Biodiversity GIS (BGIS)
Internet Mapping User Guide

http://bgis.sanbi.org

Welcome to the Biodiversity GIS (BGIS) website

We aim to assist you in biodiversity planning and decision making by offering comprehensive and freely accessible spatial biodiversity planning information. We also provide tools, such as interactive mapping tools, in analyzing and applying the available biodiversity information. We hope you will find our website useful.

http://bgis.sanbi.org
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1 Basic Introduction to BGIS Website (http://bgis.sanbi.org)

The BGIS website consists of 2 parts: online maps and pages of textual information.

The BGIS home page (http://bgis.sanbi.org) is divided into four sections: Maps, Projects, Services and Profile.

1.1 LUDS
Here you can locate a municipality by province and access its biodiversity information. Gives access to the Land Use Decision Support tool and the Municipal Summaries.

1.2 Projects
This section introduces the user to the various projects hosted on BGIS e.g. National Freshwater Ecosystem Priority Areas. Project reports and technical documents are available in this section.

1.3 Services
The Services section provides users with access to GIS related training manuals, a glossary of commonly used terms, useful links and the Municipal Biodiversity Summaries and Plan Index.

1.4 Profile
The profile page provides information regarding BGIS, its staff and partners as well as contact details for requesting support.
2 The Projects Section

When you click on the Projects tab you are presented with a list of South Africa’s provinces. Clicking on a province will reveal the project information available for that province in chronological order of publication.

Clicking on a project in the menu will open the project page for that specific project. The project page contains background information about the project, links to reports, contact information for the data custodian and a list of maps.
2.1 Maps
Under each project, there is a list of interactive maps that can be viewed online. The maps are located on the left side of the webpage under the “project maps” section. Clicking on the name of a map will launch the interactive map window and a map overview page.

2.1.1 Map Overview Page
The map overview page contains background information on the map and a link to the online map (view interactive map). The overview page also has links to the project overview page as well as the shapefiles and metadata that are freely available for download.
3  The LUDS Section

By clicking on the Luds tab, a user is able to locate a municipality and gain access to its biodiversity information.

The luds section allows users to access either the LUDS interactive map to run the Land Use Decision Support tool or the Municipal summaries.

The section allows users to view summary biodiversity statistics for selected municipality; find and link to the most relevant biodiversity conservation plan which applies to your municipality; start a Land Use Decision Support (LUDS) Tool assessment (LUDS STEP 1: Find the appropriate BGIS map (LUDS Map) for your municipality) and see a full list of all the biodiversity information BGIS has available for your municipality.

3.1.1 Accessing the Interactive Maps

Please note that to view the BGIS interactive maps, you will need to:

- Disable pop-up blocker;
- Register as a BGIS user;
- Install Silverlight Viewer
3.1.2 Disable pop-up blockers
To view the BGIS interactive maps you will need to turn off your pop-up blocker. Depending on which internet browser is used, the steps for turning off pop-up blocker will vary. So please consult your help file or contact BGIShelp@sanbi.org.

Please note that other custom add-ons to your browser (such as the Yahoo toolbar) may also contain pop-up blockers; you will need to also make sure that these have been turned off before using the interactive map.

3.1.3 Registering as a BGIS user
First time users of the BGIS interactive maps will be asked to fill in a registration form. Users will need to enter their contact details and agree to the BGIS terms and conditions. Please read the terms and conditions before ticking the checkbox. The “register me” button will only be activated once the terms and conditions have been accepted. Once users have registered they will gain access to the interactive maps and a file called a Cookie will be saved on your hard drive, this eliminates the need for future logins.
If a machine’s cookie has been deleted, then the above registration form will appear. Registered users will simply need to fill in their email address to save the Cookie again and access the interactive maps.
3.1.4 Installing Silverlight Viewer
The BGIS interactive maps run on GeoCortex Essentials and Microsoft Silverlight Viewer. Users will need to install the Silverlight Viewer to use the BGIS interactive maps. The installation takes around 30 seconds, simply follow the prompts.

Once installed, a dialog box appears explaining that it will take a few moments for the components to initialize.
4 Layout of the BGIS Online Map

After initializing, the BGIS interactive map window looks similar to the one below. The tools are immediately visible. The icons and buttons found in various sections of the Map Window are explained below.

4.1 Help
Above the Map Window there’s a Help tool. To open the full help file with Table of Contents, click on the Help icon.

4.2 Search Tool
Above the Map Window, to the left of the Help tool, there’s a search tool that allows users to locate spatial layers based on keywords. Simply type a word into the text box and the interactive map will search the databases attached to the layers in the map legend for that specific word. The results will be listed as shown below. Each result can then be clicked on to zoom to it or add it to the selection.
4.3 Map Coordinates and Scale Bar

In the bottom, left-hand corner of the Map Window there’s an arrowhead and the letters X, Y and scale bar. Click on the arrowhead to display the x, y coordinates of the site on which the pointer tool rests. The display is dynamic, which means that as the user pans across the interactive map, the value of the coordinates displayed will change.

4.4 Overview Map

In the bottom, right-hand corner of the Map Window there is an arrow that controls the Overview map. Click on the arrow to view the Overview map, click on the downwards facing arrow to hide the Overview map again. The cyan coloured block in the Overview map shows which portion of the interactive map is currently displayed on your screen. As you zoom and pan, the shape and location of the block will change to match your screen view. Click and drag the block to pan (move) around the interactive map.
4.5  **Zoom Tools, Information Panel and Easy Access Tools**

In the top, left-hand corner of the Map Window there’s an “I want to ...” dropdown box, an arrowhead and a plus and minus sign. The “I want to ...” tool provides easy access to some of the frequently used tools in the Advanced Toolbox. Clicking on the arrowhead will display the Information Panel to the left of the Map Window. The plus sign is a Fixed Zoom In tool and allows the user to zoom in on the centre of the Map Window. The minus sign is a Fixed Zoom Out button and allows the user to zoom out on the centre of the Map Window.

4.6  **Base Maps and Advanced Tools**

In the top, right-hand corner of the Map Window there are two icons: Base Maps and Advanced Toolbox (these will be explained in more detail in Section 8 of this manual).

4.7  **Information Panel**

The Information Panel displays information about the map and lets the user work with map layers. To view the layers in the Information Panel, click on the arrowhead next to the “I want to ...” tab. The Information Panel will appear to the left of the Map Window.
A number of layers can be clustered together under one group. In the Information Panel, users will notice two group layers: Operational Layers and Base Maps. These are further subdivided, and the Operational Layers has a number of group layers beneath it. To open a group layer, click on the plus sign next to the group layer’s name. The list of the layers contained in the group layer will be displayed and the plus sign will change to a minus sign. To collapse the group layer, click the minus sign. Notice that opening and closing of folders and group layers doesn’t change which layers are visible on the map; it simply helps you stay organized.
Next to each group layer is a sliding scale. With this tool it is possible to change the transparency of the group layers.

Next to every layer in the Layer List, there is a checkbox. Group layers also have a checkbox beside them. In order for a layer to be visible on the map, both the checkboxes must be selected: the layer’s checkbox and the checkbox of its folder or group layer. If the group layer’s checkbox has not been selected, then all the layers in that group will not display. At the bottom of the Information Panel there’s a Show Legend button and a Filter textbox.

**4.8 Show Legend**

The Show Legend tool opens a legend that shows the map symbols for the layers currently visible. The legend automatically updates when the set of visible layers are changed by zooming or panning.

Please note that as with the map layers, the legend is also clustered together in groups and that it is possible to collapse or expand the legend list. To collapse or expand the legend, simply click on the plus or minus sign next to the layer name.
4.9 Filter

To view only a select number of layers in Map Layers or Show Layers Panel, use the filter tool. Type in the name of a layer in the Filter textbox and the results will appear in the Information Panel.

In the above example the phrase “sub” was typed into the Filter textbox. All layers with the phrase “sub” was displayed in the Map Layers Information Panel.

In the example above, the phrase “sub” was typed in and immediately the symbology of any layer with the phrase “sub” was displayed in the Legend Information Panel.
5 Turning on Base Maps

Each BGIS interactive map has the following base maps/layers:

- National Vegetation
- National Biomes
- National Landcover
- National Soil Classes
- National Soils General

There are two ways to turn on a base layer.

- Click on the dropdown arrow on the Base Maps button, found on the upper right-hand corner of the interactive map. A list of base layers will appear. Click on one.

OR

- Click on the Map Layers button. A list of map layers will appear in the information panel. Scroll to the bottom of the list to Base Maps. Tick the checkbox next to the base layer to switch it on.

To alter the transparency of the base maps, use the Transparency scroll bar.

Please note that there is no legend associated with the base layers. To determine the feature type for a particular base map, use one of the identify tools (see section 11.1).
6 Advanced Tools

There are two ways to open the Advanced Toolbar: click on the spanner and screwdriver icon in the top right-hand corner of the Map Window, or select the Show/Hide Advanced Toolbar option from the “I Want To ...” dropdown box. An advanced toolbar that is subdivided into the following subsections: Getting Around, Maps & Data Sources, Tasks, and Analysis; will appear. These tools will be discussed in the sub-sections below.
6.1 **Save Project**

To the left of the Getting Around tab of the Advanced Toolbar is a Save Project icon and Open Project icon.

The Save Project tool saves the most recent map view created by the user to the BGIS server. To save a project, click on the Save Project icon. A Save Project dialog box appears.

Give your project a name and description. Fill in your name in the “created by” textbox. Click OK. It will take a few seconds for the map to be saved to the server. Once saved, a dialog box with the saved map’s URL will appear. Please save the project’s URL in a safe place. If you can’t find your recently saved project amongst the list of projects on the BGIS mapping system, you can navigate directly to it by using this URL.

To access the saved map, simply input the URL into a browser, you can e-mail this link to other users and in this way share your map. Alternatively users can simply click on the Open Project icon to access a saved map.

**NOTE:** A saved project can be opened by anyone with an internet connection. If your project contains sensitive information, we advise not to save the project. Your saved project will be available for a maximum of three months.

**Save Project As**

The “Save Project As” functionality allows you to avoid overwriting an existing project by saving a new project.
6.2 Open Project

To access a previously saved project, click on the Open Project button. An Open Project dialog box will appear, displaying all saved projects. To find a project, use the filter function. Simply type in the name of the project, the name of the person who created the project or a key word, and a filtered list of saved projects will appear. Once the project has been found, click on it and then click on the Open button.

![Open Project dialog box]

31 Projects Available

<table>
<thead>
<tr>
<th>Project Name / Description</th>
<th>Created By</th>
<th>Last Modified</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eden Landfill site</td>
<td></td>
<td>November 22, 2011 2:21 PM</td>
</tr>
<tr>
<td>Wildekrans CBA</td>
<td>SRippon</td>
<td>November 23, 2011 9:41 AM</td>
</tr>
<tr>
<td>CBA polygon</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wodeboom Nature Reserve</td>
<td>Thulisile Jaca</td>
<td>November 24, 2011 11:47 AM</td>
</tr>
<tr>
<td>W. Koster Farm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kraaifontein</td>
<td>A.Martin</td>
<td>November 24, 2011 4:21 PM</td>
</tr>
<tr>
<td>R. Koster Farm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Clicking on the project and then the details button, will provide basic information about the map e.g. name of project, name of person who created, project URL and description of project.

After editing the project you opened, you can overwrite the existing project by using the save button. If you do not want to overwrite the existing project you can select the “Save Project As...” option. This will create a new project.
7 Getting Around Tools

The Getting Around toolbox provides users with tools to easily navigate the interactive maps.

### 7.1 Pan

To move the map in any direction use the Pan tool. To move the map, click on the Pan tool, click on the map and then drag it in any direction.

### 7.2 Zoom In and Zoom Out

The Zoom In tool allows you to get a closer look at features on the map, activate the tool by clicking on the magnifying glass with the little plus sign.

The Zoom Out tool allows you to view a larger area of the map by making the map features smaller on the screen, activate this tool by clicking on the magnifying glass with the little minus sign.

There are a couple of ways to use these tools:

- Click on one of the magnifying tools to select it, then go somewhere on the map and press the left mouse button. With the Zoom In tool, the map zooms in. The center of the new map is where the user originally clicked on the map. The Zoom Out tool zooms out the same way.

- You can use the Zoom tools more precisely by pressing the mouse button somewhere on the map, holding it down, and dragging a box. When you let go of the mouse button, the new map extent will be the area defined by the box. Whether you are zooming in or out, the area defined by the box will become the new map extent.

### 7.3 Initial Extent

The zoom to Initial Extent button, is an easy way to zoom to the original extent of the map. For example, if the user opens a map focused on the Bergriver Municipality, and pans around to various municipalities or provinces, the user can return to the Bergriver extent simply by clicking on the Initial Extent button.
7.4 Full Extent
The zoom to Full Extent button is a quick and easy way to zoom out as far as possible. Just click on the tool and the map will zoom out to the maximum extent, showing you all the map features.

7.5 Previous Extent
The Previous Extent button will return your map to the previous extent that you viewed. For example, if the map is at a scale of 1:250 000 and a user zooms to 1:100 000, clicking the Previous Extent button will return the map to the previous scale (1:250 000). This can be compared to the Undo button in Microsoft.

7.6 Next Extent
After using the Previous Extent button, use the Next Extent button to return the map to the extent that you were viewing before you used the Previous Extent button. In the above example it would return you to the map to the 1: 100 000 scale. This can be compared to the Redo button in Microsoft.

7.7 Identify Point
Use this tool to see a list of the feature’s attributes. To identify a feature, click on the Identify Point tool and then click on the feature in the map. The identify results will be displayed in the information panel.

In the top right-hand corner of the results box is a cross and square (or Wide View icon). Clicking on the cross will close the Results Panel. Clicking on the square will move the Results Panel to below the map.
To move the Results Panel back to the side, click on the Tall View icon.

**Refine Results:** To narrow the search results, click on the Refine Results link below View History. A Refine Results dialog box will appear. To exclude certain layers from the results list, uncheck the layers in the dialog box. Click OK.

![Refine Results dialog box](image)

The results list can be viewed in two ways: Table View and List View. To look at the attributes of each feature identified, click on the Table View link below View History.

**List View:** List all the features identified.

**Zoom To All:** To zoom to the geographic extent of all identified features, click on the Zoom to All link. To Zoom to one feature identified, simply click on the feature in the Table View.

**Export to CSV:** Exports the attributes of the selected feature/s as a .CSV file, this can then be opened and used in other programs on your computer.

To go back to viewing the list of features identified, click on the List View link below View History.

Back at the List View you’ll notice a star next to feature’s name.
Click on the star to select the feature. Clicking on the identified feature’s name will open up a call out box.

![Image of map interface with selected feature]

To select the feature, click on the Add to Selected link. To view additional details related to the feature, click on the View Additional Details link. The following dialog box should appear.

![Image of details tab with field names and values]

**Zoom to feature:** The map scale will change so that the identified feature fills the screen.

**Pan to feature:** The map scale will remain the same, but the map will be centered over the identified feature.

**Copy feature:** The identified feature is copied and added as a graphic to the mapping interface, the graphic is shown in red. The graphic is also listed at the bottom of the Map Layers Panel. This graphic can be turned on and off by simply ticking and unticking the checkbox next to the layer’s name. Users can therefore control the visibility and transparency of the graphic. To delete the graphic click on the Erase Drawing icon in the Tasks toolbar, then click on the graphic in the mapping interface.

**Details:**
The Details tab displays extra information regarding the feature.

**Attributes:**
The Attributes tab displays the feature’s attribute data.

**Links:**
In certain cases, a dataset might have a links tab.
Add to Selected: Add to Selection, adds the identified feature to the selection list. Adding features to a selection enables users to export the attributes of the selected feature/s as a .CSV file; buffer the feature/s. (see Section 8.7.2); highlight and zoom to all features. If a user has already added the feature to the selection list then the option will automatically change to remove from selection.

7.7.1 View Selected
To view selected features, click on the yellow star found at the bottom of the Map Layer Panel.

A list of selected features should appear.
To perform the following functions on the selected features: buffer, zoom to all, highlight, export to CSV or remove from selection; right click on a selected feature. A dialog box will appear, select the desired option.

### 7.7.2 Buffer Features

Once features have been selected it is possible to create a buffer around the selected feature. All features falling within the buffer will be identified. To use this tool, right click on the selected feature. From the dropdown list select Buffer Features. A Buffer Options dialog box should appear.

![Buffer Options dialog box](image)

Type in the distance of the buffer and select the unit of measurement from the dropdown list. If you want to add a buffer as a markup, tick the checkbox next to the Add Buffer to Markup. To preview the buffer, click on the Preview Buffer button. To exclude layers from the identify process, click on the Display For ... dropdown list. To select Identify the features of one layer, click on the Select None link at the top of the dropdown list. Then scroll down and select the layer to include in the identification process.

To start the buffered identify process, click OK. To cancel the process, click Cancel.
7.8 Map Scale

The scale box shows the current map scale. To change the scale, type the desired ratio and press Enter.

The scale bar is a graphic that dynamically displays the current scale in units appropriate to the scale. The scale bar is found in the bottom, left-hand corner of the map window.

Note that the Scale Box and Scale Bar are for map navigation only, and may not be perfectly accurate. Without information about the size of your monitor or display device, it is impossible to accurately provide a ratio scale. An error will be most pronounced if you are operating a large monitor or a projection device running at a very low resolution, or if you are running a small monitor at a very high resolution. A 17" monitor running at a resolution of 800x600 or 1024x768 represents the scale more accurately.

Some maps have limits on the scales at which you can view the data, and some layers and map labels may only appear at certain scales. When a layer is unavailable at a certain extent, it will be greyed out, as with the three layers shown in the image below.

To view the layer, right click on the layer name. A dialog box appears, showing the layer’s symbols. Select the Zoom to Visible Scale option. The map scale will then change to the visible scale as listed in that layer’s properties (for example the visible scale for the River FEPA layer shown below is 1: 2 000 000).
7.9 **Bookmarks**

The Bookmark tool allows you to name a custom extent. You can then view that area on the map at that scale at a later stage in your map session or in your project if you save it. To add a bookmark, click on the plus sign next to the words Jump to a Map Bookmark. An Add Bookmark dialog box appears, type a name for your bookmark and click OK.

To locate the newly created bookmark, click on the Jump to a Map Bookmark button and choose the name of the area you want to see. If you have set up a number of bookmarks you can now jump between different areas of interest easily and quickly. To remove a bookmark, simply click on the cross next to its name.

<table>
<thead>
<tr>
<th>Jump to a map bookmark...</th>
<th>+</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jump to a map bookmark...</td>
<td></td>
</tr>
<tr>
<td>Leipoldtville</td>
<td>X</td>
</tr>
</tbody>
</table>

7.10 **Help**

Above the Map Window there’s a “Help” tool. To open the full help file with Table of Contents, click on the “Help” icon.

7.11 **What’s This?**

The “What’s This” icon gives tips on specific issues. Click on the What’s This icon and then click on any toolbar, tab or icon. A help file explaining the toolbar, tab or icon will appear.
8 Maps & Data Sources

8.1 Map Layers

In section 5 of the manual, users were shown how to view the list of map layers, by clicking on arrowhead in the top left-hand corner of the Map Window. There is another way to display the list of layers.

To view which layers are currently switched on, open the Advanced Toolbox and go to the Map & Data Sources tab. Click on the Show Layers icon. The map layers will be displayed in the Information Panel, to the left of the Map Window.

8.1.1 Map Layers, Results Found and Features Selected

Occasionally when the Map Layers arrowhead is selected, the following two icons can be found below the Map Layers Information Panel. These two icons will only appear when one of the identify tools has been used (see section 10). And at other times the following two icons can be found below the Information Panel. The star will only appear if the Selected Results Panel is visible.

- Map Layers : click to display all the map layers. Users will be able to click layers on and off, controlling what they see in the Map Window.
- Results Found : click to display a list of layers found when one of the identify tools is used.
- Features Selected : click to display a list of layers selected by the user.

By clicking on the view history link, a list of all the terms previously searched for will appear. Besides each term, is the time at which the search was conducted and a number listed in brackets. This number indicates is the amount of features found, matching the theme.
8.2 Map Tips

8.2.1 Enable Map Tips
The “Enable Map Tips” tool allows users to view information about features on a map. To Enable Map Tips, tick the checkbox and then position the pointer over a feature. A callout identifying the feature will open. If multiple features overlap at the pointer's position, click the arrow (↑) to see a list of the features.

To view additional details regarding a feature, click on the features name in the callout box. Then click on the “View Additional Details” link.

8.2.2 Display for ...
The “display for ...” button, allows the user to choose the layers for which map tips are required. To use the “display for” function, activate Enable Map Tips. (If map tips have not been enabled, then the “display for ...” option will be greyed out.) Next click on the “display for ...” layers dropdown arrow, a list of map layers will appear. Map tips will be shown for the layers that are ticked. Note that the more layers that are ticked on, the longer it will take for the map tip to appear.
8.2.3 Add Map Layer

The “Add Map Layer” tool allows the user to add a map service (or layer) from the ESRI website. To use the tool, click on the “Add Map Layer” icon. An “Add Layer” dialog box will appear. In the textbox, either type in the ESRI map service URL or keywords. Once the appropriate map service has been selected, click “Next”. Define the layer’s alias and click “Next”. It will take a few minutes for the map service to load. Review your layer details. To make changes to the layer, click “Back”. To add the layer to your map, click “Finish”. When the layer has been successfully added, click “Close”.

Note the layer appears on top of the layers, but you can use the fade slider next to it, to change its transparency.

8.2.4 Add Shapefile

The Add Shapefile tool allows users to add their own shapefile to the BGIS interactive mapping system. Click on the “Add Shapefile” icon. Navigate to where your data is saved and select either the .shp, .dbf or .prj file. Click open. The shapefile will be added to the bottom of the Map Layers list, under the folder Graphics Layers. Right click on your layer and click on the “zoom to extent” link. Please note that the system does have a file size limit of 2MB.

8.2.5 Add CSV file

To add x, y coordinates to the BGIS interactive system, save the information as a .csv file. Click on the “Add CSV file” icon.

8.2.6 Bing Maps

This tool allows users to open their current location in Bing Maps and use all the tools associated with Bing Maps. The tool allows the user to view the Bing Maps and the BGIS interactive map side-by-side. If the user zooms in or out, or pans around in one map, the other will track the users’ movements.
8.2.7 Google Maps

This tool allows users to open their current location in Google Maps and use all the tools associated with Google Maps. The tool allows the user to view the Google Maps and the BGiS interactive map side-by-side. If the user zooms in or out, or pans around in one map, the other will track the users’ movements.

9 Tasks

9.1 Print Map

Use the Print map tool to print the annotated map to an image. The “Print Map” functionality creates the map with additional features such as legend, scale, north arrow as well as an overview map. To print a map, click on the Print Map icon. Set the properties of the map from the dialog box, click Create File.

Once the map has been created another dialog box will appear. Click on the Open File to view the created map. Save the opened map to your computer.
9.2 Export Map

To convert the annotated map to an image, click on the Export Map icon. An Export a Map Image dialog box should appear. Select the desired image format from the dropdown box.

Once the image has been created another dialog box will appear. Click on the View Image button to display or download the image. To create another image, without saving this one, click on the Back button.

An exported image does not contain a title, legend, index map, north arrow or scale bar. The quality of the image is also very poor. For a better resolution image use the Print Map icon.

9.3 Results

The “View Results” and “View Selected” tools have been discussed in the previous section.

9.4 Drawing Tools

The Drawing Tools allows users to add graphics (points, text, polygons) to a map. Each tool has options that allow the user to change the appearance of the graphic.
9.4.1 **Point**
To add points to the map, click on the Point Tool. Specify the colour, transparency, size and style of the point.

When the point has been defined, click on the desired map location and a point will be added. Use the tool to add multiple points to your interactive map.

9.4.2 **Freehand**
The freehand tool allows users to trace the geometry on an irregular feature. To create a freehand line, select the freehand tool. Specify the style (e.g. solid, dash etc), thickness, colour, and transparency of the line. Click on the map and hold the left mouse button down to draw, release the button to end drawing your line.

9.4.3 **Line**
To add a line, select the Line tool. Specify the style (e.g. solid, dash etc), thickness, colour, and transparency of the line. Click once on the map to mark the starting point. Release the button and move the mouse to view the line that you are drawing. Click on a second point on the map to place the line. Keep clicking to continue creating the line and double-click to complete your line.

9.4.4 **Polygon**
To add a polygon, select the Polygon tool. Specify the outline colour, outline width, fill colour, and transparency of the polygon. Click once on the map to mark a starting point of the polygon. Next, add at least two more points by clicking the map in the desired locations. Double-click to close the polygon.

9.4.5 **Rectangle**
To add a rectangle, select the Rectangle tool. Specify the colour, transparency, size and style of the rectangle. Click and hold the left mouse button down on the desired location on the map. Drag the mouse to the size of the rectangle and release the mouse button to complete it.

9.4.6 **Arrow**
To add an arrow, select the Arrow tool. Specify the colour and transparency of both the border and the fill. Specify the border thickness. Drag your mouse across the map interface.

9.4.7 **Circle**
To add a circle, select the Circle tool. Specify the colour and transparency of both the border and the fill. Specify the border thickness. Click on the map interface for the centre of the circle, and drag outwards.
9.4.8 **Ellipse**
To add an ellipse, select the Ellipse tool. Specify the colour and transparency of both the border and the fill. Specify the border thickness. Drag your mouse across the map interface.

9.4.9 **Triangle**
To add a triangle, select the Triangle tool. Specify the colour and transparency of both the border and the fill. Specify the border thickness. Drag your mouse across the map interface.

9.4.10 **Text**
The Text tool allows users to add text directly to the map. Select the Text tool and format text with the font and style options provided in the Text Markup menu. Click the location on the map where text is to be placed, and start typing within the text box. Press OK to add the text to map, or press Cancel to start again.

9.4.11 **Edit Drawing**
To alter the shape of your drawing, click on the Edit Drawing tool and then click on the drawing that needs to be edited. To edit the shape of a rectangle, click on either the top, right-hand corner or the bottom, left-hand corner of the rectangle, drag the corner until the desired shape is achieved.
To edit a line, freehand drawing or polygon, click on its outline and add an extra vertex, or move the location of a pre-existing vertex. Unfortunately users can not delete pre-existing vertices. Users can only add vertices.

![Map screenshot showing editing tool options and instructions](image)
User can also edit the location of added text, but cannot alter the text itself.

9.4.12 Erase Drawing
The Erase Drawing tool allows users to delete a selected markup made on the map. Select the tool and click once on any added text or graphic to erase the selected markup. To erase multiple graphics at once, click and drag the mouse to create a box around added text or graphics. Release the mouse when the box encloses the markup to be erased. Note that when a section or portion of a graphic is enclosed within the eraser box, the entire shape is deleted.

9.4.13 Clear All Drawings
To quickly erase all the existing graphics (markups) from the map, select the Clear All Drawings tool. Before the drawings are deleted, the user will be asked to confirm or cancel the operation.
10 Analysis
The analysis toolbar provides the user with tools to identify features, measure distance and manually plot coordinates.

10.1 Location Information
The location information tools, provides users with a variety of tools to identify features.

10.1.1 Buffered Identify
To add a buffer and identify the features within this buffer, tick the Buffered Identify checkbox. Select one of the identify tools and draw over the map to identify its features. A Buffer Options dialog box will appear.

Type in the distance of your buffer and specify the unit of measurement. If you want to add the buffer as a drawing, tick the Add Buffer Markup checkbox. If you want to view the buffer before adding it, click on the Preview Buffer button. To exclude layers from the identify process, click on the Display for
10.2 Measurement Tools
The Measurement Tools allows the user to measure areas (polygons), distances (lines), and coordinates (points) on the map.

10.2.1 Measure Distance

Distance is measured as a sequence of line segments that can be drawn on the map. To measure a distance, click the Measure Distance tool, and click on the desired location. Continue clicking points until there is one point left. Double-click the last point to end the measurement. As you measure the system will report the length of the most recent segment that you have drawn in the Last Segment box and the total length of the line in the Total Distance box.

The results of the measurement are shown in the Measure window. To change the unit of measurement, select the unit from the drop-down list.
10.2.2 **Measure Area**
The Measure Area tool allows the user to calculate the perimeter and area inside a polygon. Due to the projection system being used by the interactive maps (the interactive maps use the [Web Mercator projection system](https://en.wikipedia.org/wiki/Web_Mercator_projection)) inaccuracies will creep in when measuring area using the measuring tool. To avoid inaccurate measurements download the required shapefiles, use a GIS viewer to re-project the shapefiles to an appropriate projection system and then do your measurements.

![Measurement Tools](image)

### 10.3 Coordinate Tools

**10.3.1 Enter Coordinates**

To manually plot coordinates, click on the Enter Coordinates tool. A Manually Enter Coordinates dialog box will appear.

![Manually Enter Coordinates](image)

1. Select a coordinate system: Web Mercator, Lat/Lon (DD), Lat/Lon (DMS), Custom
2. Enter your X and Y coordinates. Below follows instructions on how to input your coordinates. If the coordinate falls in the Southern Hemisphere, do not forget to include the negative sign to denote this.
3. To plot coordinates, tick the checkbox next to Add Coordinate to Map.
4. To zoom to the coordinates, tick the checkbox next to Pan to Coordinate.
5. When done inputting the coordinates, click done.

10.3.1.1 Default (4326)
The BGIS mapping system’s default coordinate system is 4326 (short for Plate Carree). The 4326 coordinate system divides earth into a Cartesian grid. The lines of latitude and longitude meet at right angles, and each cell has the same size, area and shape. This is not an accurate depiction of the earth. The further one moves north or south, the more distorted the measurements become.

Coordinates are expressed as:
X (horizontal position along the map) = 26.17084322,
Y (vertical position along the map) = -21.61550774

10.3.1.2 Web Mercator
Like the 4326 coordinate system, the lines of latitude and longitude are parallel to one another in the web Mercator coordinate system. This means that the further one moves north or south, the more distorted the measurements become.

Unlike the 4326 coordinate system, coordinates are measured in meters and expressed as:
X (horizontal position along the map) = 2,913,324.940718
Y (vertical position along the map) = -2,465,424.470345

10.3.1.3 Lat/Lon (DD or DMS)
Geographic coordinates consist of latitude (Lat) and longitude (Lon). These are expressed as
• Degrees, Minutes, Seconds (DMS);
• Decimal Degrees (DD); or
• Degrees, decimal minutes

Decimal degrees (DD) are expressed as decimal fractions:
Lat (vertical position along the map) = -21.6155;
Lon (horizontal position along the map) = 26.1708

Degrees, Minutes, Seconds (DMS) are expressed as:
Lat (vertical position along the map) = 21°36'56"S,
Lon (horizontal position along the map) = 26°10'15"E.

<table>
<thead>
<tr>
<th>Coordinates</th>
<th>Default (4326)</th>
<th>Web Mercator</th>
<th>Lat/Lon (DD)</th>
<th>Lat/Lon (DMS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>X</td>
<td>26.17084322</td>
<td>2,913,324.940718</td>
<td>26.1708</td>
<td>26°10'15&quot;E</td>
</tr>
</tbody>
</table>
10.3.1.4 Custom (WKID)

WKID is an abbreviation for Well-Known Identifier of a spatial reference e.g. the number 4326 is a well known identifier for the Plate Carree coordinate system:


10.3.2 Plot Coordinates

To view the coordinates of a particular location, click the Plot Coordinates tool in the Coordinate Tools window and then click the location on the map. The coordinates for the location will be displayed on the map.

10.3.3 Clear Coordinates

To clear all plotted points from the map, click on the Clear Coordinates button. Before the plotted coordinates are deleted, the user will be asked to confirm or cancel the operation.

10.3.4 Coordinate System

To change the coordinate system of the plotted points, click on the dropdown arrow in the Coordinate System window. Select a coordinate system. The coordinate values of the plotted points will change automatically.

10.3.5 Clicked Coordinates

The Current Coordinates information window displays the X, Y coordinates of the most recently plotted point.
Land Use Decision Support

The Land Use Decision Support functionality is not available for all the BGIS maps.

To access the Land Use Decision Support (LUDS) tool, the user will have to launch a LUDS map and follow the LUDS steps.

Working with the Land Use Decision Support interactive maps, you get an extra tab with the Land Use Decision Support (LUDS) tool.

The LUDS toolbar is explained further by the user guide.

Easy Access Tools Explained

In the top, left-hand corner of the Map Window there’s an “I want to...” dropdown box. The “I want to...” tool provides easy access to some of the frequently used tools in the advanced toolbox.

Clicking on the dropdown arrow will present the following dialog box:
Create a Printable Map: Clicking on the Create a Printable Map link will launch the Create a Printable Map dialog box. (see section Error! Reference source not found.).

Use xxxx LUDS Tool: this functionality is available for maps that can run the LUDS tool. Clicking will start the LUDS tool process.

Draw on the Map: Clicking on the Draw on the Map link, will launch the Tasks toolbar above the interactive map. (see section 9.1).

Measure Distance: Clicking on the Draw on the Map link, will launch the Analysis toolbar above the interactive map. The Measure Distance button will be highlighted to show that it has been activated. (see section 10.2.1).

Share Current Map: Clicking on the Share Current Map will launch a dialog box, containing the URL for the current user-edited map. Press CTRL + C to copy the URL. Users can email the URL to colleagues.

Return to Initial Extent: This link is an easy way to zoom to the original extent of the map (see section 4.5). For example, if the a user opens the a map focused on the Bergriver Municipality, and pans around to various municipalities or provinces, the user can return to the Bergriver extent simply by clicking on the Initial Extent icon/button.

Turn Map Data On or Off: Clicking on the Turn Map Data On or Off link, displays the list of map layers available (see section 4.7). The map layers are displayed in the information panel, to the left of the interactive map.

Add Map Layer: Clicking on this Add Map Layer link, opens a dialog box that allows the user to search for compatible layers of information and add these layers to the BGIS online map. The added layer will appear at the top of the online map (see section 9).

Show/Hide Advanced Toolbar: Clicking on the Show/Hide Advanced Toolbar link displays or removes the advanced toolbar from the top of the interactive map (see section 0).

View Results: Displays the product of a search or features found when using the Identification tools, in the information panel (see section 9.1.1).

View Selected: Displays selected features in the information panel (see section 9.1.1).