



HLU GIS Tool v1.0

User Guide



















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24 March 2010	Draft installation and configuration guide
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Table of Contents

1	INTRODUCTION.....	3
1.1	OPTIMISING PERFORMANCE.....	4
1.1.1	Creation of ArcGIS Map Document (.mxd) or MapInfo Workspace (.wor).....	4
1.1.2	Use of HLU GIS Tool with ArcGIS or MapInfo.....	4
1.1.3	Selection of Database Type.....	4
1.1.4	Local vs. Network Storage.....	5
1.1.5	Data Management.....	5
1.2	DISCLAIMER - UPDATES TO USER GUIDE.....	5
1.3	RECOMMENDED USER KNOWLEDGE.....	5
1.3.1	Administrator.....	5
1.3.2	Users.....	5
2	USER INTERFACE.....	6
2.1	DOS AND DON'TS.....	6
2.2	HLU GIS TOOL WINDOW.....	6
2.3	FILE MENU.....	8
2.3.1	 Export.....	8
2.3.2	 Exit.....	8
2.4	EDIT MENU.....	9
2.4.1	 Copy.....	9
2.4.2	 Paste.....	9
2.4.3	 Bulk Update.....	9
2.5	VIEW MENU.....	11
2.5.1	 Maximise GIS window.....	11
2.5.2	 Windows side by side.....	11
2.5.3	 Keep DB window on top.....	11
2.5.4	 Switch to GIS window.....	11
2.5.5	 Zoom to selection.....	11
2.6	SELECT MENU.....	12
2.6.1	 Select by Attributes.....	12
2.6.2	 Clear Filter.....	13
2.6.3	 Select Current INCID on Map.....	13
2.6.4	 Get Map Selection.....	13
2.6.5	 Select by INCID.....	13
2.7	SPLIT/MERGE MENU.....	14
2.7.1	 Split Features.....	14
2.7.1.1	Logical Split.....	14
2.7.1.2	Physical Split.....	14
2.7.2	 Merge Features.....	16
2.7.2.1	Logical Merge.....	16
2.7.2.2	Physical Merge.....	17
2.8	TOOLS MENU.....	18
2.8.1	 Options.....	18
2.8.1.1	Database Options.....	18
2.8.1.2	GIS Options.....	19
2.8.1.3	Vague Date Season Names.....	19
2.9	DATA.....	21
2.9.1	INCID Box.....	21
2.9.2	IHS Tab.....	22
2.9.3	Details Tab.....	23
2.9.4	Sources Tab.....	24

2.9.5	History Tab.....	25
3	DATABASE CONFIGURATION	26
3.1	ADDING SOURCES	26
3.2	ADDING USERS	26
3.3	CONFIGURING EXPORTS	27
3.3.1	Adding Export Types.....	27
3.3.2	Adding Fields to an Export Type	27
4	APPENDIX	29
4.1	KNOWN ISSUES AND BUGS	29

List of Figures

Figure 1 - HLU GIS Tool window	7
Figure 2 - Export dialog	8
Figure 3 - Checkboxes ticked to copy data	9
Figure 4 - HLU Main Window in Bulk Update Mode.....	10
Figure 5 - Windows arranged side by side	11
Figure 6 - HLU Query Builder	12
Figure 7 - List of Operators.....	12
Figure 8 - Edit Settings for Physical Split (ArcGIS).....	14
Figure 9 - Split Features (ArcGIS).....	15
Figure 10 - Data Disaggregation Dialog (MapInfo)	15
Figure 11 - Split Features (MapInfo)	16
Figure 12 - Select INCID to Keep Dialog.....	17
Figure 13 – Physical Merge – Before (left) and After (right)	17
Figure 14 - HLU Options Dialog.....	18
Figure 15 - GIS Selection Warning Box	19
Figure 16 - INCID Box	21
Figure 17 - IHS Tab.....	22
Figure 18 - Details Tab.....	23
Figure 19 - Sources Tab.....	24
Figure 20 - History Tab.....	25
Figure 21 - Format of lut_sources table	26
Figure 22 - Format of lut_user table.....	26
Figure 23 - Format of exports table.....	27
Figure 24 - Format of exports_fields table.....	28

List of Tables

Table 1 - Effect of OS Mastermap Split (Single Dataset)	3
Table 2 - Effect of OS Mastermap Split (Attribute and Spatial Datasets).....	3

1 Introduction

In August 2009 Hampshire Biodiversity Information Centre (HBIC) awarded exeGesIS SDM the contract to develop a new toolkit which would manage their Habitat and Land Use spatial data. The new toolkit would be used by HBIC and Local Record Centres in the South-East of England, and therefore needed to be compatible with both ArcGIS and MapInfo.

The Habitat and Land Use (HLU) data consisted of a set of habitat polygons. Each habitat polygon had approximately 80 attributes. The decision was taken by Local Records Centres to split these habitat polygons into Ordnance Survey (OS) Mastermap derived polygons.

Whilst there are benefits to splitting the habitat polygons by OS Mastermap, such as ensuring polygon boundaries are accurate, the splitting process significantly increases the volume of data. On average, there are 33.5 Mastermap-derived polygons for each habitat polygon in the HLU data.

For example, Table 1 indicates the effect on a 500 polygon dataset if the data was held in a single GIS layer.

	Original	Split by Mastermap
Polygons	500	16,750
Attributes	40,000	1,340,000
Total	40,500	1,356,750

Table 1 - Effect of OS Mastermap Split (Single Dataset)

Due to the complexity of the attribute data required by the Local Records Centres and to minimise data duplication, the habitat attribute and spatial data were split into a relational database with an associated GIS layer. Splitting the attribute and spatial data, reduces the number of attributes required for the spatial layer to 6.

This offers a significant reduction in total attributes as shown in Table 2. Nevertheless, there is still a significant increase in data volume versus the original HLU dataset.

	Original	Attribute database and associated GIS Layer
HLU Records	500	500
HLU Attributes	40,000	40,000
Spatial Polygons		16,750
Spatial Attributes		100,500
Total	40,500	157,750

Table 2 - Effect of OS Mastermap Split (Attribute and Spatial Datasets)

The HLU GIS Tool provides a user interface for maintaining the habitat and spatial data, including changes to attributes and changes to the spatial data. It also provides an audit trail to indicate when it was last edited, why and by whom.

The toolkit provides an interface that links the spatial and attribute data in multiple software environments. It can link ArcGIS and MapInfo with databases held in Access or SQL Server. In principle, the toolkit could link to other database systems such as PostgreSQL and Oracle but these have not been tested and are not supported.

The performance of the tool is limited by the capabilities of third party software, particularly GIS software, which were not designed to handle large datasets split across multiple platforms.

In addition, one of the key requirements for this tool was the ability to use multiple GIS and database environments. Significant improvements in performance could have been achieved if the tool had been designed to work with a single environment e.g. ArcGIS and SQL Server but multiple environment functionality was a key requirement.

The HLU GIS Tool has been optimised as far as possible and there are no further technological enhancements that can be made to significantly improve performance. It is important therefore to ensure performance is optimised wherever possible through user operation. The following section suggests some simple approaches to improving performance.

The code for the HLU GIS Tool is 'open source'.

1.1 Optimising Performance

1.1.1 Creation of ArcGIS Map Document (.mxd) or MapInfo Workspace (.wor)

An ArcGIS Map Document (.mxd) or MapInfo Workspace (.wor) must be created for use with the HLU GIS Tool. This should be optimised to ensure maximum performance, which should include the following:

- Ensure that the .mxd or .wor file only contains one copy of the HLU layer
- Add zoom layering to datasets so that detailed datasets such as the HLU layer and aerial photography are not displayed at smaller scales. Our recommended maximum extents are:
 - ArcGIS – Do not display out beyond:
 - HLU Layer: 1:24,000
 - Aerial Photography: 1:10,000
 - MapInfo – Max Zoom:
 - HLU Layer: 7.5 km
 - Aerial Photography: 3 km
- Ensure that the .mxd or .wor is saved at a sensible view level such as 1:10,000 scale rather the full extent of the HLU dataset

1.1.2 Use of HLU GIS Tool with ArcGIS or MapInfo

It takes a significant length of time for ArcGIS or MapInfo to draw an entire HLU GIS layer, therefore care should be taken when using certain tools to avoid this issue.

- 'Zoom to Selection' is useful for identifying the habitat polygons on the map, however if zoom layering is not used it may take a significant length of time to display the result depending upon the number of polygons selected and their geographical distribution.
- 'Select by Attributes' performs complex queries and selects the results in the GIS window. If a large number of results are returned, it could take a long time to select the spatial polygons in the GIS.
- If the layer is taking a long time to draw, pause or cancel the drawing using:
 - ArcGIS - Click the Pause (II) button in the bottom left corner of the map window
 - MapInfo – Press the Esc key on your keyboard
- For ArcGIS users, if an ArcMap error occurs when the tool is used, check that the HLU ArcMap Extension is enabled in Tools > Extensions – see section **Error! Reference source not found..**
- For ArcGIS users, we strongly recommend that the HLU layer is stored as a file geodatabase or personal geodatabase. **The tool will be significantly slower if the HLU layer is stored as a shapefile due to the limitations of the file format.**
e.g. exporting 152 features takes 18 minutes from a shapefile but takes under 3 minutes from a file geodatabase.
- For MapInfo users, ensure the Cosmetic layer is editable when digitising a polygon for a split operation. The polygon will be added to the layer much faster than if the HLU layer was used and also removes the possibility that the polygon is not deleted after the split.

1.1.3 Selection of Database Type

The HLU GIS Tool is supplied with both Microsoft Access 2000 and SQL Server 2008 databases.

Microsoft Access is a versatile desktop database application, but does not have the same performance as other database systems. Database management systems such as SQL Server are optimised to handle large data volumes and complex queries, and can be significantly faster.

We therefore recommend using the HLU GIS Tool with SQL Server or a similar database management system, as this will improve performance when filtering the database records and updating attribute data.

1.1.4 Local vs. Network Storage

It is important to remember that application performance will depend upon the data transfer speed. Data stored locally on a single computer will provide good performance, but will limit access to the data to a single user. Data stored on a network drive is accessible to all users, but performance will be limited by the speed that the data can be transferred across the network.

1.1.5 Data Management

Only one copy of the database and the GIS layer should be used to avoid data becoming corrupted. If multiple copies are used e.g. an ArcGIS layer and a MapInfo layer or an Access database and a SQL Server database, changes to one GIS layer or database will not be present on the other, causing a mismatch between the attribute and spatial data.

Habitat data must not be edited directly in either the database or the GIS layer. Any modifications made outside the HLU GIS Tool could cause data corruption particularly if unique identifiers are altered.

However, if additional entries are required in the lookup tables, these may be added to the database directly. It is essential that the structure of these tables is not altered and we recommend that any updates to the data in these tables are carried out solely by the database administrator.

1.2 Disclaimer - Updates to User Guide

Version 2.3 of the user guide is the official exeGesIS SDM guide to the HLU GIS Tool v1.0.

exeGesIS SDM takes no responsibility for errors or omissions in future versions of the HLU GIS Tool User Guide that have not been produced by exeGesIS SDM.

1.3 Recommended User Knowledge

1.3.1 Administrator

We recommend that a person with the organisation should be designated as the database administrator. This person should:

- Have several years experience of IT systems management.
- Be an expert user of the database system.
- Understand relational database structures
- Have qualifications, certified training or equivalent experience in managing databases using that system.

1.3.2 Users

This user guide assumes that users of the HLU GIS Tool have:

- General IT experience including use of Microsoft Windows
- Certified training or equivalent experience in the use of the relevant GIS software.

2 User Interface

2.1 *DOs and DON'Ts*

It is essential that the following guidelines are followed to ensure that the tool runs smoothly.

- **DO** close all instances of ArcGIS or MapInfo before the tool launching the tool. The tool will automatically communicate with the correct instance; however multiple instances will require more memory and will therefore affect tool performance.
- **DO NOT** remove the HLU layer from the map while the tool is running.
- For ArcGIS users, **DO NOT** create or open another map document in the associated GIS window while the tool is running.
- **DO NOT** close the associated GIS while the tool is running, otherwise the tool will display an error message.
- **DO** ensure that the HLU GIS layer contains polygons for all INCIDs in the HLU database.
- For ArcGIS users, **DO** use a file geodatabase or personal geodatabase to store spatial information. **DO NOT** use a shapefile as this affects performance.

2.2 *HLU GIS Tool Window*

Once the HLU GIS Tool has been configured, the tool will start the associated GIS, then the main window will appear as shown in Figure 1.

HLU GIS Tool [READONLY]

File Edit View Select Split/Merge Tools

INCID

INCID 0230:0000002 Area [ha] 0 Length [km] 0

Created 18/06/2007 By SERC IHS Team

Modified 18/06/2007 By SERC IHS Team

Reason Process

IHS Details Sources History

IHS Habitat

Category Built-up areas and gardens NVC

Habitat UR0 : Built-up areas and gardens

NVC Codes

IHS Matrix

Matrix 1

Matrix 2

Matrix 3

IHS Formation

Formation 1

Formation 2

IHS Management

Management 1 UA42 : Other public amenity

Management 2

IHS Complex

Complex 1

Complex 2

Summary

IHS Summary UR0.UA42 Legacy Habitat UU8

INCID: |< < 1 > >| of 83439

Figure 1 - HLU GIS Tool window

The following sections provide some guidelines for use and summarise the menu functionality. All menu functions are also available on the toolbar and the relevant icon is shown next to each heading.

2.3 File Menu

2.3.1 Export

Allows you to export data from the HLU database to a GIS layer using a pre-defined export format. For details on defining export formats, see section 3.3.

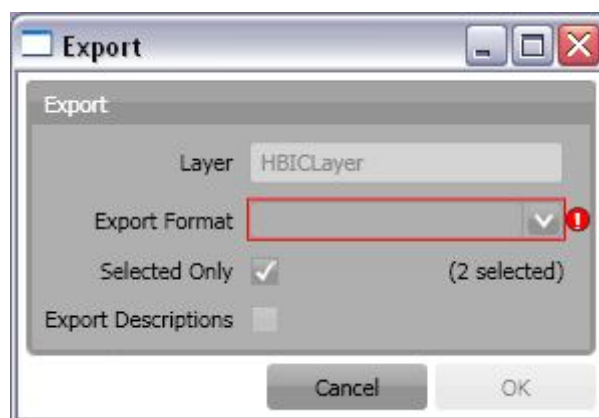


Figure 2 - Export dialog

Select one of the export formats from the drop-down list.

If the database records have been filtered, the 'Selected only' checkbox is automatically ticked as shown in Figure 2 and only the records related to the selected INCIDs will be exported. Untick this box to export all records. For details on how to filter records, see section 2.6.

The 'Export Descriptions' checkbox replaces habitat codes with textual descriptions. This feature is only available for ArcGIS users due to record length restrictions in MapInfo.

2.3.2 Exit

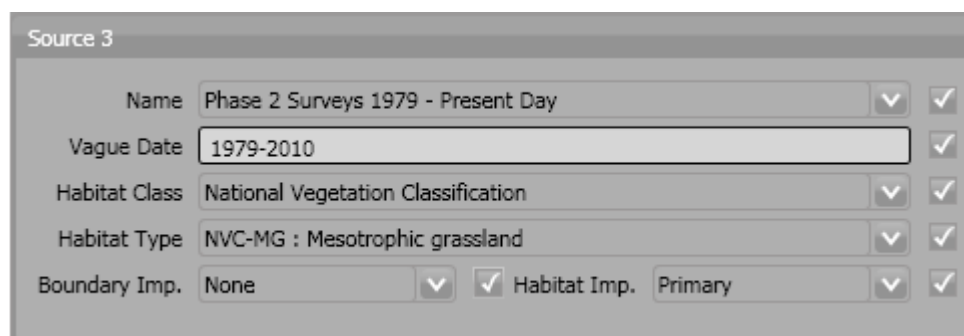
Exits the HLU GIS tool and allows you to decide whether or not to close the GIS window.

2.4 Edit Menu

When the tool is launched, the database tool is read-only by default as indicated. To enable edit mode, the user details must be configured in the database (see section 3.2) and the spatial data must be editable in the GIS software.

2.4.1 Copy

Copies selected attributes so they can be applied to these fields in another record.



The screenshot shows a dialog box titled 'Source 3'. It contains several fields, each with a dropdown menu and a checkbox to its right. The fields and their values are: 'Name' (Phase 2 Surveys 1979 - Present Day), 'Vague Date' (1979-2010), 'Habitat Class' (National Vegetation Classification), 'Habitat Type' (NVC-MG : Mesotrophic grassland), and 'Boundary Imp.' (None). The checkboxes for 'Name', 'Vague Date', 'Habitat Class', 'Habitat Type', and 'Boundary Imp.' are all checked. There is also a checkbox for 'Habitat Imp.' which is checked, and a dropdown for 'Primary'.

Figure 3 - Checkboxes ticked to copy data

Tick the checkboxes next to the fields you wish to copy as shown in Figure 3, then click 'Copy'.

2.4.2 Paste

Pastes the data copied by the 'Copy' tool into the same fields in another record.

For example, the fields copied in Figure 3 would be pasted into Source 3 on the new record.

Note: it is not possible to copy data from one field in one record and paste it into a different field in another.

2.4.3 Bulk Update

Allows you to update the attributes for all selected database records.

Note: this feature is only available to configured users who have been given bulk update permissions. For details on configuring users, see section 3.2.

To perform a bulk update, filter the database records using 'Select by attributes' or select polygons in the GIS layer and click 'Get Map Selection'. For details on filtering records, see section 2.6.

Click 'Bulk Update' on the Edit menu or toolbar. The HLU GIS Tool enters bulk update mode and an empty form is displayed as shown in Figure 4.

The 'Bulk Update' box displays the number of INCIDs, TOIDs and fragments affected by the update and allows you to select whether to create a History record for this process.

Enter the updated details in the IHS, Details, and Sources tabs, then click Apply. These fields will be updated for all the selected INCIDs.

Note: if 'Delete Empty Bulk Update Rows' is checked, child records will be deleted if these fields are not completed in the bulk update form. For details, see section 2.8.1.1.

HLU GIS Tool

File Edit View Select Split/Merge Tools

Bulk Update

DB: INCID 22

Map: INCID 22 TOID 202 Fragments 217

Create History ☐

Reason

IHS Details Sources History

IHS Habitat

Category NVC

Habitat

NVC Codes

IHS Matrix

Matrix 1

Matrix 2

Matrix 3

IHS Formation

Formation 1

Formation 2

IHS Management

Management 1

Management 2

IHS Complex

Complex 1

Complex 2

Summary

IHS Summary Legacy Habitat

Bulk Update. Affected:

Figure 4 - HLU Main Window in Bulk Update Mode

2.5 View Menu

2.5.1 Maximise GIS window

Maximises the ArcGIS or MapInfo window and sets it as the active window.

2.5.2 Windows side by side

Aligns the HLU window to the top left of the screen and expands the GIS window to fill the remaining area as shown in Figure 5.

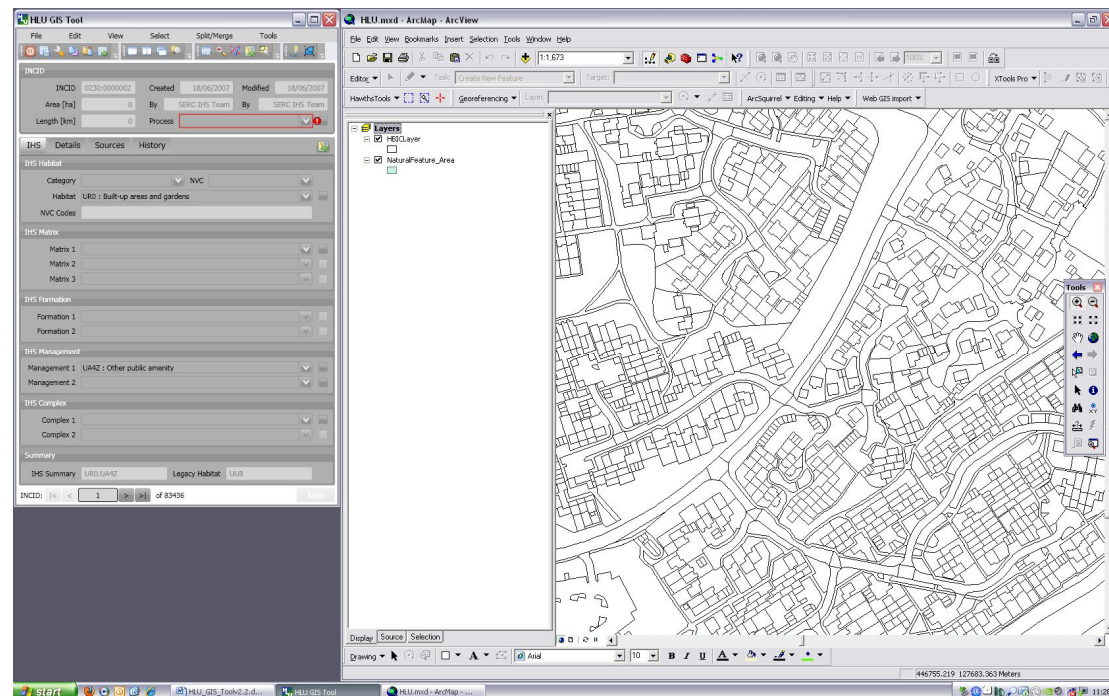


Figure 5 - Windows arranged side by side

2.5.3 Keep DB window on top

Sets the HLU database window to remain floating on top of any other open windows so that the database window is always visible. Enabling this option will ensure that the database window will not disappear behind the GIS window when the GIS window is active.

2.5.4 Switch to GIS window

Sets ArcGIS or MapInfo as the active window but does not alter its size.

2.5.5 Zoom to selection

Zooms to the current database selection in the GIS window.

Note: This process may take a long time depending upon the layer size, the number of selected records and their geographical distribution.

2.6 Select Menu

2.6.1 Select by Attributes

Allows you to filter the database records using the query builder shown in Figure 6.

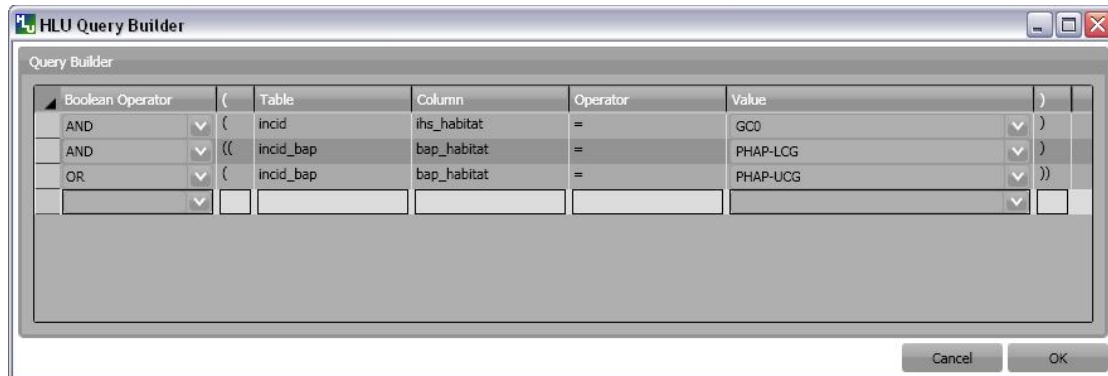


Figure 6 - HLU Query Builder

- 'Boolean Operator' allows you to perform logical selections using
 - AND; AND NOT; OR; OR NOT.
 Note: the value of the 'Boolean Operator' field on the first row is not used.
- '(' and ')' fields allow you to add additional brackets as shown in the example in Figure 6 to define how the query is executed.
- 'Table' and 'Column' define the table and field to be searched.
- 'Operator' provides a drop-down list of the available operators as shown in Figure 7.

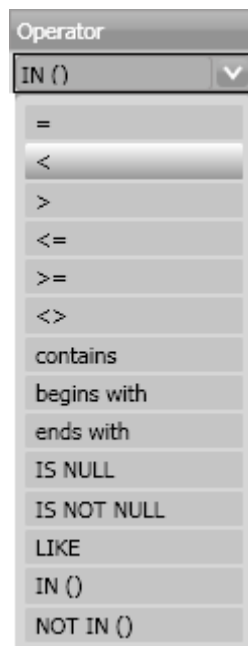


Figure 7 - List of Operators

- 'Value' is the value to search for. Values can either be entered as text or selected from the drop-down list (where available).

Once you have entered the values for the current row, click on another row in the query builder to confirm the entry and enable the 'OK' button.

If you have made a mistake when entering the selection criteria, click on the grey box to the left of 'Boolean Operator' to select the row, then press the 'Delete' key on your keyboard to remove it.

Note: If IHS category and/or IHS summary are enabled in the Options menu, it will be quicker to select data from these fields in the GIS, then use 'Get Map Selection'.

2.6.2 Clear Filter

Removes the current filter so that all database records are visible.

2.6.3 Select Current INCID on Map

Selects all MasterMap polygons associated with the INCID on the current database record in the GIS layer.

2.6.4 Get Map Selection

Filters the database records to retrieve the attributes associated with the selected polygons in the GIS layer.

2.6.5 Select by INCID

Select a polygon on the map and go to 'Get Map Selection' to select the database records.

Once the records are filtered in the database, if all the polygons are part of the same INCID, 'Select by INCID' allows you to expand the map selection to include all polygons belonging to that INCID.

2.7 Split/Merge Menu

Note: Both options in this menu are disabled until the database records have been filtered and a process has been selected from the 'Process' drop-down list in the INCID box on the main window. For details on the INCID box, see section 2.9.1.

2.7.1 Split Features

Split features performs two types of split: Logical Split and Physical Split.

2.7.1.1 Logical Split

Logical split is used to create a new INCID in the database based upon polygons selected from the GIS layer. The habitat details for the new INCID can then be updated.

To perform a logical split:

- Click 'Switch to GIS Window' and select the polygons in the GIS layer.
Note: The polygons must all belong to the same INCID.
- Return to the HLU main window and click 'Get Map Selection'.
- Select one of the options in the 'Process' list.
- Click on 'Split Features'. The new INCID will be created and set as the current record.

2.7.1.2 Physical Split

Physical split creates a new TOID fragment in the database based upon a single TOID which has been split in the GIS layer.

To perform a physical split:

- **ArcGIS**
 - On the 'Editor' toolbar, click on 'Editor' and select 'Start Editing'
 - Select the polygon you wish to split
 - In the 'Task' drop-down list on the 'Editor' toolbar, select 'Cut Polygon Features' as shown in Figure 8.



Figure 8 - Edit Settings for Physical Split (ArcGIS)

- Using the Sketch tool on 'Editor' toolbar, draw a polyline

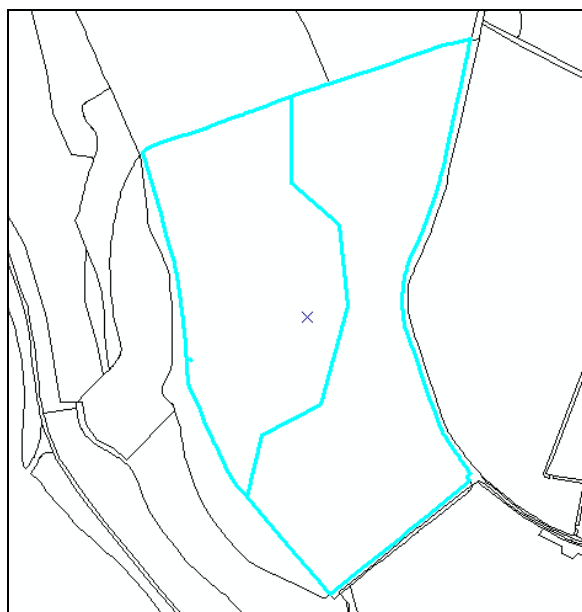


Figure 9 - Split Features (ArcGIS)

- On the 'Editor' toolbar, click on 'Editor' and select 'Save Edits'
 - The polygon will be split but still selected as shown in Figure 9. Return to the HLU GIS Tool and click 'Get Map Selection'
 - Select one of the options in the 'Process' list
 - Click on 'Split Features'. The record will be updated and details added to the History tab for the INCID.
- **MapInfo**
 - Set the Cosmetic layer as 'Editable' and draw the polygon to split by
 - **Note:** The Cosmetic layer should be used due to the time required for MapInfo to add a new polygon to the full HLU layer.
 - Set the HLU layer as 'Editable'
 - Select the polygon you wish to split and go to Objects > Set Target
 - Select the polygon in the Cosmetic layer and go to Objects > Split
 - In the Data Disaggregation box, ensure that 'Method' for all fields is set to 'Value' as shown in Figure 10, then click OK.

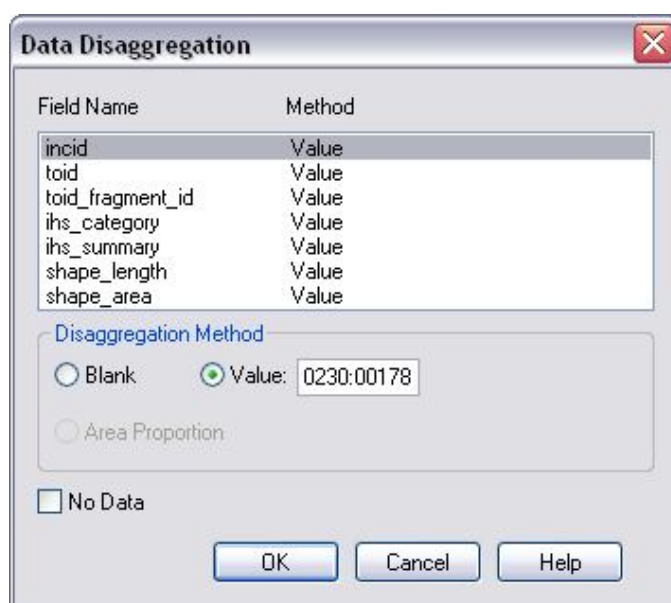


Figure 10 - Data Disaggregation Dialog (MapInfo)

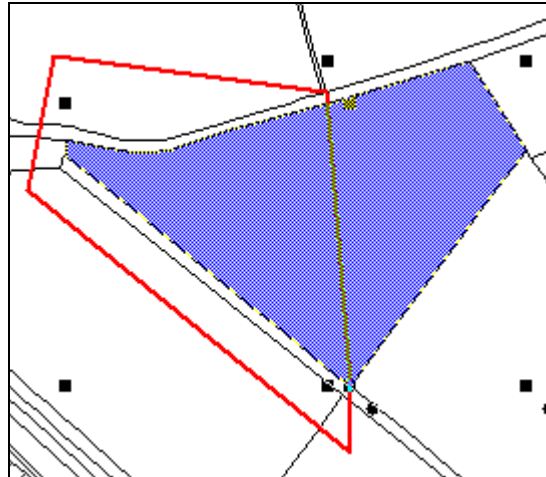


Figure 11 - Split Features (MapInfo)

- The polygon will be split but still selected as shown in Figure 11. Return to the HLU GIS Tool and click 'Get Map Selection'
- Select one of the options in the 'Process' list
- Click on 'Split Features'. The record will be updated and details added to the History tab for the INCID. The Cosmetic layer will be cleared.

Notes:

- Only one polygon should be split in a single operation. Splitting multiple polygons will cause database synchronisation issues.
- If several polygons have been split, select the fragments for one original polygon and split using the tool. Repeat this operation for the remaining polygons.
- Ensure that the physical split is completed in the database prior to commencing any other operations such as 'Select by attributes...' to avoid database synchronisation issues.

2.7.2 Merge Features

Merge features performs two types of merge: Logical Merge and Physical Merge

2.7.2.1 *Logical Merge*

Logical merge combines the selected TOIDs on the map with the INCID selected from the list.

To perform a logical merge:

- Click 'Switch to GIS Window' and select the polygons you wish to merge and a polygon from the INCID you wish to merge them with in the GIS layer
- Return to the HLU main window and click 'Get Map Selection'
- Select one of the options in the 'Process' list
- Click on 'Merge Features'. A list of INCIDs will be displayed as shown in Figure 12.

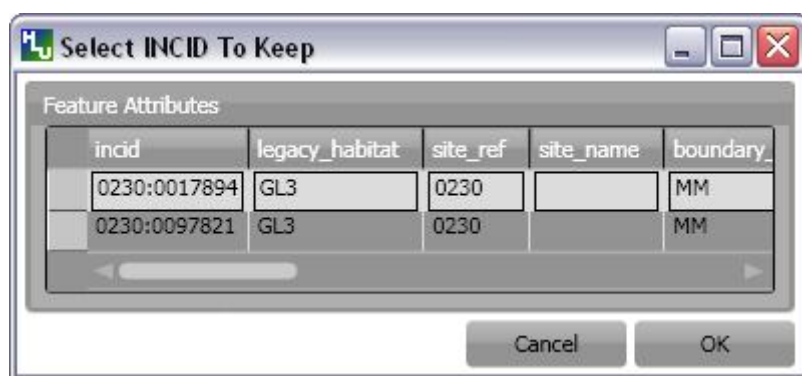


Figure 12 - Select INCID to Keep Dialog

- Click on the grey box to the left of the row to select an INCID. The associated polygon will blink in the GIS window. Click 'OK'
- The selected Mastermap polygons will be merged with the selected INCID and details added to the History tab.
- If the merge polygons are fragments of a single TOID, you will be given the option to perform a physical merge.

2.7.2.2 Physical Merge

Physical merge combines fragments of a single TOID into a single polygon in the GIS layer.

To perform a physical merge:

- Select two or more fragments from one TOID in the GIS layer as shown in Figure 13 (left).
- Return to the HLU main window and click 'Get Map Selection'
- Select one of the options in the 'Process' list
- Click on 'Merge Features'. The polygons will be combined in the GIS layer as shown in Figure 13 (right).



Figure 13 – Physical Merge – Before (left) and After (right)

Note: Only fragments belonging to the same TOID can be merged in a single operation. If fragments for several TOIDs need to be merged, the operation must be repeated for each TOID.

2.8 Tools Menu

2.8.1 Options

Allows you to alter your HLU configuration. There are three categories of options as shown in Figure 14.

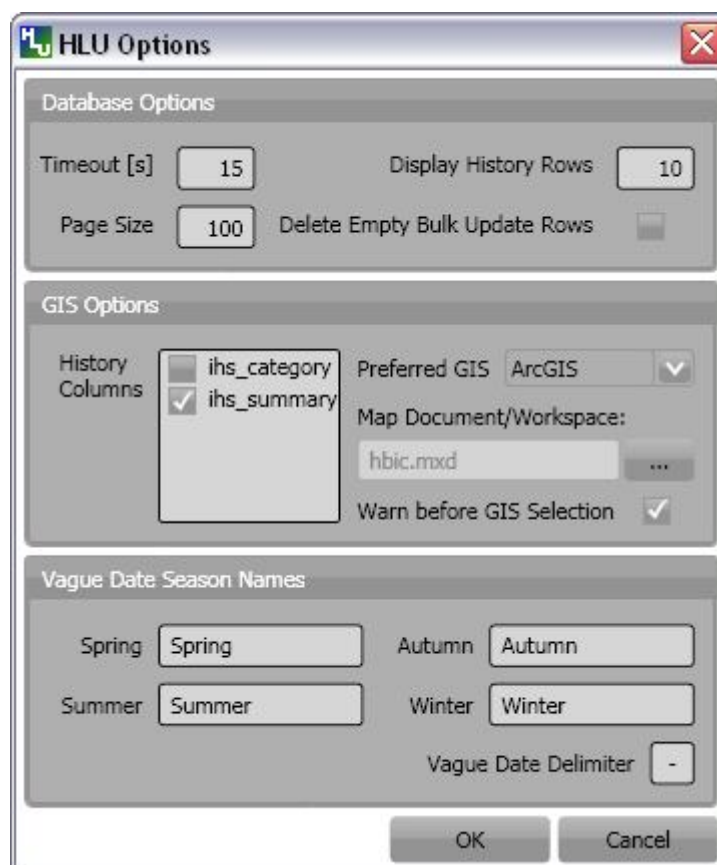


Figure 14 - HLU Options Dialog

2.8.1.1 Database Options

- 'Timeout' sets the amount of time the tool will wait for the database to respond. The default value is 15. This value should be increased if an error occurs such as 'The connection to the database timed out'.
- 'Page Size' sets how many records are retrieved from the database and stored in memory. The default value is 100. Increasing this value can improve performance when browsing records, however this will increase the amount of RAM required by the application and significant increases in the page size value could cause the tool to stop responding.
- 'Display History Rows' sets the number of entries displayed in the 'History' tab of the main window. For detail on the 'History' tab - see section 2.9.5.
- 'Delete Empty Bulk Update Rows' removes the details of child records if they are these fields are not completed in the bulk update form if this box is checked. By default this box is unchecked.

This affects the following sections of the main window:

- IHS Matrix, IHS Formation, IHS Management, IHS Complex, BAP Habitat, Potential BAP Habitats, Sources.

Example: if the bulk update record has only 1 source record completed. For each of the selected records, source 1 will be updated and if the selected record has data entered in sources 2 and 3, it will be deleted.

2.8.1.2 GIS Options

- 'History Columns' allows you to select which additional columns from the GIS layer are displayed in the History tab for each update. If the box is unchecked, the field will not be displayed.
- 'Preferred GIS' allows you to select whether the tool should use ArcGIS or MapInfo if both applications are installed on your computer.

Note: The tool must be closed and restarted for this change to take effect.

- 'Map Document/Workspace' sets the default map document or workspace opened by the HLU GIS Tool. As this field cannot be edited directly, you must click on the "..." button and browse to the new map document or workspace.

Note: If the preferred GIS is altered, this field must also be updated.

- 'Warn before GIS selection' allows you to enable or disable the warning message indicating the number of polygons which will be selected by the current query as shown in Figure 15 - GIS Selection Warning Box

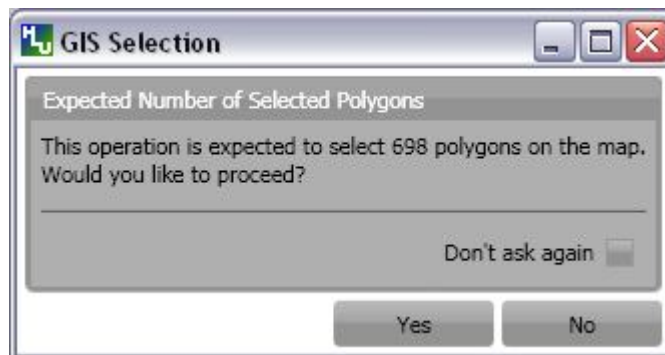


Figure 15 - GIS Selection Warning Box

2.8.1.3 Vague Date Season Names

These fields allow you to define how vague dates, such as Spring 2010-Autumn 2010 or 1989-2010, are entered so that they can be converted to dates in the HLU database.

The default value for the 'Vague Date Delimiter' is a hyphen (-). This can be altered to any character, however it must not be the same delimiter used by your computer to enter precise dates, such as 01/04/2010. The default delimiter used by Windows for English-format dates is a forward slash (/).

2.9 Data

Records can be viewed or updated through the main window of the HLU GIS Tool. The following sections summarise the details available for each record.

Required fields are highlighted in red on each tab. The 'Apply' button will be active when the required fields have been completed on all tabs.

2.9.1 INCID Box

The 'INCID' box displays summary information for each INCID in the database, including area, perimeter, date created and date last modified as shown in Figure 16.

Note: If the user is not configured, the 'By' fields will display their Windows login. For details on configuring users, see section 3.1.

The screenshot shows a software interface titled 'INCID'. It contains several input fields and labels. The top section displays 'INCID' with the value '0230:0000002', 'Area [ha]' with '0', and 'Length [km]' with '0'. Below this, 'Created' is '18/06/2007' and 'By' is 'SERC IHS Team'. 'Modified' is also '18/06/2007' and 'By' is 'SERC IHS Team'. At the bottom, there are two dropdown menus labeled 'Reason' and 'Process'. Both dropdown menus are highlighted with a red border and have a red exclamation mark icon next to them, indicating they are required fields.

Figure 16 - INCID Box

- 'Reason' and 'Process' are required fields for all updates and are used on the History tab to indicate why the record was last updated. These fields are sticky i.e. the selected reason and process will be used for all updates in the current session unless they are altered manually.

2.9.2 IHS Tab

The IHS tab displays the IHS details for the current database record as shown in Figure 17.

Figure 17 - IHS Tab

- 'Category' and 'NVC' drop-down lists are used to filter the 'Habitat' drop-down list to relevant IHS codes. The entries in these fields are not saved to the database.
- The drop-down lists in the IHS Matrix, IHS Formation, IHS Management and IHS Complex boxes allow you to define the habitat according to the SERC IHS guidelines.
- 'IHS Summary' is automatically generated based upon the options selected from the preceding drop-down lists.
- 'Legacy Habitat' is the pre-IHS habitat code.

2.9.3 Details Tab

Click on 'Details' to display the Details tab as shown in Figure 18.

The screenshot shows the 'Details' tab of the HLU GIS Tool. The window has four tabs: 'IHS', 'Details', 'Sources', and 'History'. The 'Details' tab is selected. The main content area is divided into several sections:

- BAP Habitats:** A table with three columns: 'BAP Habitat', 'Determination Quality', and 'Interpretation Quality'. The first row contains 'Lowland Beech and Yew Woodland', 'Definitely is this habitat', and 'Good'.
- Potential BAP Habitats:** A table with four columns: 'BAP Habitat', 'Determination Quality', 'Interpretation Quality', and 'Interpr'. It is currently empty.
- General Comments:** A large text input field.
- Maps:** Two dropdown menus. The first is labeled 'Boundary Map' and the second is labeled 'Digitisation Map'. Both are set to 'OS MasterMap'.
- Biosite:** A text input field labeled 'BiositeName'.

Figure 18 - Details Tab

- 'BAP Habitats' is automatically updated based upon the habitat code selected on the 'IHS' tab. For new BAPHabitats, 'Determination Quality' and 'Interpretation Quality' must be entered.
- 'Potential BAP Habitats' allows you to define other BAP habitats which may also be present within the BAP habitat. An INCID may have a potential BAP habitat even if no BAP habitats are present.
- 'General Comments' is a text field which allows you to enter any additional comments up to 254 characters.
- 'Maps' contains two drop-down lists:
 - 'Boundary Map' defines the source data used to identify the boundary.
 - 'Digitisation Map' defines the map data used to digitise the boundary.
- 'BiositeName' is a text field which allows you to enter the name of the biosite.

2.9.4 Sources Tab

Click on 'Sources' to display the Sources tab as shown in Figure 19. Up to three sources can be defined for each INCID.

Figure 19 - Sources Tab

- 'Name' contains a list of data sources. For details on adding new sources, see section 3.1.
- 'Vague Date' allows you to enter the date of the dataset. This can be either a precise date e.g. 01/04/2010 or a vague date e.g. Spring 2010-Summer 2010, 1980-2010 or 'Unknown'. For details on defining vague dates, see section 2.8.1.3.
- 'Habitat Class' defines the habitat classification used for this data source. If no habitat classification is used, select 'Non-applicable'
- 'Habitat Type' defines the type of habitat. This list is filtered based upon the habitat class.
- 'Boundary Imp.' sets the importance of the source data in determining the habitat boundary.
- 'Habitat Imp.' sets the importance of the source data in determining the habitat type.

Note:

- If the default date for the selected data source has been configured, the 'Vague Date' field will be updated to the default date. If the default date has not been defined, then the 'Vague Date' field must be updated manually.
- For boundary importance and habitat importance, there must only be one source set as 'Primary' or 'Secondary' for each field.

2.9.5 History Tab

The History tab displays a list of modifications made to the current INCID and the associated TOIDs. Each entry displays what modification was made, when and by whom as shown in Figure 20. Entries are shown in descending date order. The number of entries can be configured in the Options, see section 2.8.1.

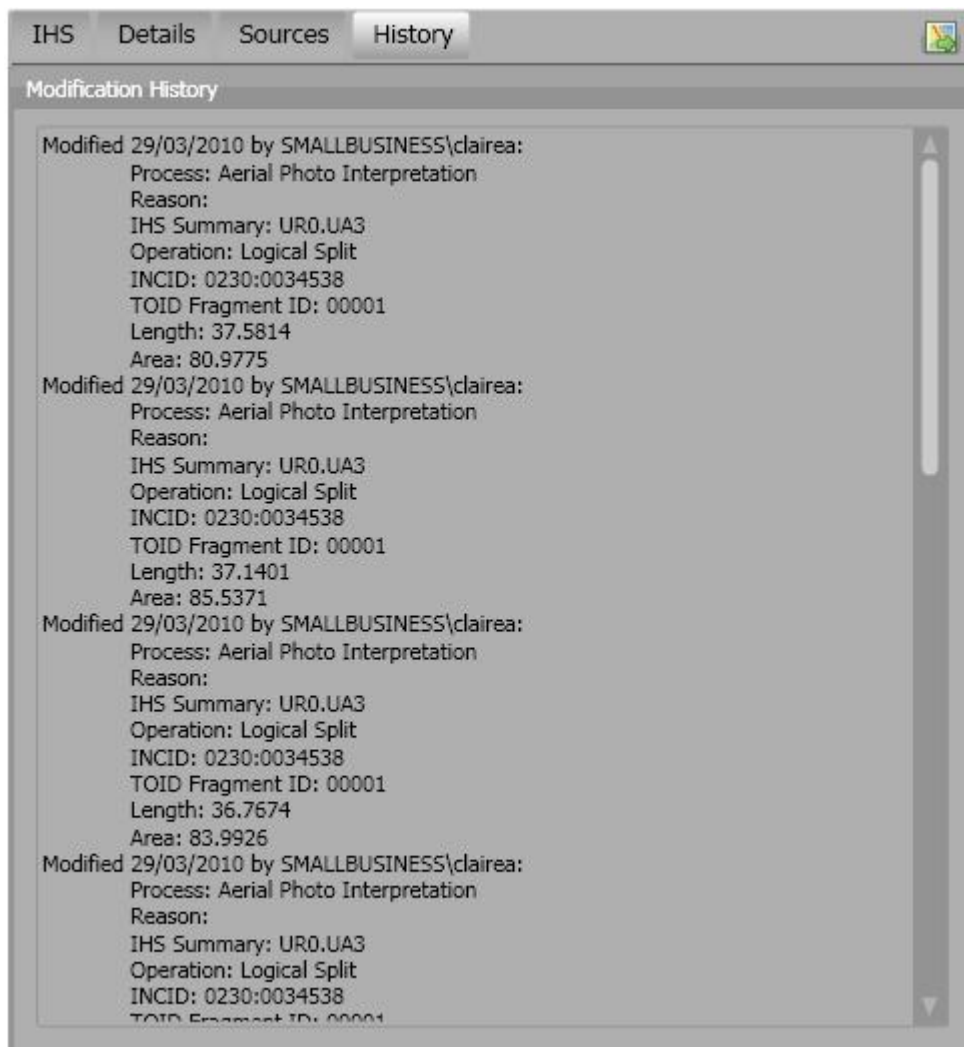
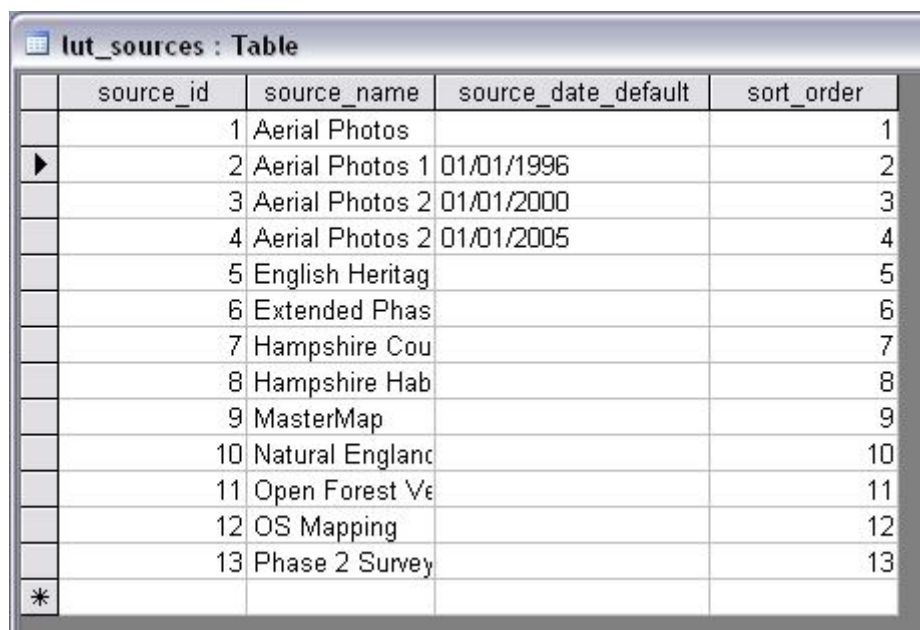


Figure 20 - History Tab

3 Database Configuration

3.1 Adding Sources

Additional sources should be added to the 'lut_sources' table by the database administrator. The format of the table is shown in Figure 21.



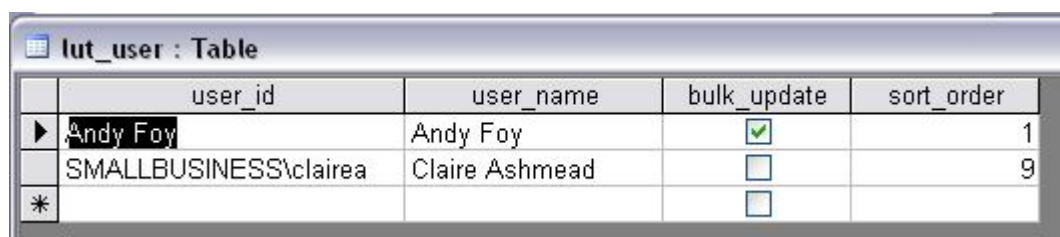
	source_id	source_name	source_date_default	sort_order
	1	Aerial Photos		1
▶	2	Aerial Photos 1	01/01/1996	2
	3	Aerial Photos 2	01/01/2000	3
	4	Aerial Photos 2	01/01/2005	4
	5	English Heritag		5
	6	Extended Phas		6
	7	Hampshire Cou		7
	8	Hampshire Hab		8
	9	MasterMap		9
	10	Natural Englan		10
	11	Open Forest Ve		11
	12	OS Mapping		12
	13	Phase 2 Survey		13
*				

Figure 21 - Format of lut_sources table

- 'source_id' is a unique ID for each source.
- 'source_name' is the name which appears in the 'Name' drop-down list.
- 'source_date_default' is an optional field. If a date is entered, the 'Vague Date' field will be overwritten with this value when this data source is selected. If this field is blank, the existing entry in the 'Vague Date' field will not be altered.
- 'sort_order' determines the order names are displayed in the 'Name' drop-down list.

3.2 Adding Users

Each user of the HLU GIS Tool should be added to the 'lut_user' table by the database administrator. The format of the table is shown in Figure 22.



	user_id	user_name	bulk_update	sort_order
▶	Andy Foy	Andy Foy	<input checked="" type="checkbox"/>	1
	SMALLBUSINESS\clairea	Claire Ashmead	<input type="checkbox"/>	9
*			<input type="checkbox"/>	

Figure 22 - Format of lut_user table

- 'user_id' is the user's Windows login ID. If the user logs in to a domain, the login should be entered in the format: [Domain]\[LoginID] as shown in the second record.
- 'user_name' is the name which will be displayed in the 'By' fields of the INCID box and History tab.

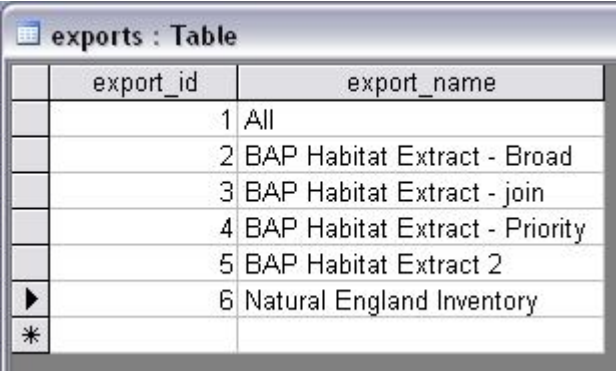
- 'bulk_update' determines whether the user has permissions to run a bulk update to change attributes for all selected records. Ticking this box gives the user permission to run bulk updates.
- 'sort_order' determines the order names would be displayed in drop-down lists. This field is not currently used.

Users will be able to use the tool even if their user details have not been entered into the lut_user table, however the 'By' fields in the INCID box and History tab will display the login ID and bulk updates will be disabled.

3.3 Configuring Exports

3.3.1 Adding Export Types

Export types can be added or removed in the 'exports' table shown in Figure 23.



export_id	export_name
1	All
2	BAP Habitat Extract - Broad
3	BAP Habitat Extract - join
4	BAP Habitat Extract - Priority
5	BAP Habitat Extract 2
6	Natural England Inventory

Figure 23 - Format of exports table

- 'export_id' is a unique identifier used to determine which fields are selected from the 'exports_fields' table – see section 2.3.1.
- 'export_name' is the name which will be displayed in the 'Export Format' drop-down list – see section 2.3.1.

3.3.2 Adding Fields to an Export Type

The 'exports_fields' table shown in Figure 24 defines which fields are exported for each export type in the 'exports' table.

exports_fields : Table						
export_field_id	export_id	table_name	column_name	column_ordinal	field_name	fields_count
1	1	incid	incid	1	incid	1
2	1	incid	legacy_habitat	2	legacy_habitat	2
3	1	incid	site_ref	3	site_ref	3
4	1	incid	site_name	4	site_name	4
5	1	incid	boundary_base_map	5	boundary_base_map	5
6	1	incid	digitisation_base_map	6	digitisation_base_map	6
7	1	incid	ihs_version	7	ihs_version	7
8	1	incid	ihs_habitat	8	ihs_habitat	8
9	1	incid	general_comments		general_comments	24
10	1	incid	created_date	10	created_date	25
11	1	incid	created_user_id	11	created_user_id	26
12	1	incid	last_modified_date	12	last_modified_date	27
13	1	incid	last_modified_user_id		last_modified_user_id	28
14	1	incid_ihs_matrix	matrix	3	matrix	9
15	1	incid_ihs_formation	formation	3	formation	10
16	1	incid_ihs_management	management	3	management	11
17	1	incid_ihs_complex	complex	3	complex	12
18	1	incid_bap	bap_habitat	3	bap_habitat	13
19	1	incid_bap	quality_determination	4	quality_determination	14
20	1	incid_bap	quality_interpretation	5	quality_interpretation	15
21	1	incid_bap	interpretation_comments	6	interpretation_comments	16
22	1	incid_sources	source_date_start	4	source_date_start	17
23	1	incid_sources	source_date_end	5	source_date_end	18
24	1	incid_sources	source_date_type	6	source_date_type	19
25	1	incid_sources	source_habitat_class	7	source_habitat_class	20
26	1	incid_sources	source_habitat_type	8	source_habitat_type	21
27	1	incid_sources	source_boundary_importance	9	source_boundary_importance	22
28	1	incid_sources	source_habitat_importance	10	source_habitat_importance	23
*						0

Figure 24 - Format of exports_fields table

- 'export_field_id' is a unique identifier for the field.
- 'export_id' is the unique identifier for the export type in the 'exports' table – see section 3.3.1.
- 'table_name' is the name of the source table in the database containing the column to be exported
- 'column_name' is the name of the column within the source table
- 'column_ordinal' is the number of the column within the source table starting from 1. The export function does not require this column to be completed.
- 'field_name' is the name of the column in the exported GIS layer.
Note: This must be a valid ArcGIS/MapInfo column name i.e. no spaces or special characters.
- 'field ordinal' sets the order of the fields in the exported GIS layer.
- 'fields_count' allows you to determine the number of child records to be exported.

Note: As shown in the example in Figure 24, geometry fields should not be included. This includes: obj, shape, perimeter, area, x, y etc. These fields will be added automatically to the exported layer.

4 Appendix

4.1 *Known Issues and Bugs*

- ArcGIS generates a 'hard error' when the HLU GIS Tool is used
 - Solution 1: The HLU ArcMap extension has not been enabled. Close and relaunch the tool, then enable the extension in ArcMap before using the toolkit.
 - Solution 2: ArcGIS has been closed while the tool was running. Close and relaunch the tool.
- The HLU GIS Tool stops responding to GIS requests
 - Solution 1: The HLU GIS layer is no longer active in the map or MapInfo has been closed while the tool was running. Close and relaunch the tool.
- The HLU GIS Tool communicates with the wrong instance of the GIS software
 - Close all GIS instances except the one associated with the HLU GIS tool. To avoid this issue, ensure all instances of ArcGIS or MapInfo are closed before launching the tool and do not open any additional instances whilst the tool is running.
- The Bulk Update tool errors and fails to create history if the bulk update is applied to database records which do not have corresponding polygons in the HLU layer.
 - Ensure that the database and map layer are kept in sync so this situation does not occur.