March 2016

GLASTIR MONITORING & EVALUATION PROGRAMME
MAPPING FIELD HANDBOOK
Part 2: using Surveyor software

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NATURAL ENVIRONMENT RESEARCH COUNCIL

GMEP procedure	Mapping Field Handbook Part 2: Using Surveyor Software
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Version History

Version	Updated By	Date	Changes
1.1	Bronwen Williams	12/3/2014	Minor changes – formatting document
1.2	Lindsay Maskell	26/3/14	Edits resulting from discussions after last year's field season. Changes to field key and minor edits to handbook.
1.3	Lindsay Maskell/ Emma Waters	04/04/14	Updates from discussions with team leaders (LM) Formatting/page numbers/helpdesk number updated (EW)
1.4	Lindsay Maskell	23/04/14	Minor changes
1.5	Lindsay Maskell	24/03/16	Updated mapping change section

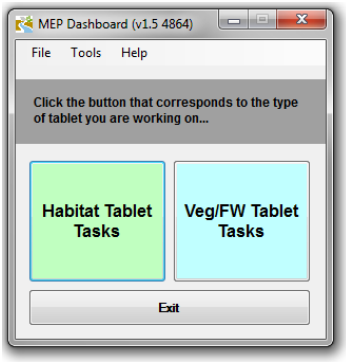
Table of Contents

1. Using the Digital Mapping System

A digital system called Surveyor was specially developed for CEH for CS2007. It was originally based on a system developed by the Forestry Commission which was customised as part of a joint collaboration between CEH and ESRI for CS and has been subsequently further customised for GMEP (although it still has the surveyor logo). PLEASE telephone the helpdesk to discuss any queries or problems you have with the system.

Starting ArcMap & CS Surveyor

Choose the Habitat tablet tasks menu



Open Arcmap using Habitats task manager and clicking on Launch Surveyor application. Choose square to edit.

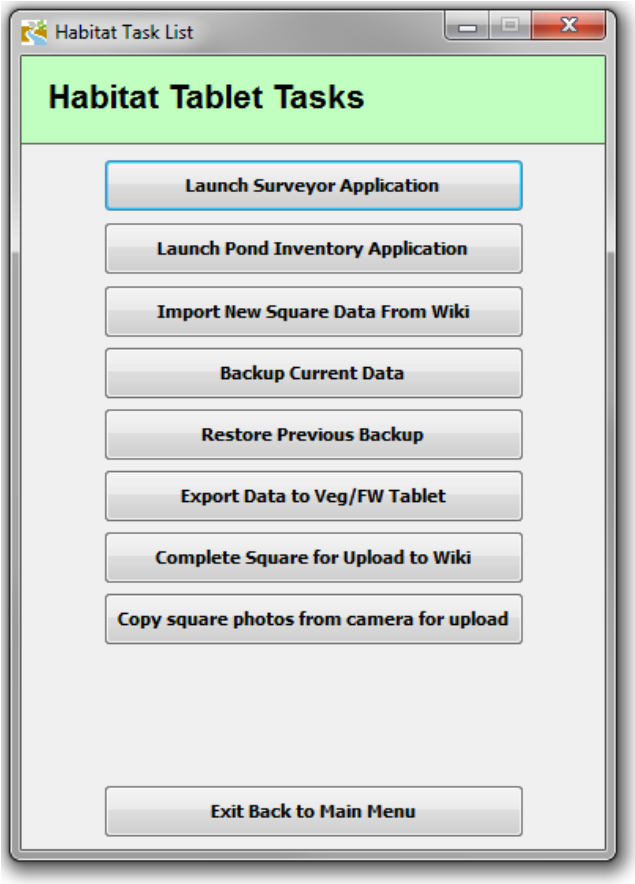


Figure 1.1 Habitats task manager

Basic ArcMap

ArcMap is the GIS program, upon which CS Surveyor is built.

Surveyors are not required to have a knowledge of how ArcMap operates, since CS Surveyor includes all of the tools required to allow capture of all necessary data for GMEP. This introduction will illustrate how to navigate around ArcMap and use the tools and buttons needed to do so.

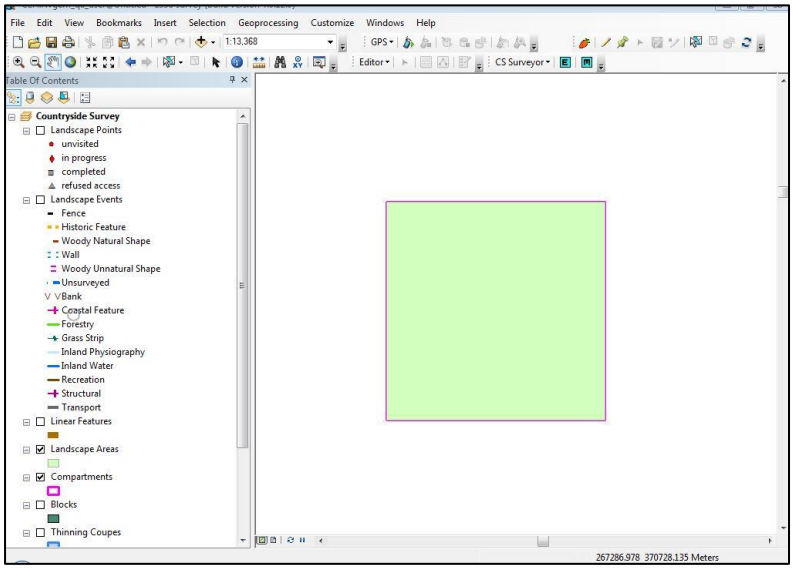
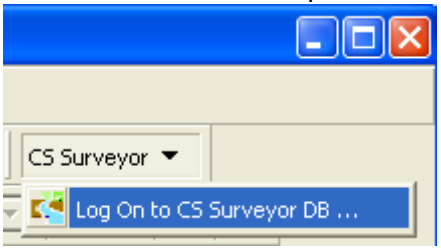


Figure 1.2: The ArcMap Interface

There are two main parts to the ArcMap interface, the Table of Contents, and the Map Display.
The Table of Contents displays Layers of data, which are held in a Data Frame.
The Map Display shows the geographical representation of the data which is held in the Table of Contents.
The CS Surveyor extension also adds a menu item in the ArcMap interface, to allow the surveyor to access the main functions of the program.

When ArcMap has started up, start and log on to the CS Surveyor extension. This is done from the ArcMap toolbar.



The CS Surveyor Extension welcome screen opens. Check that the path to the database is correct; enter your username and password to log on to the extension.

Main Survey
User Name: WGEMUSER
Password: 4nt34t3r

Training and QA
User Name: WGEM_QA_USER
Password: 44rdv4rk

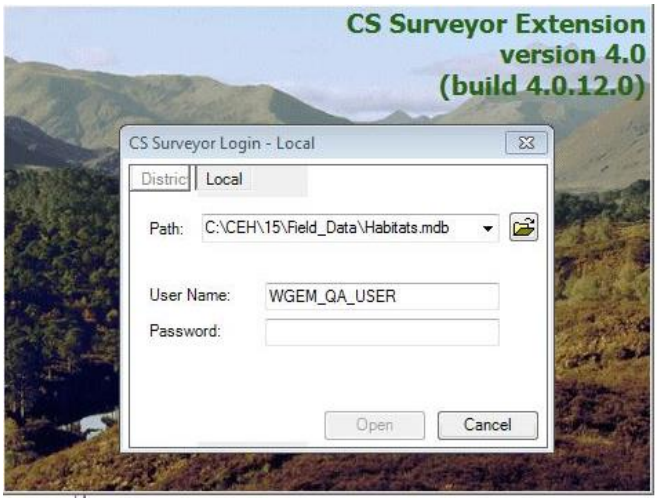


Figure 1.3 Surveyor login

When you have successfully logged on, the CS Surveyor Extension loads into the GIS, and shows the relevant survey square in the map screen.

ArcMap with CS Surveyor

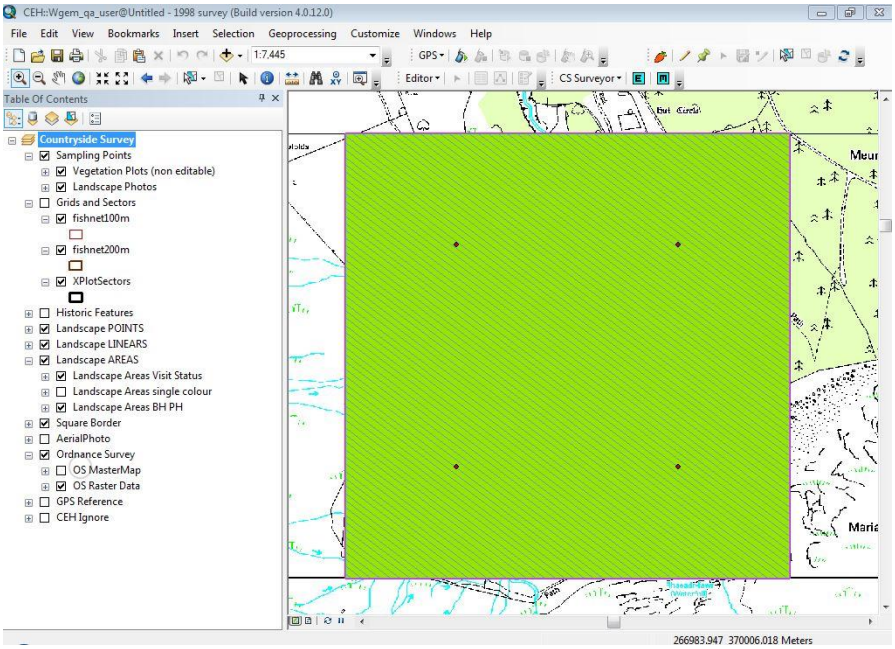


Figure 1.4 The ArcMap Interface with CS Surveyor running

When CS Surveyor is started, it automatically loads in the data required to allow the surveyor to view and edit the location and attributes of point features, linear features, and polygon features within the chosen square.

A data frame named Countryside Survey in the table of contents holds the various data layers with their symbology pre-set to ensure their visibility, and usability.

Navigation tools and buttons in ArcMap

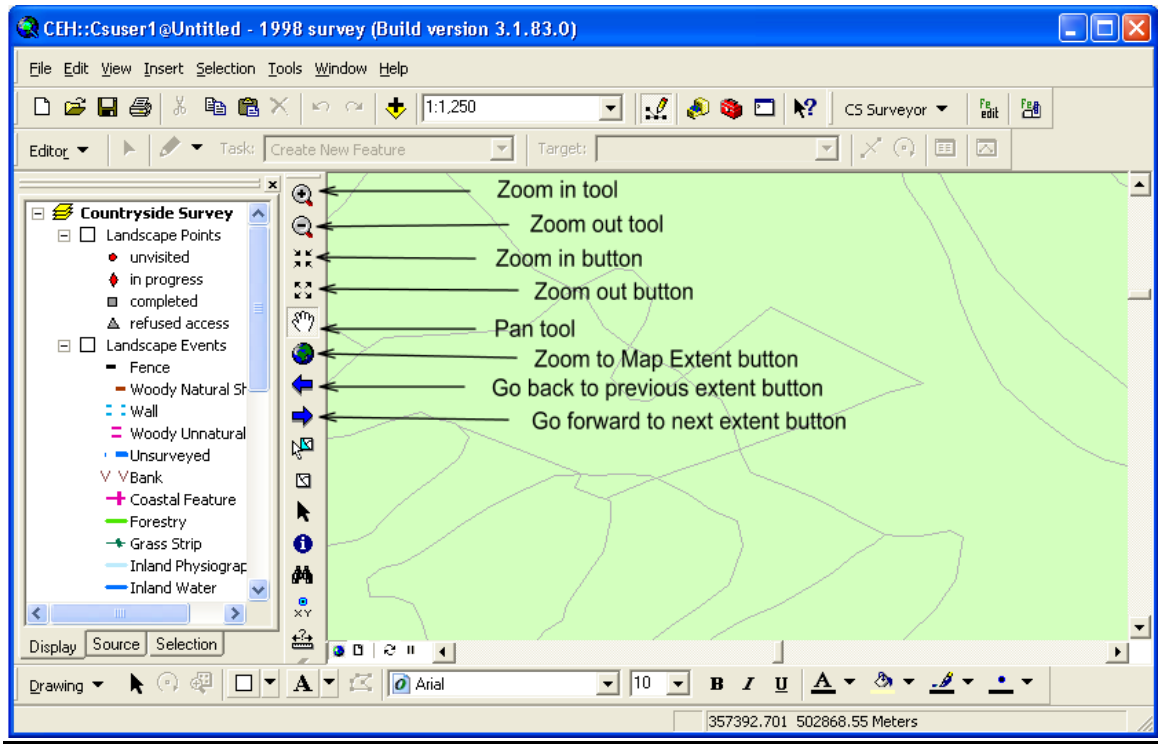


Figure 1.5 ArcMap navigation tools and buttons

The Zoom in tool allows the user to click at a chosen point on the map display, the result is the map zooms in and is re-centred on the clicked point. Alternatively a zoom box can be dragged across the map display to zoom in to the extent of the box.

The Zoom out tool allows the user to click at a chosen point on the map display, the result is the map zooms out and is re-centred on the clicked point. Alternatively a zoom box can be dragged across the map display to zoom out recentred on the box.

The Zoom in button makes the map display zoom in centred on the mid point of the display.

The Zoom out button makes the map display zoom out centred on the mid point of the display.

The Pan tool allows the user to pan the map in any chosen direction over the map display.

The Zoom to map extent button zooms the map display out so that all layers in the data frame are displayed. In CS Surveyor this will normally be the extent of the 1km square.

The Go back to previous extent and Go forward to next extent buttons allow the user to scroll back and forwards between previous and next extents on the map display.

Other tools and buttons in ArcMap tools toolbox

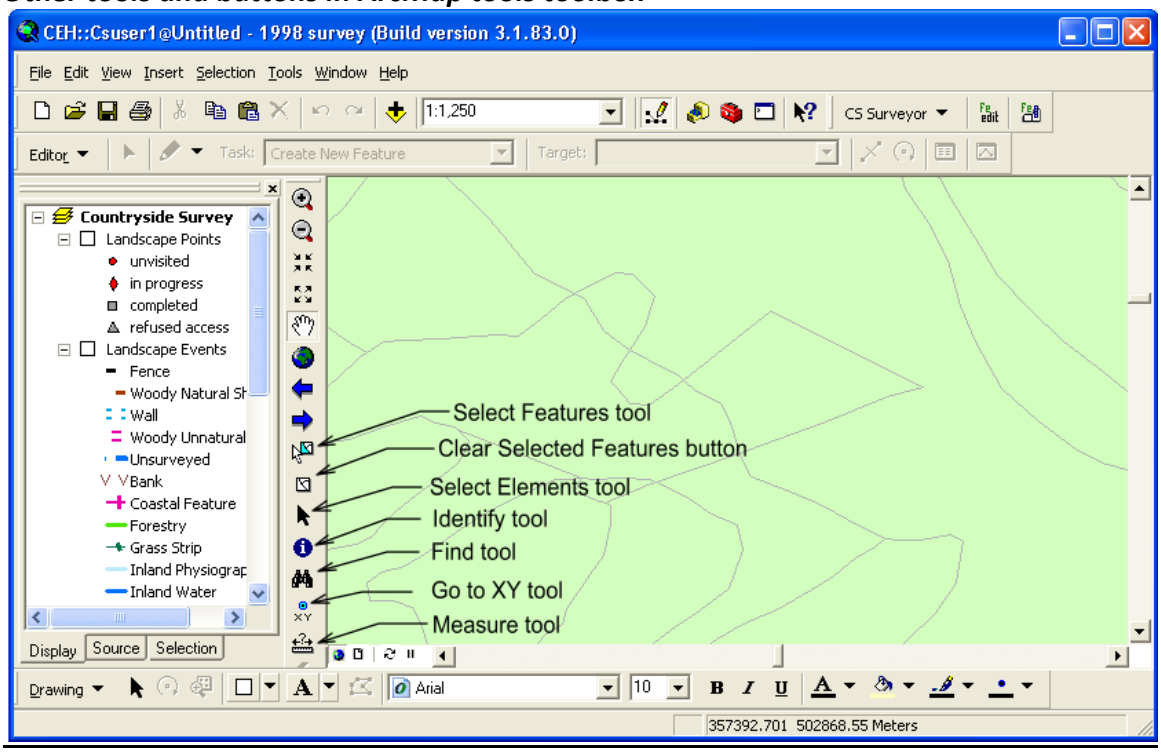


Figure 1.6 ArcMap navigation tools and buttons

The Select Features tool allows the user to select a feature, or features, from one or more layers of data in the map display.

The Clear Selected Features button clears any selected features.

The Select Elements tool allows the selection, moving and resizing of graphics, text and similar elements.
The Identify tool allows the user to view the attributes of any feature in the map display, without selecting or de-selecting the feature.

The Find tool allows the user to search for a feature by a particular value of an attribute.

The Go to XY tool allows the user to navigate to a point by entering a set of X and Y co-ordinates.

The Measure tool allows the measurement of approximate lengths and areas on the map display.

Before you start mapping you may want to initiate the GPS, for information on setting up the GPS see the technical manual. The GPS on the motion may be slightly less accurate than the GPS on the GETAC (and may also take longer to initiate). This shouldn't affect the quality of the mapping as you should be using all available sources of contextual data- aerial photographs, OS maps, Master map data but just keep this in mind and don't depend solely on the GPS.

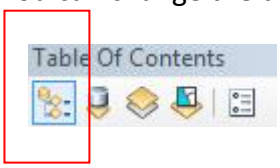
The Table of Contents contains the following features

- Grids and sectors
    - Fishnet 100m- U plot location
    - Fishnet 200m- guide in unenclosed uplands
    - X plot sectors
- Historic features
- Landscape points
- Landscape Linears
- Landscape Areas
- Aerial photos
- Ordnance Survey
    - OS MasterMap
    - OS Raster data

There are various things that the surveyor can do to customise their set-up

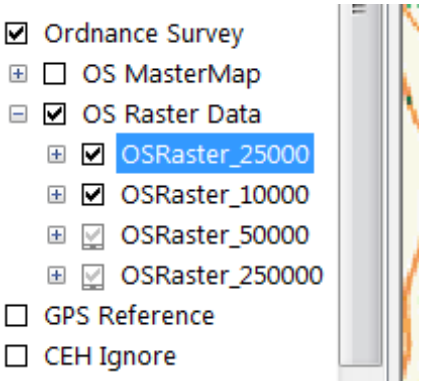
They can change the transparency of a layer by right clicking on it, going to properties then the display tab and changing the % transparency.

You can change the drawing order by going to the button that lists by drawing order

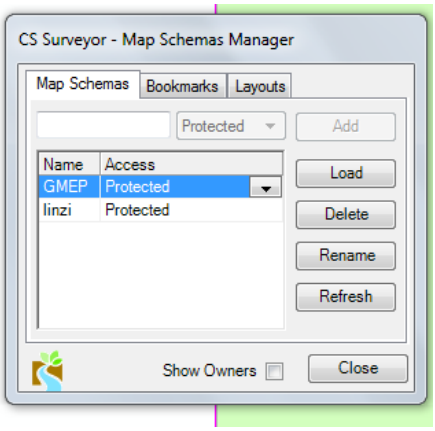


Move the layers up and down according to which you want at the front. If you move the OS Master Map polygons data to the top it should appear at the top of the list when you use the copy button on split or update.

You can change the scale at which the OS maps are visible- go to the OS raster data and right click on the layer you want and choose properties. In the general tab choose Show layer at all scales.



Once you have set up the way that you want you can save to the schema

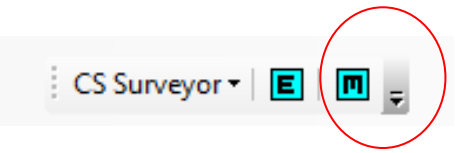


2 Methodology for Mapping Polygons (Habitat Areas)

To edit areas you will need to be zoomed in to a scale of < 1:5000

Map Schema

Click on the Edit button in the ArcMap toolbar to begin an edit session. Click on the 'M' button to set up the schema (the way that the data looks/appears).



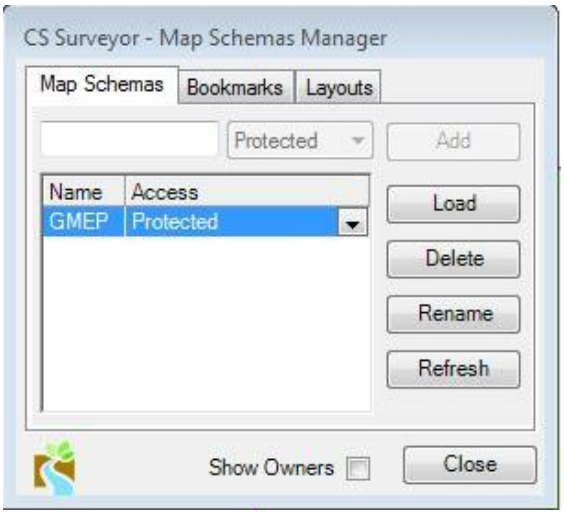


Figure 2.1 Schema

Click on the 'E' button to start an edit session. This will open the Landscape Feature Editing toolbox, which has 3 tabs which enable the user to edit each of landscape feature types.

Figure 2.2 Edit button on ArcMap toolbar

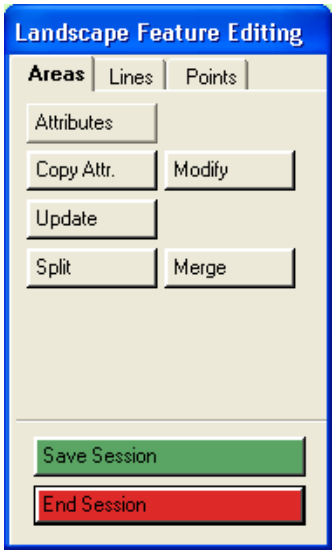


Figure 2.3 Landscape Feature Editing Toolbox

Each feature type has its own selection of tools; these are designed to allow the surveyor to manipulate features to reflect change in the landscape.

The surveyor can use any of the tools, and edit Areas, Lines, and Points, without leaving an edit session. Click the Areas tab in the Landscape Feature Editing toolbox:

The surveyor can edit the attributes of an area, copy attributes from a source to target areas, split an area, merge areas together, modify the boundaries of areas, and update areas using a copied shape or digitised sketch .

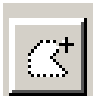
2.1 Split

To begin with, squares in the GMEP survey will be new squares so surveyors will need to begin by creating polygons from a single 1km square polygon. This can be done freehand by looking at what is there on the ground and drawing your own shape (simple split). It can also be done by copying polygons from external datasets, OS Master Map will be the most useful of these and this is described under the copy tool.

Simple split

Click 'split' on the edit menu box, click on the select polygon icon,
Zoom or pan to the location on the map display where the area is to be split. Click or drag a selection box to select the area to be split. The selected area is shown highlighted with a blue hatch.

Using the sketch tool, digitise the split polygon, ensuring the split line is in the correct location. Using a series of join-the-dots type editing with the stylus, start just outside the polygon and touch the screen, lift the stylus off the screen and move to where you want the next 'dot' to be, carry on across the polygon until you are out the other side, then carry on until you can complete a polygon that will include all the bit you want to split out. If the area is at the edge of the square just tap outside of it. Double tap to finish (this is not easy and may need a few attempts – if so make sure the stylus hits the same point). The area which will be split is shown highlighted with a blue/red cross hatch.



Sketch Tool

Split Area showing area to be split off

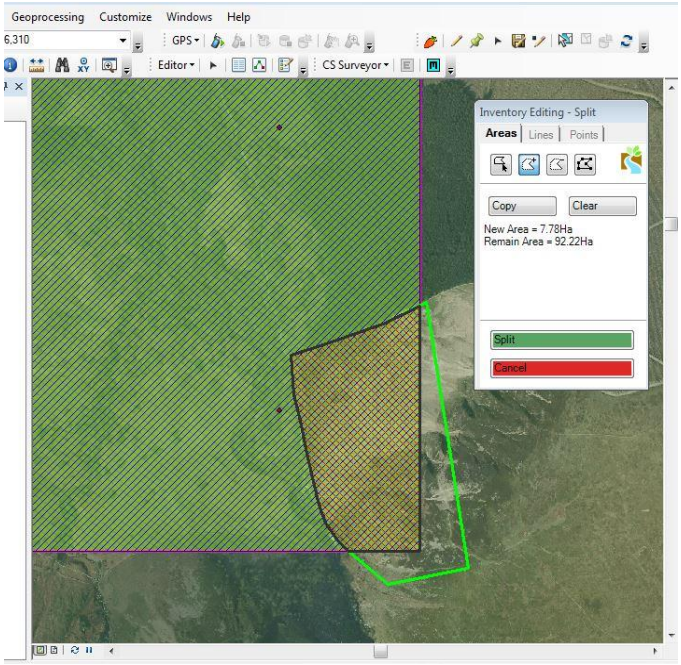


Figure 2.1.1 Splitting a polygon

If the part to split is too small (i.e. below the minimum mappable unit) it will be highlighted in bright red.

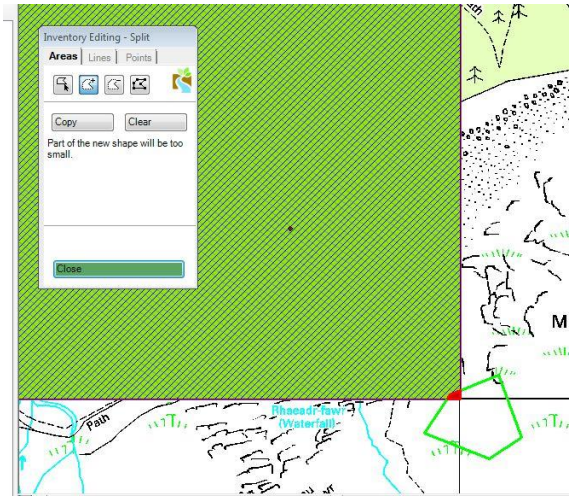


Figure 2.1.2 Splitting a polygon MMU too small

Click 'clear' on the dialogue box and start again.

If everything is OK the part to be split will show in red hatching. The attribute editor will open, with each part of the split area being highlighted in turn, the surveyor should input attributes for the split areas to complete the edit.

If you have drawn the shape and it is large enough but you are not happy with the shape and want to start again click 'clear' on the dialogue box and repeat.

If you want to remove a piece of the polygon you have just created click on the shape with a minus sign.

Modifying the Edit Sketch

If the edit sketch created to split an area is not satisfactory in terms of shape, then it can be modified by moving its vertices to create the final shape.

Click on the vertex edit tool, the edit sketch now has vertices shown as edit handles. The edit sketch can now be modified, with vertices added, deleted, and moved, until the surveyor is satisfied that the edit sketch will produce the split required.

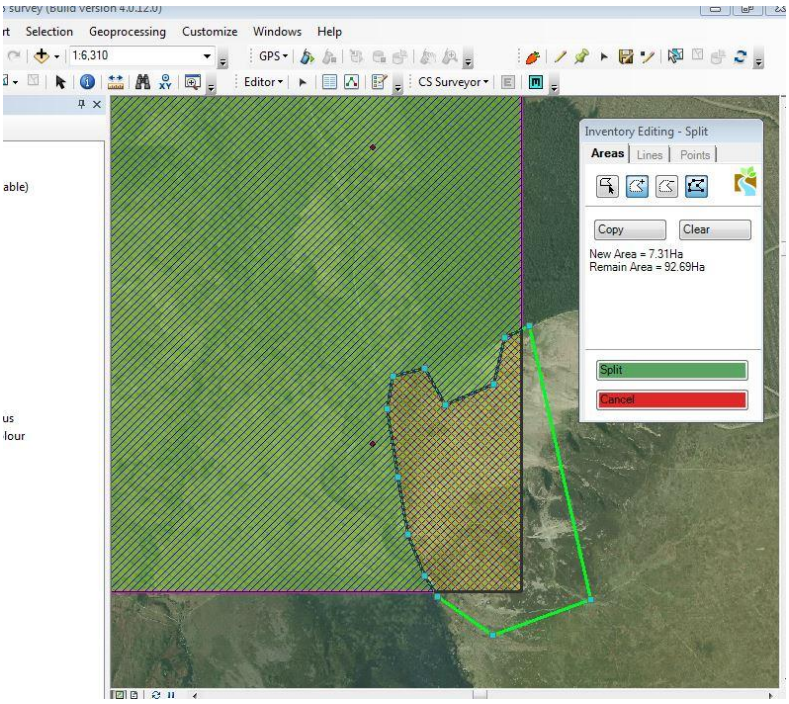


Figure 2.1.3 Edit sketch with vertices shown – ready to modify

When you have created the split shape the attribute editor will open, with each part of the split area being highlighted in turn, the surveyor should input attributes for the split areas to complete the edit.

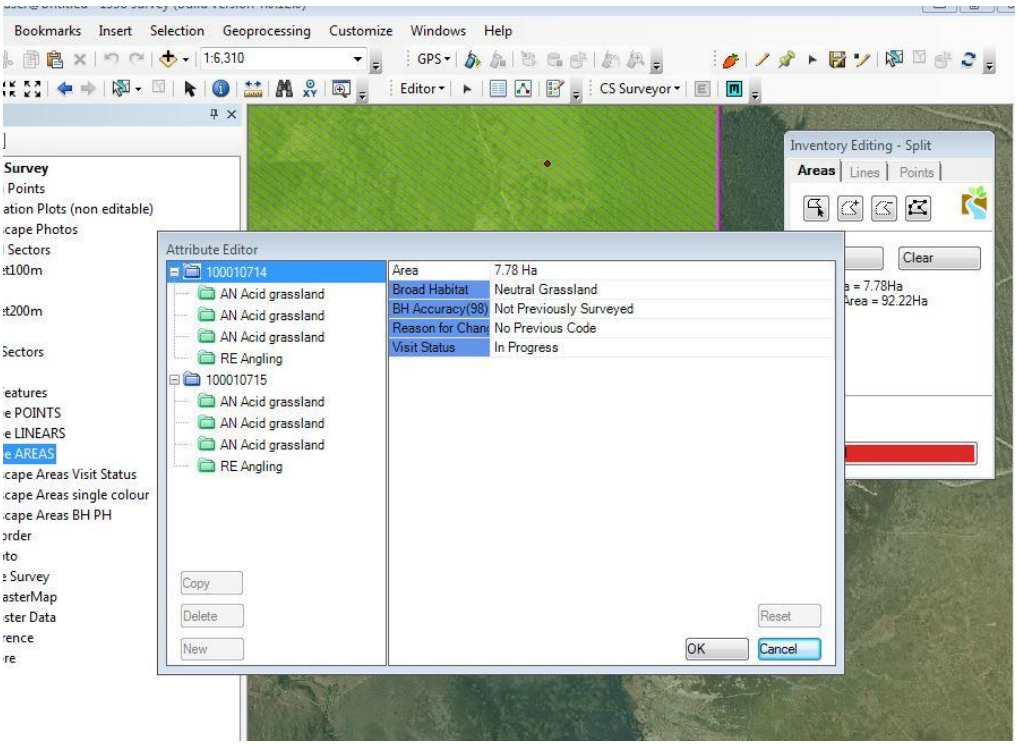


Figure 2.1.4 editing attributes after a split

Split Area – Creating a doughnut polygon

This edit should be done as a standard split, but since the intended result is to cut the split polygon from within the selected polygon, then it should be digitised accordingly.

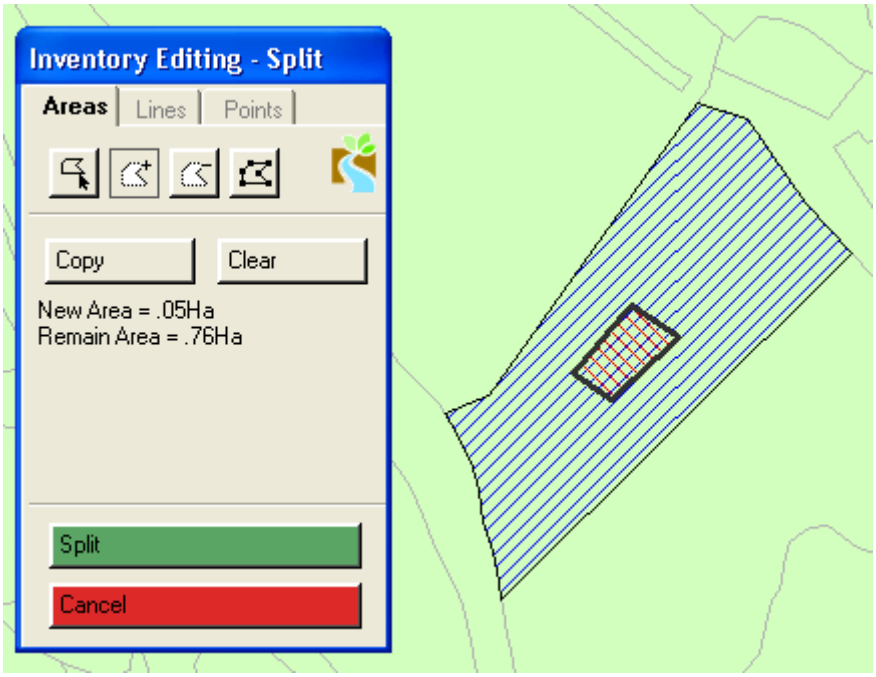


Figure 2.1.5 Split edit sketch to create doughnut polygon

2.1.1 Copying polygons from existing layers

Existing polygons from other map layers, for example OS MasterMap, can be copied and used to make a Split Area edit sketch polygon.

Zoom or pan to the location on the map display where the area is to be split. Click or drag a selection box to select the area to be split. The selected area is shown highlighted with a blue hatch.

Click on this button

Click the Copy button to open the Copy features toolbox. Select the layer you wish to copy features from, this must be a polygon layer (most likely to be OSMaster Map) and select the feature you wish to copy.

The selected feature is shown with a heavy blue outline. Click the Copy+ button to include this feature in the edit sketch, the polygon is now shown with a heavy green outline, to indicate that it is part of the Split edit sketch. Select other features in the same way, clicking Copy+ to add more features to the edit sketch, and Copy- to remove features from the edit sketch.

The edit sketch can be further refined using the edit vertex tool, as described above in Modifying the Edit Sketch.

Areas to be split are shown with a heavy black outline, and a red/blue cross hatch.

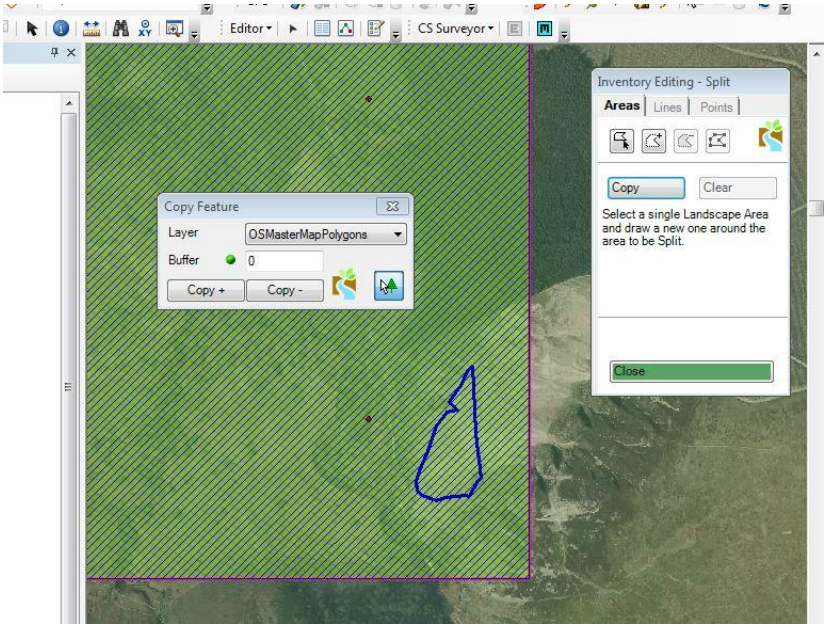


Figure 2.1.2.1 Edit sketch made by using the Copy Features tool

Click split to complete the spatial edit.
The attribute editor will open, with each part of the split area being highlighted in turn, the surveyor should input attributes for the split areas to complete the edit.
The copy tool is particularly useful if a polygon exists on another map layer, OS MasterMap for example, and the surveyor wishes to use this to create an identical polygon within the Landscape Areas layer. It is also possible to copy from OS Master may layer but to exclude a polygon from the Landscape Areas BH PH layer (which is the mapping layer you are creating).

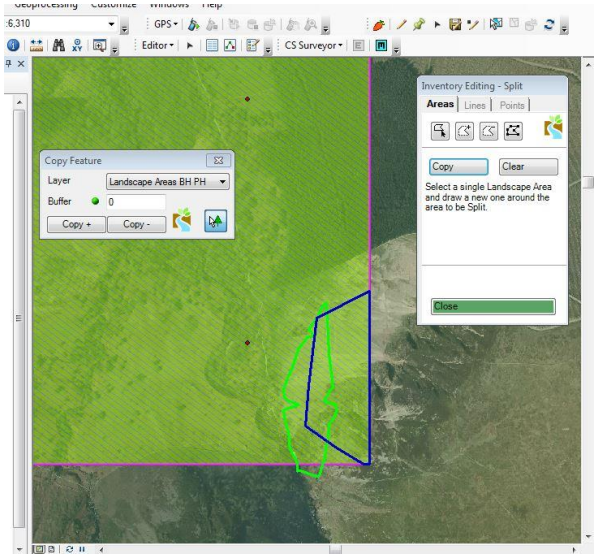


Figure 2.1.2.2 Edit sketch made by using the Copy Features tool and Landscape features layer excluded

Areas can only be split one at a time.
A Split can be digitised across and around a polygon to create a simple split or within a polygon creating a doughnut polygon.

It may be that your square has a large area of urban or other homogenous habitat which is greatly sudivided on mastermap so drawing through from this layer would take a lot of time. A quicker method is to wait until all polygons adjacent and surrounding the large urban etc area have been done so it is completely ringed by split out polygons. Then draw a polygon around the large area of urban etc making sure it does not cross into it and split out the urban area. It can then have it's attributes added/copied across from another area of urban.

2.2 Modify

Zoom or pan to the location on the map display where the area is to be modified. Click on or drag a selection box over the boundary between two polygons, which is to be modified.
The selected boundary is shown highlighted in mauve, and edit handles are shown along its length. Using the topology edit tool the edit sketch can now be modified, with vertices added, deleted, and moved, until the surveyor is satisfied that the edit sketch reflects how the boundary is on the ground.
Note that the vertices at the end of the shared boundary cannot be edited at this point, since they are shared nodes – they share their topology with other features, and can only be modified in Shared Node Modify.

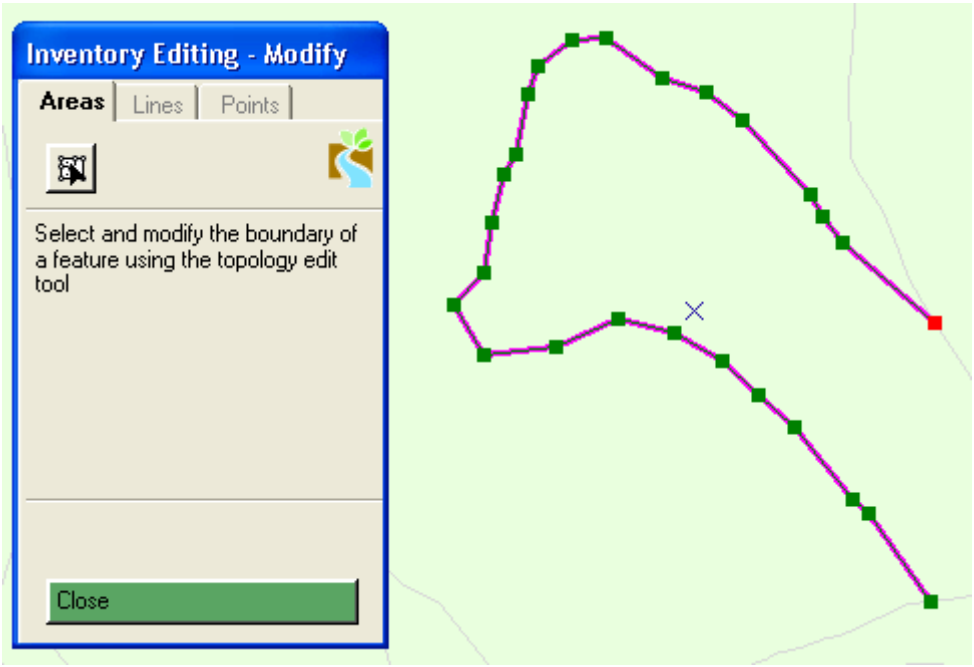


Figure 2.2.1 Boundary selected for Modify edit

Click to one side of the boundary to see how the edited boundary will be changed as a result of the edit.
Click Save Changes to save the spatial edit.
The attribute editor will open, with each part of the modified area being highlighted in turn, the surveyor should input attributes for the split areas to complete the edit.

Shared Nodes – These can only be modified if selected individually as a node, for modify editing.
Using the topology edit tool, select a shared node to modify by clicking carefully on the node

(use the keyboard shortcut of n to prevent the selection of a boundary rather than the node). The node is shown highlighted in mauve.

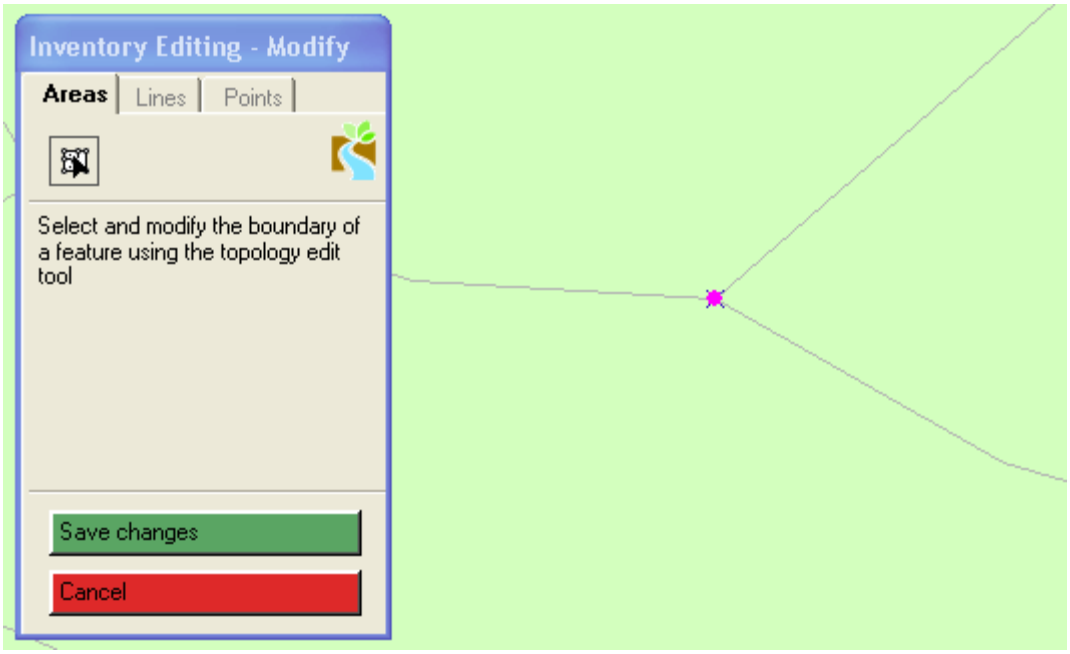


Figure 2.2.2 Shared node which has been modified – ready to save changes

Drag the node to its new position, the adjoining polygon boundaries will move along with the node as it is moved.
Click on Save Changes to save the spatial edit.
The attribute editor will open, with each part of the modified area being highlighted in turn, the surveyor should input attributes for the split areas to complete the edit.

Only the boundary between two polygons is edited using Modify.
The points at the end of an edit boundary are shared nodes, and these can only be edited using shared node modify.

2.3 Merge

Before carrying out a merge, the surveyor will have satisfied him/her self that the attributes of the areas to be merged are identical.

Zoom or pan to the location on the map display where the areas are to be merged. Click or drag a selection box to select the areas to be merged. The selected areas are shown highlighted with a blue hatch.
If required, select the polygon, from within those selected to merge, whose attributes should be used in the new merged polygon. (If not, then the merged polygon is given a single Unsurveyed/Missing Data component, and input is required by the surveyor.)

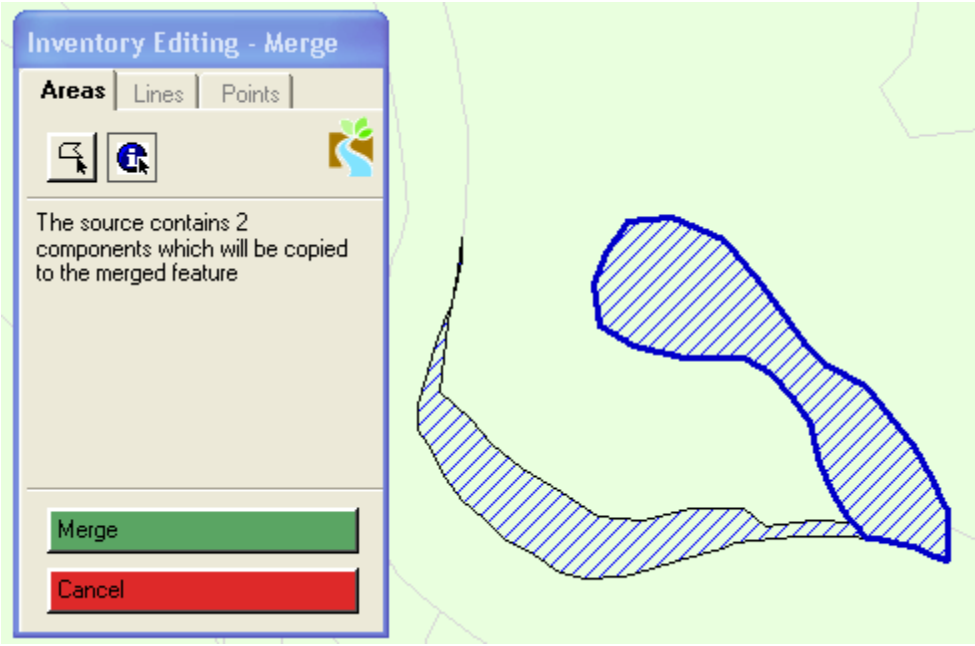


Figure 2.3.1 Areas selected to be merged – using attributes of highlighted area

Click the Merge button to complete the spatial edit.
The attribute editor will open, with the new merged area being highlighted in yellow; the surveyor should check attributes for the merged area to complete the edit.

Many areas can be merged together, but attributes can only be copied from one of the areas to be merged.
Attributes copied to merged areas overwrite all currently held attributes at both area and component level.

2.4 Update

The update function creates a new landscape area by splitting existing polygons, and then merging the split areas together. It can be used to create new polygons on top of existing polygons and also allows new habitat polygons to be created by copying areas through from other layers as the split tool does. It is useful for surveying previously unsurveyed squares and is less sensitive than the split tool i.e. can deal with areas less than the MMU.

Areas can be updated using a manually digitised polygon:
Zoom or pan to the location on the map display to create an update polygon.
Digitise an update polygon on the map display, the areas which it intersects are highlighted with a blue hatch, the new area enclosed by the update polygon is shown highlighted with a red hatch and a black boundary. Any small areas which are below the minimum permitted polygon size as a result of the update edit are shown in red, and will be merged with an adjacent polygon when the edit is completed.

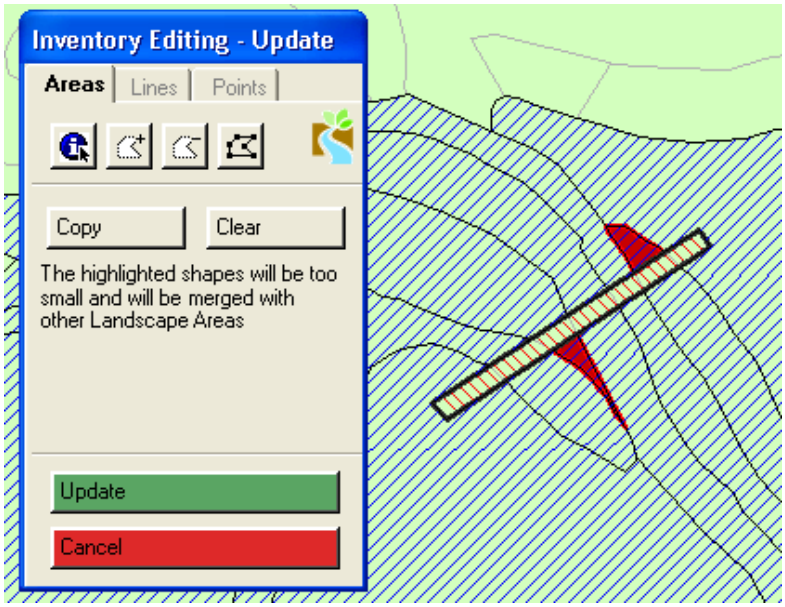


Figure 2.4.1 Update polygon showing interaction with affected areas

At this stage, the update polygon is an edit sketch, so can be modified using the vertex edit tool, see instructions for use of this tool in Split Polygon above. Additionally the update polygon can be created from polygons copied from other layers, for example OS MasterMap, using the Copy Features Tool. See instructions for use of this tool in Split Polygon above.

One of the polygons intersected by the update edit may be selected to have its attributes copied into the new update area. Alternatively if no area is chosen, then the new area is created with a single Unsurveyed/Missing Data component.

When the surveyor is satisfied that the update polygon is the correct shape, click the Update button to complete the spatial edit.

The attribute editor will open, with each area affected by the update edit being highlighted in turn, the surveyor should input attributes for the updated, and new areas to complete the edit.

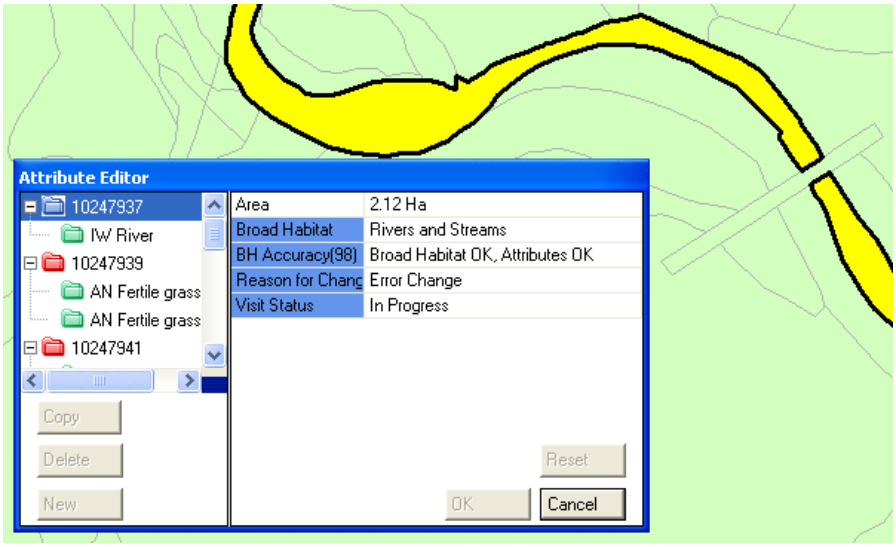


Figure 2.4.2 Attribute edits post update edit

Update can be used in place of a series of Split and Merge edits as an effective way of including a new area which intersects many existing areas.

2.5 Attributes

The attributes of an area or feature are all the possible descriptors for that feature including; Broad or Priority Habitat, habitat type, species and physiography. The keys above provide detailed guidance on how to assign areas to particular vegetation types (on the basis of indicator species physiography and other factors). The listed Broad and Priority Habitats below provide more detailed habitat descriptions and also indicate where the relevant attributes for each habitat are to be found within the digital recording system.

Editing Area Attributes

Click on the Attributes tab in the Landscape Feature Editing toolbox.

Zoom or pan to the location on the map display to select an area for attribute update. Select by clicking or dragging a selection box over it. The selected area is shown highlighted in yellow. The attribute editor will open, and details should be entered for the area. Fields for Broad Habitat, BH Accuracy (98), Reason for change and visit status have been set to non-mandatory and will come up with default values set.

2.5.1 Polygon Level Attributes

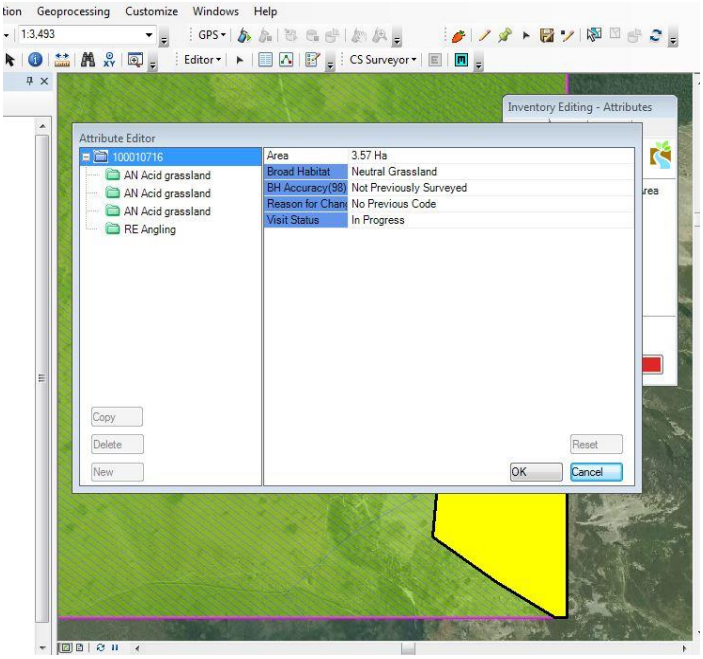


Figure 2.5.1 Polygon level attributes

Area: the area of the polygon is given

Broad (Priority) habitat: Surveyors should choose the appropriate Broad or Priority habitat using the vegetation key and the additional information on Broad and Priority habitats. <u>If you have a Priority Habitat please record it as the polygon level attribute i.e. first dropdown menu</u>

BH (Broad Habitat) **Accuracy –** for new squares in GMEP should be set as 'Not previously surveyed'

'Reason for change' is should be set to 'No previous code'

- Error change- surveyor was mistaken previously
- No change
- **No previous code**
- Real change

Visit status:

- **In progress**
- **Completed**
- **Refused access**

2.5.2 Component Level Attributes

An area may have more than one component. Components can be added, copied, or deleted, and attributes of components can be edited. These edits are all undertaken in the Landscape Areas Attribute Editor toolbox.

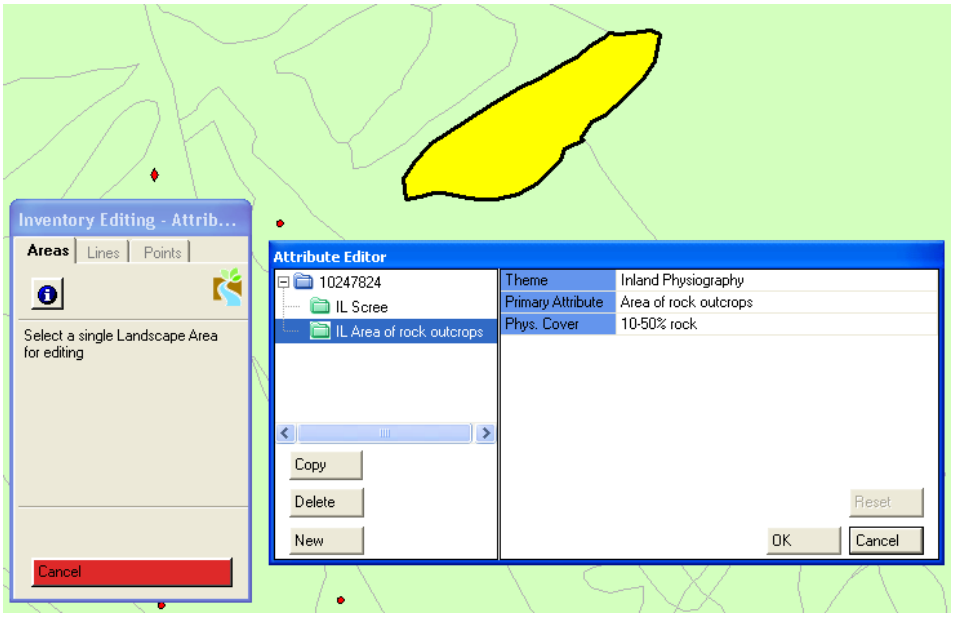


Figure 2.5.2 Area Attribute Editing showing selected area and Attribute Editor dialog

To add a new component, click on an existing component and click the **New** button in the attribute editor summary pane on the left.

To **copy** components, click on an existing component, and click the Copy button in the attribute editor summary pane.

To **delete** a component, click on the component to select it, and click the Delete button.

When two or more components have the same primary attribute e.g. moorland grass then you can only change the primary attribute if you select all of the same components with the same attribute, i.e. if you select only one of the components you will only be able to select secondary attributes such as species.

Areas can only have their attributes updated one area at a time.
Each area must contain at least one component.

Habitat Attributes

Theme – organises primary and secondary attributes into intuitive groups (e.g. physiography, agriculture/natural vegetation) to make selection easier and control dependent attributes. On the tablet surveyors will choose the appropriate attributes from the complete list of attributes under each theme

AGRICULTURAL CROPS: associated fields include Primary attribute (these will be agriculturally related i.e. mostly crops), Primary qualifier (optional), vegetation type, Species and Species cover

AGRICULTURE/NATURAL VEGETATION: associated fields include Primary attribute, Primary qualifier (optional), Vegetation Type, Species, Species cover, Sward <7cm, Sward Height, Variation in Sward, Tussockiness

AGRICULTURE/NATURAL VEGETATION USE: Primary attribute

COASTAL FEATURE: Primary attribute

DELETED FEATURE: No fields

FORESTRY: associated fields include Primary attribute, Primary qualifier (optional), Modal DBH, vegetation type, Species and Species cover

FORESTRY FEATURE: Primary attribute only

FORESTRY USE: Primary attribute only

INLAND PHYSIOGRAPHY: Primary attribute and Physiographic feature cover

INLAND WATER: Primary attribute

RECREATION: **Primary attribute only**

STRUCTURES: Primary attribute only

TRANSPORT: **Primary attribute, road verge a and b.**

WIDE LINEAR FEATURE: **Primary attribute only**

UNSURVEYED/MISSING DATA: No fields

Vegetation type – organises species into groups (e.g. grasses) to aid selection.

Species – as described.

Cover/proportion – choose from <10%, 10-25%, 25-50%, 50-75%, 75-100%

Primary qualifier –.relates to specific terms which support the primary attribute

e.g. ley, amenity grass, parkland

2.6 Copy Attributes

Choose **Copy Attr.** Button from Landscape Feature Editing toolbox. Zoom or pan to the location on the map display to select one or more areas which will be target areas, and have attributes of another area copied to them.
Select areas by clicking on each area or dragging a selection box over them. The selected target areas are shown highlighted with a blue hatch. The surveyor can change the selection of target polygons by clicking on selected areas to de-select them, or clicking on additional areas to add them to the selection.
Now select an area which will be used as the source area to copy attributes from by clicking on the 'i' button. The selected source area will be highlighted with a thick blue boundary.
The surveyor can change the source area chosen by selecting a different source area.

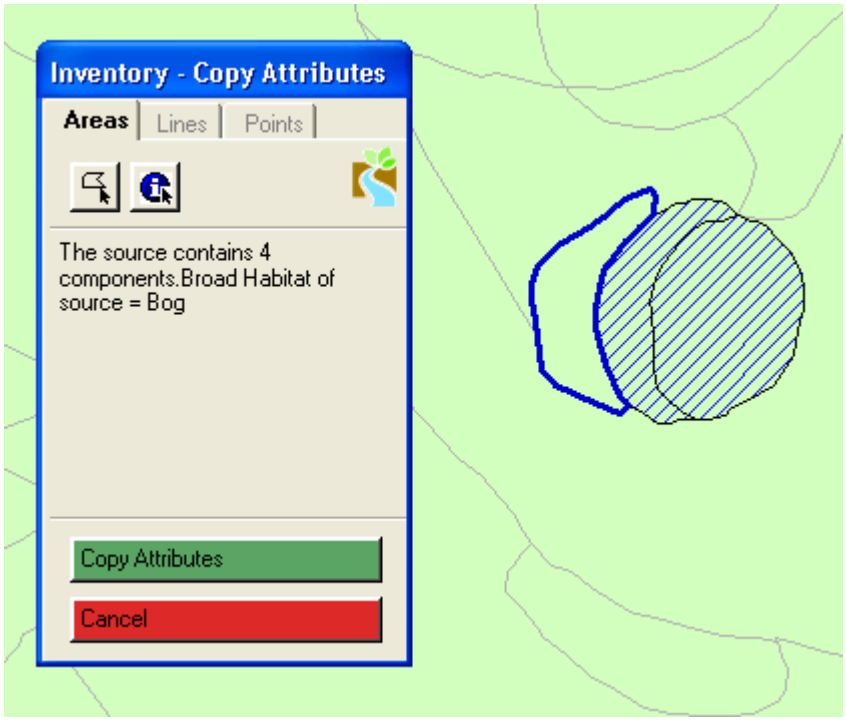


Figure 2.6.1 Copying attributes

Click **Copy Attributes**. The attributes of the source area will be copied to the target areas. The attribute editor will open, and details should be checked for each area. Target areas will now have the same attributes as the source area.

There can only be one source area, there can be many target areas.
Attributes copied to target areas overwrite all currently held attributes at both area and component level.

2.7 Mapping change in CS squares

Unlike new squares, for repeating CS squares surveyors will be provided with data from

previous surveys.
Surveyors will need to click on each polygon and either confirm that the polygon accurately represents what they see in the field, or change accordingly. Spatial accuracy is not a key aspect of the survey and therefore surveyors are asked to concentrate on the extent to which the data accurately represents the habitats in the survey square rather than their exact locations. Where necessary, surveyors can indicate errors in spatial accuracy by changing the attributes and or shapes and sizes of polygons and recording Error change against those polygons.

The task that surveyors will most commonly be carrying out in the field is checking and confirming and /or changing the attributes assigned to each polygon by previous surveyors.
The main difference between CS and new squares is that surveyors will need to pay close attention to the polygon level attributes.

Area: the area of the polygon is given

Broad (Priority) habitat: Surveyors will be provided with an appropriate Broad or Priority habitat and using the vegetation key and the additional information on Broad and Priority habitats need to decide whether the habitat classification has changed. Please also look at the data provided by the previous surveyors on species and attributes to decide whether you think it is really necessary to record a change.
Then think carefully about whether based on the attributes, species and habitat recorded previously along with what you can see in the field the previous surveyor was correct then fill in the field accordingly.

BH (Broad Habitat) **Accuracy –** was the polygon allocated to the right BH in 98 (**allocation ok**)? Were the attributes right or wrong?

- **Broad habitat ok, attributes ok**
- **Broad Habitat ok, attributes wrong**
- **Broad Habitat wrong, attributes ok**
- **Broad Habitat wrong, attributes wrong**
- **New baseline for Priority Habitat** (Some of the PH's were not recorded separately last time and would have just been recorded as part of the Broad habitat)
- **Not previously surveyed**

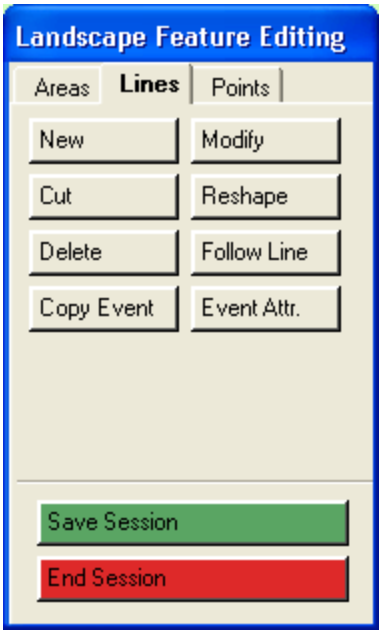
'Reason for change' should be set to 'No previous code'

- **Error change- surveyor was mistaken previously**
- **No change**
- **No previous code**
- **Real change**

3 Saving Edits in CS Surveyor- Logging Off And Closing Arcmap

Stop Editing

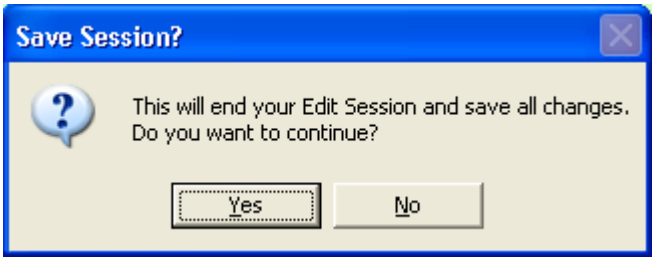
At the end of editing in CS Surveyor, the Landscape Feature Editing toolbox will be open, as shown below.



The surveyor has two options to exit from the CS Surveyor edit session, Save Session, and End Session.

Click on Save Session in order to save the edits which have been undertaken and stop editing.

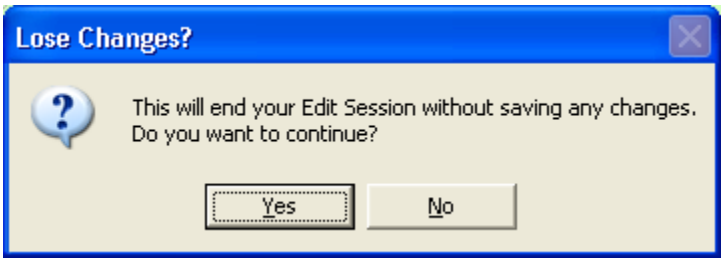
NOTHING THAT YOU HAVE DONE WILL BE SAVED UNLESS YOU CLICK ON SAVE SESSION. YOU SHOULD COME OUT OF YOUR SESSION AND SAVE CHANGES AT REGULAR INTERVALS.



A confirmation dialog opens

Click Yes to end the edit session, and save all changes.

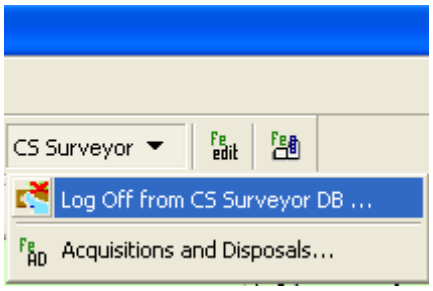
Click on End Session to discard all edits undertaken, and exit from edit session.



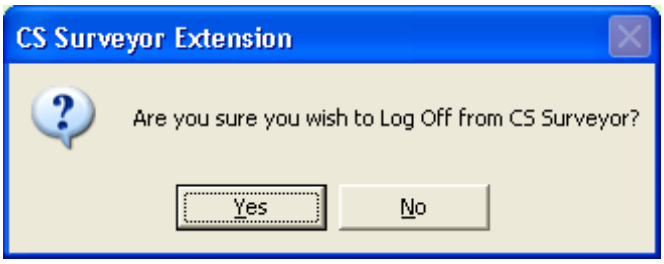
A confirmation dialog opens
Click Yes to end the edit session, and discard all changes.

CS Surveyor saves all the changes, editing is closed, and the main ArcMap screen opens.

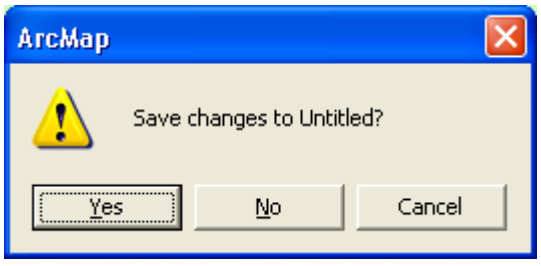
Log off from the CS Surveyor Database



Click the CS Surveyor Menu in ArcMap and choose Log Off from CS Surveyor DB…
Choose Yes at the confirmation dialog



At the prompt to save changes to the untitled ArcMap document:



Choose No. ArcMap will close, returning the surveyor to the Windows XP desktop.

4 Freshwater Mapping

Pond attributes to record on Grid square inventory for ponds form

If a square contains one or more ponds, the mapping surveyor will need to complete the "Grid square inventory for ponds" form (PC tablet) (Figure 32.1). One form needs to be completed for every pond in the square.

For every pond the following attributes need to be recorded:

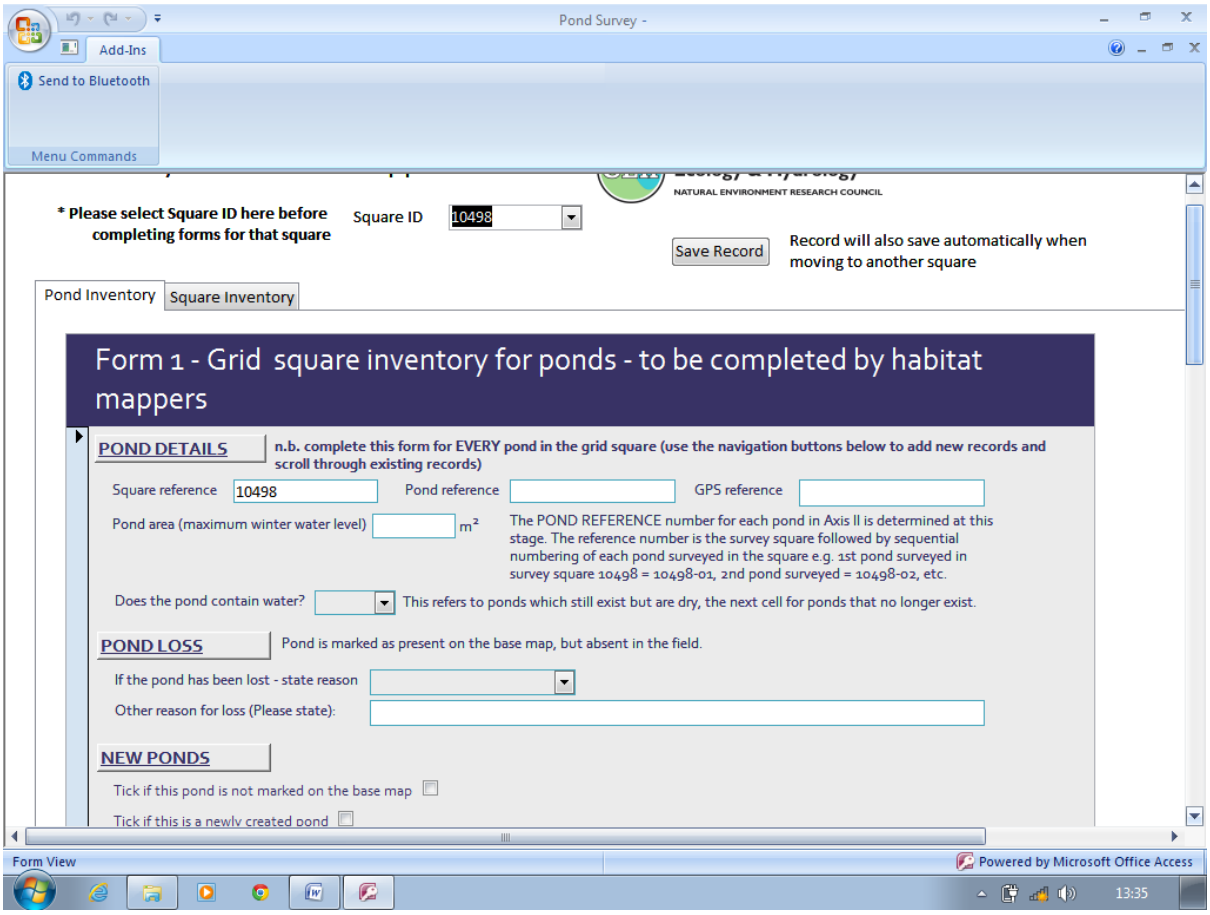


Figure 4.1: Grid square inventory for ponds form which needs to be completed for every pond in the grid square.

Pond details

i) Square reference number, Pond reference number and the fullest Grid Reference possible.

ii) Area of pond (maximum winter water level) in m^2. Note – this is already recorded on the tablet PC if the pond is above the Minimum Mappable Unit (MMU) size. **BUT**, it also needs to be recorded here because it may be different from the PC record if (i) it meets the pond definition but is below the MMU size (i.e. is between 25 m^2 and 400 m^2), or (ii) the pond falls on the boundary of the square – here record the entire area of the pond, not just the area within the square.

iii) Does the pond contain water? Record Yes or No, if only wet mud is present record No. Note that this refers to ponds which still exist but are dry at the time of survey. The next section refers to ponds which no longer exist.

Pond loss

iv) If the pond is marked as present on the base map, but absent in the field, give the reason for the loss - where L = land drainage, I = infilling, B = built over, O = other (list in notes), U = unknown

New ponds

v) If the pond is not marked on the base map, tick the relevant box on the survey form – this pond may be an old pond (which has not been mapped previously) or a new pond.

vi) If this is a newly created pond (up to c.10 years of age) tick the relevant box on the survey form. Determine age on the basis of the best available information - e.g. information from land owners/land managers, bare banks, lack of bottom sediment, presence of bare spoil heaps following pond excavation, etc.

Give the reason (or reasons) for creation if any evidence can be seen: F = fishing, S = shooting, W = wildfowl, L = wildlife, G = golf hazard, X = ornamental fish, O = other (list in notes), U = unknown.

Record any additional notes in notes.

As soon as all the ponds in a square have been recorded, you should carry out the process of identifying the survey pond and then give this information to the freshwater surveyors so they can carry out the condition survey.

Selecting one pond per square for condition survey

<u>Overview</u>

If the survey square contains one or more ponds, a single pond per square will be surveyed to assess its condition. This pond is referred to here as the "survey pond" ('Pond, sampled' in Surveyor).

The survey pond needs to be randomly selected from the ponds available. You cannot do this until all the ponds in the square have been mapped and you have the completed a "Grid square inventory for ponds" form for every pond in the grid square.

Method for selecting a survey pond

1. Open the form "Grid square inventory of ponds" (PC tablet).

2. Fill in the survey details: Square reference number, name of surveyor and survey date.

3. Assess how confident you are that all the ponds in the grid square have been mapped. If you are not confident, tick the relevant box on the form and give the reason. For example, there may have been difficulty in gaining access to the whole square (e.g. difficult terrain such as bog land), or difficulty in distinguishing individual ponds in wetland habitats (e.g. wet heathland, bog, mire, reedbed).

4. Use the data entered through the "Grid square inventory for ponds" form to

determine how many ponds there were in the grid square. Enter this number in the box.

5. If the square only contains one pond this will be the survey pond.

6. If it contains more than one pond select the survey pond as follows: The PC tablet will automatically generate a number for you to use along with the total number of ponds recorded above. Use the numbers to select the survey pond in the lookup table provided on the form and write the number of the survey pond in the box (Figure 32.2).

   Record the selected pond using the 'Pond sampled' primary attribute under the Inland Water theme on either the Areas or Points tab (depending on whether the pond is an area or a point) in the Landscape Feature Editing toolbox in Surveyor (on the tablet) to reflect the correct pond.

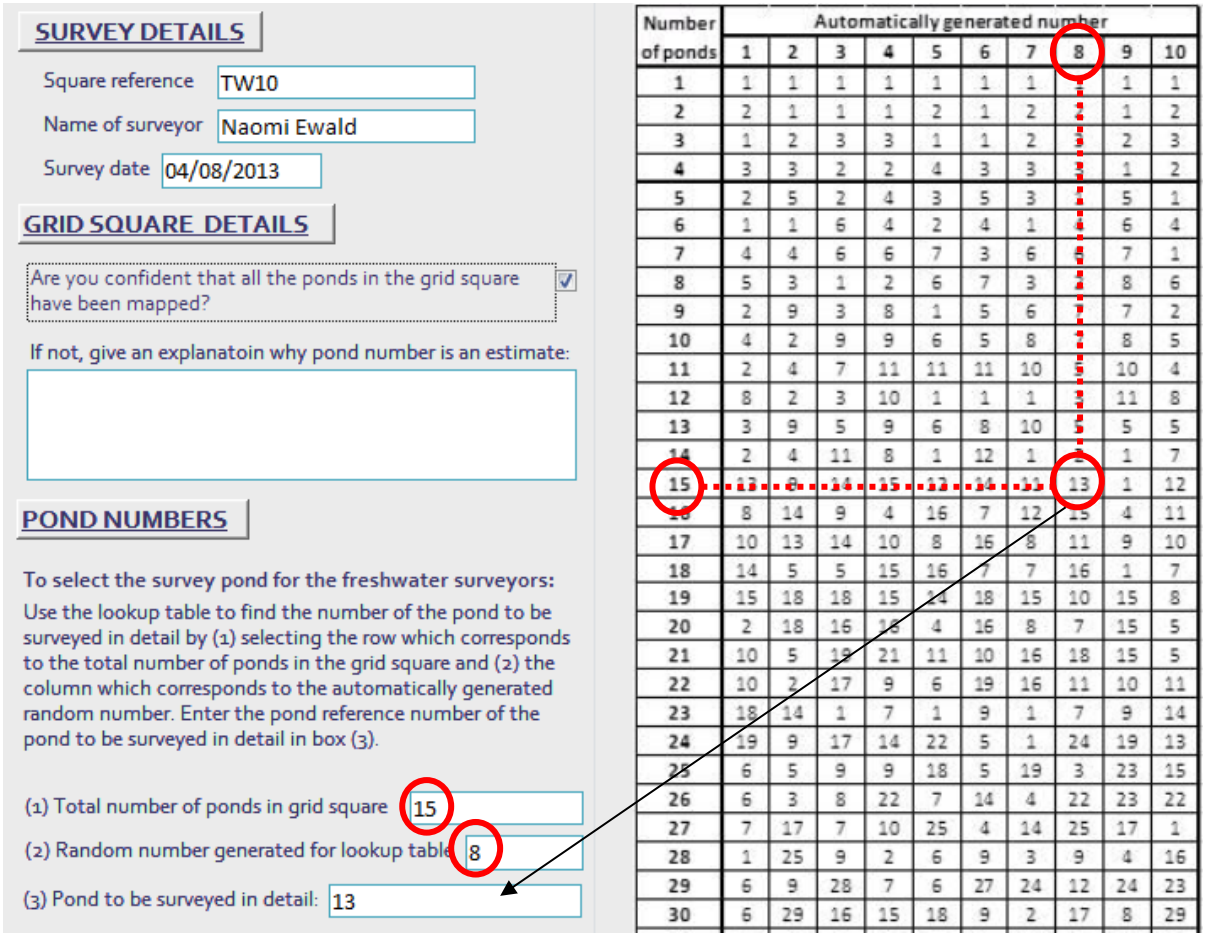
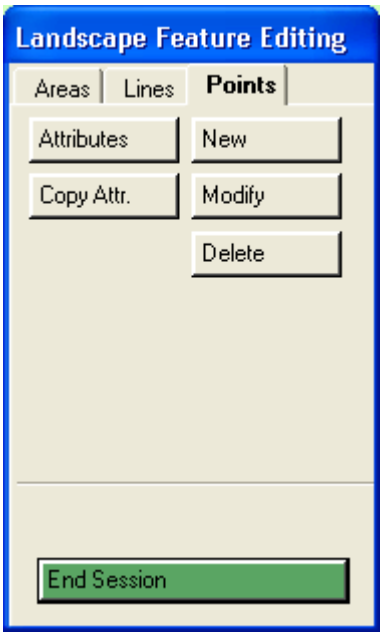


Figure 4.2: Use the lookup table on the "Grid square inventory for ponds" to select the pond for survey.

5 Methodology for Mapping Point Features

Point features are individual landscape elements that occupy less than an area of 20x20m. Features which will be recorded as points on the map are listed below (POINT ATTRIBUTES). They include trees, standing water bodies and ponds and are listed under all the available themes. Spatial accuracy is not a key aspect of the survey but where necessary, surveyors can also move points. Points can also be added to indicate new features.

For all point editing tasks surveyors will need to click the Points tab in the Landscape Feature Editing toolbox:



5.1 New

Having clicked on the Points tab in the Landscape Feature Editing toolbox click on the New button. Zoom or pan to the location on the map display where the new point is to be added. Click Create New and click on the map display to create a new point. The new point is shown highlighted in yellow. Should the point need to be relocated, click on the map display to move it to its new position.
Click the Create Point button to finish the spatial edit.
The attribute editor will open, and details should be entered for the new point.

The map must be at a scale of 1:5000 or less before the surveyor can edit points.
Points can only be added one at a time.
A point cannot be added within 5.0m of an existing point.
Every new point is created with a single Unsurveyed/Missing Data component.

5.2 Modify

Having clicked on the Points tab in the Landscape Feature Editing toolbox click on the Modify button. Zoom or pan to the location on the map display where the point is to be moved. Click Move and select the point to be moved by clicking on it, or dragging a selection box over it. The selected point is shown highlighted in yellow. Click on the map display to move it to its

new position. The moved point retains its yellow highlight, but is shown in its new position.
The surveyor can choose to move a different point by making a new selection, the originally selected point will revert to its original position.
Click the Move Point button to finish the spatial edit.
The attribute editor will open, and details should be entered for the moved point. On completing attribute edits and selecting 'Completed' from the visit status field at the polygon level the point will change in appearance (see below) when the map screen is refreshed.

The map must be at a scale of 1:5000 or less before the surveyor can move points.
Points can only be moved one at a time.
A point cannot be moved to within 5.0m of an existing point.

5.3 Delete

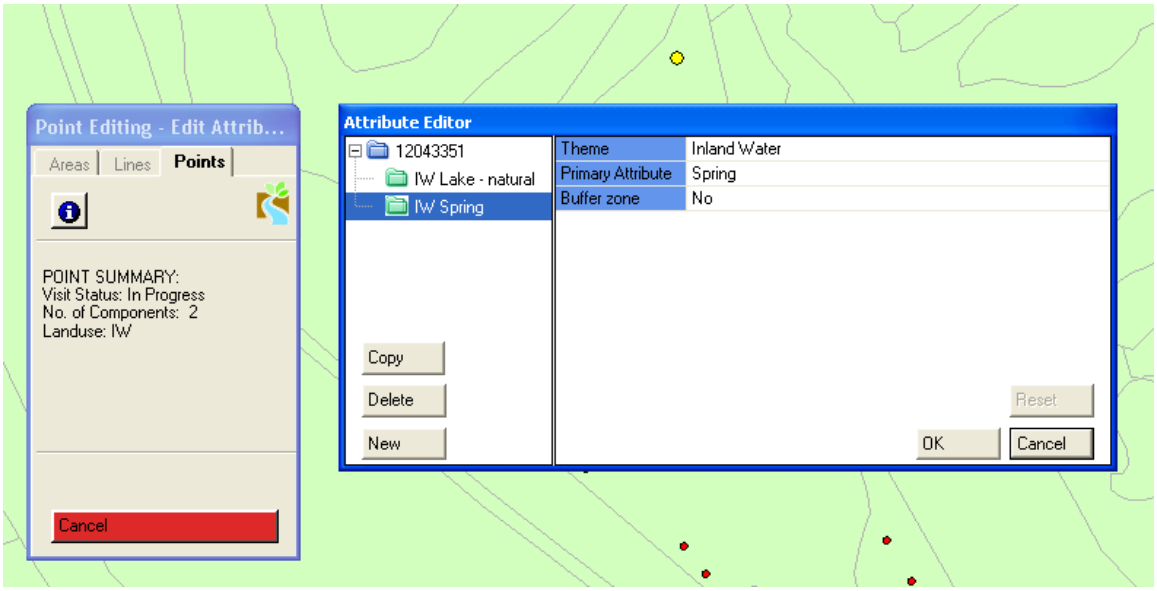
Having clicked on the Points tab in the Landscape Feature Editing toolbox click on the Delete Point button. Zoom or pan to the location on the map display where the point is to be deleted.
Click Delete and select the point to be deleted by clicking on it, or dragging a selection box over it. The selected point is shown highlighted in yellow, provided it has a valid Reason for Change value – if not, then the point attributes must be edited prior to the delete edit, and the selected point will be highlighted in red.
The surveyor can select a different point to delete, and the originally selected point is no longer selected.
Click the Delete Point button to finish the spatial edit.
The point will be deleted, and the surveyor will be returned to the Landscape Editing Points toolbox.

The map must be at a scale of 1:5000 or less before the surveyor can delete points.
Points can only be deleted one at a time.
Points which do not have a valid Reason for Change value cannot be deleted.

5.4 Attributes

Having clicked on the Attributes button the surveyors will then need to zoom or pan to the location on the map display to select a point for attribute update. Points can be selected by dragging a box around them as an alternative to trying to click on the point. The selected point is shown highlighted in yellow. The attribute editor will open, and details should be checked and/or changed for the point. Fields requiring mandatory values are shown in orange, and those for which values are optional are shown in blue.

A point may have more than one component. Components can be added, copied, or deleted, and attributes of components can be edited. These edits are all undertaken in the Landscape Points Attribute Editor toolbox.



To add a new component, click on an existing component and click the New button in the attribute editor summary pane on the left.
To copy a component, click on an existing component, and click the Copy button in the attribute editor summary pane.
To delete a component, click on the component to select it, and click the Delete button.

On completing attribute edits and selecting 'Completed' from the visit status field at the point level the point will change in appearance (see below) when the map screen is refreshed.

The map must be at a scale of 1:5000 or less before the surveyor can select points for attribute update.
Points can only have their attributes updated one at a time.
Each point must contain at least one component.

5.5 Copy Attributes

Having clicked on the Points tab in the Landscape Feature Editing toolbox click on the Copy Attr. Button. Zoom or pan to the location on the map display to select one or more points which will be target points, and have attributes of another point copied to them.
Select points by clicking on each point or dragging a selection box over them. The selected target points are shown highlighted in yellow.
Now select a point which will be used as the source point to copy attributes from. The selected source point will be highlighted in blue.
The surveyor can change the source point chosen by selecting another source point.

Click Copy Attributes. The attributes of the source point will be copied to the target points. The attribute editor will open, and details should be checked for each point. On completing attribute edits and selecting 'Completed' from the visit status field at the polygon level the point will change in appearance (see below) when the map screen is refreshed.

The map must be at a scale of 1:5000 or less before the surveyor can select points to copy attributes.
There can only be one source point, there can be many target points.
Attributes copied to target points overwrite all currently held attributes at both point and component level.

6 Methodology for Mapping Linear Features

Linear features are landscape elements less than 5m wide that form lines in the landscape. GMEP will report on the length and condition (and changes in these over time) of a range of linear features including woody linear features, walls, fences and other linear features outlined below. Linear features have a minimum length of 20m and may include gaps of up to 20m.

Background

All linear features (minimum length 20m, maximum width 5m) should be recorded **unless** they form part of a curtilage or they are within the woodland canopy. However, linear features running along the edge of woodlands must be recorded. Linear features which form part of curtilage, (i.e. land intimately associated with buildings) at the boundary of urban and rural land should not be recorded. Canals, canalised rivers and rivers should all appear as **areas** in the dataset

Linear features on the GIS system will appear as continuous lines. Each continuous line represents a linear feature which may consist of a number of different parts named 'events' on Surveyor. The attributes of an event are all the possible descriptors for that event. Features which will be recorded as events on the map are listed below (EVENT ATTRIBUTES). They include fences, walls, woody linear features etc and are listed under all the available themes. These events may be either additive, e.g. a linear with both a fence and a woody linear feature running along its whole length, or replacements e.g. a field boundary in which the woody linear feature is replaced by a fence where it is guppy.

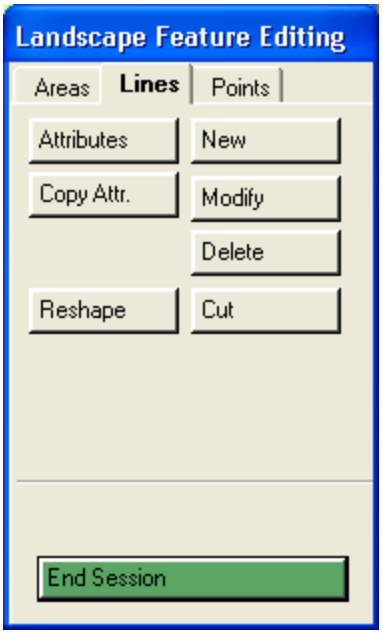
Where the linear features (although individually each less than 5m wide) take up an area larger than the minimum mappable unit a polygon should be created and assigned the BH 'Boundary and Linear features' described as a **wide linear feature** (see BH 3 Boundaries and Linear features) . Each linear feature should continue to be collectively represented by a single line with multiple events e.g. two woody linear features (one a line of trees, the other a managed hedge), earth bank, ditch and fence. (This is to avoid the necessity of trying to accurately draw each component and assess its area).

Recording Events

The Surveyor system should be used to create a new line, cut a line, delete a line, modify the shape of a line, reshape a line, reshape a line to follow another feature and edit the attributes of the events along the linear feature. New lines should be drawn on the tablet as accurately as possible, using existing features for reference, as well as making full use of range finders, measuring tapes and compasses to position and measure them.

Where there is a step change in the events along a linear feature they should be coded and recorded as different events with their own set of attributes e.g. where a management of a WLF changes along its length resulting in a difference in height or where a section of hedge has a totally different species composition.

For all Event editing tasks surveyors will need to click the Lines tab in the Landscape Feature Editing
Toolbox.



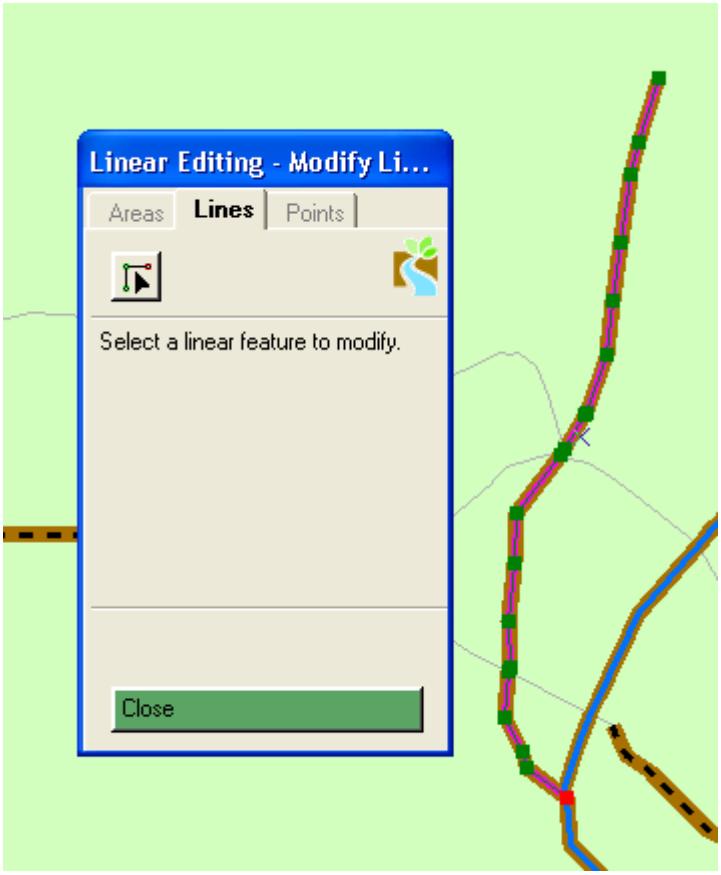
6.1 New

Zoom or pan to the location on the map display where the new line is to be added. Click New and use the pen to click on the map display to create a new line. Double click to finish the edit sketch. The new line is shown highlighted in pink. Should the shape of the line need to be refined, use the vertex edit button to highlight the vertices and the pen to move them to the desired positions.
Click the Create button to finish the spatial edit.
The new line is created, and contains a single Unsurveyed/Missing Data event. In order to record an event on the linear feature, attribute editing protocols need to be followed as described below.

The map must be at a scale of 1:5000 or less before the surveyor can edit lines.
Lines cannot be added outside the survey square.
Lines can only be added one at a time.
Lines must be 5.0m long minimum.
A line cannot cross over itself.
When a line crosses another line, all of the lines are automatically split at the intersection point.
Every new line is created with a single Unsurveyed/Missing Data event which runs over the entire length of the line.

6.2 Modify

Zoom or pan to the location on the map display where the line is to be modified. Click on or drag a selection box over the line, which is to be modified.
The selected line is shown highlighted in pink, and vertices which can be used to edit the shape of the line are shown along its length. Using the pen the sketch can now be modified, with vertices added (by holding the pen along the line and right clicking until a menu appears with Insert Vertex as an option), deleted (by selecting a vertex, right clicking and selecting Delete Vertex on the menu), and moved (by clicking on a Vertex until the symbol changes and dragging to a new location), until the surveyor is satisfied that the line reflects how the feature looks in the field.
Note that vertices at the end of shared boundaries cannot be edited at this point, since they are shared nodes – they share their topology with other features, and can only be modified in Shared Node Modify.

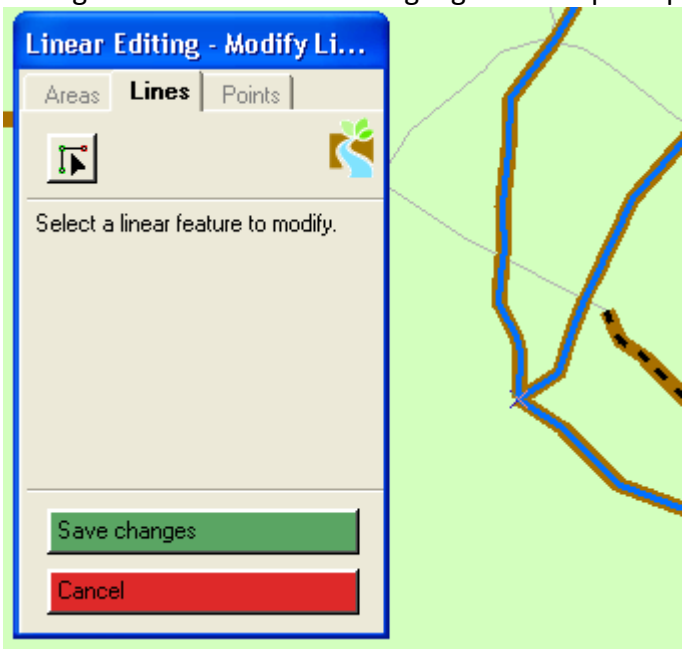


Line selected for Modify edit

Click to one side of the sketch to complete the modify, and view how the line will be changed as a result of the edit.
Click Save Changes to save the spatial edit and return to the Landscape Editing – Lines toolbox.

Shared Nodes – These can only be modified if selected individually as a node, click modify in the lines editing toolbox.
Using the pen, select a shared node to modify by clicking carefully on the intersection between two or more lines (or use the keyboard shortcut of n to prevent the selection of a

boundary rather than the node). Be patient, it can be difficult to select a node but when you manage it the node is shown highlighted as a pink spot.



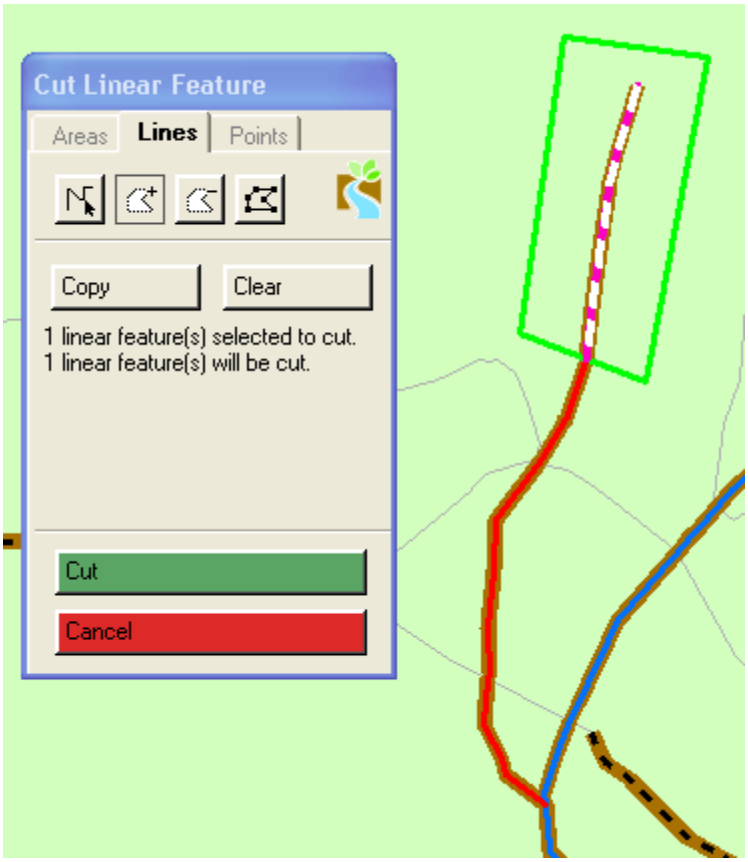
Shared node (marked with a pink cross) which has been modified – ready to save changes

Drag the node to its new position, the adjoining lines will move along with the node as it is moved.
Click to one side of the sketch to complete the modify, and see how the edited lines will be changed as a result of the edit.
Click Save Changes to save the spatial edit and return to the Landscape Editing – Lines toolbox.

If a modify edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.
If the points at the end of a line are shared with another line, these can only be edited using shared node modify.
When using shared node modify the edit cannot cause any revised lines to intersect any other revised line.
When using shared node modify the edit cannot cause any revised lines to intersect any other linear feature.

6.3 Cut

Zoom or pan to the location on the map display where the line is to be cut. Click or drag a selection box to select the line to be cut. The selected line is shown highlighted in red. Using the sketch tool (polygon with a + sign) digitise the cut polygon along the line. The length which will be cut from the line is shown highlighted as a pink/white chain dotted line, and the length which will remain is shown in red.



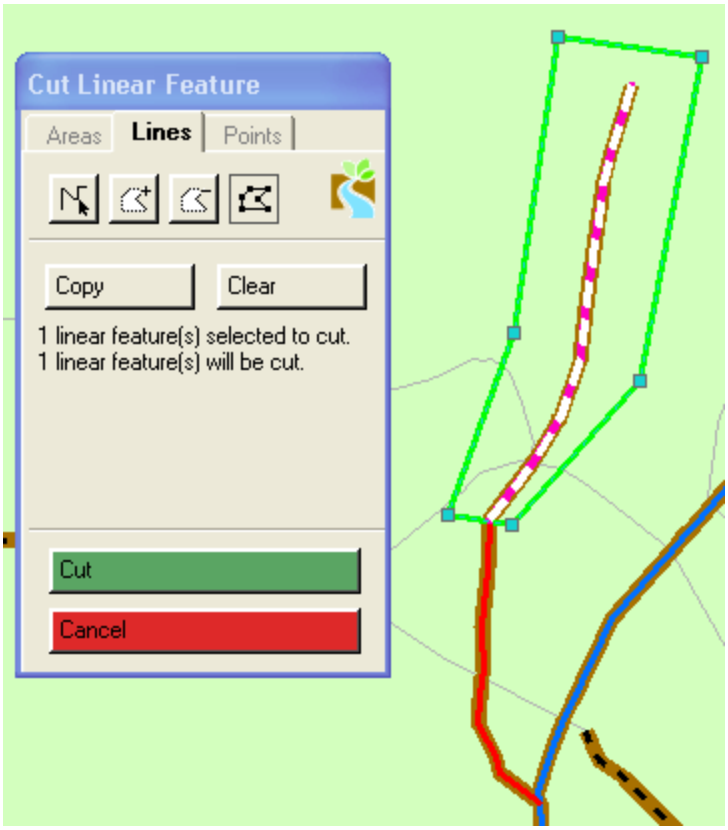
Line with cut polygon over a section – ready to cut

Click the Cut button to complete the spatial edit and return to the Landscape Editing – Lines toolbox.

Modifying the Edit Sketch

If the polygon created to cut a line is not satisfactory in terms of shape, then it can be modified by moving its vertices to create the final shape.

Click on the vertex edit button (polygon with vertices), the line now has vertices which can be used to modify the line by adding/deleting (using the right click) or moving until the surveyor is satisfied that the edit sketch will produce the cut required.



Edit sketch with vertices shown – ready to modify

Once the surveyor is satisfied that the edit will produce the required line click the Cut button to complete the spatial edit and return to the Landscape Editing – Lines toolbox.

Copying from other spatial layers

Existing polygons from other map layers, for example OS Mastermap, can be used to make a Cut Line edit sketch polygon, e.g. if a linear feature has been eliminated from a field (represented by a polygon) this tool can be used to cut it accurately.

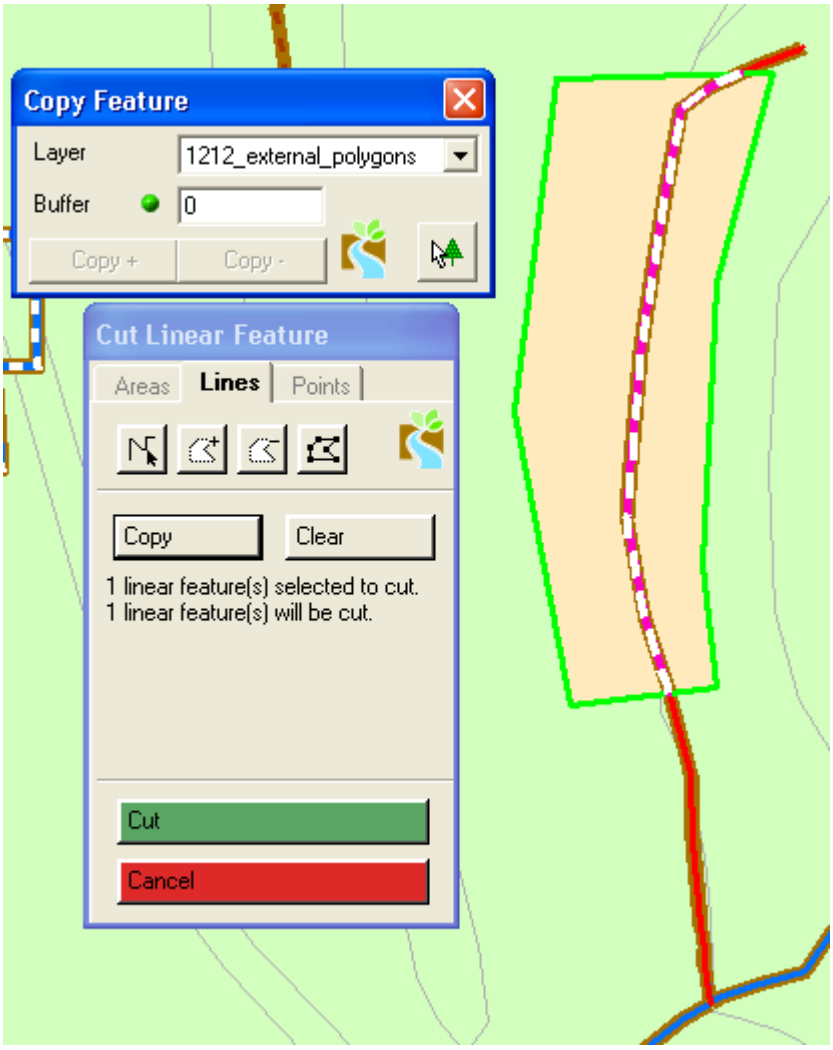
Zoom or pan to the location on the map display where the line is to be cut. Click or drag a selection box to select the line to be cut. The selected line is shown highlighted in red.

Click the Copy button in the Inventory Editing – Lines toolbox to open the Copy features toolbox. Select the layer you wish to copy features from (Landscape Areas) and select the feature you wish to copy.

The selected feature is shown with a heavy blue outline. Click the Copy+ button to include this feature in the edit sketch, the polygon is now shown with a heavy green outline, to indicate that it is part of the Cut edit sketch. Select other features in the same way, clicking Copy+ to add more features to the edit sketch, and Copy- to remove features from the edit sketch.

The edit sketch can be further refined using the edit vertex tool, as described above in Modifying the Edit Sketch.

The length which will be cut from the line is shown highlighted as a pink/white chain dotted line, and the length which will remain is shown in red.



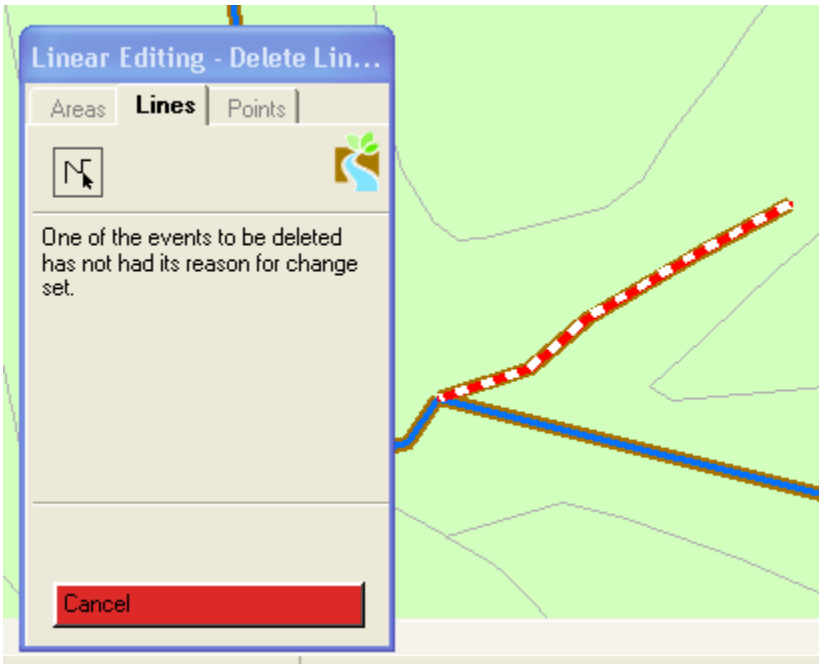
Edit sketch made by using the Copy Features tool

Click the Cut button to complete the spatial edit and return to the Landscape Editing – Lines toolbox.

More than one line can be cut with a cut edit.
Lines can be cut in more than one place – user is given feedback if more than one linear feature will result from the edit.
If a cut edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.
A line cannot be deleted by a cut edit.

6.4 Delete

Zoom or pan to the location on the map display where the line is to be deleted. Click Delete and select the line to be deleted by clicking on it, or dragging a selection box over it. The selected line is shown highlighted in red, provided all events attached to the line have a valid Reason for Change value – if not, then the line attributes must be edited prior to the delete edit, and the selected line will be highlighted as a red/white chain dotted line. N.B. there are no reason for change fields attached to the Historic Features theme so if you want to delete this you will need to record it as something else first.



Line selected for delete with no reason for change set on an event

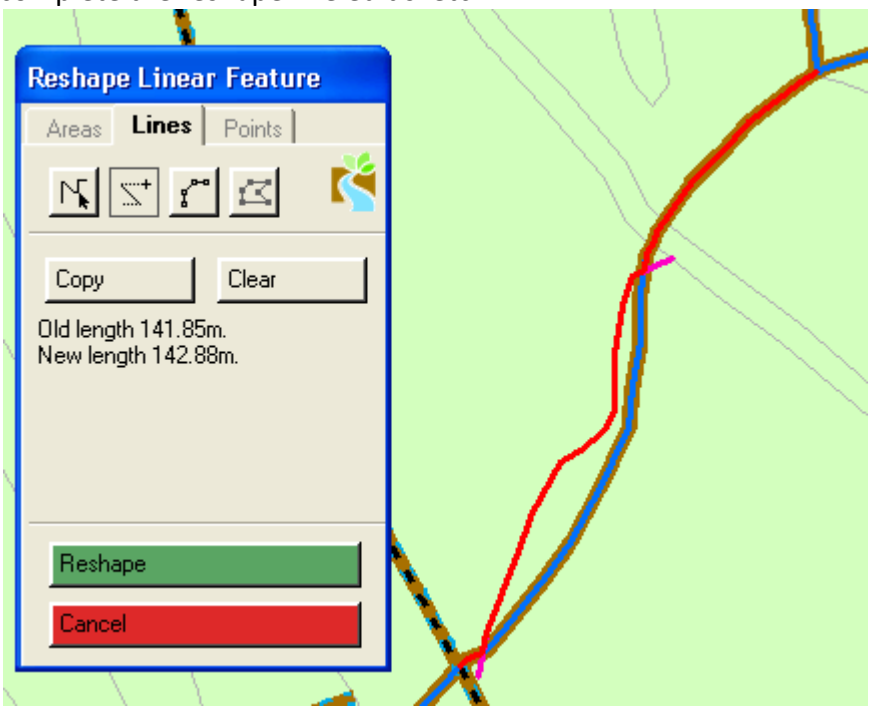
The surveyor can select a different line to delete, and the originally selected line is no longer selected.
Click the Delete Line button to finish the spatial edit.
The line, and all events associated with that line, will be deleted, and the surveyor will be returned to the Landscape Editing Lines toolbox.

The map must be at a scale of 1:5000 or less before the surveyor can delete lines.
Lines can only be deleted one at a time.
Lines which have an event which does not have a valid Reason for Change value cannot be deleted.

6.5 Reshape

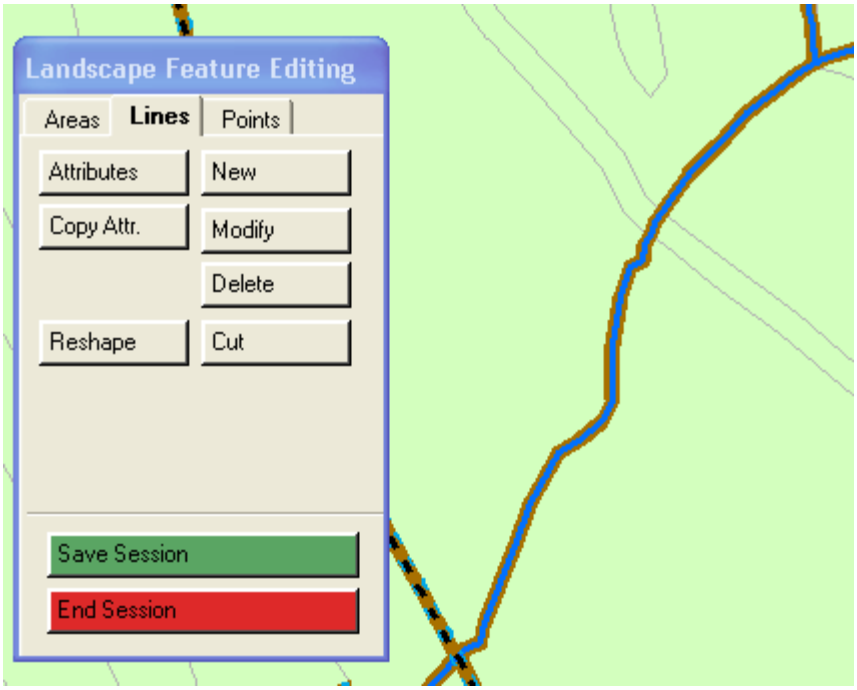
Reshape Line 1 – following a digitised line

Having clicked on the Reshape button zoom or pan to the location on the map display where the line is to be reshaped. Click on or drag a selection box over the line, which is to be reshaped. The selected line is highlighted in red.
Click the reshape line button (zig-zag with +) and use the pen to draw a reshape line along the selected line, intersecting the line at the beginning and end of the edit. Double click to complete the reshape line edit sketch.



Reshape edit sketch along existing line

The reshape line is shown in red, the part of the line which will be deleted is shown as usual, and unaffected parts of the line are shown in red.
The surveyor can edit the reshape line by using the pen having clicked on the vertex edit button.
Click the Reshape button to complete the spatial edit.
The reshape edit is saved, and the surveyor is returned to the Landscape Editing – Lines toolbox.

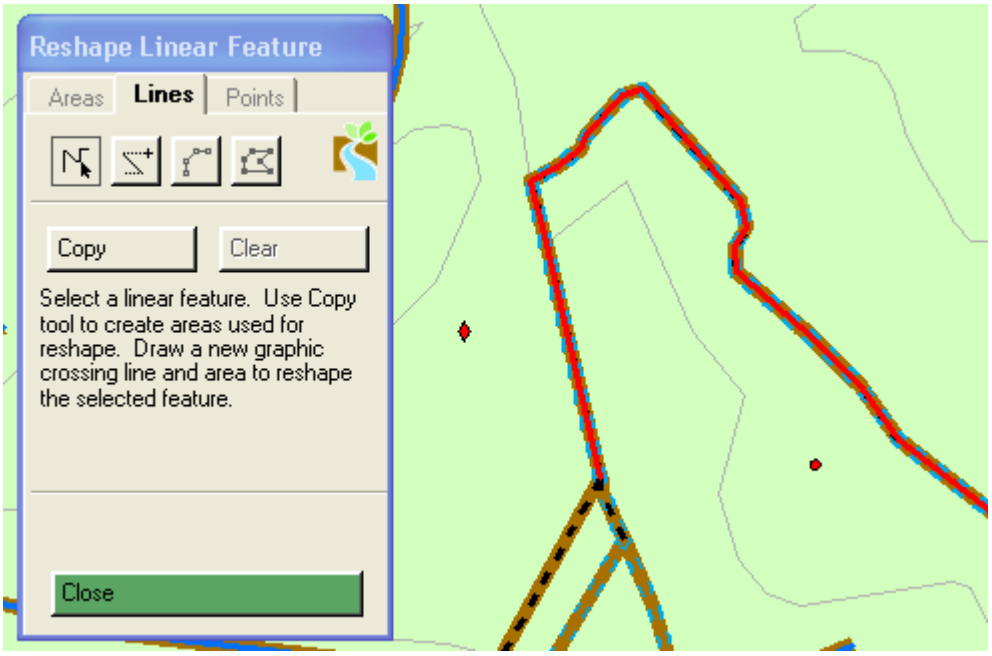


Completed reshape on a line

The map must be at a scale of 1:5000 or less before the surveyor can reshape a line. If a reshape edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.

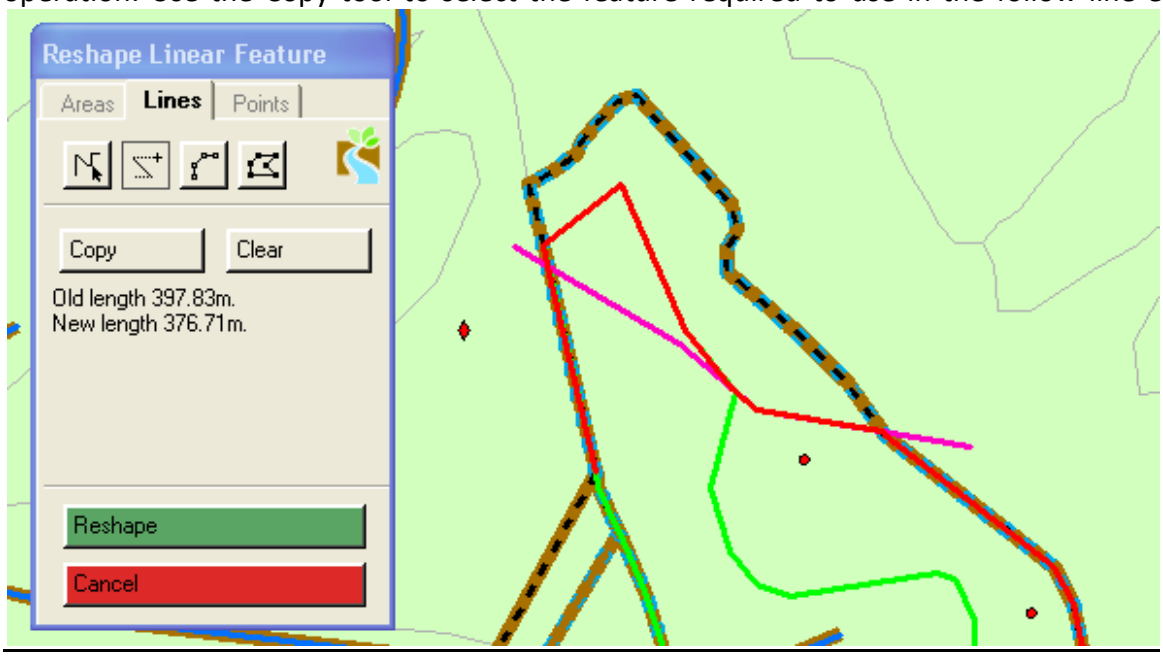
Reshape Line 2 – Following a copied line

Zoom or pan to the location on the map display where the line is to be reshaped. Click on or drag a selection box over the line which is to be reshaped. The selected line is highlighted in red.



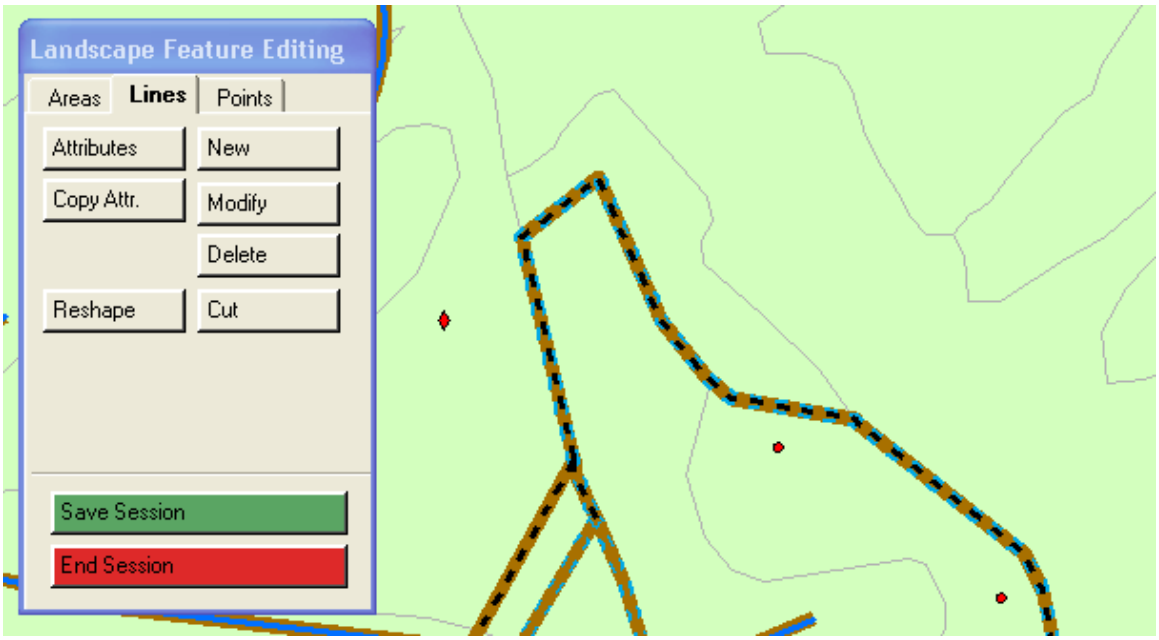
Line selected for reshape follow line shown in red

Use the pen to draw a reshape graphic along the selected line, intersecting the line at the beginning and end of the edit. The reshape graphic must intersect the line to be reshaped, and any line or polygon boundary which is to be utilised for the reshape follow copied line operation. Use the Copy tool to select the feature required to use in the follow line edit.



Reshape using landscape area boundary copied feature

The edit sketch graphic line is shown in pink – this defines the start and end points of the reshape.
The original line remains unchanged. The line to be followed by the edit is shown in red – hence the red line previews the result of the edit.
The reshape graphic can be modified if need be, using the vertex edit button and the pen.
Click the Reshape button to complete the spatial edit.
The original line has been moved, to follow the landscape area boundary as shown below.

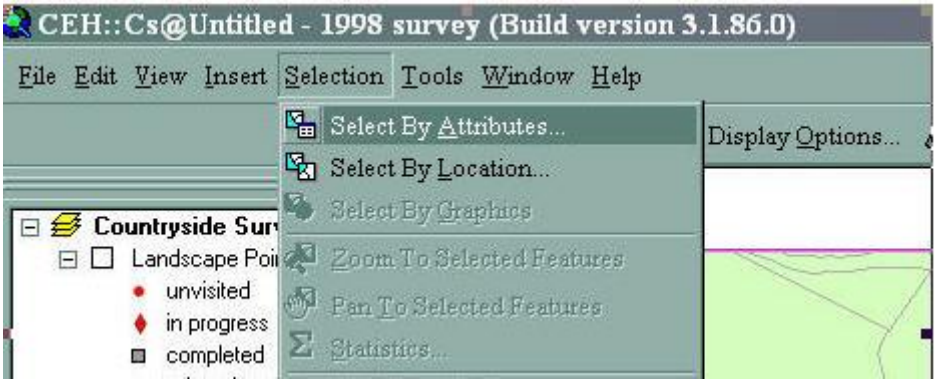


Completed reshape following copied line edit

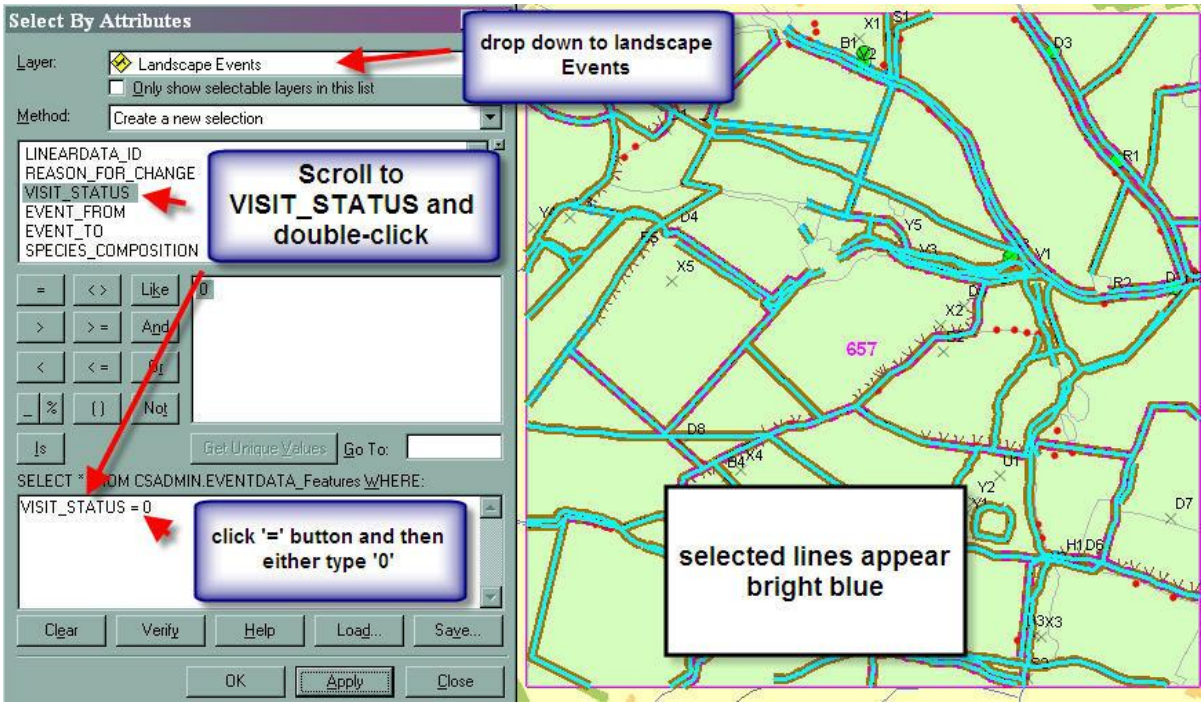
The map must be at a scale of 1:5000 or less before the surveyor can reshape a line. If a reshape edit would result in a line, or an event which is less than the minimum linear feature length, the edit will not be permitted.

6.6 Checking Visit Status on Linear Features

Unfortunately the process for checking visit status on linear features is not as straightforward as it is for either points or areas. In order to check which linear features within a square have not been visited surveyors will need to click on the Select By Attributes field as shown below.

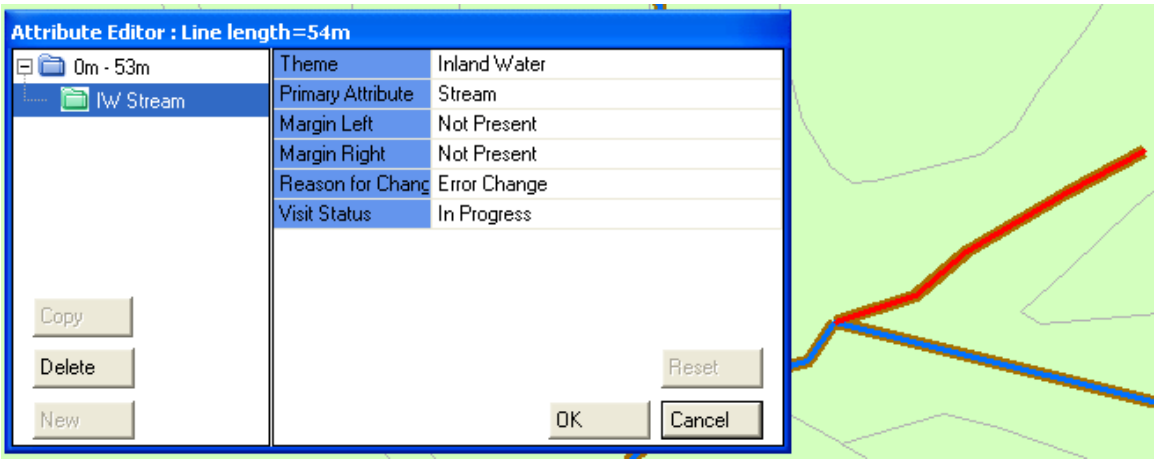


In the Select by Attributes Toolbar the surveyor will then need to click in the Layer field and select Landscape Events from the dropdown menu, then scroll to VISIT_STATUS and double click following which the VISIT_STATUS field will appear in the bottom window. The surveyor will then need to click on '=' on the buttons above, followed by '0' on the tablet keyboard (available at the bottom left of the screen). On clicking the 'Apply' button enabled at the bottom of the screen, unvisited lines will appear highlighted blue.



6.7 Attributes

Having clicked on the Attributes button the surveyors will then need to zoom or pan to the location on the map display to select a line for event attribute update. Lines can be selected by dragging a box across them as an alternative to trying to click on the line. The selected line is shown highlighted in red. The attribute editor will open, and details should be checked and/or changed for the linear feature. At the line level (top folder), only line length can be altered (see below). Event folders (which sit underneath the top folder) in the summary pane of the Attribute Editor are shown in red when they contain fields for which input is mandatory and in green when no input is required. Fields requiring mandatory values are shown in orange, and those for which values are optional are shown in blue.



Line with a single Event - Attribute Editing

To add a new event, click on an existing event and click the New button in the attribute editor summary pane on the left.

To copy an event, click on an existing event, and click the Copy button in the attribute editor summary pane.

To delete an event, click on the event to select it, and click the Delete button.

Event length can be set using the keyboard with the cursor in the Event From or Event To fields in the Attribute Editor, or the increment/decrement buttons which are at the right hand end of these fields. Finally the length of an Event can be set on the map display, as follows:

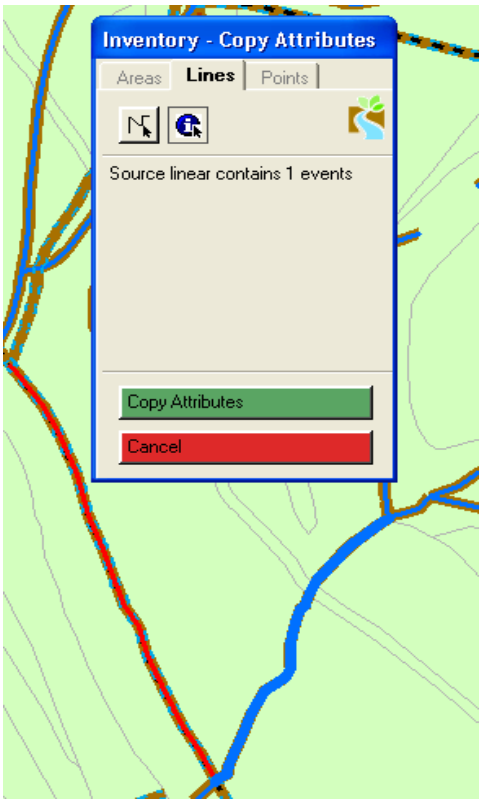
Click the Set button which is accessed through the Attribute Editor, and is positioned immediately to the right of the Event From and Event To boxes. To position the 'Event From' point, click on that row in the Attribute Editor, select one end of the line (the number in the field will indicate whether you are at the Event From or the Event To end of the line). Moving the pen along the line will allow you to set the new starting point. Similarly to set the Event To point, click on that row in the Attribute Editor, select the To point along the line, and click. As the cursor is drawn along the line, the event length, which is highlighted in yellow, is shown following along the line.

Event from and to points being set on map display

On completing attribute edits the line will change in appearance based on the Theme Type when the map screen is refreshed.

The map must be at a scale of 1:5000 or less before the surveyor can select lines for event attribute update.
Lines can only have their event attributes updated one at a time.
Each line must contain at least one event.
Events must be a minimum of 5.0m long.

6.8 Copy Attributes



Zoom or pan to the location on the map display to select one or more lines which will be target lines, and have events from another line copied to them.
Click on the Copy Attr. Button and select target lines by clicking on each line or dragging a selection box over them. The selected target lines are shown highlighted in red.
Now having clicked on the 'i' button, select a line which will be used as the source line to copy events from. The selected source line will be highlighted with a thick blue line.
The surveyor can change the source line chosen by selecting another source line.
Click Copy Attributes.
The attributes of the source line will be copied to the target lines. The attribute editor will open, and details should be checked for each line. You will have a new unsurveyed feature that you will need to edit/delete.
On completing copy line attribute edits, the target lines will have the same appearance as the source line when the map screen is refreshed.

Copy events showing source (left) and target (right) lines

The map must be at a scale of 1:5000 or less before the surveyor can select lines to copy attributes.
There can only be one source line, there can be many target lines.
Events copied to target lines are added to events already attributed to target lines.

7 Troubleshooting

- If you lose your Table of contents go to the Windows tab at the top and on the drop down menu choose Table of contents.
- If you lose other toolbars e.g. add data go to the ‘customize’ tab at the top and choose toolbars then tick standard
- If you lose the toolbar with zoom buttons and binoculars on choose ‘tools’ in the same way