed.

Export Example

Exporting to an XYZ Tab Delimited Row/Column Point File

A Geological Survey was conducted through this study area in the summer of 1998. Outcrops belonging to four formations were found in the area and a map layer was generated from GPS (Global Positioning System) readings. This mapped data is to be exported and used in a vector based Geological Modelling application:
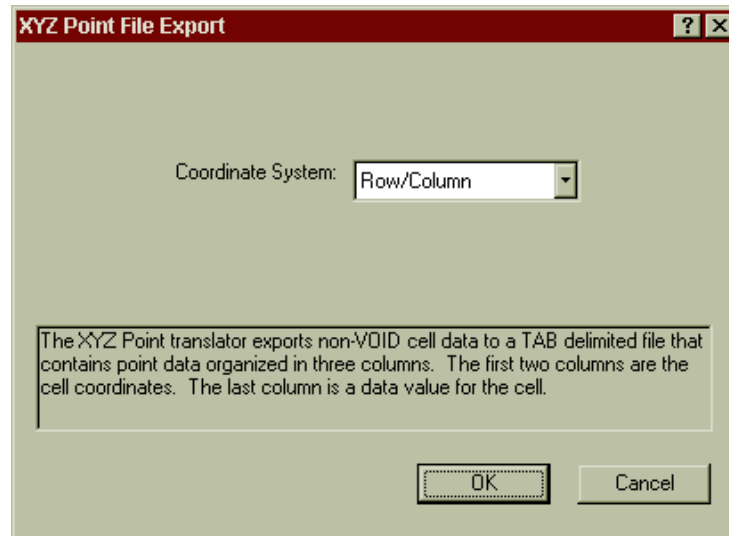

The map data is to be exported in Row/Column format. **Export Map** is selected from the **File** menu. The name of the file and a file type of **XYZ** is specified in the **Save** file dialog box. When the **Export XYZ Point File**

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(Text) dialog box is displayed **Row/Column** is selected from the **Coordinate system** drop-down list:

If you were to perform this command from the Script window the statement would be:

```
ExportMap "Summer 1998 Survey"
    To "Summer 1998 Survey (RCZ)"
    Using "Text (Point File)";
```

Before using the file in the Geological Modelling application the data are examined in a word processing application. XYZ files are tab delimited

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ASCII text files that can be opened by most word processing and spreadsheet applications:

```
Summer 1998 Survey (RCZ).TXT

0   →   21  →   100¶
2   →   110 →   100¶
8   →   172 →   100¶
22  →   75  →   100¶
22  →   122 →   100¶
25  →   128 →   100¶
38  →   12  →   100¶
43  →   34  →   100¶
45  →   39  →   100¶
55  →   116 →   100¶
58  →   104 →   100¶
73  →   145 →   200¶
105 →   90  →   200¶
119 →   92  →   200¶
120 →   59  →   200¶
157 →   34  →   200¶
187 →   59  →   300¶
190 →   21  →   200¶
196 →   65  →   300¶
234 →   189 →   400¶
238 →   138 →   400¶
243 →   38  →   300¶
259 →   178 →   400¶
261 →   12  →   300¶
285 →   187 →   400¶
```

Export Example

Exporting to an XYZ Tab Delimited UTM Point File

A Geological Survey was conducted through this study area in the summer of 1998. Outcrops belonging to four formations were found in the area and a map layer was generated from GPS (Global Positioning System) readings.
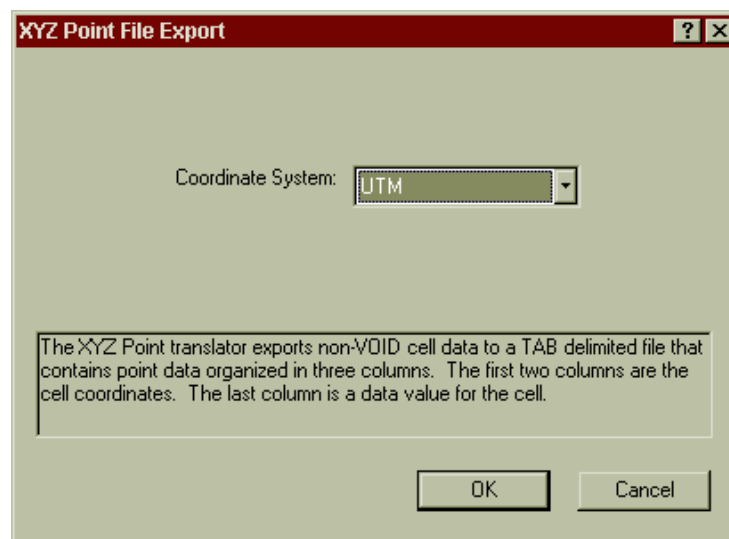
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This mapped data is to be exported and used in a vector based Geological Modelling application:
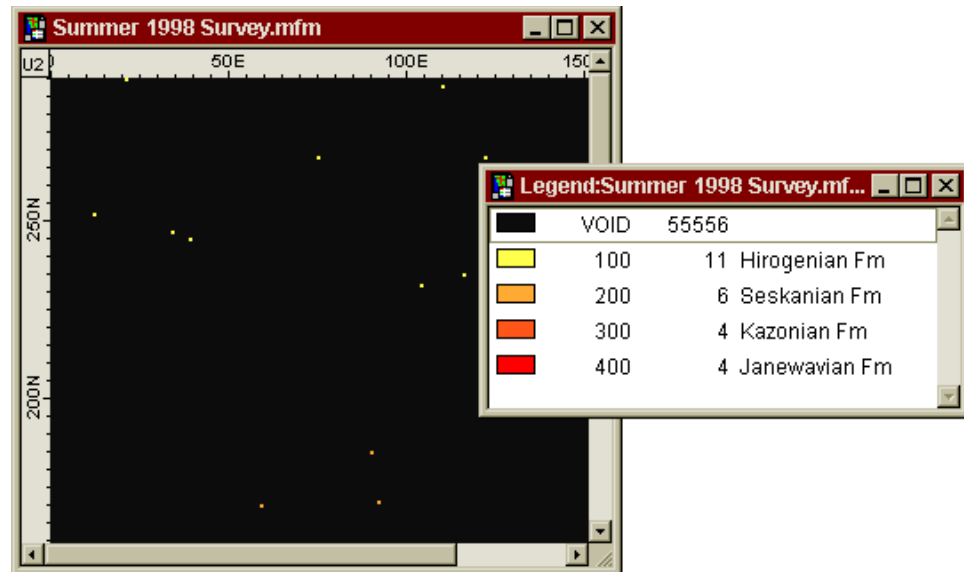
The map data is to be exported in UTM Northing/Easting format. **Export Map** is selected from the **File** menu. The name of the file and a file type of **XYZ** is specified in the **Save** file dialog box. When the **Export XYZ Point File (Text)** dialog box is displayed **UTM** is selected from the **Coordinate system** drop-down list:

If you were to perform this command from the Script window the statement would be:

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```
ExportMap "Summer 1998 Survey"
      To "Summer 1998 Survey (UTM)"
      Using "Text (Point File)"
      Reference "Summer 1998 Survey" [UTM];
```

Before using the file in the Geological Modelling application the data are examined in a word processing application. XYZ files are tab delimited ASCII text files that can be opened by most word processing and spreadsheet applications:

Summer 1998 Survey (UTM).TXT

```
49.889474  → 581.000000 → 100¶
227.421053 → 576.993103 → 100¶
351.094737 → 564.972414 → 100¶
157.605263 → 536.924138 → 100¶
251.357895 → 536.924138 → 100¶
263.326316 → 530.913793 → 100¶
31.936842  → 504.868966 → 100¶
75.821053  → 494.851724 → 100¶
85.794737  → 490.844828 → 100¶
239.389474 → 470.810345 → 100¶
215.452632 → 464.800000 → 100¶
297.236842 → 434.748276 → 200¶
187.526316 → 370.637931 → 200¶
191.515789 → 342.589655 → 200¶
125.689474 → 340.586207 → 200¶
75.821053  → 266.458621 → 200¶
125.689474 → 206.355172 → 300¶
49.889474  → 200.344828 → 200¶
137.657895 → 188.324138 → 300¶
385.005263 → 112.193103 → 400¶
283.273684 → 104.179310 → 400¶
83.800000  → 94.162069  → 300¶
363.063158 → 62.106897  → 400¶
31.936842  → 58.100000  → 300¶
381.015789 → 10.017241  → 400¶
```

Export Example

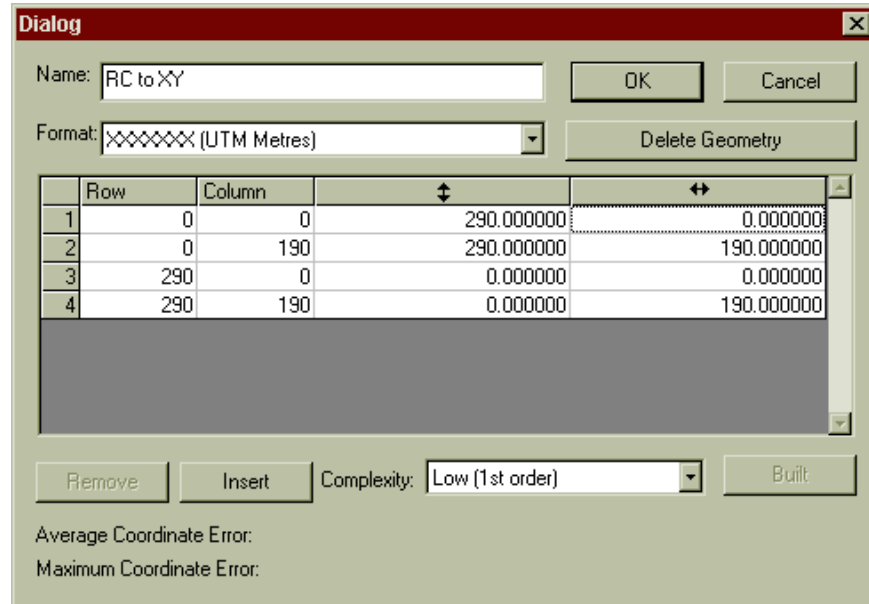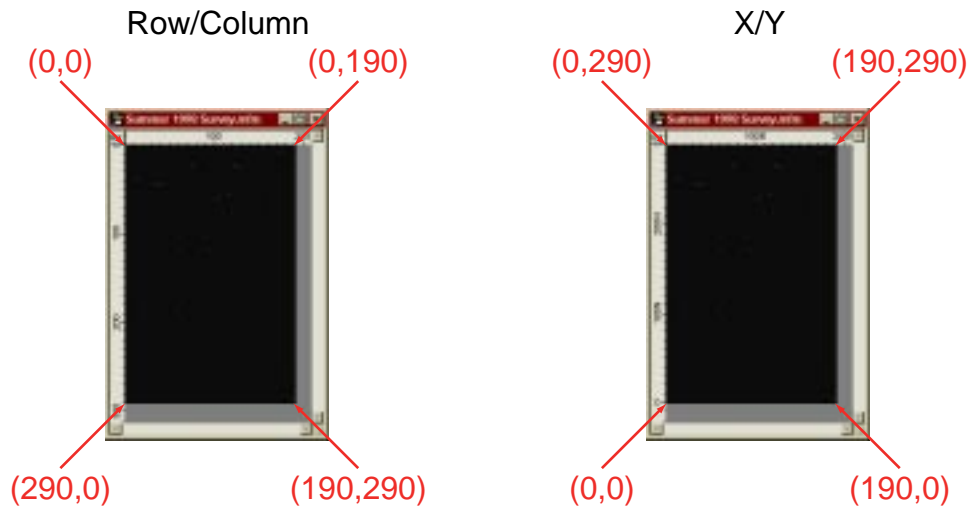**Exporting to an XYZ Tab Delimited X/Y Point File**

A Geological Survey was conducted through this study area in the summer of 1998. Outcrops belonging to four formations were found in the area and a map layer was generated from GPS (Global Positioning System) readings. This mapped data is to be exported and used in a vector based Geological Modelling application.

Before the file can be exported in an XYZ format, a new X/Y geometry must be built for the file to move the position of the origin from the top left hand corner to the bottom left hand corner. This simple process is outlined

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in the figure below. First determine the Row/Column extents of the map layer, then mirror the positions vertically. Open the **Geometry Editor** dialog box by selecting **Edit Geometry** from the **Map** menu, and enter the Row/Column coordinates and their corresponding X/Y coordinates, specify a new name and click on the **Build** button. UTM Metres was selected from the **Format** drop-down list to give the correct numerical format to the output X/Y coordinates:

Row/Column

(0,0)   (0,190)

(290,0)   (190,290)

X/Y

(0,290)   (190,290)

(0,0)   (190,0)

Dialog

Name: RC to XY

Format: XXXXXXX (UTM Metres)

	Row	Column	↕	↔
1	0	0	290.000000	0.000000
2	0	190	290.000000	190.000000
3	290	0	0.000000	0.000000
4	290	190	0.000000	190.000000

Remove   Insert   Complexity: Low (1st order)   Built

Average Coordinate Error:
Maximum Coordinate Error:

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The new geometry can be checked by returning to the Map window and specifying the new geometry from the **Ruler Coordinates** sub menu of the **Map** menu:
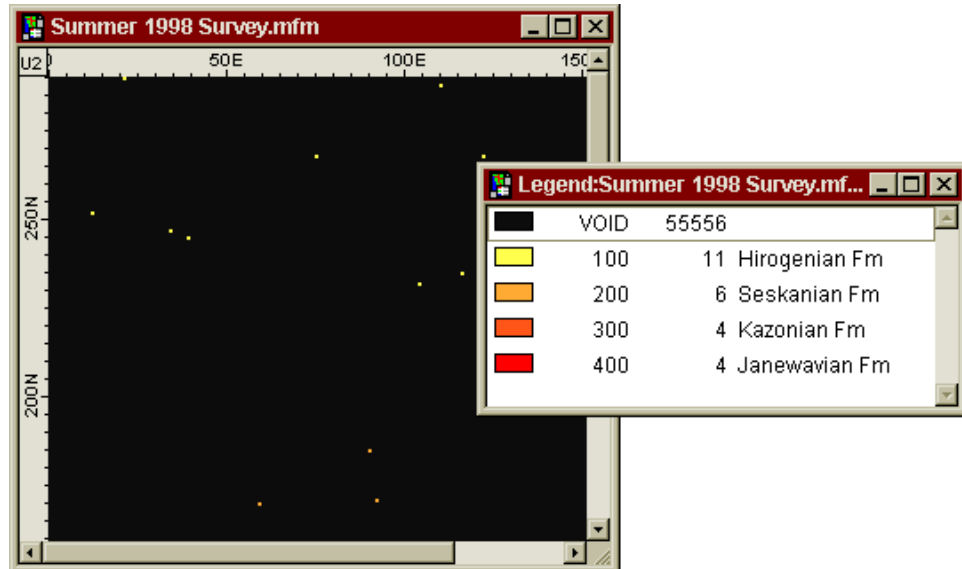
Export Map is selected from the **File** menu. The name of the file and a file type of **XYZ** is specified in the **Save** file dialog box. When the **Export XYZ Point File (Text)** dialog box is displayed, the new geometry is selected from the **Coordinate system** drop-down list:
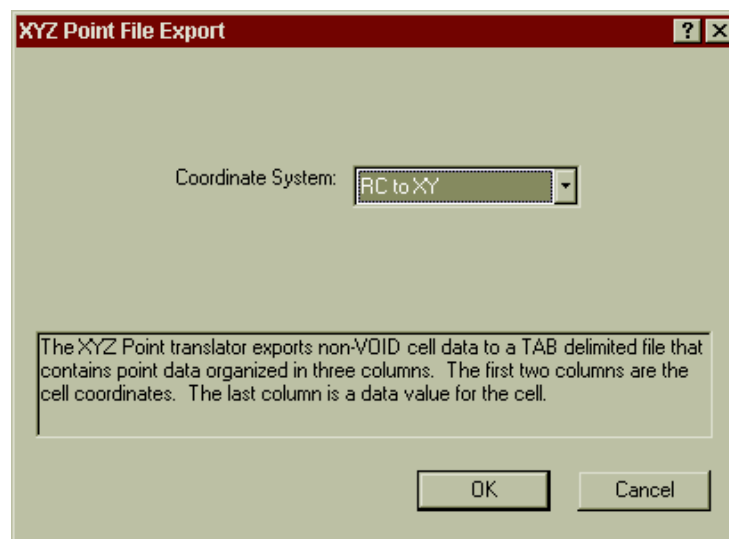
If you were to perform this command from the Script window the statement would be:

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```
ExportMap "Summer 1998 Survey"
      To "Summer 1998 Survey (XYZ)"
      Using "Text (Point File)"
      Reference "Summer 1998 Survey" ["RC to XY"];
```

Before using the file in the Geological Modelling application the data are examined in a word processing application. XYZ files are tab delimited ASCII text files that can be opened by most word processing and spreadsheet applications: