



# Introduction to Quantum GIS (Titan) Version 0.8.0

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


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## Copyright Summary

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## Notes and Remarks

**Notes:** In this and following tutorials, the following will be used:

**[New]** a button activated by clicking on it  
“(A new blank map project)” a checkbox activated by put a check in the box by clicking on the box  
“(Username)” a text-box name where you enter data by typing it in



**ISSUE**

a potential limitation to the use of the software



**NOTE**

an addition comment to point out addition functionality or information



**TASK**

Asking you to practice a skill we just discussed



**QUESTION:**

Asking you to collect information provided by a **TASK**

1.0 Chapter  
1.1 Section  
1.1.1 Subsection  
1.1.1.01 Sub-subsection

## Chapter 1 Introduction

### 1.1 General Information

#### 1.1.1 Introduction

*1.1.1.01* **Quantum GIS (QGIS)** is a user friendly Open Source Geographic Information System (GIS) that runs on Linux, Unix, Mac OSX, and Windows. **QGIS** supports vector, raster, and database formats. **QGIS** is licensed under the GNU General Public License. **QGIS** lets the user browse and create map data on their computer. It supports many common spatial data formats (e.g. ESRI ShapeFile, geotiff). **QGIS** supports Plug-ins to do things like display tracks from the GPS units. **QGIS** is Open Source software and it is free of cost.

*1.1.1.02* **Known Issues:** There are a number of issues related to this release. As the name 'preview' indicates, this is still an unstable release, intended to provide a peek at the new features coming in **QGIS** 0.8 and to provide a platform for users to file bug reports. The user can view the currently open issues at the [Quantum GIS Trac](#) website.

*1.1.1.03* New features in Version 0.8.0-Preview-2

- On the fly projection support to automatically project layers from different coordinate systems
- Map Composer for creating map layouts
- Toolbox for running **GRASS** tools from **QGIS**. The toolbox can be easily customized to add additional tools
- Handling of spatially enabled tables and views in **PostgreSQL** has been greatly improved. **QGIS** can now load any table in the database that contains a geometry column
- **PostgreSQL** views containing a geometry column can be viewed in **QGIS**
- Raster graphing tool to produce a histogram for a raster layer
- Raster query using the identify tool allows the user to get the pixel values from a raster by making it the active layer and clicking on the point of interest

- User preferences provides customizable settings for the digitizing line width, color, and selection color
- New symbols for use with point layers are available from the layer properties dialog
- Spatial bookmarks allow the user to create and manage bookmarks for an area on the map. Bookmarks are persistent and global; meaning they are available for all projects
- Measure tool allows the user to measure distances on the map with both segment length and total length displayed as the user clicks
- GPX loading times and memory consumption for large GPX (GPS) files has been drastically reduced
- Many enhancements to the digitizing tools have been made, including the ability to capture data straight into *PostgreSQL/PostGIS*, and improvements to the definition of attribute tables for newly created layers
- The Raster Georeferencer Plug-in can be used to generate a world file for a raster. The Plug-in allows you to define known control points in the raster coordinate system. Once enough control points are defined, the world file can be generated and the raster properly displayed in *QGIS* or other GIS applications
- Improvements to the *Mapserver* export tool

## Chapter 2 Getting the software

### 2.1 File Unzip software

#### 2.1.1 General Information for File Unzip software:

2.1.1.01 The following information on 7-Zip is taken from <http://www.7-zip.org/>

2.1.1.02 **7-Zip** is a file archive program with high compression ratio. **7-Zip** is free software distributed under the **GNU LGPL** (except for the RAR Plug-in).

#### 2.1.2 Getting and Installing 7-Zip

2.1.2.01 Open the web browser and go to <http://www.7-zip.org/>

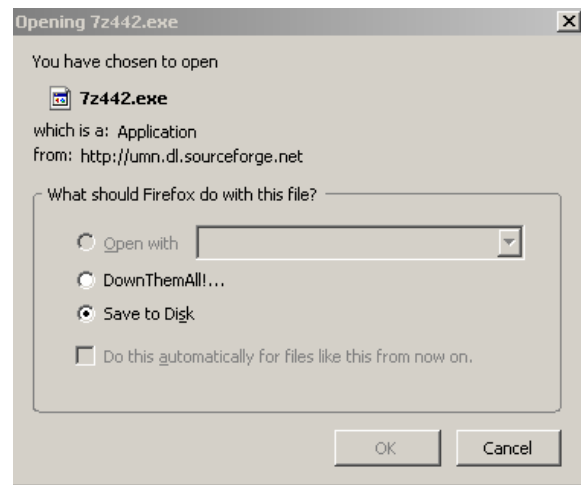
2.1.2.02 Click on the [**download**] button next to type “.exe”

Link	Type	Windows	Size
<a href="#">Download</a>	.exe	32-bit	818 KB
<a href="#">Download</a>	.msi		873 KB
<a href="#">Download</a>			x64

Figure 2.1

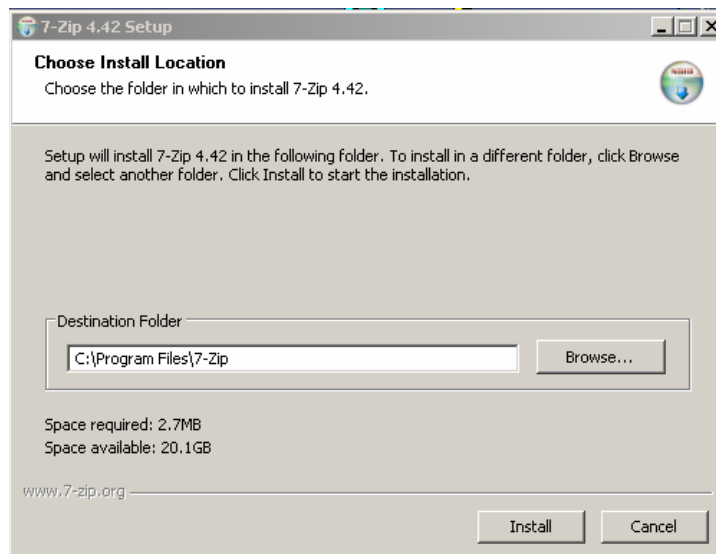
2.1.2.03 Select a mirror site and click on [**download**]

2.1.2.04 When the screen changes to



**Figure 2.2**

Click on radio-button “(Save to Disk)” then **[OK]**



**Figure 2.3**

2.1.2.05 Click **[Install]**

2.1.2.06 Click **[Finish]**.

## **2.2 Quantum GIS**

### **2.2.1 General Information for Quantum GIS:**

2.2.1.01 Not Applicable



## 2.2.2 Get and Set Up Quantum GIS

2.2.2.01 Open the web browser and navigate to the *Quantum GIS* website at <http://qgis.org/>

2.2.2.02 Click on the Newsflash item [**0.8 Preview 2 Available**]



Figure 2.4

2.2.2.03 Choose the operating system for the platform

Choose your platform <sup>1</sup>			
Platform	Package	md5	Comments
All	<a href="#">qgis_Release-0_8-preview-2.tar.gz</a>	<a href="#">[md5]</a>	Source code only
Micorsoft Windows	<a href="#">qgis-0.8.0_Preview-2.zip</a>	<a href="#">[md5]</a>	
SUSE 10.0	<a href="#">qgis-0.8.0_preview2-1.i586.rpm</a>	<a href="#">[md5]</a>	Binary rpm only
Fedora Core 5	<a href="#">qgis-0.8.0_preview2-1.i386.rpm</a>	<a href="#">[md5]</a>	Binary rpm only
Ubuntu 'Dapper'	<a href="#">ubuntu_dapper</a>		
Ubuntu 'Edgy'	<a href="#">ubuntu_edgy</a>		
Debian Testing (aka 'etch')	deb <a href="http://debian.gfoss.it/">http://debian.gfoss.it/</a> etch main	n/a	<a href="#">README!</a>
Mac OSX Universal - All In one	<a href="#">qgis-0.8.0pre2.dmg.gz</a>	<a href="#">[md5]</a>	
Mac OSX Universal - With external Frameworks	<a href="#">QGIS-0.8-Preview-2.dmg.gz</a>	<a href="#">[md5]</a>	Install frameworks below
Frameworks for Mac OSX Universal	<a href="#">AllFrameworks.dmg.gz</a>	<a href="#">[md5]</a>	Accompanies dmg above

<sup>1</sup> All packages contain GRASS support unless otherwise indicated.

Figure 2.5

2.2.2.04 Download the windows file  
 Micorsoft Windows [qgis-0.8.0\\_Preview-2.zip](#) into a directory.( i.e. C:\temp)

2.2.2.05      Unzip the file by copying it into the correct directory (i.e. "C:\Program Files\qgis\") and then unzip it.

2.2.2.06      Make a shortcut on the desktop using attached icon

---

## Chapter 3 Getting the data

### 3.1 To Obtain Data from National Atlas

#### 3.1.1 General Information for Obtaining Data from National Atlas:

3.1.1.01 Not Applicable

#### 3.1.2 To Obtain Data from National Atlas

3.1.2.01 Create a directory called workspace on the machine e.g. D:/workspace.

3.1.2.02 Open the web browser and go to  
<http://www.nationalatlas.gov/atlasftp.html>

3.1.2.03 Click on “Boundaries”

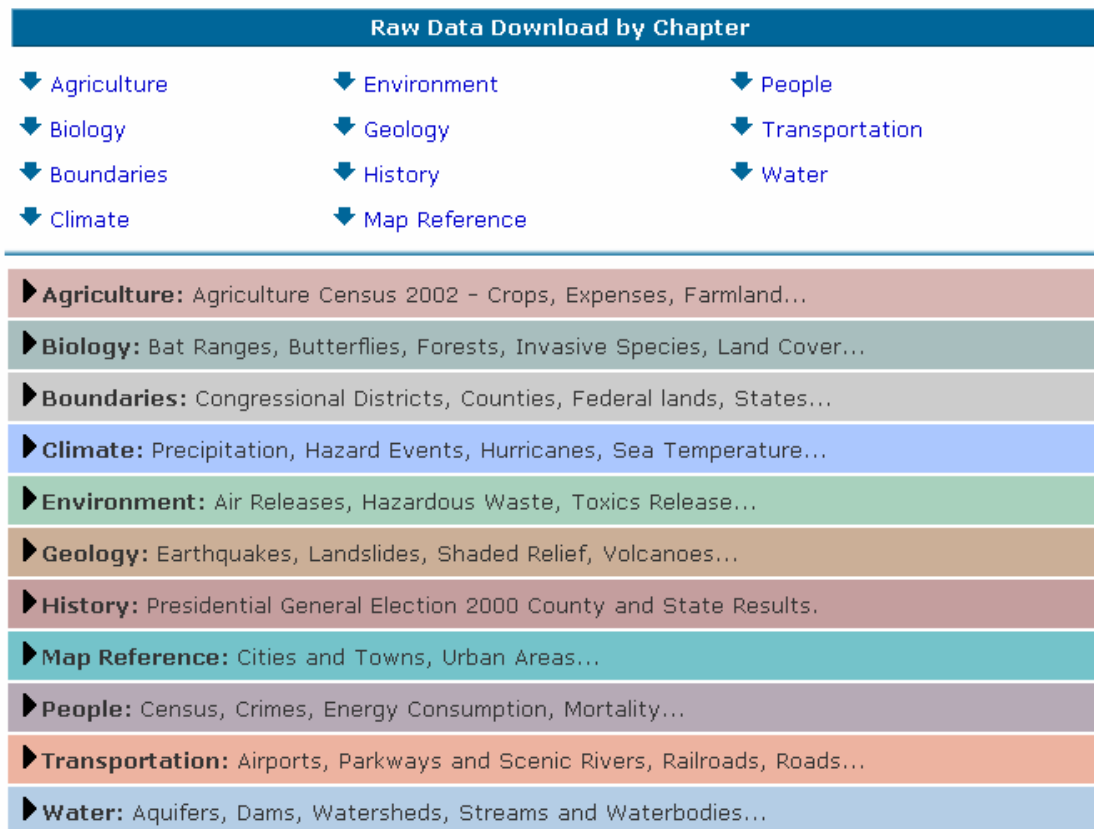


Figure 3.1

- 3.1.2.04 Download the following Shapefile layers and unzip them into the Workspace folder:
- County Boundaries, 2001
  - Federal Lands
  - State Boundaries
- 3.1.2.05 Download the following Shapefile layer from “Map Reference” and unzip them into the Workspace folder:
- Urban Areas
- 3.1.2.06 Download the following Shapefile layers from “Transportation” and unzip them into the Workspace folder:
- Airports
  - Railroads
  - Roads
- 3.1.2.07 Download the following Shapefile layer from “Water” and unzip them into the Workspace folder:
- Streams and Waterbodies
- 3.1.2.08 Download the following Shapefile layers from “Biology” and unzip them into the Workspace folder:
- Invasive Species - Africanized Honey Bees
  - Invasive Species – Zebra Mussel Distribution
  - Ecoregions – Bailey
  - Ecoregions – Omernik
- 3.1.2.09 Download the following Shapefile layer from “People” and unzip them into the Workspace folder:
- Mortality, Various Causes
- 3.1.2.10 Download the following Shapefile layer from “Geology” and unzip them into the Workspace folder:
- Shaded Relief Land - Color - 1 Kilometer Resolution
  - Shaded Relief Land - Color - Conterminous United States 200 Meter Resolution
  - Coal Fields

## Chapter 4      **Updating Quantum GIS**

### **4.1            *Updating Quantum GIS***

#### **4.1.1          General Information for Updating Quantum GIS**

4.1.1.01      Not Applicable

#### **4.1.2          Setup for Updating Quantum GIS**

4.1.2.01      Not Applicable

#### **4.1.3          Updating Quantum GIS**

4.1.3.01      Click on the [**Help**]

4.1.3.02      Click on [**About**]

4.1.3.03      Go back to the website and check the current development release. Do this occasionally to take advantage of the latest tools.

---

## Chapter 5 Projects

### 5.1 *Creating a New Project*

#### 5.1.1 **General Information for Creating a New Project**

5.1.1.01 Not Applicable

#### 5.1.2 **Setup for Creating a New Project**

5.1.2.01 Not Applicable

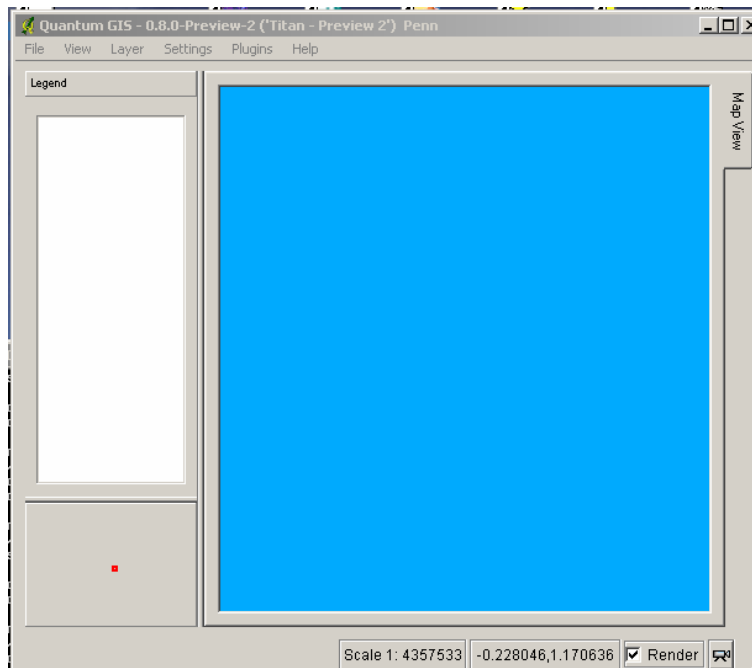
#### 5.1.3 **Creating a new project**

5.1.3.01 Double Click on the Desktop Icon



**Figure 5.1**

5.1.3.02 The following screen will appear



**Figure 5.2**

## **5.2 Loading an Existing Project**

### **5.2.1 General Information for Loading an Existing Project**

5.2.1.01 Not Applicable

### **5.2.2 Setup for Loading an Existing Project**

5.2.2.01 Not Applicable

### **5.2.3 Steps for Loading an Existing Project**

5.2.3.01 Click on [**File**] menu item

5.2.3.02 Click on [**Open Project**]

5.2.3.03 Navigate to the directory where the stored projects are and select the project to be opened by highlighting it

5.2.3.04 Click the [**Open**] button to launch *QGIS* with the selected project

## **5.3 Saving a Project**

### **5.3.1 General Information for Saving a Project**

5.3.1.01 While working on any project it is advisable to save regularly to guard against data lost and for later retrieval. When saving a project for the first time it is necessary to provide a name for the project file. It is important to note that a saved project file does not contain any map data. The project file contains references to map data, as well as other information, such as layer symbology. Projects are stored on the hard drive with an .epf extension

### **5.3.2 Setup for Saving a Project**

5.3.2.01 Not Applicable

### **5.3.3 Steps for Saving a Project**

5.3.3.01 Click the [**File**] on the Main Toolbar

5.3.3.02 Click the [**Save**] item, if this is the first time the project has been saved, the user will be prompted to provide a path and filename

5.3.3.03 Click the [**Save as**] item, if the project has been saved once, but want to save a different version, a prompt will appear for the user to provide a new path and filename



## Chapter 6 The First Project

### 6.1 Specifying Map Properties


#### 6.1.1 General Information for Specifying Map Properties

6.1.1.01 Map Properties - It is important that all data loaded into a map is in the same map properties.

#### 6.1.2 Setup for Specifying Map Properties:

6.1.2.01 Not Applicable

#### 6.1.3 Specifying Map Properties:

6.1.3.01 Click on the [**Settings**] from the main menu or click on little projector in lower right corner of screen 

6.1.3.02 Click on the [**Project Properties**]

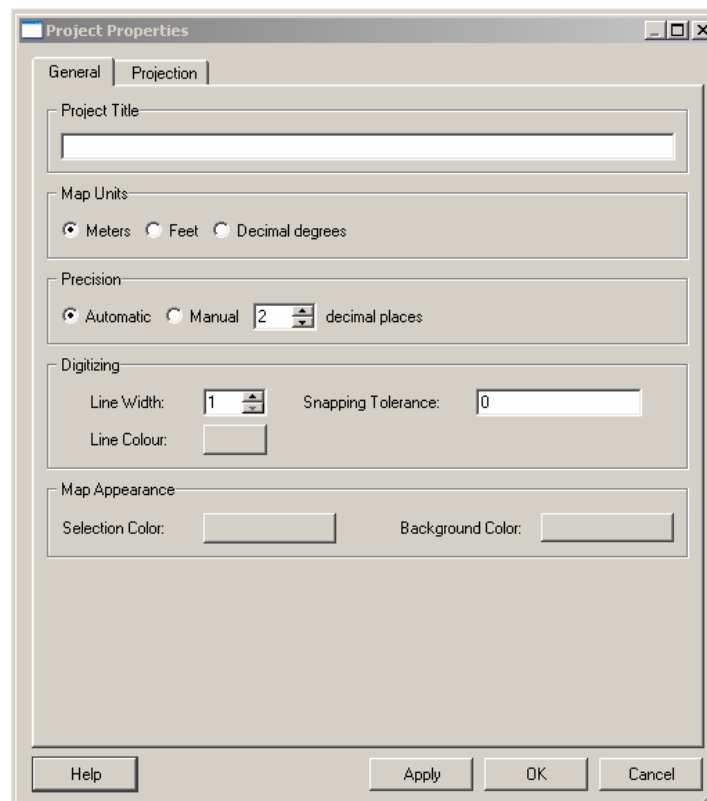


Figure 6.1

- 6.1.3.03 Select the [**General Tab**]
- 6.1.3.04 Type in a Project Title
- 6.1.3.05 Select the Map Units to be used



***NOTE #1\*\*\*\*\*** the Map units should be in the units that your data is in i.e. Meters, Feet or Decimal Degrees. Do not set it to meters if the data is Decimal Degrees as this will generate strange results*

- 6.1.3.06 Select the Cursor Display Precision.
- 6.1.3.07 Click on the [**Projection Tab**]
- 6.1.3.08 Click on '(Enable on the Flyer Projection)'
- 6.1.3.09 Click on [**OK**]



***TASK # 1\*\*\*\*\***Under [**General**],Type Project name as 'Penn', set decimal degrees as the map unit for this project, set cursor display precision to manual and 6 decimal places. Click [**Apply**]. Click on [**Projection**] tab, click on '(Enable Projection on the Fly)'. Set Projection as WGS 84 under Geographic Coordinate System, Click [**OK**]*



***ISSUE # 1\*\*\*\*\*** The functionality to measure in feet if the map data is in Decimal Degrees is not included in the software due to the complex algorithms required to accurately compute distance when using decimal degrees.*

## **6.2 Options**

### **6.2.1 General Information for Options**

- 6.2.1.01 This allows the user to preset certain conditions within your project

### **6.2.2 Setup for Options**

- 6.2.2.01 Click on the [**Settings**] from the main menu.
- 6.2.2.02 Click on [**Options**]

6.2.2.03 On the [**Appearance**] Tab, the user can hide the opening splash screen and change the icons on the toolbars. It starts out as default but can be changed to 'nkids'.

6.2.2.04 There is nothing to change on the [**Rendering**] tab

6.2.2.05 The user can change the Search radius for identifying features on the [**Selection & Measuring**] Tab

6.2.2.06 On the [**Projection**] tab the user can set what to do when loading a layer that has no projection information with it. It is recommended to use '(Prompt for projection)' unless the user is sure all the data is already in the same projection (i.e. it all came from the same source).

6.2.2.07 The [**Help Browser**] tab allows the user to set the browser to be used when opening the Help documents



***NOTE #2\*\*\*\*\*** in this exercise we will use d:\workspace or the directory you created when you installed the software*

## Chapter 7      Rendering

### 7.1            *Rendering*

#### 7.1.1          **General Information about Rendering**

7.1.1.01        By default, *QGIS* renders all visible layers whenever the map canvas must be refreshed. The events that trigger a refresh of the map canvas include:

- Adding a layer
- Panning or zooming
- Resizing the *QGIS* window
- Changing the visibility of a layer or layers

7.1.1.02        *QGIS* allows the user to control the rendering process in a number of ways.

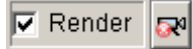
#### 7.1.2          **Setup for Rendering:**

7.1.2.01        **Controlling Map Rendering:** Map rendering can be controlled in the following ways:

- Stopping rendering during drawing of the map canvas
- Temporarily suspending rendering
- Setting an option to control the visibility of layers when they are added

7.1.2.02        **Stopping Rendering:** To stop the map drawing, press the [**ESC**] key. This will halt the refresh of the map canvas and leave the map partially drawn. It may take a bit of time between pressing [**ESC**] and the time the map drawing is halted.

7.1.2.03        **Suspending Rendering:** To suspend rendering, click the ‘(Render)’



checkbox in the lower right corner of the status bar. When the Render box is not checked, *QGIS* does not redraw the canvas in response to any of the events described in Section 103.1.1.01

7.1.2.04        Examples of when the user might want to suspend rendering include:

- Add many layers and symbolize them prior to drawing
- Add one or more large layers and set scale dependency before drawing
- Add one or more large layers and zoom to a specific view before drawing
- Any combination of the above

7.1.2.05        Checking the ‘(Render)’ box enables rendering and causes an immediate refresh of the map canvas.

7.1.2.06      **Setting Layer Add Option:** The user can set an option to always load new layers without drawing them. This means the layer will be added to the map, but its visibility checkbox in the legend will be unchecked by default.

7.1.2.07      To set this option, choose [**Options**] from the [**Settings**] menu and click on the [**Rendering**] tab. Uncheck the '(New layers added to the map should be displayed)' checkbox. Any layer added to the map will be off (invisible) by default.

7.1.2.08      **Updating the Map Display during Rendering,** The user can set an option to update the map display as features are drawn. By default, *QGIS* does not display any features for a layer until the entire layer has been rendered. To update the display as features are read from the data store, choose [**Options**] from the [**Settings**] menu and click on the [**Rendering**] tab. Set the feature count to an appropriate value to update the display during rendering. Setting a value of 0 disables update during drawing (this is the default). Setting a value too low will result in poor performance as the map canvas is continually updated during the reading of the features. A suggested value to start with is 500.



**TASK #2**\*\*\*\*\* *Go Ahead and adjust the rendering by Checking Initial Visibility and setting the Update during Drawing to 500*

---

## Chapter 8 Projections

### 8.1 Projections

#### 8.1.1 General Information about Projections

8.1.1.01 *QGIS* supports on-the-fly projection of vector layers. This feature allows the user to display layers with different coordinate systems and have them overlay properly.

8.1.1.02 *QGIS* has support for approximately 2,700 known projections. Projections are stored in a Sqlite database that is installed with *QGIS*. Normally the user does not need to manipulate the database directly. In fact, doing so may cause projection support to fail. Custom projections are stored in a user database

8.1.1.03 The projections available in *QGIS* are based on those defined by EPSG and are largely abstracted from the spatial references table in *PostGIS* version 1.x. Note that the identifiers used in *QGIS* do not correspond to the EPSG or *PostGIS* spatial reference identifiers. The EPSG and *PostGIS* identifiers are present in the database and can be used to specify a projection in *QGIS*.

8.1.1.04 In order to use OTF projection, the data must contain information about its coordinate system. For *PostGIS* layers *QGIS* uses the spatial reference identifier that was specified when the layer was created. For data supported by OGR, *QGIS* relies on the presence of a format specific means of specifying the coordinate system. In the case of shapefiles, this means a file containing the Well Known Text (WKT) specification of the coordinate system. The projection file has the same base name as the shapefile and a prj extension. For example, a shapefile named lakes.shp would have a corresponding projection file named lakes.prj.

#### 8.1.2 Setup for Projections

8.1.2.01 Not Applicable

#### 8.1.3 Usage of Projections

8.1.3.01 At startup, *QGIS* does not have On-the-Fly (OTF) projection enabled. To use OTF projection, the user must open the Project Properties dialog, select a projection for the map, and enable projections. There are two ways to open the Project Properties dialog:

8.1.3.02 Select [**Project Properties**] from the [**Settings**] Menu or

8.1.3.03 Click on the projector icon in the lower right-hand corner of the status bar

8.1.3.04 When opening the [**Project Properties**] dialog from the [**Settings**] menu, click on the [**Projection**] tab to view the projection settings. Opening the dialog from the [**Projector**] icon will automatically bring the [**Projection**] tab to the front.

## 8.2 The Projection dialog

### 8.2.1 General Information for the Projection dialog

8.2.1.01 The Projection dialog contains four important components.

- **(Enable on the fly projection)** - This checkbox is used to enable or disable OTF projection. When off, no projection takes place and each layer is drawn using the coordinates as read from the data source. When on, the coordinates in each layer are projected to the coordinate system of the map canvas.
- **Projections** - this is a list of all projection supported by QGIS, including Geographic, Projected, and Custom coordinate systems. To use a coordinate system, select it from the list by expanding the appropriate node and selecting the projection.
- **Proj4 text** - this is the projection string used by the Proj4 projection engine. This text is read-only and provided for informational purposes.
- **Search** - if the user knows the PostGIS or EPSG identifier for a projection, use the search feature to find it. Enter the identifier and click on [**Find**].

## 8.3 Specifying a Projection

### 8.3.1 General Information for Specifying a Projection

8.3.1.01 *QGIS* automatically sets the map projection to the coordinate system of the first layer loaded. One way to specify the map projection is to first load a layer with the projection that is wanted for the entire map. Then open the [**Project Properties**] dialog and click on the “(Enable on the fly projection)” checkbox. And finally, close the Project Properties dialog and add additional layers to the map.

### 8.3.2 Setup for Specifying a Projection

8.3.2.01 Not Applicable

### **8.3.3 Use for Specifying a Projection**

8.3.3.01 If the user has already added layers and wants to enable OTF projection, open the [**Project Properties**] dialog. Then find the projection or geographic coordinate system that is to be used in the list of projections. Alternatively, use the search feature as described in the previous section.

## **8.4 Custom Projections**

### **8.4.1 General Information about Custom Projections**

8.4.1.01 If *QGIS* doesn't have the projection need, define a custom projection

8.4.1.02 Defining a custom projection requires a good understanding of the Proj.4 projection library. To begin, refer to Cartographic Projection Procedures for the UNIX Environment/NA User's Manual by Gerald I. Evenden, U.S. Geological Survey Open-File Report 90-284, 1990 (available at [ftp://ftp.remotesensing.org/proj/new\\_docs/OF90-284.pdf](ftp://ftp.remotesensing.org/proj/new_docs/OF90-284.pdf)). This manual describes the use of the proj and related command line utilities. The cartographic parameters used with proj and described in the user manual are the same as those used by *QGIS*.

8.4.1.03 The Custom Projections dialog requires only two parameters to define a user projection:

- a descriptive name
- the cartographic parameters

### **8.4.2 Setup for Custom Projections**

8.4.2.01 Not Applicable

### **8.4.3 Usage of Custom Projections**

8.4.3.01 To define a projection, select [**Custom Projections**] from the [**Settings**] menu. Custom projections are stored in the QGIS user database. In addition to custom projections, this database contains spatial bookmarks and other custom data.

8.4.3.02 To create a new projection, click the [**New**] button and enter a descriptive name and the projection parameters.



8.4.3.03 The user can test the custom projection parameters to see if they give sane results by clicking on the [**Test**] tab and pasting the projection parameters into the “(Parameters)” field.

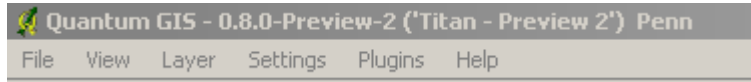
8.4.3.04 Then enter known WGS 84 latitude and longitude values in ‘North’ and ‘East’ fields respectively.

8.4.3.05 Click on [**Calculate**] and compare the results with the known values in the projected coordinate system.

## Chapter 9 The Quantum GIS Interface

### 9.1 The Standard Toolbars

#### 9.1.1 General Information about the Standard Toolbar








**Figure 9.1**

In the upper left corner of the program is a toolbar with several drop-down menus. Each of the Drop-down lists has several functions within them.










*NOTE #3\*\*\*\*\* several of the Buttons appear in both the drop-down lists and individual toolbars, I will only define the button the first time.*

##### 9.1.1.01 [File]












-  [New Project] - create a new project
-  [Open Project] – open an existing project
- [Open Recent Project]
- -----
-  [Save Project] – save a project with the existing name
-  [Save Project As] – save a project with a new name
- [Save as Image]
- [Export To Mapserver Map] - export as a .map for the web-server MapServer
-  [Print] – call up the Map Composer
- -----
- [Exit] – exit the program

##### 9.1.1.02 [View]

-  [Zoom Full]
-  [Zoom to Selection] in Active layer
-  [Zoom to Layer]

-  [**Zoom Last**]
-  [**Refresh**] – redraws the map
-  [**Show Bookmarks**] – list all existing bookmarks
-  [**New Bookmarks**] – create a new bookmark

#### 9.1.1.03 [**Layer**]




-  [**Add a Vector Layer**] – add a data layer
-  [**Add a Raster Layer**] – add a image layer
-  [**Add a PostGIS Layer**]
-  [**Add WMS layer**]
-  [**Remove Layer**]
-  [**New Vector Layer**] – create anew data layer
-  [**In Overview**] – send to overview map
-  [**Add All to Overview**] – add all layers to overview
-  [**Remove All from Overview**] – removes all layers from overview
-  [**Hide All Layers**] – make all layers invisible
-  [**Show All Layers**] – make all layers visible














#### 9.1.1.04 [**Settings**]

- [**Project Properties**] – set project information for layer or project
- [**Custom Projections**] – build your own custom projects
- [**Options**] – set options for the project


#### 9.1.1.05 [**Plug-ins**]

- [**Plug-in Manager**] – turn on and off Plug-ins
- The following will appear if turned on by the Plug-in Manager.

- [**Decorations** >]
  -  [**Copyright Label**]
  -  [**Scale Bar**]
  -  [**North Arrow**]
- [**Delimited Text** >]

-  [Add Delimited Text]
- [Geoprocessing >]
  -  [Buffer Feature]
- [Georeferencing >]
  -  [Georeferencer]
- [GPS >]
  -  [GPS Tools]
  -  [Create New GPX Layer]
- [GRASS >]
  - [Open Mapset]
  - [New Mapset]
  - [Close Mapset]
  -  [Add GRASS Vector Layer]
  -  [Add GRASS Raster Layer]
  -  [Open GRASS Tools]
  -  [Display Current GRASS Region]
  -  [Edit Current GRASS Region]
  -  [Edit Grass Vector Layer]
  - [Create New GRASS Vector]
- [Graticules >]
  -  [Graticule Creator]
- [Spit]
  -  [Import shape to PostGreSQL]

9.1.1.06 [Help]

-  [Help Contents]
- [QGIS Home Page]
- [QGIS Sourceforge]
- [Check QGIS Version]
- [About]

---

## 9.2 **Addition Menus:**

### 9.2.1 **General Information about Addition Menus:**

9.2.1.01 Right-click on an empty place on the toolbar, a drop-down menu will appear. By click on different name the can add extra specific tool bars. Most of the buttons on the additional menus or toolbars are contained in the drop down menus.



**ISSUE # 2\*\*\*\*\*** *If the user closes all the toolbars on the drop-down menu, the right click to reopen the drop down menu no longer works. The user has to use the Plug-in manager to turn on the GRASS Toolbar. Then the right-click drop-down menu works again.*



**TASK #3\*\*\*\*\*** *right-click on an empty place on the toolbar, a drop-down menu will appear. Click on all the different specific tool bars.*

The screen will look as follows:

9.2.1.02 [**File Toolbar**] (Click this tool to turn it one)



**Figure 9.2**











- [**New Project**]
- [**Save Project**]
- [**Save Project As**]
- [**Open Project**]
- [**Print**]

9.2.1.03 [**Manage Layers**] (Click this tool to turn it one)



**Figure 9.3**

- [**Add a Vector Layer**]

- 
-  [Add a Raster Layer]
  -  [Add a PostGIS Layer]
  -  [Add WMS Layer]
  -  [New Vector Layer]
  -  [Remove Layer]
  -  [In Overview]
  -  [Add All to Overview]
  -  [Remove All from Overview]
  -  [Show All Layers]
  -  [Hide All Layers]

9.2.1.04 [Help] (Click this tool to turn it on)











Figure 9.4





-  [Help Contents]

9.2.1.05 [Digitizing] (Click this tool to turn it one)



Figure 9.5









-  [Start Editing the Current Layer]
-  [Stop Editing the Current Layer]
-  [Capture Point]
-  [Capture Line]
-  [Capture Polygon]
-  [Delete Selected]
-  [Add Vertex]
-  [Delete Vertex]

- 
-  [*Move Vertex*]
  -  [*Cut Feature*]
  -  [*Copy Feature*]
  -  [*Paste Feature*]

9.2.1.06 [*Map Navigation*] (Click this tool to turn it one)



Figure 9.6

-  [*Pan Map*]
-  [*Zoom In*]
-  [*Zoom Out*]
-  [*Zoom Full*]
-  [*Zoom to Selection*]
-  [*Zoom to Layer*]
-  [*Zoom Last*]
-  [*Refresh*]

9.2.1.07 [*Attributes*] (Click this tool to turn it one)

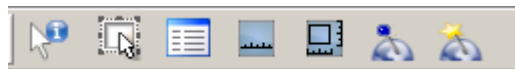







Figure 9.7

-  [*Identify Features*]
-  [*Select Features*]
-  [*Open Table*]
-  [*Measure Line*]
-  [*Measure Area*]

- 
-  [Show Bookmark]
  -  [New Bookmark]

9.2.1.08 [Plug-in] (Click this tool to turn it one)









Figure 9.8

-  [Add Delimited Text]
-  [Copyright Label]
-  [Georeferencer]
-  [GPS Tools]
-  [Graticular Creator]
-  [North Arrow]
-  [Buffer Feature]
-  [Scale Bar]
-  [Import shape to PostGreSQL]

9.2.1.09 [GRASS] (Click this tool to turn it one)



Figure 9.9

-  [Add GRASS Vector Layer]
-  [Add GRASS Raster Layer]
-  [Open GRASS Tools]
-  [Display Current GRASS Region]
-  [Edit Current GRASS Region]
-  [Edit Grass Vector Layer]



## Chapter 10 Tools

### 10.1 **Map Zoom Tools**

#### 10.1.1 **General Information for Map Zoom Tools**

*10.1.1.01* When working with a map it may be necessary to zoom in to view an area in more detail, or zoom out to see a larger area.

### 10.2 **Zooming In**

#### 10.2.1 **General Information for Zooming In**

*10.2.1.01* Not Applicable

#### 10.2.2 **Setup for Using the Zoom-in Function:**

*10.2.1.01* Not Applicable

#### 10.2.3 **Steps for Using the Zoom-in Function**

*10.2.3.01* Zoom in to a specific area. Click and hold the left mouse. Move the mouse to drag a rectangle to create the area to zoom to. Release the mouse button to complete the zoom.

### 10.3 **Zooming Out:**

#### 10.3.1 **General Information for Zooming Out**

*10.3.1.01* Not Applicable

#### 10.3.2 **Setup for Using the Zoom-out Function**

*10.3.2.01* Not Applicable

#### 10.3.3 **Steps for Using the Zoom-out Function**

*10.3.3.01* Zoom out to a specific Area. Click and hold the left mouse button, Move the mouse to drag a rectangle to create the area. The current map extent will be

---

resized to fit in the rectangle drawn. As a result the smaller the rectangle the further the map will zoom out. Release the mouse button to complete the zoom.

## **10.4      *Zooming to Full Extent***

### **10.4.1      General Information for Zooming to Full Extent**

*10.4.1.01*      Zooming to full extent resets the map view so that every feature of every layer is contained within the visible extent

### **10.4.2      Setup for Zooming to Full Extent:**

*10.4.2.01*      Not Applicable

### **10.4.3      Steps for Zooming to Full Extent**

*10.4.3.01*      Click the [**Zoom Full**] button on the Tools toolbar

*10.4.3.02*      Or click on [**View**] then [**Zoom Full**]

## **10.5      *Zooming to Last Extent:***

### **10.5.1      General Information for Zooming to Last Extent**

*10.5.1.01*      Zooming to last extent allows stepping back to last map view. For example, start with a map view at full extent then zoom in to an area on the map. Now click the last button; the map will return to the previous map view, which was the full extent.

### **10.5.2      Setup for Zooming to Last Extent**

*10.5.2.01*      Not Applicable

### **10.5.3      Steps for Zooming to Previous Extent**

*10.5.3.01*      For Zooming to Last Extent – Click the [**Zoom Last**] button on the Tools Toolbar

## **10.6      *Zoom to Layer***

## **10.6.1 General Information for Zoom to Layer**

*10.6.1.01* Zoom to a layers extent will set the map display to an area just big enough to show every feature in a particular layer.

## **10.6.2 Setup for Zooming to Layer**

*10.6.2.01* Not Applicable

## **10.6.3 Steps for Zooming to Layer Extent**

*10.6.2.01* Click on the [**Zoom to Layer**] button on the Map Navigation Toolbar or

*10.6.3.02* Right-click on the layer in the legend, a new menu will popup.

*10.6.3.03* Click on [**Zoom to Layer Extent**]

## **10.7 Panning**

### **10.7.1 General Information for Panning**

*10.7.1.01* Panning allows the user to move the map display around to show areas outside of the current viewing area without changing the scale of the map.

### **10.7.2 Setup for Panning**

*10.7.2.01* Not Applicable

### **10.7.3 Steps for Panning**

*10.7.3.01* Click the [**Pan**] button on the Map Navigation Toolbar.

*10.7.3.02* Move the mouse over the map.

*10.7.3.03* Click and hold down the left mouse button.

*10.7.3.04* Move the mouse, still holding down the mouse button. The map will move with the mouse.

*10.7.3.05* Release the mouse button to complete the pan operation

## **10.8 Measuring Distance**

### **10.8.1 General Information for Measuring Distance**

*10.8.1.01* The measurement tool is used to calculate distances between 2 or more user-defined points on the map.

### **10.8.2 Setup for Measuring Distance**

*10.8.2.01* Not Applicable

### **10.8.3 Measuring Distance**

*10.8.3.01* Click the [**Measure Line**] tool on the Map Navigation Toolbar.

*10.8.3.02* Move the mouse over the map to the starting position.

*10.8.3.03* Using the left mouse button, Click once, and now move to the next position. A line will draw as the mouse moves.

*10.8.3.04* Using the left mouse button, click once to define the end position

*10.8.3.05* Repeat steps 3 and 4 to create a multi point line as necessary.

*10.8.3.06* The distance will be calculate and displayed in a popup window. The upper window column is the length of each segment while the bottom column is the cumulative length

*10.8.3.07* Right Clicking will reset the measuring tool.

## **10.9 Measuring Area**

### **10.9.1 General Information for Measuring Area**

*10.9.1.01* The measurement tool is used to calculate area within 3 or more user-defined points on the map.

### **10.9.2 Setup for Measuring Area**

*10.9.2.01* Not Applicable

### **10.9.3 Measuring Area**

- 10.9.3.01* Click the [**Measure Area**] tool on the Map Navigation Toolbar.
- 10.9.3.02* Move the mouse over the map to the starting position.
- 10.9.3.03* Using the left mouse button, Click once, and now move to the next position. A line will draw as the mouse moves.
- 10.9.3.04* Using the left mouse button, click to create a second point
- 10.9.3.05* Using the left mouse button, click to create a third point
- 10.9.3.06* Repeat steps 5 to create as many points for the area as necessary.
- 10.9.3.07* The total area will be calculate and displayed in a popup window.
- 10.9.3.08* Right Clicking will reset the measuring tool.

## Chapter 11 Vector Data

### 11.1 Adding Vector Map Data

#### 11.1.1 General Information for Adding Vector Map Data: Not Applicable

11.1.1.01 *QGIS* supports numerous GIS data formats that can be added to a project with a few simple clicks. It should first be determined if the GIS data is in a vector format that is compatible with Quantum GIS by using the list below:

- ESRI® Shapefiles (\*.shp)
- ESRI® Arc/Info Binary Coverages (\*.E00)
- MapInfo® TAB files (\*.tab)
- STDT

11.1.1.02 *QGIS* supports vector data in a number of formats, including shapefiles, MapInfo mif, and PostGIS layers in a PostgreSQL database. Support for additional data types is provided by Plug-ins, for example delimited text. Many of the features available in *QGIS* work the same regardless of the vector data source. This is by design and includes the identify, select, labeling, and attributes functions

11.1.1.03 PostGIS layers are stored in a *PostgreSQL* database. The advantage of PostGIS is the spatial indexing, filtering, and query capability. Using PostGIS, vector functions such as select and identify work more accurately than with OGR layers in *QGIS*.

11.1.1.04 Each GIS data set will be added to the map project as a single layer

#### 11.1.2 Setup for Adding Vector Map Data

11.1.2.01 Not Applicable

#### 11.1.3 Adding Vector Map Data

11.1.3.01 Adding data using [**Layer**] then [**Add a Vector Layer**]

11.1.3.02 or Click on the [**Add a Vector Layer**] icon on the [**Data**] Toolbar

11.1.3.03 Browse to the location of the GIS data.

---

11.1.3.04 Click on the GIS data you want to add as a new layer in your project.



**NOTE #4** \*\*\*\*\* *If you want to add multiple layers, hold down the control key and select each addition layer by clicking on it.*

11.1.3.05 Click the [**Open**] button. The new layer will be added to your project



**TASK #3**\*\*\*\*\* *Uncheck the render box in the lower right corner, add **afrebpp020, airportx020, coalfdp050, countyp020, ecoomrpr075,.ecoregp075, fedlandp020, hydrogpl020, hydrogpp020, mortalp020, railrdl020, roadtrl020, statep020, urbanp020, and zmusse020** layers to the project.*



**TASK #4** \*\*\*\*\* *Turn the **Statep020** Layer on by putting the check in the box next to the layer name. Put a check in the render box.*

## 11.2 Using the Legend to Control the Layers

### 11.2.1 General Information about Using the Legend to Control the Layers

11.2.1.01 The legend is a graphical representation of all the map layers in the current project. The default position of the legend is docked on the left hand side of the screen. The legend offers layer manipulation functionality including but not limited to changing a layers symbology or its order in the drawing process.

11.2.1.02 Right Click Functionality

- [**Properties**]
- [**Zoom to Layer Extent**]
- [**Add to Overview**]
- [**Remove from Overview**]
- [**Remove**]
- [**Allow Editing**]
- [**Save as Shapefile**]
- [**Rename**]
- [**Add Group**]
- [**Expand All**]
- [**Collapse All**]
- [**Show File Groups**]

## **11.3 Changing the Layer Name**

### **11.3.1 General Information for Changing the Layer Name**

*11.2.1.01* Changing the name of a layer does not affect the underlying data. The layer name is project dependent and will not modify any information stored against the map source.

### **11.3.2 Setup for Changing the Layer Name**

*11.3.2.01* Not Applicable

### **11.3.3 Steps for Changing the Layer Name**

*11.3.3.01* Right-click on the layer in the legend and a new menu will popup.

*11.3.3.02* Click on the [**Properties**] and the Layer Properties dialog will be displayed.

*11.3.3.03* Click on [**General**] Tab

*11.3.3.04* Change the text in the “Display Name” box. This will be the new layer name.

*11.3.3.05* Click the [**OK**] button to close the Layer Properties dialog. The legend will update to show the new layer name.

*11.3.3.06* Or right-click on the layer in the legend and a new menu will popup

*11.3.3.07* Click on [**Rename**]

*11.3.3.08* Highlight the name in the legend and type in new name



#### **TASK #5\*\*\*\*\* Change**

- *afrbeep020 to Africanize Honey Bees*
- *airportx020 to Airports*
- *coalfdp050 to Coal Fields*
- *countyp020 to U.S. Counties*
- *ecoomrpr075 to Ecoregions – Omernik*
- *ecoregp075 to Ecoregions – Bailey*
- *fedlandp020 to Federal Lands*



- *hydrogpl020 to Rivers and Streams*
- *hydrogpp020 to Lakes and Ponds*
- *mortalp020 to Mortality 1988-1992*
- *railrdl020 to Railroads*
- *roadtrl020 to Roads*
- *statesp020 to U.S. States*
- *urbanp020 to Urban Areas*
- *zmusslx020 to Zebra Mussels*

## **11.4 Changing the Drawing Order:**

### **11.4.1 General Information for Changing the Drawing Order:**

*11.4.1.01* The legend indicates the order that layers are drawn in. The first layer in the legend is the top layer of the map. The last layer in the legend is the bottom layer on the map. The layers are drawn from bottom up, hence the bottom layer is drawn first then the last but one layer and so on. As a result it is important to carefully order the map layers so data is not obscured by layers placed on top.

### **11.4.2 Setup for Using the Changing the Drawing Order**

*11.4.2.01* Not Applicable

### **11.4.3 Steps for Using the Changing the Drawing Order:**

*11.4.2.01* Click and drag a layer to the desired location.



**TASK #6\*\*\*\*\*** *Put the layers in the following order from top to bottom,*

- *Zebra Mussels*
- *Africanized Honey Bees*
- *Airports*
- *Roads*
- *Railroads*
- *Mortality 1988-1992*
- *Rivers and Streams*
- *Lakes and Ponds*
- *Federal Lands*
- *Urban Areas*
- *Coal Fields*
- *U.S. Counties*
- *Ecoregions – Omernik*

- *Ecoregions – Bailey*
- *U.S. States*

*Save your project*

## **11.5 Removing a Layer from the Map**

### **11.5.1 General Information for Removing a Layer from the Map**

*11.5.1.01* Removing a layer does not remove or delete the underlying data, it just removes the reference to the layer from the project

### **11.5.2 Setup for Using the Removing a Layer from the Map**

*11.5.2.01* Not Applicable

### **11.5.3 Steps for Using the Removing a Layer from the Map**

*11.5.3.01* Right-click on the layer in the legend, a new menu will popup

*11.5.3.02* Click on [**Remove**]

## **11.6 Making the Layer Scalable**

### **11.6.1 General Information for Making the Layer Scalable**

*11.6.1.01* When adding a new data layer to the project the default scale dependency will be set to all. Essentially meaning that the layer will be visible at all scales. If map units have been set for this project it is possible to make any of the layers scale dependent, that is, visible between certain scale bounds.

*11.6.1.02* For example, for a layer to be visible below 1:50000 set Min Scale to 1 and Max Scale to 50000. For a layer to be visible between 1:20000 and 1:50000 set Min Scale to 20000 and Max Scale to 50000

### **11.6.2 Setup for Using the Making the Layer Scalable**

*11.6.2.01* Not Applicable

### **11.6.3 Steps for Using the Making the Layer Scalable**

*11.6.2.01* Right-click on the layer in the legend, a new menu will appear.

- 11.6.3.02 Click on [**Properties**], the Layer Properties dialog will be displayed.
- 11.6.3.03 Click on [**General**] tab, by default the Minimum scale is set to 1 and Maximum scale is to the largest dataset scale, which means the layer is not scale dependent.
- 11.6.3.04 Change the “(Minimum)” text box to a valid scale value. This is the minimum scale at which a layer will be visible.
- 11.6.3.05 Change the “(Maximum)” text box to a valid scale value. This is the maximum scale at which a layer will be visible.
- 11.6.3.06 Check the ‘(use scale dependent rendering)’
- 11.6.3.07 Click [**OK**]



**TASK #7\*\*\*\*\*** set the maximum scale for U.S. Counties to be 2500000 and the minimum scale to 2400, check the ‘(use scale dependent rendering)’ turn on U.S. Counties.



**TASK #8\*\*\*\*\*** Zoom into the area around the Great Lakes until the counties appear.



**TASK #9\*\*\*\*\*** Zoom out to the Full extent of the map using the [**Zoom to Full Extent**] Button



**TASK #10\*\*\*\*\*** using the [**Zoom Last**] and [**Zoom to Full Extent**], you can switch between the Great Lakes and the Whole coverage



**TASK #12\*\*\*\*\*** Turn on the Coal Fields layer and zoom to its extent



**QUESTION #1 \*\*\*\*\*** what is your current map scale? It is on the lower right of screen Scale 1: ?



**TASK #13\*\*\*\*\*** Zoom to extent of Zebra Mussels



**QUESTION #2 \*\*\*\*\*** *what is your current map scale? It is on the lower right of screen Scale 1: ?*

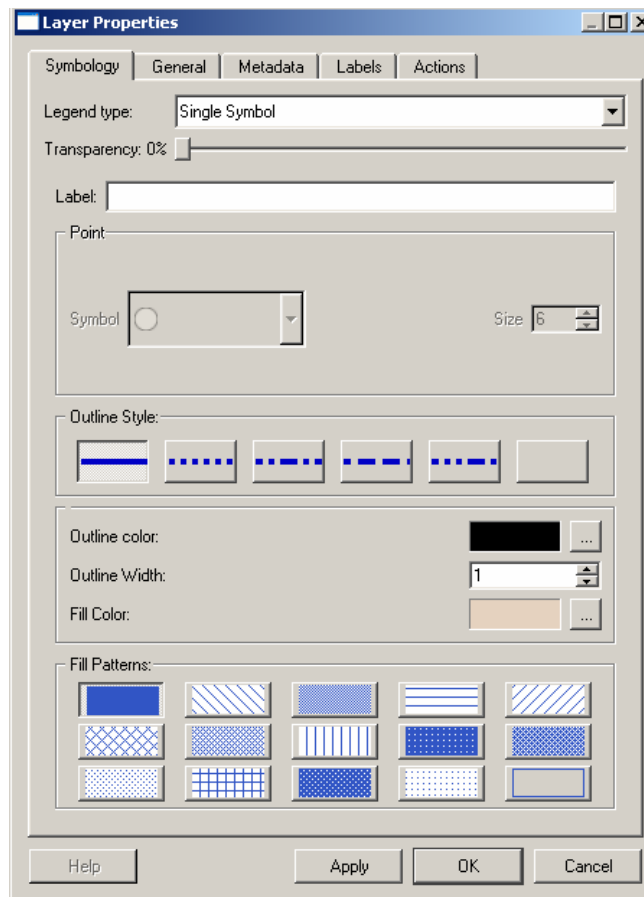


**QUESTION #3 \*\*\*\*\*** *Are there coal Fields in Wisconsin? Are there coal fields in New York State?*

## 11.7 Map Layer Symbolization

### 11.7.1 General Information for Map Layer Symbolization:

*11.7.1.01* Default Symbology - When adding a new map layer to the project a default symbol will be automatically generated. **QGIS** will select a random color scheme and pick a pen and fill style appropriate to the geometry type of the data to be used for display purposes.



**Figure 11.1**

*11.7.1.02* GIS supports a number of symbology renderers to control how vector features are displayed. Currently the following renderers are available:

- Single symbol - a single style is applied to every object in the layer.
- Graduated symbol - objects within the layer are displayed with different symbols classified by the values of a particular field.
- Continuous color - objects within the layer are displayed with a spread of colors classified by the numerical values within a specified field.
- Unique value - objects are classified by the unique values within a specified field with each value having a different symbol.

*11.7.1.03* For layers containing point features, additional renderers are available that use SVG icons:

- Single marker - a single specified icon is used for every point within the layer.
- Graduated marker - points within the layer are displayed with different icons classified by values within a particular field.
- Unique value marker - points are classified by unique values within a specified field with each value having a different icon.

## **11.8 *Changing the Default Symbology***

### **11.8.1 General Information for Changing the Default Symbology:**

*11.8.1.01* Not Applicable

### **11.8.2 Setup for Changing the Default Symbology:**

*11.8.2.01* Not Applicable

### **11.8.3 Steps for Changing the Default Symbology**

*11.8.3.01* Right-click on the layer in the legend, a new menu will appear

*11.8.3.02* Click on [**Properties**], the Layer Properties dialog will be displayed


11.8.3.03 Click on the [**Symbology**] tab. Changes made under the outline style and Fill Patterns sections will become the new default symbology



**TASK # 14\*\*\*\*\*** Change the color of the U.S. States Layer. Click on it in the legend, Click [**Properties**]. Click the Fill color, select 'define custom Color' and set it to Red, Green Blue(RGB) Values of 240,219,0; Click [**Add to Custom Colors**]; Click [**Ok**]; Click the Line color and set it to RGB 0,97,73; Click [**Add to Custom Colors**]; Click [**Ok**]; Leave Transparency set at 0%, Click [**OK**].




**TASK #15\*\*\*\*\*** Change the color of the Coal Fields, Click on it in the legend, Click [**Properties**]. Set Legend type to "Unique Value", set Classification field to "Descriptio". Click [**Apply**], A list will appear with all the values, Set the following values.

<i>Name</i>	<i>RGB Value</i>
<i>Anthracite / other uses</i>	191,71,31
<i>Anthracite / potentially minable</i>	160,137,115
<i>Lignite / other uses</i>	98,1,59
<i>Lignite / potentially minable</i>	226,137,169
<i>Low Volatile Bituminous / other uses</i>	32,238,125
<i>Low Volatile Bituminous / potentially minable</i>	136,238,179
<i>Medium and High Volatile Bituminous / other uses</i>	179,11,136
<i>Medium and High Volatile Bituminous / potentially minable</i>	179,136,179
<i>NO COAL / INTERNAL POLYGON</i>	<i>hollow</i> 
<i>Subbituminous / other uses</i>	255,170,0
<i>Subbituminous / potentially minable</i>	255,170,75




**QUESTION #4\*\*\*\*\*** what is the color of the coal fields in Michigan?



**QUESTION #5\*\*\*\*\*** Using the  [**Identify Features**], what type of coal is in Michigan?



**QUESTION #6\*\*\*\*\*** Using the  [**Identify Features**], what type of coal is found on the eastern side of the large coal fields that extend from New York State southwest to Alabama?



**QUESTION #7\*\*\*\*\*** *Make sure your map units are decimal degrees and your project is WGS 84. What is the approximate length of the Coal field described in Question #6?*



**QUESTION #8\*\*\*\*\*** *What is the approximate area of the Coal field in Question #6?*

## **11.9 Changing Selected Symbology**

### **11.9.1 General Information for Changing Selected Symbology**

*11.9.1.01* Selected symbology is used to render a feature that has been selected. By making this symbol different from the main default symbol it is easy to see which features on the map are selected

### **11.9.2 Setup for Changing the Selected Symbology**

*11.9.2.01* Not Applicable

### **11.9.3 Steps for Changing the Default Symbology**

*11.9.2.01* Click on [**Settings**]

*11.9.3.02* Click on [**Project Properties**]

*11.9.3.03* Click on the Colored bar under Map Appearance and set the color to desired choice.

## **11.10 Adding a Label to a Layer**

### **11.10.1 General Information for Adding a Label to a Layer**

*11.10.1.01* Label themes are an easy method to add dynamic text labels to geometry feature on the map. *QGIS* will extract a user-defined field from the map data to be used as the label text.

### **11.10.2 Setup for Adding a Label to a Layer**

*11.10.2.01* Not Applicable

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### 11.10.3 Steps for Adding a Label to a Layer

- 11.10.2.01 Right-click on the layer in the legend, a new menu will appear
- 11.10.3.02 Click on [**Properties**], the Layer Properties dialog will be displayed.
- 11.10.3.03 Click the [**Labels**] tab
- 11.10.3.04 Select the '(Field containing label)'
- 11.10.3.05 Select the '(display labels)' so a check appears.
- 11.10.3.06 Click [**OK**]



**ISSUE #2** \*\*\*\*\* *the program does not remove duplicate labels so every polygon of a theme is labeled. This is a problem with multiple parts having the same name such as Florida which would label each Island.*

- 11.10.3.07 To remove the label theme, Select the '(display labels)' so the check disappears.



**TASK #16** \*\*\*\*\* *Label U.S. Counties with the County names. Zoom in until the counties and their name appear and then zoom out again to the Zebra Mussel Coverage*



**NOTE #4** \*\*\*\*\* *I don't know if it is a software, hardware, or user issue on my part, but every once and a while, the program will kick me out back to the operating system. So save your project after you complete a major piece of work.*

*If you come to a place where it exits the program more than twice, read over the part that does not work and proceed past it. We have run into a problem where it works on one machine but does not work on an second identical machine. We have a problem symbolizing the lakes and streams ( it could be size of the data) but we can perform the same task using urban areas, so go ahead and experiment a little to learn the strengths and limitations of Quantum GIS*



**TASK #17** \*\*\*\*\* *Turn on Lakes and Ponds, Open the layer property, Change 'Legend Type' to "Unique Value",*





**Figure 11.2**

*Set the 'Classification Field' to "feature".*



**Figure 11.3**

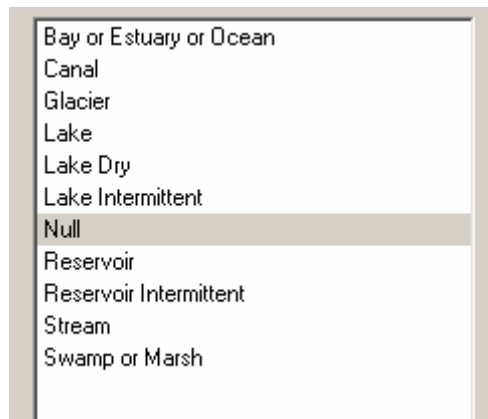
*Click [Apply],*

*Click on the [blank] Button under 'Outline Style'.*



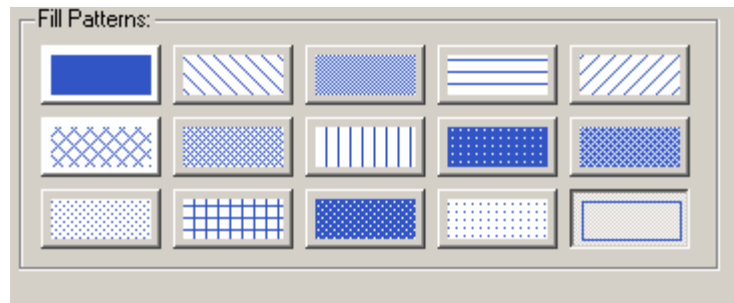
**Figure 11.4**

*Click on the Null Feature*



**Figure 11.5**

*Click on the [hollow] button under 'Fill Patterns'. This turns off the Outline*



**Figure 11.6**

Click [**Apply**]

*This will make the null layer invisible*

*Repeat these steps for the 'Glacier' Feature*

*Now Select 'Bay or Estuary or Ocean' Feature, Click on the fill Color and set the RGB to 76,143,209*



**Figure 11.7**

Turn off the Outline as well just like the 'Null' Feature

Repeat these steps for Canal, Lake, Reservoir, and Stream

For the 'Swamp or Marsh' Feature, hide the outline and set RGB to 76,209,185

For 'Lake Dry', 'Lake Intermittent', 'Reservoir Intermittent', hide the Outline and set the RGB to 197,132,2

Click [**OK**]



**TASK #18\*\*\*\*\****Open the County File, on the symbology page, set the Fill to Hollow, then Click [**OK**]*



**QUESTION #9 \*\*\*\*\****Are there swamps in both North Carolina and South Carolina?*



**TASK #19\*\*\*\*\*** Turn on Rivers and Streams, Right click on it in the legend, Click on [**General**] tab, check the ‘(use scale dependent rendering)’ set the maximum scale for Rivers to be 5000 and the minimum scale to 2400 Click the [**Properties**]. Click the [**Symbology**] tab. Click the outline color and set it to (RGB) Values of 29,190,224; Click [**Add to Custom Colors**]; Click [**Ok**]; Click [**Ok**]



**ISSUE #3 \*\*\*\*\*** If the data set is too large, when you try to symbolize it, it may kick you out of the program



**TASK #20\*\*\*\*\*** Turn on Urban Areas, Right click on it in the legend, Click the [**Properties**]. Click the [**Symbology**] tab. Set outline Style to Blank; Click the fill color and set it to (RGB) Values of 244,150,104; Click [**Add to Custom Colors**]; Click [**Ok**]; Click the Outline color and set it to blank; Click [**Ok**]Click “Close”.

Save Project



**ISSUE #4\*\*\*\*\*** If you try to zoom out to full extent after you do a reprojection and the data set is too large, it may exit the program without warning. So zoom out in smaller increments if it does happen. Also I recommend you save your project just before you do any reprojecting



**TASK #21\*\*\*\*\*** Click on [**Settings**] then [**Project Properties**], Click on the [**Projection**] Tab. Select “(Projected Coordinate Systems)” then click on the plus box next to “(Lambert Azimuthal Equal Area)” until “(U.S. National Atlas Equal Area)” appears. Highlight “(U.S. National Atlas Equal Area)” and click [**OK**].



**QUESTION #10 \*\*\*\*\*** What is the unit of measure on the scale bar?



**QUESTION #11\*\*\*\*\***What is the approximate length of the Coal field described in Question #6?



**QUESTION #12\*\*\*\*\*** Was there a significant difference in the measurements in Question #7 and #11?

## List of Questions for Lesson #01

*QUESTION #1 \*\*\*\*\* what is your current map scale? It is on the lower right of screen  
Scale 1: ?*



*QUESTION #2 \*\*\*\*\* what is your current map scale? It is on the lower right of  
screen Scale 1: ?*



*QUESTION #3 \*\*\*\*\* Are there coal Fields in Wisconsin? Are there coal fields in  
New York State?*



*QUESTION #4\*\*\*\*\* what is the color of the coal fields in Michigan?*



*QUESTION #5\*\*\*\*\* Using the  [Identify Features], what type of coal is in  
Michigan?*



*QUESTION #6\*\*\*\*\* Using the  [Identify Features], what type of coal is  
found on the eastern side of the large coal fields that extend from New York State  
southwest to Alabama?*



*QUESTION #7\*\*\*\*\* Make sure your map units are decimal degrees and your  
project is WGS 84. What is the approximate length of the Coal field described in  
Question #6?*



*QUESTION #8\*\*\*\*\* What is the approximate area of the Coal field in Question  
#6?*



*QUESTION #9 \*\*\*\*\* Are there swamps in both North Carolina and South  
Carolina?*



*QUESTION #10 \*\*\*\*\* What is the unit of measure on the scale bar?.*



*QUESTION #11\*\*\*\*\*What is the approximate length of the Coal field described in  
Question #6?*



*QUESTION #12\*\*\*\*\* Was there a significant difference in the measurements in Question #7 and #11?*

**End of Lesson #01**

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## *Beginning of Lesson #02*



***NOTE #5\*\*\*\*\***This week, most of the exercises will take place in New England, which is in the northeastern part of the United States.*




***TASK #22\*\*\*\*\*** Zoom into New England (This should include the states of New York on the West and Maine on the East.*

## Chapter 12 Manipulating the Map

### 12.1 Querying Map Features

#### 12.1.1 General Information for Querying Map Features

12.1.1.01 Identifying features - The identify tool  is the simplest way to retrieve attribute data about a feature on the map

12.1.1.02 The identify result tool has a limited radius of effect.

#### 12.1.2 Setup for Querying Map Features:

12.1.2.01 Click the [**Settings**] menu from the main menu.

12.1.2.02 Click on the [**Options**] tab

12.1.2.03 Click on [**Selection and Measuring**]

12.1.2.04 Enter a valid search radius.

12.1.2.05 Press the [**OK**] button.

#### 12.1.3 Steps for Querying Map Features

12.1.3.01 Click the [**Identify**] button on the toolbar.

12.1.3.02 Move the mouse over the map and click on the feature to be identified.  
The Identify Results dialog will be displayed.



**TASK #23**\*\*\*\*\* *Zoom into the state of Maine.*



**QUESTION #13** \*\*\*\*\* *what is the northern most county in Maine?*



**QUESTION #14** \*\*\*\*\* *what are size in square miles of this county?*

### 12.2 Selecting Features by Rectangle

## 12.2.1 General Information for Selecting Features by Rectangle

12.2.1.01 Select by Rectangle allows the user to select features on the map by drawing a rectangle. Any features of the active layer that fall within the selection tolerance of the rectangle will be selected

## 12.2.2 Setup for Selecting Features by Rectangle

12.2.2.01 Not Applicable

## 12.2.3 Steps for Selecting Features by Rectangle

12.2.3.01 Click on the layer that has features to be looked at from on the legend. This will make the layer active.

12.2.3.02 Click the [**Select Features**] button  on the toolbar.

12.2.3.03 Move the mouse over the map and click and hold the mouse button. This click will represent the first corner of the rectangle.


12.2.3.04 Move the mouse to another location, keeping the mouse button held down.

12.2.3.05 Release the mouse button to specify the opposite corner of the rectangle. Features of the active layer that fall within the selection tolerance will be selected and drawn.



**NOTE #8\*\*\*\*\*** *by holding down the control key, you can draw additional rectangles and add the selection to the original selected data.*

12.2.3.06 To view attribute data of selected features, click on [**Open Table**] in the 'Attributes Toolbar', the Attribute Table dialog for the layer will open.

12.2.3.07 Click on the  [**Move Selected to Top**] button to see the attributes of the selected features moved to the top of the table



**TASK #24\*\*\*\*\*** *turn on Urban Areas, click on it in the legend, click on properties, Set the outline style to 'blank', click the fill color and set it to RGB of 244,150,104; click [**Add to Custom Colors**]; click [**Ok**]; click [**Ok**].*





**QUESTION #15 \*\*\*\*\*** *In the eastern most county of Maine (Washington County), what are the names of the six towns?*

## 12.3 Selecting Features by Attribute

### 12.3.1 General Information for Selecting Features by Attribute

12.3.1.01 Select by Attribute allows the user to select features from within the attribute table of the layer.

### 12.3.2 Setup for Selecting Features by Attribute

12.3.2.01 Not Applicable

### 12.3.3 Steps for Selecting Features by Attribute

12.3.3.01 Click on the layer that has features to be looked at from on the legend.

12.3.3.02 Click on [**Open Table**] in the 'Attributes Toolbar', the Attribute Table dialog for the layer will open.

12.3.3.03 Type in the search attributes, select the column that is to be searched, and the type of selection to be done.



Figure 12.1

12.3.3.04 Click [**Search**]

12.3.3.05 There are several options that can be done



Figure 12.2

- [**Remove Selection**] – Unselects the values just selected
- [**Move Selection to Top**]
- [**Invert Selection**]

- [**Copy Selected Rows to Clipboard**]
- [**New Attribute**] – Edit Mode only and will be available in later versions
- [**Delete Attribute**] – Edit Mode only and will be available in later versions

12.3.3.06 Click on the "Zoom to selection" button in the toolbar and the map will zoom to the selected features



**TASK #25**\*\*\*\*\**open attribute table for Urban Areas, Search for 'ME' in the 'STATE' Attribute column, and have it select them.*



**QUESTION #16** \*\*\*\*\**How many features were selected?*



**QUESTION #17**\*\*\*\*\**Search for the town of 'Machias' in 'Name'. Was it found?*



**QUESTION #18**\*\*\*\*\**Search for the town of 'MACHIAS' in 'Name'. Was it found?*

## Chapter 13 Data Creating and Editing



*NOTE #9\*\*\*\*\*this tutorial will cover GRASS more fully as a Plug-in later in the course*



*ISSUE #5\*\*\*\*\*A problem exists in that user created point files do not display properly, This issue is being address and will be addressed in the next preview release or the final release of 0.8.0. the course will address making point layers when it covers the GRASS tolls later in the turoial.*

### 13.1 Creating a New Layer

#### 13.1.1 General Information about Creating a New Layer

13.1.1.01 Not Applicable

#### 13.1.2 Setup for Creating a New Layer

13.1.1.01 Not Applicable

#### 13.1.3 Usage of Creating a New Layer

13.1.3.01 To create a new layer for editing, choose [**New Vector Layer**] from the [**Layer**] menu.

13.1.3.02 The 'New Vector Layer' dialog will be displayed. Choose the type of layer (point, line, or polygon).

13.1.3.03 To complete the creation of the new layer, add the desired attributes by clicking on the [**Add**] button and specifying a name and type for the attribute. Only real, integer, and string attributes are supported



*NOTE #10\*\*\*\*\*Real are floating point numbers*

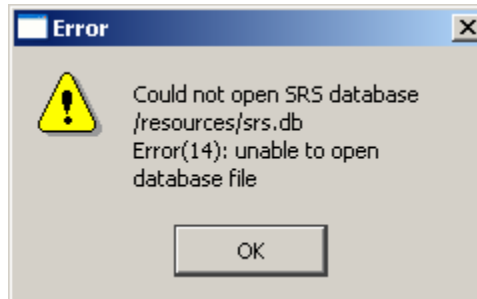


*ISSUE #6\*\*\*\*\*There is not a way to add attribute column or delete attribute columns after the shapefile is created. These two features will be available in a future Preview release and the final official release.*

13.1.3.04 Click [**Ok**] and provide a name for the shapefile. *QGIS* will automatically add a .shp extension to the name specified.



**ISSUE #7\*\*\*\*\*** This error box will appear, Click [**ok**]



**Figure 13.1**

13.1.3.05 When the program asks for the layer Projection, make sure the Radio button 'EPSG ID' is selected



**TASK #26\*\*\*\*\*** Turn on airports, click on [**Layer**] then [**New Vector Layer**], select 'line', then click on [**Add**], make the name "number", type is 'integer', click [**OK**], click [**OK**] to close the new layer. save it as 'lines', click [**Save**], Set projection as Projected Coordinate system, U.S. National Atlas, Equal Area, Select "EPSG ID", click [**OK**], click on 'Capture Line', draw a line between the two airports in Aroostook County. Save changes



**QUESTION #19\*\*\*\*\*** what is the distance between the two airports as measured down the line?



**TASK #27\*\*\*\*\*** Penobscot county is just south of Aroostook County near the center of the state, click on [**Layer**] then [**New Vector Layer**], select 'polygon', then click on [**Add**], make the name "number", type is 'integer', click [**OK**], click [**OK**] to close the new layer. save it as 'polygon', click [**Save**], Set projection as Projected Coordinate system, U.S. National Atlas, Equal Area, Select "EPSG ID", click [**OK**], click on 'Capture Polygon', draw a polygon covering the three airports in Penobscot County. Save changes



**QUESTION #20\*\*\*\*\*** What is the area between the three airports measured in square kilometers?

## 13.2 **Editing a Layer**

### 13.2.1 **General Information for Editing a Layer**

13.1.3.01 *QGIS* supports basic capabilities for editing spatial data. Before performing any edits, always make a backup of the dataset you are about to edit.

### 13.2.2 **Setup for the Editing a Layer**


13.2.2.01 Not Applicable

### 13.2.3 **Steps for Editing a Layer**

13.2.3.01 To edit an existing layer, click on the legend entry for that layer then choose [**Start Editing the Current Layer**] from the 'Digitizing Toolbar'. Remember to backup the data to be edited before starting!



**ISSUE #8\*\*\*\*\* Add, Delete, or Move Vertex do not work in this version**

13.2.3.02 Now that the layer is editable, use the [**Capture Points**]  icon (or similar icon for line and polygon layers) on the 'Digitize toolbar' to put the *QGIS* cursor into digitizing mode. If capturing a point feature, simply use the pan and zoom tools to navigate to the area of interest, then click the [**Capture Points**] tool and click on the map area to create the new point feature.

13.2.3.03 A window will appear allowing the user to set the attributes, type in the data, press [**Ok**].

13.2.3.04 Feature deletion for shapefiles was only recently added to *GDAL* (the underlying library we use for reading and writing shapefiles). Support for deleting shapes is now in *QGIS* development branch and will be available as part of 0.8 final release (and the next preview release most likely). The user will need to have an up to date copy of *GDAL* installed for it to work.

13.2.3.05 When finished editing features, choose [**Stop Editing**] from the layer's context menu. Choosing [**Yes**] will save the changes to disk, while choosing [**No**] at this point will cause them to be discarded.

13.2.3.06 *QGIS* currently has no possibility of joining external tables to attribute tables.

#####

## List of Questions for Lesson #02



**QUESTION #13** \*\*\*\*\* *what is the northern most county in Maine?*



**QUESTION #14** \*\*\*\*\* *what are size in square miles of this county?*



**QUESTION #15** \*\*\*\*\* *according to the Urban Area Layer, in the eastern most county of Maine (Washington County), what are the names of the six towns in Washington County?*



**QUESTION #16** \*\*\*\*\**How many features were selected?*



**QUESTION #17**\*\*\*\*\**Search for the town of 'Machias' in 'Name'. Was it found?*



**QUESTION #18**\*\*\*\*\**Search for the town of 'MACHIAS' in 'Name'. Was it found?*



**QUESTION #19**\*\*\*\*\**what is the distance between the two airports as measured down the line?*



**QUESTION #20**\*\*\*\*\**What is the area between the three airports measured in square kilometers?*

## End of Lesson #02

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## [Beginning of Lesson #03](#)

### **Chapter 14 Raster Data**

#### **14.1 Working with Raster Data**

##### **14.1.1 General Information for Working with Raster Data**

*14.1.1.01* Definition: Raster data in GIS are matrices of discrete cells that represent features on, above or below the earth's surface. Each cell in the raster grid is the same size, and cells are usually rectangular (in *QGIS* they will always be rectangular). Typical raster datasets include remote sensing data such as aerial photography or satellite imagery and modeled data such as an elevation matrix.

*14.1.1.02* *QGIS* supports a number of different raster data formats. Currently tested formats include:

- Arc/Info Binary Grid
- Arc/Info ASCII Grid
- Grass Raster
- GeoTIFF
- Spatial Data Transfer Standard Grids (with some limitations)
- USGS ASCII DEM
- Erdas Imagine

*14.1.1.03* Because the raster implementation in *QGIS* is based on the *GDAL* library, other raster formats implemented in *GDAL* are also likely to work, but have not yet been tested.

*14.1.1.04* Unlike vector data, raster data typically do not have an associated database record for each cell.

#### **14.2 Loading Raster Data**

##### **14.2.1 General Information about Loading Raster Data:**

*14.2.1.01* Not Applicable

##### **14.2.2 Creation or Setup for Loading Raster Data:**

*14.2.1.01* Not Applicable

## 14.2.3 Usage of Loading Raster Data

14.2.3.01 Raster layers are loaded either by clicking on the [**Load Raster**] icon on the 'Manage Layers Toolbar'

14.2.3.02 Or by selecting the [**Layer**] and then [**Add Raster Layer**] menu option.

14.2.3.03 More than one layer can be loaded at the same time by holding down the Control key and clicking on multiple items in the file dialog.



**TASK #28\*\*\*\*\****Turn off all layers in the Project. Load the image 'shdrfi020l.tif' into the Penn project, move it to the bottom of the legend and make it visible. Right Click on shdrfi020l.tif and rename it" Shaded Relief'*

## 14.3 Raster Properties

### 14.3.1 General Information about Raster Properties

14.3.1.01 **QGIS** supports three forms of raster layers:

- Single Band Grayscale Rasters
- Palette Based RGB Rasters
- Multi-band RGB Rasters

14.3.1.02 From these three basic layer types, eight forms of symbolized raster display can be used:

- Single Band Grayscale
- Single Band Pseudocolor
- Paletted Grayscale (where only the red, green or blue component of the image is displayed)
- Paletted Pseudocolor (where only the red, green or blue component of the image is displayed, but using a pseudocolor algorithm)
- Paletted RGB
- Multi-band Grayscale (using only one of the bands to display the image)
- Multi-band Pseudocolor (using only one of the bands shown in pseudocolor)
- Multi-band RGB (using any combination of three bands)

14.3.1.03 **QGIS** can invert the colors in a given layer so that light colors become dark (and dark colors become light). Use the Invert Color Map checkbox to enable / disable this behavior. **QGIS** has the ability to display each raster layer at varying transparency levels. Use the transparency slider to indicate to what extent the underlying layers (if any) should be visible through the current raster layer.



---

The transparency can also be set using the transparency slider in the layer context menu which is accessible by right-clicking on the layer in the legend.



**TASK #29**\*\*\*\*\*Right Click on Shaded Relief layer and select properties, on the symbology tab, select “(Invert Color Map)”, Click [OK]



**QUESTION #21**\*\*\*\*\*what happened to the color of the water?



**TASK #30**\*\*\*\*\*Right Click on Shaded Relief layer and select properties, on the symbology tab, deselect “(Invert Color Map)”, Click [Apply], select “(Grayscale Image)”, In the ‘ Grayscale Image’ box set “(Gray)” to ‘Green’, “(Std Deviation)” to ‘0’, and “(Color Map)” to ‘Greyscale’, click [OK]



**QUESTION #22**\*\*\*\*\*Changing the color between red, blue and green in the “(Gray)” box, which color gives the darkest Grey scales?



**TASK #31**\*\*\*\*\*Move U.S. States to the bottom of the legend, Right Click on Shaded Relief layer and select properties, on the symbology tab, deselect “(Grayscale Image)”, Click [Apply], Move the transparency Slide bar to a value of 25%, click [OK].



**NOTE #11**\*\*\*\*the state layer does not line up with the image, the course will cover this issue later.

14.3.1.03 **QGIS** can restrict the data displayed to only show cells whose values are within a given number of standard deviations of the mean for the layer. This is useful when there are one or two cells with abnormally high values in a raster grid that are having a negative impact on the rendering of the raster. This option is only available for pseudocolor images.

14.3.1.04 **The General tab** displays basic information about the selected raster, including the layer source and display name in the legend (which can be modified). This tab also shows a thumbnail of the layer, its legend symbol, and the palette.

14.3.1.05 **The Metadata tab** displays a wealth of information about the raster layer, including statistics about each band in the current raster layer. Statistics are gathered on a ‘need to know’ basis, so it may well be that a given layers statistics have not yet been collected.

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14.3.1.06 To gather statistics for a layer, select pseudocolor rendering and click the [Apply] button, Gathering statistics for a layer can be time consuming. Please be patient while **QGIS** examines the data!

14.3.1.07 Large resolution raster layers can slow navigation in **QGIS**, By creating lower resolution copies of the data (pyramids), performance can be considerably improved as **QGIS** selects the most suitable resolution to use depending on the level of zoom.

14.3.1.08 The user must have write access in the directory where the original data is stored to build pyramids.



**NOTE #12**\*\*\*\*\*Please note that building pyramids may alter the original data file and once created, they cannot be removed. In order to preserve a 'non-pyramided' version of the raster, make a backup copy prior to building pyramids.



**ISSUE #9**\*\*\*\*\* If the user forgets to check 'projection on the fly' and add an image to a set of shapefiles layers and they are in different projections, it may exit the program.



**ISSUE #10**\*\*\*\*\*If the user tries to reproject the image by setting 'projection on the fly' and then adding shapefile layers in one projection (thus setting the projection for the project) and then add a image layer in a different projection, it may exit the program.



**NOTE #13**\*\*\*\*\* Add the image to the project first, check 'projection on the fly', add shapefile layers, do not reproject while images are loaded.



**TASK #31**\*\*\*\*\*Move U.S. States to above the Shaded Relief layer of the legend, Right Click on Shaded Relief layer and select properties, on the symbology tab, Move the transparency Slide bar to a value of 0%, click [OK].



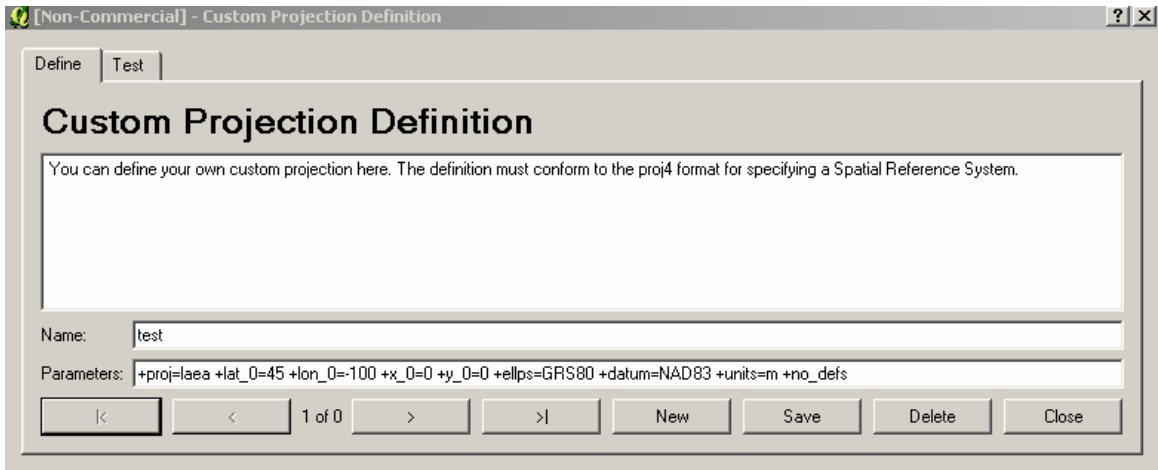
**NOTE #14**\*\*\*\*\*There is an offset in the way the state layer overlays the image. This is because the projections are not identical.

The Image is  
`+proj=laea +lat_0=45 +lon_0=-100 +x_0=0 +y_0=0 +ellps=WGS84 +datum=WGS84  
+units=m +no_defs`  
while "U.S. National Atlas Equal Area", is

+proj=laea +lat\_0=45 +lon\_0=-100 +x\_0=0 +y\_0=0 +a=6370997 +b=6370997 +units=m  
+no\_defs



**TASK #32\*\*\*\*\*** *Build a custom projection using the image parameters*



**QUESTION #23\*\*\*\*\*** *Does this fix the shift error?*



## List of Questions for Lesson #03



*QUESTION #21\*\*\*\*\*what happened to the color of the water?*



*QUESTION #22\*\*\*\*\*Changing the color between red, blue and green in the  
“(Gray)” box, which color gives the darkest Grey scales?*



*QUESTION #23\*\*\*\*\* Does this fix the shift error?*

**End of Lesson #03**

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## [Beginning of Lesson #04](#)

### **Chapter 15 Plug-ins and Extensions**

#### **15.1 Plug-ins**

##### **15.1.1 General Information about Plug-ins**

15.1.1.01 *QGIS* has been designed with a Plug-in architecture. This allows new features/functions to be added to the application. Many of the features in *QGIS* are actually implemented as Plug-ins.

15.1.1.02 There are two types of Plug-ins in *QGIS*: core and user-contributed. A core Plug-in is maintained by the *QGIS* development team and is part of every *QGIS* distribution. A user-contributed Plug-in is an external Plug-in that is maintained by the individual author. The *QGIS* Community site (<http://qgis.org>) serves as the repository for user contributed Plug-ins.

##### **15.1.2 Setup for Plug-ins**

15.1.2.01 When *QGIS* is installed, all of the core Plug-ins are included. Additional user contributed Plug-ins may be available on the *QGIS* site. To see what user-contributed Plug-ins are available, see the Plug-ins page on the *QGIS* site ([http://qgis.org/index.php?option=com\\_content&task=category&sectionid=5&id=75&Itemid=48](http://qgis.org/index.php?option=com_content&task=category&sectionid=5&id=75&Itemid=48)).

15.1.2.02 Typically, user-contributed Plug-ins are distributed in source form and require compiling. For instructions on building and installing a user-contributed Plug-in, see the documentation included with the Plug-in.

##### **15.1.3 Usage of Plug-ins**

15.1.3.01 Managing Plug-ins consists of loading or unloading them from *QGIS*.

15.1.3.02 Loaded Plug-ins are “remembered” when the user exits the application and restored the next time *QGIS* is run.

15.1.3.03 To manage Plug-ins, open the [**Plug-in Manager**] from the [**Tools**] menu. The Plug-in Manager displays all the available Plug-ins and their status (loaded or unloaded).

*15.1.3.04* Typically all **QGIS** Plug-ins are installed in the same location. This location is shown in the Plug-in Directory text field. The user can tell **QGIS** to load Plug-ins from another location by specifying a different directory.

*15.1.3.05* If the user finds that **QGIS** crashes on startup, a Plug-in may be at fault. Stop all Plug-ins from loading by editing the .qt/qgisrc file in the home directory on Linux/Unix (Windows users will have to edit the registry). On Linux/Unix, open the qgisrc file in a text editor and find the [Plug-ins] section. Set all the Plug-in values to false to prevent them from loading. For example, to prevent the Delimited text Plug-in from loading, the entry in qgisrc should look like this: 'Add Delimited Text Layer=false'. Do this for each Plug-in in the [Plug-ins] section. Then start **QGIS** and add the Plug-ins one at a time from the Plug-in Manger to determine which is causing the problem.

## **15.2 Adding Data Using the Delimited Text Plug-in**



### **15.2.1 General Information for Adding Data Using the Delimited Text Plug-in**

*15.2.1.01* The Delimited Text Plug-in allows the user to load a delimited text file as a layer in **QGIS**.

### **15.2.2 Setup for Adding Data Using the Delimited Text Plug-in:**

*15.2.2.01* To view a delimited text file as layer, the text file must contain:

- A delimited header row of field names. This must be the first line in the text file
- The header row must contain an X and Y field. These fields can have any name.
- The x and y coordinates must be specified as a number. The coordinate system is not important

*15.2.2.02* An example of a valid text file might look like this:

```
name,latdec,longdec,cell,
196 mile creek,61.89806,-150.0775,tyonek d-1 ne,
197 1/2 mile creek,61.89472,-150.09972,tyonek d-1 ne
a b mountain,59.52889,-135.28333,skagway c-1 sw,
apw dam number 2,60.53,-145.75167,cordova c-5 sw,
apw reservoir,60.53167,-145.75333,cordova c-5 sw,
apw reservoir,60.53,-145.75167,cordova c-5 sw,
aaron creek,56.37861,-131.96556,bradfield canal b-6,
aaron island,58.43778,-134.81944,juneau b-3 ne,
```

aats bay,55.905,-134.24639,craig d-7,

Some items of note about the text file are:

- The example text file uses , as delimiter. Any character can be used to delimit the fields.
- The first row is the header row. It contains the fields name, latdec, longdec, and cell
- No quotes (") are used to delimit text fields
- The x coordinates are contained in the longdec field
- The y coordinates are contained in the latdec field

### 15.2.3 Adding Data Using the Delimited Text Plug-in:

15.2.3.01 Open the Plug-in Manager by choosing the **[Tools]** then the **[Plug-in Manager]** menu. The Plug-in Manager displays a list of available Plug-ins. Plug-ins that are already loaded have a check mark to the left of their name.

15.2.3.02 Click on the checkbox to the left of the **[Add Delimited Text Layer]** Plug-in and click **[Ok]** to load it.

15.2.3.03 Click on **[Add Delimited Text Layer]** on Plug-in toolbar. This will open the Delimited Text dialog.

15.2.3.04 First select the file to import by clicking on the ellipsis button:

15.2.3.05 Select the desired text file from the file dialog. Once the file is selected, the Plug-in attempts to parse the file using the last used delimiter, in this case ‘,’

15.2.3.06 If the delimiter ‘,’ is not correct for the file, the X and Y field drop-down boxes will not contain valid field names. To properly parse the file, change the delimiter

15.2.3.07 After changing the delimiter, click **[Parse]**. The drop-down boxes now contain the fields properly parsed.

15.2.3.08 Choose the X and Y fields from the drop down boxes and enter a Layer name.

15.2.3.09 To add the layer to the map, click **[Add Layer]**. The delimited text file now behaves as any other map layer in **QGIS**.



**TASK #33**\*\*\*\*\*Pplace several Buoys off the northeast coast. Using a text editor like wordpad or notepad, create a file with the following data in it

*Station, lat, long,comment*

*44013,42.35,-70.69,Boston 16 NM east of Boston*

*44018,41.26,-69.29,SE Cape Cod 30 NM East of Nantucket MA*

*44027,44.27,-67.31,Joneport ME*

*44005,43.19,-69.19,Gulf of Maine 78 NM East of Portsmouth NH*

*44007,43.53,70.14,Portland 12 NM Southeast of Portland ME*

*Add save it as buoys.txt*



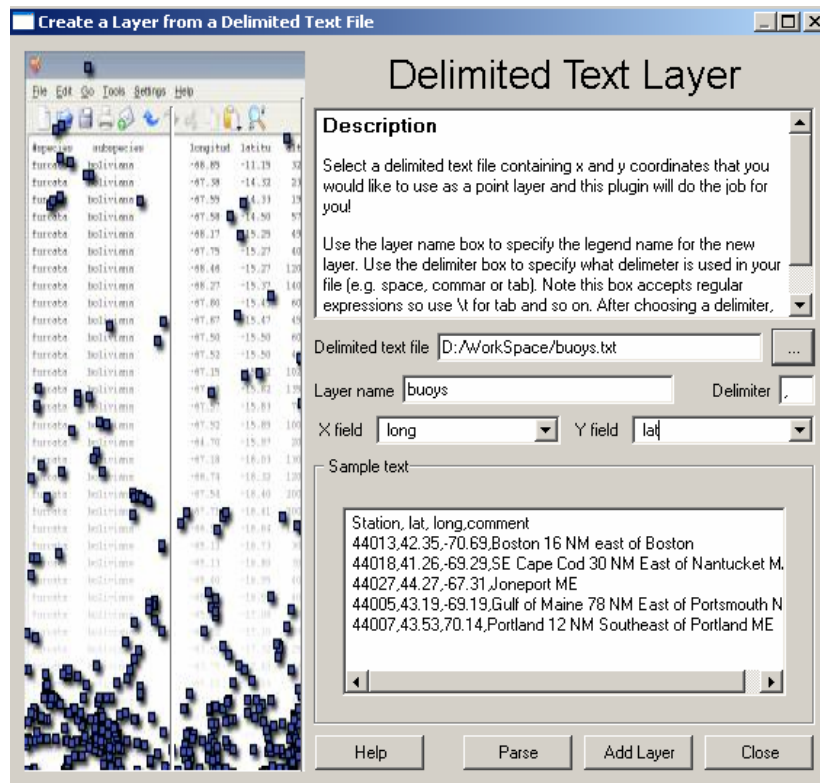
**NOTE #15\*\*\*\*\*Remember, The data is in WGS84 and should be set as the projection when creating the shapefile.**

Click on **[Tools]** then **[Plug-in Manager]** menu, Turn on **[Delimited Text]** Plug-in, open the Delimited Text dialog, select *buoys.txt* to import, make sure the delimiter is **,** Choose **'long'** as the X field and **'lat'** as the Y field, enter a Layer name of **'buoys'**, click **[Add Layer]**.

*Label the buoys by using the station number*



**QUESTION #24\*\*\*\*\* What are the buoys from north to south?**



**Figure 15.1**





**ISSUE #11**\*\*\*\*\* will only accept .txt files



**ISSUE #12**\*\*\*\*\* In order to do any further editing of this file you have to right-click on the file just created and select [**Save as Shape File**]. If the user opens the buoy layer attribute table without resaving it as a shapefile, the attribute table may be missing data.



**TASK #34**\*\*\*\*\*resave the buoys as a shapefile named NEBuoys

## 15.3 Working with the Attribute Table

### 15.3.1 General Information for Working with the Attribute Table

15.3.1.01 Using the Attribute Table - The attribute table displays all data that is associated with the currently selected layer. This data is displayed as a table on which functions can be performed



**ISSUE #13**\*\*\*\*\* the user can not add or delete attribute columns



**ISSUE #14**\*\*\*\*\* The user can not add new features to the shape if the layer type is point.

## 15.4 Copyright Plug-in

### 15.4.1 General Information about Copyright Plug-in:

15.4.1.01 This Plug-in overlays copyright information on the rendered map

### 15.4.2 Setup for Copyright Plug-in

15.4.2.01 Click on [**Plug-ins**] on Main toolbar

15.4.2.02 Check “**CopyrightLabel**”

15.4.2.03 Click [**OK**]

### 15.4.3 Use of Copyright Plug-in

15.4.3.01 Click [**Copyright Label**] on main toolbar

15.4.3.02 Type in copyright information in box

15.4.3.03 Select placement

15.4.3.04 Check “(Enable Copyright Label)”

15.4.3.05 Click [**OK**]



**QUESTION #25\*\*\*\*\*** *How many locations are there for the user to choose from in placing the copyright mark?*



**TASK #35\*\*\*\*\*** *Put a copyright for your organization in the lower right corner*

### 15.5 Georeferencer Plug-in

#### 15.5.1 General Information about Georeferencer Plug-in

15.5.1.01 The **QGIS** Geo-referencing Plug-in is a tool that can generate world files for raster files. World files are small text files that contain the world coordinates for the upper left corner of the raster, and the size in world coordinate units of every raster pixel.

15.5.1.02 This Plug-in can be used to add world files to scanned paper maps, so the user can use them in a project with other datasets covering the same area.

#### 15.5.2 Setup for Georeferencer Plug-in

15.5.2.01 Not Applicable

#### 15.5.3 Use of Georeferencer Plug-in

15.5.3.01 To figure out the coordinates for the raster's upper left corner and the size of the pixels, the Plug-in needs to know the world coordinates for some points in the raster. The user can supply these coordinates by clicking on points in the raster and entering their coordinates in a popup window. The more coordinates given, the better the generated world file should fit the "real" coordinates.

15.5.3.02 When the user thinks that enough coordinates have been entered, tell the Plug-in to generate the world file.

15.5.3.03 The Plug-in will then try to fit a certain transform to the given coordinates. The user can choose between two types of transform, "Linear" and "Helmert".

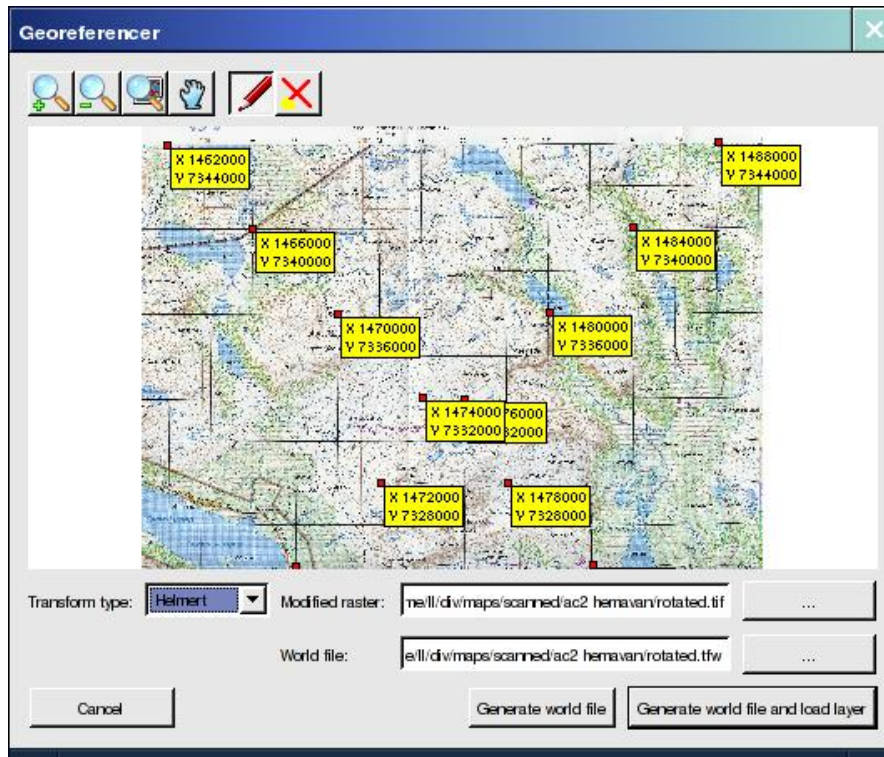


Figure 15.2

15.5.3.04 If the user chooses the "Linear" transform type (which isn't really linear in the mathematical sense but it is a combination of two separate line functions in the X and Y coordinates) the Plug-in will assume that the raster only needs to be scaled and translated to fit the map, and it will simply generate a world file for the original raster file.

15.5.3.05 If the user on the other hand chooses the "Helmert" transform the Plug-in will assume that the raster also needs to be rotated to fit the map (this is useful if the user has scanned a paper map and couldn't get it to line up perfectly in the scanner). A new raster file will be generated, which is a rotated copy of the old raster, and a world file will be generated for this new raster file instead.

15.5.3.06 If the user chooses the "Helmert" transform he/she will also get to choose the resampling method for the rotation - "Cubic" or "Bilinear" is best for RGB raster, but "Nearest neighbor" should be used for raster that use an indexed colormap.

## 15.6 **GPS Tools Plug-in**



### 15.6.1 **General Information about GPS Tools Plug-in**

15.6.1.01 Tool for loading and importing GPS data.

15.6.1.02 The user has the options to

- **Load GPX Files.** GPX is the [GPS Exchange file format](#), which is used to store information about waypoints, routes, and tracks.
- **Import other file:** *QGIS* can only load GPX files by itself, but many other formats can be converted to GPX using GPSBabel (<http://gpsbabel.sf.net>). This requires that the user have GPSBabel installed where *QGIS* can find it.
- **Download from GPS:** This tool will help you download data from a GPS device.
- **Upload to GPS:** This tool will help to upload data from a GPX layer to a GPS device.

### 15.6.2 **Setup for GPS Tools Plug-in**

15.6.1.01 Not Applicable

### 15.6.3 **Use of GPS Tools Plug-in**

15.6.1.01 This is a little more involved for a basic introduction to Software

15.6.1.02 **Import other file:** Select a GPS file format and the file to import, the feature type to use, a GPX filename to save the converted file as, and a name for the new layer. All file formats can not store waypoints, routes, and tracks, so some feature types may be disabled for some file formats.

15.6.1.03 **Download from GPS:** Choose GPS device, the port it is connected to, the feature type to download, a name for new layer, and the GPX file to store the data. If the device isn't listed, or to change some settings, edit the devices.

This tool uses the program GPSBabel (<http://gpsbabel.sf.net>) to transfer the data. If GPSBabel is not installed where *QGIS* can find it, this tool will not work.

15.6.1.04 **Upload to GPS:** Choose the layer to upload, the device to upload it to, and the port the device is connected to. If the device isn't listed, or to change some settings, edit the devices.

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This tool uses the program GPSBabel (<http://gpsbabel.sf.net>) to transfer the data. If GPSBabel is not installed where QGIS can find it, this tool will not work.

## 15.7 GRASS Plug-in

### 15.7.1 General Information about GRASS

15.7.1.01 Geographic Resources Analysis Support System (**GRASS**) is a Geographic Information System (GIS) used for geospatial data management and analysis, image processing, graphics/maps production, spatial modeling, and visualization. **GRASS** is currently used in academic and commercial settings around the world, as well as by many governmental agencies and environmental consulting companies. It is a very powerful GIS tool that requires some effort to get started with

15.7.1.02 **GRASS** is ideal for use in engineering and land planning applications. Like other GIS packages, **GRASS** can display and manipulate vector data for roads, streams, boundaries, and other features. **GRASS** can also be used to keep maps updated with its integral digitizing functions. Another feature of **GRASS** is its ability to use raster, or cell, data. This is particularly important in spatial analysis and design. **GRASS** functions can convert between vector data to raster data for seamless integration.

15.7.1.03 **GRASS** can be used through the Graphical User Interface (GUI) offered by **QGIS**.

### 15.7.2 Setup for GRASS:

15.7.1.01 Click on [**Plug-ins**] on Main toolbar

15.7.1.02 Click on [**Plug-in Manager**]

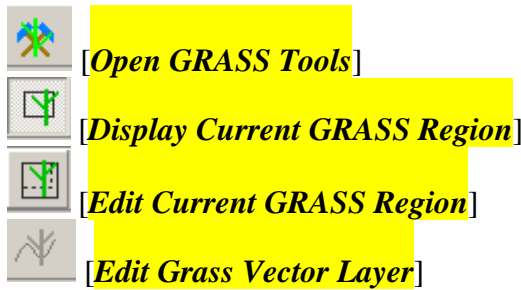
15.7.1.03 Check “(GRASS)”

15.7.1.04 The following will appear as a tool bar



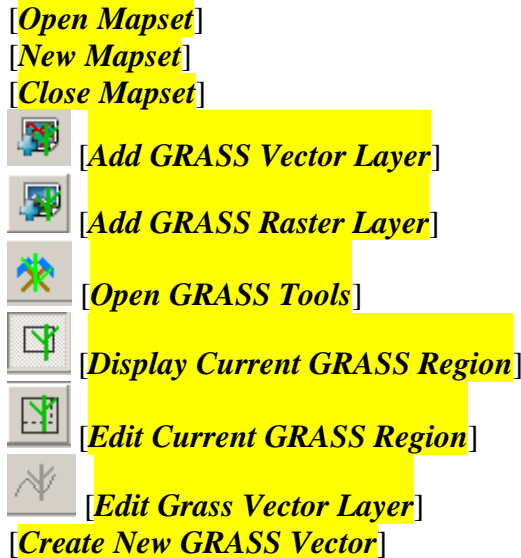
Figure 15.3




































## 15.7.2 Usage of GRASS
















15.7.2.01 Click on [*Plug-ins*] and then hover over [*GRASS*] will make the following tools available



15.7.2.02 When  is not grayed out , and the user clicks on it, a suite of new tools appear.

- Import
  -  →  [*Import OGR/PostGIS Vector Layer*]
  -  →  [*Import GDAL raster layer*]
- Vector Overlay
  -  →  [*Vector union*]
  -  →  [*Vector intersection*]
  -  →  [*Vector subtraction*]

-  [Vector non-intersection]
- Buffer
  -  [Vector Buffer]
  -  [Raster Buffer]
- Extract features from Vectors
  -  [Select features overlapped by features in another map]
  -  [Select Features by attribute]
  -  [Extract Selected Features]
- Delaunay triangulation, Voronoi diagrams and convex hulls
  -  [Delaunay Triangulation (lines)]
  -  [Delaunay Triangulation (areas)]
  -  [Voronoi diagram (lines)]
  -  [Voronoi diagram (areas)]
  -  [Convex hull]
- Network Analysis
  -  [Create nodes on network]
  -  [Allocate network]
  -  [Cut network by cost isolines]
  -  [Connecting nodes by shortest route (traveling salesman)]
  -  [Connect selected nodes by shortest tree (Steiner tree)]
- Layers
  -  [Add elements to layer (All elements of the selected layer type)]
- Random Points
  -  [Create Grid in Current Region]
  -  [Create new vector area map with current region extent]
- Convert a vector to raster
  -  [Convert a vector to raster using constant]
- Density of Points
  -  [Count of neighboring points]

-  [Gaussian kernel density]
- Interpolation
  -  [Interpolate attribute values (RST)]
  -  [Interpolate attribute values (IDW)]
-  Raster Map Calculator
- Geomorphology
  -  [Generate slope map from DEM (digital elevation model)]
  -  [Generate aspect map from DEM (digital elevation model)]
- Set raster color table
  -  [Set raster color table]
- Convert a raster to vector
  -  [Convert a raster to vector points]
  -  [Convert a raster to vector lines]
  -  [Convert a raster to vector Areas]
- Export
  -  [Shapefile export of vector layers]
  -  [GML export of vector layer]
  -  [Geo TIFF raster export]
- General
  -  [GRASS Shell]
  -  [Grass environmental variables]

## 15.8 GRASS Mapsets

### 15.8.1 General Information about GRASS Mapsets

15.8.1.01 A GRASS mapset holds a set of data layers that cover a geographic area and all in the same projection.

### 15.8.2 Setup for GRASS Mapset:

15.8.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in



### 15.8.3 Creation of GRASS Mapsets

- 15.8.3.01 Create a subdirectory in workshop called ‘GRASS’
- 15.8.3.02 Click on [**Plug-in**]
- 15.8.3.03 Click on [**GRASS**]
- 15.8.3.04 Click on [**New Mapset**]
- 15.8.3.05 GRASS data are stored in tree directory structure. The GRASS database is the top-level directory in this tree structure. Click [**Next**]
- 15.8.3.06 Select “(Create new location)” and type in location name, Click [**Next**]
- 15.8.3.07 Set projection and click [**Next**]
- 15.8.3.08 The user can set the region by entering in the coordinates, selecting a predefined region such as ‘United States’ or click [**set current QGIS extent**] which would set the region to your screen extent. Set the region and click [**Next**]. The GRASS region defines a workspace for raster modules. The default region is valid for one location. It is possible to set a different region in each mapset. It is possible to change the default location region later.
- 15.8.3.09 Enter “(New mapset)” name and click [**Next**]
- 15.8.3.10 Click [**Finish**]
- 15.8.3.11 Click on [**Edit Current GRASS Region**] on the **GRASS** toolbar and this allows the users to change parameters of the region
- 15.8.3.12 By clicking on [**Plug-in**], then [**GRASS**], and finally [**Open Mapset**], allows the user to change back and forth between mapsets.



**TASK #35\*\*\*\*\*** Create a mapset called NewEngland and set it to your current screen. Zoom out slightly and the region should appear on the map vie.



**QUESTION #26\*\*\*\*\*** What are the coordinates of your GRASS region?

### 15.9 Creating new GRASS Vector files

## 15.9.1 General Information about Creating new GRASS Vector files

15.9.1.01 This tool allows for the creation of new Vector files

## 15.9.2 Setup for Creating New GRASS Vector files:

15.9.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in



*NOTE #12\*\*\*\*\* Apparently, this application does not work when 'on the fly projection' is turned on. I recommend that this be used in Geographic Coordinate Systems (i.e WGS 84 or NAD 83) projections with 'Enable on the fly projection' turn off.*

## 15.9.3 Creating New Vector files

15.9.3.01 Click on [**Settings**]

15.9.3.02 Click on [**Projection Properties**]

15.9.3.03 Click on [**Projections**]

15.9.3.04 Uncheck "(Enable on the fly projection)"

15.9.3.05 Click [**Ok**]

15.9.3.06 Click on [**Plug-in**]

15.9.3.07 Click on [**GRASS**]

15.9.3.08 Click on [**Create new GRASS Vector**]

15.9.3.09 Type "(New Vector Name)" and click [**Ok**]

15.9.3.10 The following Screen appears, select the type of shape file to build

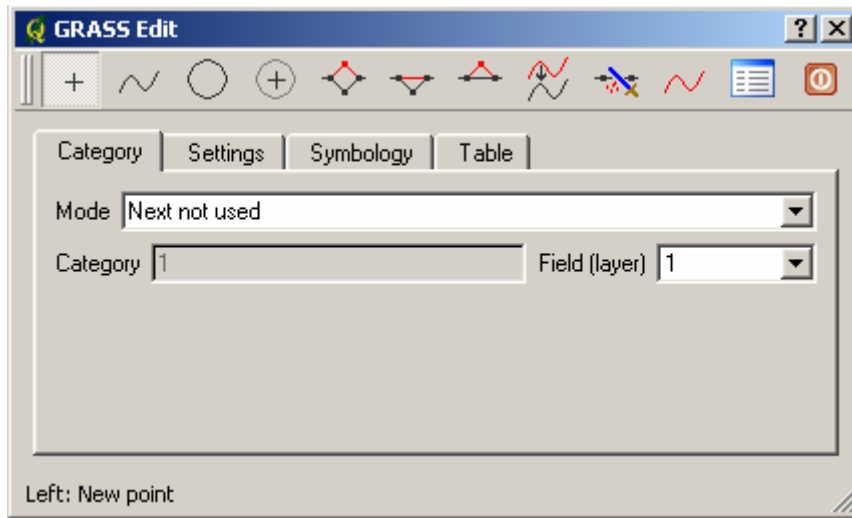



Figure 15.4

15.9.3.11 Add the features to the layer using the  tool

15.9.3.12 Under the 'Table' tab, Add the appropriate columns to the Attribute Table

15.9.3.13 Click on [**Create /Alter Table**]

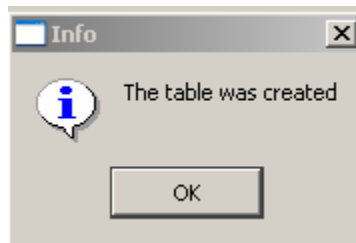


Figure 15.5

15.9.3.14 Click [**Ok**]

15.9.3.15 Click the  to close the tool.

15.9.3.16 Click on [**Settings**]

15.9.3.17 Click on [**Projection Properties**]

15.9.3.18 Click on [**Projections**]

15.9.3.19 Uncheck “(Enable on the fly projection)”



**TASK #36\*\*\*\*\*** Create a point map with at least 5 points.

## 15.10 Editing GRASS Vector files

### 15.10.1 General Information about Editing GRASS Vector files:

15.10.1.01 Not Applicable

### 15.10.2 Setup for Editing GRASS Vector files:

15.10.1.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### 15.10.3 Editing GRASS Vector files

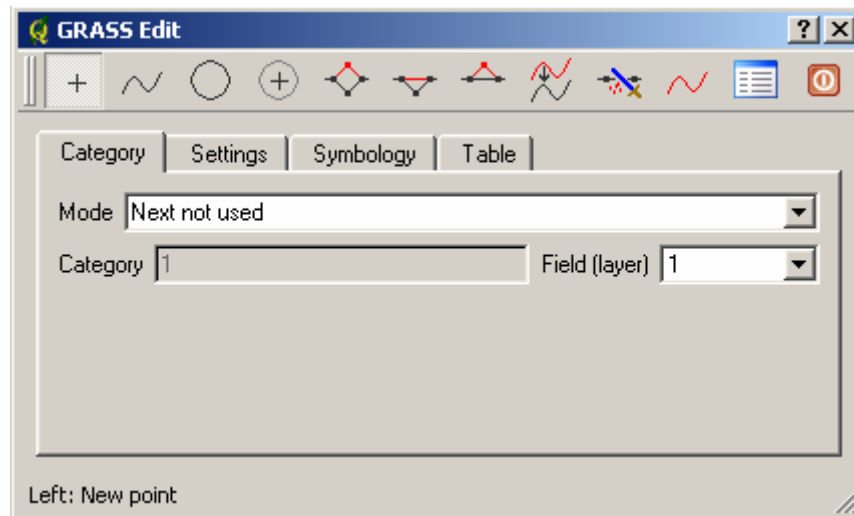
15.10.3.01 Click on the GRASS layer to be edited

15.10.3.02 Click on [**Plug-in**]


15.10.3.03 Click on [**GRASS**]

15.10.3.04 Click on [**Edit GRASS Vector Layer**]

15.10.3.05 The following Screen appears, select the type of shape file to build



**Figure 15.6**

15.10.3.06 Add the features to the layer using the  tool

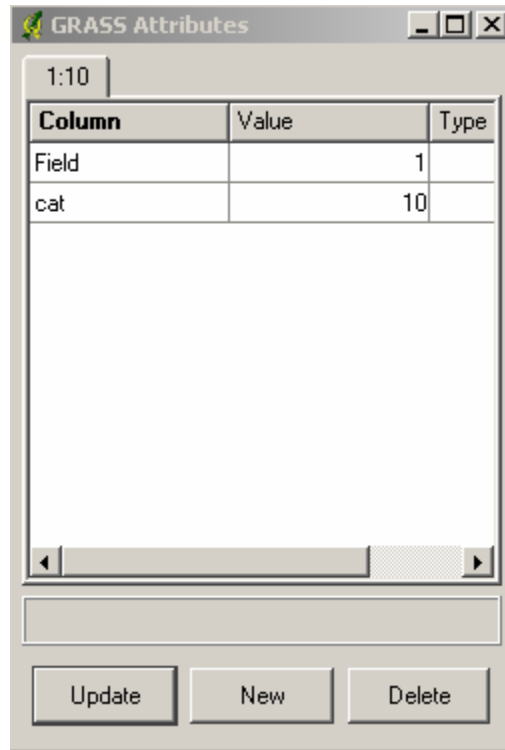


Figure 15.7

Click on **[Update]** when finished adding features

15.10.3.07 Under the 'Table' tab, Add the appropriate additional columns to the Attribute Table

15.10.3.08 Click on **[Create /Alter Table]**

15.10.3.09 Click the  to close the tool.



**TASK #36**\*\*\*\*\*Add at least 3 more points to the point map just created

## 15.11 GRASS Importing

### 15.11.1 General Information about GRASS Importing

15.10.1.01 Not Applicable

### 15.11.2 Setup for GRASS Importing:

15.10.1.01 Not Applicable as already installed with Quantum GIS as a Plug-in

---

### 15.11.3 Usage of GRASS Importing

15.11.3.01  **[Import OGR/PostGIS Vector Layer]**

15.11.3.02 Click on **[Open GRASS tools]** on **GRASS** toolbar

15.11.3.03 Click on **[Import OGR/PostGIS Vector Layer]**

15.11.3.04 On the options tab, select “(OGR raster layer)” (Shapefile) to import

15.11.3.05 Enter “(Name for output vector map)” and click **[Run]**

15.11.3.06 Click on **[Add GRASS vector layer]**

15.11.3.07 Select layer to be added and click **[Ok]**

### 15.12 GRASS Import GDAL raster layer

#### 15.12.1 General Information about GRASS Import GDAL raster layer

15.12.1.01  **[Import GDAL raster layer]** is not covered in this tutorial.



**TASK #37\*\*\*\*\*** Import the buoys file created earlier in the tutorial. Name vector map as Buoy1



**QUESTION #27\*\*\*\*\*** Is the Buoy1 layer visible?



**TASK #38\*\*\*\*\*** Import the poly1 and poly2 layers created earlier in the tutorial. Name vector maps as poly1 and poly2



**TASK #39\*\*\*\*\*** Import the line1 layer created earlier in the tutorial. Name vector maps as line1



**QUESTION #28\*\*\*\*\*** Is the poly1, poly2, and line1 maps visible?

## **15.13 GRASS Vector Overlays**

### **15.13.1 General Information about GRASS Vector Overlays.**

15.13.1.01 This tool allows for the clipping of a polygon by another polygon.

### **15.13.2 Setup for GRASS Vector Overlays**

15.13.1.02 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.13.3 Usage of GRASS Vector Overlays**

15.13.3.01  [Vector union]

15.13.3.02 Click on [**Open GRASS tools**] on **GRASS** toolbar

15.13.3.03 Click on [**Union Vector**]

15.13.3.04 Select 2 input polygon vector maps

15.13.3.05 Name the “(Name of output vector map)”

15.13.3.06 Click [**Run**]

15.13.3.07 Click on [**Add GRASS vector layer**]

15.13.3.08 Select layer to be added and click [**Ok**]



**TASK #45\*\*\*\*\*** *Make a union of poly1 and poly2 and add to map view*

## **15.14 GRASS Vector intersection**

### **15.14.1 General Information about GRASS Vector Intersection.**

15.14.1.01 Not Applicable

### **15.14.2 Setup for GRASS Vector Intersection**

15.14.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### 15.14.3 Usage of GRASS Vector Intersection

15.14.3.01  [Vector intersection]

15.14.3.02 Click on [Open GRASS tools] on GRASS toolbar

15.14.3.03 Click on [Union Intersection]

15.14.3.04 Select 2 input polygon vector maps

15.14.3.05 Name the “(Name of output vector map)”

15.14.3.06 Click [Run]

15.14.3.07 Click on [Add GRASS vector layer]

15.14.3.08 Select layer to be added and click [Ok]



**TASK #40\*\*\*\*\*** *Make a intersection of poly1 and poly2 and add to map view*

### 15.15 GRASS Vector intersection

#### 15.15.1 General Information about GRASS Vector Subtraction.

15.15.1.01 Not Applicable

#### 15.15.2 Setup for GRASS Vector Subtraction

15.15.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

#### 15.15.3 Usage of GRASS Vector Subtraction

15.15.3.03  [Vector subtraction]

15.15.3.04 Click on [Open GRASS tools] on GRASS toolbar

15.15.3.05 Click on [Vector Subtraction]

15.15.3.06 Select 2 input polygon vector maps

15.15.3.07 Name the “(Name of output vector map)”



- 15.15.3.08 Click [**Run**]
- 15.15.3.09 Click on [**Add GRASS vector layer**]
- 15.15.3.10 Select layer to be added and click [**Ok**]



**TASK #41**\*\*\*\*\* *Make a subtraction of poly1 minus poly2 and add to map view*

## **15.16 GRASS Vector intersection**

### **15.16.1 General Information about GRASS Vector Non-Intersection.**

- 15.16.1.01 Not Applicable

### **15.16.2 Setup for GRASS Vector Non-Intersection.**

- 15.16.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.16.3 Usage of GRASS Vector Non-Intersection**

- 15.16.3.01  [**Vector non-intersection**]

- 15.16.3.02 Click on [**Open GRASS tools**] on **GRASS** toolbar

- 15.16.3.03 Click on [**Vector Non-Intersection**]

- 15.16.3.04 Select 2 input polygon vector maps

- 15.16.3.05 Name the “(Name of output vector map)”

- 15.16.3.06 Click [**Run**]

- 15.16.3.07 Click on [**Add GRASS vector layer**]

- 15.16.3.08 Select layer to be added and click [**Ok**]



**TASK #42**\*\*\*\*\* *Make a non-intersection of poly1 and poly2 and add to map view*

## **15.17 GRASS Vector Buffers**

## 15.17.1 General Information about GRASS Vector Buffers

15.16.2.01 Not Applicable

## 15.17.2 Setup for GRASS Vector Buffers

15.17.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

## 15.17.3 Usage of GRASS Vector Buffers

15.17.3.01  [Vector Buffer]

15.17.3.02 Click on [**Open GRASS tools**] on **GRASS** toolbar

15.17.3.03 Click on [**Vector Buffer**]

15.17.3.04 Select a input vector map (point, line, polygon)

15.17.3.05 Set the “(Buffer distance in map units)”

15.17.3.06 Name the “(Name of output vector map)”

15.17.3.07 Click [**Run**]

15.17.3.08 Click on [**Add GRASS vector layer**]

15.17.3.09 Select layer to be added and click [**Ok**]



**TASK #42\*\*\*\*\*** *Make a buffer of line1 at 10000 meters and add to map view*

## 15.18 GRASS Raster Buffers

### 15.18.1 General Information about GRASS Raster Buffers

15.18.1.01  [**Raster Buffer**] is not covered in this tutorial.

---

## **15.19 Select GRASS Features overlapped by features in another map**

### **15.19.1 General Information about Select GRASS Features overlapped by features in another map**

15.19.1.01 This tool allows for the selection of features by use of another feature or by attribute and then to be able to extract them.

### **15.19.2 Setup for Select GRASS Features overlapped by features in another map**

15.19.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.19.3 Usage of Select GRASS Features overlapped by features in another map**

15.19.3.01  [Select features overlapped by features in another map]

15.19.3.02 Click on [Open GRASS tools] on GRASS toolbar

15.19.3.03 Click on [Select features overlapped by features in another map]

15.19.3.04 Enter “(Name of input Vector map)” that is to be selected from. This can be a line, point or area file.

15.19.3.05 Enter “(Name of input Vector map)” that is to be used as the selection layer.

15.19.3.06 Name the “(Name of output vector map)”

15.19.3.07 Click [Run]

15.19.3.08 Click on [Add GRASS vector layer]

15.19.3.09 Select layer to be added and click [Ok]

## **15.20 Select GRASS Features by attributes**

### **15.20.1 General Information about Select GRASS Features by Attributes**

15.20.1.01 Not Applicable

## **15.20.2 Setup for Select GRASS Features by Attributes**

15.20.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

## **15.20.3 Usage of Select GRASS Features by Attributes**

15.20.3.01  →  [Select Features by attribute]

15.20.3.02 Click on [Open GRASS tools] on GRASS toolbar

15.20.3.03 Click on [Select Features by attribute]

15.20.3.04 Enter “(Name of input Vector map)” that is to be selected from. This can be a line, point or area file.

15.20.3.05 Enter “(Where conditions of SQL statement without)”.

15.20.3.06 Name the “(Name of output vector map)”

15.20.3.07 Click [Run]

15.20.3.08 Click on [Add GRASS vector layer]

15.20.3.09 Select layer to be added and click [Ok]

## **15.21 Extract Selected GRASS Features**

### **15.21.1 General Information about Extract Selected GRASS Features**

15.21.1.01 Not Applicable

### **15.21.2 Setup for Extract Selected GRASS Features**

15.21.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.21.3 Usage of Extract Selected GRASS Features**

15.21.3.01  →  [Extract Selected Features]

- 15.21.3.02 Click on [**Open GRASS tools**] on *GRASS* toolbar
- 15.21.3.03 Click on [**Extract Selected Features**]
- 15.21.3.04 Enter “(Name of input Vector map)” that is to be selected from. This can be a line, point or area file.
- 15.21.3.05 Enter “(CATS)” that is to be used as the selection categories.
- 15.21.3.06 Name the “(Name of output vector map)”
- 15.21.3.07 Click [**Run**]
- 15.21.3.08 Click on [**Add GRASS vector layer**]
- 15.21.3.09 Select layer to be added and click [**Ok**]

## 15.22 *GRASS Delaunay triangulation (lines)*

### 15.22.1 General Information about GRASS Delaunay triangulation (lines)

15.22.1.01  [**Delaunay Triangulation (lines)**] is not covered in this tutorial.

## 15.23 *GRASS Delaunay triangulation (areas)*

### 15.23.1 General Information about GRASS Delaunay triangulation (areas)

15.23.1.01  [**Delaunay Triangulation (areas)**] is not covered in this tutorial.

## 15.24 *GRASS Voronoi diagram (areas)*

### 15.24.1 General Information about GRASS Voronoi diagram (areas)

15.24.1.01  [**Voronoi diagram (areas)**] is not covered in this tutorial.


**15.25 GRASS convex hulls**

**15.25.1 General Information about GRASS Convex Hulls**

15.25.1.01  [Convex hull] is not covered in this tutorial.

**15.26 GRASS Network Analysis - Create nodes on network**

**15.26.1 General Information about GRASS Create nodes on network**

15.26.1.01  [Create nodes on network] is not covered in this tutorial.


**15.27 GRASS Network Analysis - Allocate network**

**15.27.1 General Information about GRASS Allocate network**

15.27.1.01  [Allocate network] is not covered in this tutorial.


**15.28 GRASS Network Analysis - Cut network by cost isolines**

**15.28.1 General Information about GRASS Cut network by cost isolines**

15.28.1.01  [Cut network by cost isolines] is not covered in this tutorial.

**15.29 GRASS Network Analysis - Connecting nodes by shortest route (traveling salesman)**


**15.29.1 General Information about GRASS Connecting nodes by shortest route (traveling salesman)**

15.29.1.01  [Connecting nodes by shortest route (traveling salesman)] is not covered in this tutorial.

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## 15.30 GRASS Network Analysis - Connect selected nodes by shortest tree (Steiner tree)

### 15.30.1 General Information about GRASS Connect selected nodes by shortest tree (Steiner tree)

15.30.1.01  [Connect selected nodes by shortest tree (Steiner tree)] is not covered in this tutorial.

## 15.31 Add elements to GRASS layer (All elements of the selected layer type)

### 15.31.1 General Information about Add elements to GRASS layer (All elements of the selected layer type)

15.31.3.01  [Add elements to layer (All elements of the selected layer type)] is not covered in this tutorial.

## 15.32 GRASS Random Points


### 15.32.1 General Information about GRASS Random Points

15.32.1.01 Not Applicable

### 15.32.2 Setup for GRASS Random Points

15.32.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### 15.32.3 Usage of GRASS Random Points

15.32.3.01  [Random Points]

15.32.3.02 Click on [Open GRASS tools] on GRASS toolbar

15.32.3.03 Click on [Random Points]

15.32.3.04 Enter “(Number of points to be created)”

15.32.3.05 Name the “(Vector File to be created)”

15.32.3.06 Click [Run]

15.32.3.07 Click on [**Add GRASS vector layer**]

15.32.3.08 Select layer to be added and click [**Ok**]



**TASK #43**\*\*\*\*\*Zoom out so the mapset is visible and there is an area visible around the mapset. Make a Random point File of 1000 points?



**QUESTION #29**\*\*\*\*\*Do all the points fall inside the mapset?

## **15.33 Create Grid in Current GRASS Region**

### **15.33.1 General Information about Create Grid in Current GRASS Region**

15.25.1.01  [**Create Grid in Current Region**] is not covered in this tutorial.

## **15.34 Create new Grass vector area map with current region extent**

### **15.34.1 General Information about Create new Grass vector area map with current region extent**

15.34.1.01 Not Applicable

### **15.34.2 Setup for Create new Grass vector area map with current region extent:**

15.34.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.34.3 Usage of Create new Grass vector area map with current region extent**

15.34.3.01  [**Create new vector area map with current region extent**]

15.34.3.02 Click on [**Open GRASS tools**] on GRASS toolbar

15.34.3.03 Click on [**Create new vector area map with current region extent**]



15.34.3.04 Enter “(Output map where points will be written)”

15.34.3.05 Click [**Run**]

15.34.3.06 Click on [**Add GRASS vector layer**]

15.34.3.07 Select layer to be added and click [**Ok**]



**TASK #44**\*\*\*\*\*Zoom out so the mapset is visible and there is an area visible around the mapset. Make a new vector area map?



**QUESTION #30**\*\*\*\*\*Does the new area map fall inside the mapset?

## **15.35 Convert a GRASS vector to raster using constant**

### **15.35.1 General Information about Convert a GRASS vector to raster using constant**

15.35.1.01 Not Applicable

### **15.35.2 Setup for Convert a GRASS vector to raster using constant**

15.35.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.35.3 Usage of Convert a vector to raster using constant**

15.35.3.01  [**Convert a vector to raster using constant**]

15.35.3.02 Click on [**Open GRASS tools**] on **GRASS** toolbar

15.35.3.03 Click on [**Convert a vector to raster using constant**]

15.35.3.04 Enter “(Name of input vector map)”

15.35.3.05 Name the “(Raster Value)”

15.35.3.06 Name the “(Name for output raster map)”

15.35.3.07 Click [**Run**]

15.35.3.08 Click on [**Add GRASS raster layer**]

15.35.3.09 Select layer to be added and click [**Ok**]



**TASK #45**\*\*\*\*\*Zoom out so the mapset is visible and there is an area visible around the mapset. Make a raster map of poly1?

## **15.36 Count of neighboring GRASS points**

### **15.36.1 General Information about Count of neighboring GRASS points**

15.36.1.01  [**Count of neighboring points**] is not covered in this tutorial.


## **15.37 GRASS Gaussian kernel density**

### **15.37.1 General Information about GRASS Gaussian kernel density**

15.37.1.01  [**Gaussian kernel density**] is not covered in this tutorial.


## **15.38 GRASS Interpolate attribute values (RST)**

### **15.38.1 General Information about GRASS Interpolate attribute values (RST)**

15.38.1.01  [**Interpolate attribute values (RST)**] is not covered in this tutorial.

## **15.39 GRASS Interpolate attribute values (IDW)**


### **15.39.1 General Information about GRASS Interpolate attribute values (IDW)**

15.39.1.01  [**Interpolate attribute values (IDW)**] is not covered in this tutorial.

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## 15.40 **GRASS Raster Map Calculator**

### 15.40.1 **General Information about GRASS Raster Map Calculator**

15.40.1.01  [**Raster Map Calculator**] is not covered in this tutorial.


## 15.41 **Generate GRASS slope map from DEM (digital elevation model)**

### 15.41.1 **General Information about Generate GRASS slope map from DEM (digital elevation model)**

15.41.1.01  [**Generate slope map from DEM (digital elevation model)**] is not covered in this tutorial


## 15.42 **Generate GRASS aspect map from DEM (digital elevation model)**

### 15.42.1 **General Information about Generate GRASS aspect map from DEM (digital elevation model)**

15.42.1.01  [**Generate aspect map from DEM (digital elevation model)**] is not covered in this tutorial


## 15.43 **Generate GRASS Set raster color table**

### 15.43.1 **General Information about Set raster color table**

15.43.1.01  [**Set raster color table**] is not covered in this tutorial

## 15.44 **Convert a raster to GRASS vector points**

### 15.44.1 **General Information about Convert a raster to GRASS vector points**

15.44.1.01  [**Convert a raster to vector points**] is not covered in this tutorial

## **15.45 Convert a raster to GRASS vector lines**

### **15.45.1 General Information about Convert a raster to GRASS vector lines**

15.45.1.01  [Convert a raster to vector lines] is not covered in this tutorial

## **15.46 Convert a raster to GRASS vector Areas**

### **15.46.1 General Information about Convert a raster to GRASS vector Areas**

15.46.1.01  [Convert a raster to vector Areas] is not covered in this tutorial

## **15.47 Shapefile export of GRASS vector layers**

### **15.47.1 General Information about Shapefile export of GRASS vector layers**

15.47.1.01 Not Applicable

### **15.47.2 Setup for Shapefile export of GRASS vector layers**

15.47.2.01 Not Applicable as already installed with Quantum GIS as a Plug-in

### **15.47.3 Usage of Shapefile export of GRASS vector layers**

15.47.3.01  [Shapefile export of vector layers]

15.47.3.02 Click on [Open GRASS tools] on GRASS toolbar

15.47.3.03 Click on [Shapefile export of vector layers]

15.47.3.04 Enter “(Name of input vector map)”

15.47.3.05 Enter “(Output Shapefile)”


15.47.3.06 Click [Run]

15.47.3.07 Click on [**Add a vector layer**]

15.47.3.08 Select layer to be added and click [**Ok**]

## **15.48 GML export of GRASS vector layer**

### **15.48.1 General Information about GML export of GRASS vector layer**

15.48.1.01  [**GML export of vector layer**] is not covered in this tutorial

## **15.49 GRASS Geo TIFF raster export**

### **15.49.1 General Information about GRASS Geo TIFF raster export**

15.49.1.01  [**Geo TIFF raster export**] is not covered in this tutorial


## **15.50 GRASS Shell**

### **15.50.1 General Information about GRASS Shell**

15.50.1.01  [**GRASS Shell**] is not covered in this tutorial

## **15.51 Grass environmental variables**

### **15.51.1 General Information about Grass environmental variables**

15.51.1.01  Grass environmental variables is not covered in this tutorial



## List of Questions for Lesson #04



*QUESTION #24\*\*\*\*\* What are the buoys from north to south?*



*QUESTION #25\*\*\*\*\* How many locations are there for the user to choose from in placing the copyright mark?*



*QUESTION #26\*\*\*\*\* What are the coordinates of your GRASS region?*



*QUESTION #27\*\*\*\*\* Is the Buoy1 layer visible?*



*QUESTION #28\*\*\*\*\* Is the poly1 and poly2 maps visible?*



*QUESTION #29\*\*\*\*\* Do all the points fall inside the mapset?*



*QUESTION #30\*\*\*\*\* Does the new area map fall inside the mapset?*

**End of Lesson #04**

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## [Beginning of Lesson #05](#)

### **15.52 Graticule Creator Plug-in**

#### **15.52.1 General Information about Graticule Creator Plug-in:**

15.52.1.01 This tool allows for the building of a graticule grid over the map

#### **15.52.2 Setup for Graticule Creator Plug-in**

15.52.3.01 Click on [**Plug-ins**] on Main toolbar

15.52.3.02 Click on [**Plug-in Manager**]

15.52.3.03 Check “(Graticule Creator)”

15.52.3.04 Click [**OK**]

#### **15.52.3 Use of Graticule Creator Plug-in**

15.52.3.01 Click [**Graticule Builder**] on main toolbar

15.52.3.02 Fill in the appropriate values

15.52.3.03 Click [**OK**]



**QUESTION #31**\*\*\*\*\* *What type of Graticules can you make?*



**TASK #45**\*\*\*\*\* Build a Grid from Latitude 10.0 Longitude -170.0 to Latitude 80.0 Longitude -10.0, Graticule Size 5 and 5, save as shape “latlon” in your workspace directory



**ISSUE #15**\*\*\*\*\* *no easy way to label graticule*

### **15.53 North Arrow Plug-in**

### 15.53.1 General Information about North Arrow Plug-in

15.53.1.01 Not Applicable

### 15.53.2 Setup for North Arrow Plug-in

15.53.2.01 Click on [**Plug-ins**] on Main toolbar

15.53.2.02 Click on [**Plug-in Manager**]

15.53.2.03 Check “**NorthArrow**”

15.53.2.04 Click [**OK**]

### 15.53.3 Use of North Arrow Plug-in

15.53.3.01 Click [**North Arrow**] on main toolbar

15.53.3.02 Select desired placement

15.53.3.03 Click on “(Enable North Arrow)”

15.53.3.04 Click on “(Set direction automatically)”

15.53.3.05 Click [**OK**]



**TASK #45\*\*\*\*\*** *Put a North Arrow in the upper right corner*



**QUESTION #32\*\*\*\*\*** *What many types of North Arrow can be chosen?*



**QUESTION #33\*\*\*\*\*** *What is the angle of the north arrow using the current projection?*



**QUESTION #34\*\*\*\*\*** *Can the north arrow be pointed in a direction other than true north?*

## 15.53 PostgreSQL Geoprocessing Plug-in



## 15.53.1 General Information about QGS Launcher Plug-in

15.53.1.01 Geoprocessing functions for working with PostgreSQL/PostGIS Layers is not covered in this tutorial

## 15.55 Scale Bar Plug-in

### 15.55.1 General Information about Scale Bar Plug-in

15.55.1.01 Plug-in to draw scale bar on Map

#### 15.55.2 Setup for Scale Bar Plug-in

15.55.2.01 Click on [**Plug-ins**] on Main toolbar

15.55.2.02 Click on [**Plug-in Manager**]

15.55.2.03 Check “**ScaleBar**”

15.55.2.04 Click [**OK**]

### 15.55.3 Use of Scale Bar Plug-in

15.55.3.01 Click [**Scale Bar**] on main toolbar

15.55.3.02 Select desired placement

15.55.3.03 Select Bar Style

15.55.3.04 Click on “(Enable Scale Bar)”

15.55.3.05 Click on “(Automatically snap to round numbers in resize)”

15.55.3.06 Click [**OK**]



**QUESTION #35\*\*\*\*\*** *How many locations are there to put the Scale bar*



**QUESTION #36\*\*\*\*\*** *How many types of scale bar are there?*



**TASK #46\*\*\*\*\*** *Put a Scale Bar in the low left corner*

**15.56**      ***Spit Plug-in*** 

**15.56.1**    **General Information about Spit Plug-in**

*15.55.1.01*    This is a Shapefile to PostgreSQL/PostGIS Import Tool and is not covered in this tutorial

## Chapter 16 Third Party Plug-ins

### 16.1 *Open Modeler Plug-in*

#### 16.1.1 General Information about Open Modeler Plug-in

*16.1.1.01* The *openModeller* project aims to provide a flexible, user friendly, cross-platform environment where the entire process of conducting a fundamental niche modeling experiment can be carried out. The software includes facilities for reading species occurrence and environmental data, selection of environmental layers on which the model should be based, creating a fundamental niche model and projecting the model into an environmental scenario. A number of fundamental niche modeling algorithms are provided as plug-ins, including GARP, Climate Space Model, Bioclimatic Envelopes, and others. Additional algorithms are planned for the future.

*16.1.1.02* *OpenModeller* is a spatial distribution modeling library, providing a uniform method for modeling distribution patterns using a variety of modeling algorithms. *openModeller* can be used via programmatic interfaces, including SOAP and SWIG-python, as well as via a user friendly desktop graphical user interface and a GIS Plug-in.

#### 16.1.2 Setup for Open Modeler Plug-in

*16.1.2.01* Not Applicable

#### 16.1.3 Use of Open Modeler Plug-in

*16.1.3.01* The *openModeller* desktop GUI program runs on both Linux and Windows (9x,ME,2k,NT,XP). The program can be run as a standalone GUI application or as a Plug-in for Quantum GIS. The program takes the form of a 'Wizard', collecting information from the user via a number of screens. The selections made are saved between sessions thus streamlining the modeling process on subsequent occasions.

*16.1.3.02* The first screen prompts the user to select the modeling algorithm to use. Tabbed pages provide the user with information about each algorithm such as the author details, general description and references.

*16.1.3.03* The second step asks the user to select a coordinate system. *openModeller* uses the projection library proj to support using point locality data in any WKT defined coordinate system

- 16.1.3.04* Next, the user is asked to load a text file containing the point locality data for the study species. As the text file can contain data for more than one species, the user must then specify which species to use.
- 16.1.3.05* Then the user defines the environmental raster layers with which to build the model. Layers can be specified one by one, or the folder containing all the required files can be selected and openModeller will load them recursively. The openModeller uses the GDAL library to read raster surfaces and therefore it supports most of the popularly used GIS data formats. The openModeller can use raster layers of different extents and coordinate systems within the same analysis and therefore all raster layers must have coordinate systems defined.
- 16.1.3.06* The following page provides a similar interface so the user can specify the layers into which they would like to project their model. This could be the same data as was specified in the previous page (to model the present day potential distribution), or data for a different region or time period.
- 16.1.3.07* Next, the user is prompted to select the mask layers which will be used to mask the input occurrences and to determine the output format. As openModeller supports raster layers of different extents and coordinate systems, the output mask layer specified determines the extent and coordinate system of the resulting prediction.
- 16.1.3.08* The next step allows the user to define parameters required for the selected modeling algorithm. The number of available parameters depends on the algorithm selected. By holding your mouse over each box, a tooltip provides a more detailed description of each parameter's function
- 16.1.3.09* Here the user defines the base file name for the model output files and the folder where these files should be written. The wizard will produce a GEOTIFF image suitable for use in most GIS packages, a configuration file which can be used to run the model again using the openModeller console client and a color ramped PNG image for initial viewing by the user.
- 16.1.3.10* The final wizard screen displays progress bars informing the user of the progress of the model creation and model projection.
- 16.1.3.11* Once the wizard has completed the task, a new window is opened showing the color ramped PNG image of the model output. The window can be used to save the image in a variety of file formats as well as to open the Wizard to run another model



*NOTE #11\*\*\*\*\* There is a link from the <http://qgis.org/> site to the openModeller Plug-in. Download and work through it if you want, but it is a little more involved for a basic introduction to Software*

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## List of Questions for Lesson #05



**QUESTION #31\*\*\*\*\*** *What type of Graticles can you make?*



**QUESTION #32\*\*\*\*\*** *What many types of North Arrow can be chosen?*



**QUESTION #33\*\*\*\*\*** *What is the angle of the north arrow using the current projection?*



**QUESTION #34\*\*\*\*\*** *Can the north arrow be pointed in a direction other than true north?*



**QUESTION #35\*\*\*\*\*** *How many locations are there to put the Scale bar*



**QUESTION #36\*\*\*\*\*** *How many types of scale bar are there?*

**End of Lesson #05**

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**Beginning of Lesson #06**



**TASK #46\*\*\*\*\*** *Create two polygon layers named poly1 and poly2 and make sure that partially overlap each other. Create a line layer named Line1 and make sure it crosses over poly1.*

## **Chapter 17 Stand Alone Utilities**

Not Applicable

## Chapter 18    **Extra Features**

### **18.1        *Map Overview***

#### **18.1.1        **General Information for Map Overview****

*18.1.1.01*        The map overview area provides a full extent view of layers added to it. Within the view is a rectangle showing the current map extent. This allows the user to quickly determine which area of the map currently being viewed. Note that labels are not rendered to the map overview even if the layers in the map overview have been set up for labeling.

#### **18.1.2        **Setup for Using the Map Overview****

*18.1.2.01*        Not Applicable

#### **18.1.3        **Steps for Using the Map Overview****

*18.1.3.01*        The user can add a single layer to the overview by right-clicking on it in the legend and choosing [**Add to Overview**].

*18.1.3.02*        The user can also add or remove all layers to the overview using the [**Add All to Overview**] or [**Remove All from Overview**] tool on the Layer drop down menu or on the [**Manage Layers**] toolbar.



## **Chapter 19 Customizing and Programming**

Not covered in this tutorial but will be added

## Chapter 20 Hard Copy/Exporting

### 20.1 Map Composer

#### 20.1.1 General Information about Map Composer

20.1.1.01 The map composer is a feature that provides improved layout and printing capabilities. The composer allows the user to add elements such as the *QGIS* map canvas, legend, scalebar, and text. The user can size and position each item and adjust the properties to create the layout. The result can be printed, exported as an image, or exported to SVG.

#### 20.1.2 Setup for Map Composer

20.1.2.01 Not Applicable

#### 20.1.3 Using Map Composer

20.1.3.01 To access the map composer, click on the **Print** button in the toolbar or choose **Print** from the **File** menu

20.1.3.02 To use the map composer, first add the layers wanted to be printed to *QGIS*. The layers should be rendered and symbolized prior to composing the map. Opening the map composer provides a blank canvas to which can be added the current map view, legend, scalebar, and text.

20.1.3.03 The map composer has two tabs: **General** and **Item**. The General tab allows the user to set the paper size, orientation, and resolution for the map. The Item tab displays the properties for the currently selected map element. By selecting an element on the map (eg. legend, scalebar, text, etc.) and clicking on the Item tab, the user can customize the settings.

20.1.3.04 The user can add multiple elements to the composer. This allows the user to have more than one map view and legend in the composer. Each element has its own properties and in the case of the map, its own extent.

20.1.3.05 Adding a Map to the Composer

- To add the *QGIS* map canvas to the map composer, click on the **Add a new map** button in toolbar.
- Drag a rectangle on the composer canvas to add the map. The user can resize the map later by clicking on the Select/move item button, clicking on the map,

and dragging one of the handles in the corner of the map. With the map selected, the user can also resize the map by specifying the width and height on the [**Item**] properties tab.

- The map is linked to the *QGIS* map canvas. If the user changes the view on the map canvas by zooming or panning, the user can update the map composer view by selecting the map in composer and clicking on the [**Set Extent**] button. The user can also change the composer view by specifying a map scale. To set the view to a specific scale:
  - Choose [**Scale**] (calculate extent) from the Set drop-down box
  - Enter the scale denominator in the scale box
  - Press [**Enter**]

20.1.3.06 Adding other Elements to the Composer

20.1.3.07 A legend can be added to the composer canvas and customized to show only the desired layers. To add a legend, click on the [**Add New Vector Legend**] button. The legend will be placed on the composer canvas and the user can move it to where it is desired.

20.1.3.08 Click on the [**Items**] tab to customize the appearance of the legend, including

- Setting the Title for the legend
- Setting a border or frame for the map
- Setting the font, font style and font size
- Which layers are shown or hidden.

20.1.3.09 To add a scalebar to the composer, click on the [**Add Scalebar**] button.

20.1.3.10 Use the [**Item**] tab to customize

- the segment size
- number of segments
- Map Units per scalebar unit
- Unit Label

- Map it applies to
- font, font style and font size
- Line Width.

20.1.3.11 The user can add text labels to the composer by clicking on the [**Add New Label**] button.

20.1.3.12 Use the Item tab while the text is selected to

- customize the default text
- change the font, font style and font size

20.1.3.13 The map composer has navigation tools to zoom in and out.

20.1.3.14 To zoom in, click the zoom in tool. The map composer canvas will be scaled by a factor to 2. Use the scrollbars to adjust the view to the area of interest.

20.1.3.15 Zooming out works in a similar fashion.

20.1.3.16 If the user finds the view in an inconsistent state, use the refresh button to redraw the map composer

20.1.3.17 The map composer allows the user to print the map to a printer, export to a PNG, or export to SVG. Each of these functions is available from the composer toolbar.

20.1.3.18 The map composer also allows for the building of templates and loading of templates



**TASK #47\*\*\*\*\*Make a png file of a map**

## Chapter 21 Support and Help

### 21.1 Support

#### 21.1.1 General Information about Support

21.1.1.01 *QGIS* is still under active development and as such it won't always work like the user expects it to. The preferred way to get help is by joining the qgis-users mailing list. The questions will reach a broader audience and answers will benefit others. The user can subscribe to the qgis-users mailing list by visiting here: <http://lists.sourceforge.net/lists/listinfo/qgis-user>

21.1.1.02 If the user is a developer facing problems of a more technical nature, the user may want to join the qgis-developer mailing list here: <http://lists.sourceforge.net/lists/listinfo/qgis-developer>

21.1.1.03 There is also a presence on IRC - visit *QGIS* by joining the #qgis channel on irc.freenode.net. Please wait around for a response to the question as many folks on the channel are doing other things and it may take a while for them to notice the question.

21.1.1.04 Commercial support for *QGIS* is available from Micro Resources

21.1.1.05 While the qgis-users mailing list is useful for general 'how do I do xyz in *QGIS*' type questions, the user may wish to notify the developers about bugs in *QGIS*. The user can submit bug reports using the *QGIS* bug tracker. When reporting a bug, either login to SourceForge or, if you don't have a SourceForge id, provide an email address where we can request additional information.

21.1.1.06 Please bear in mind that the bug may not always enjoy the priority the user might hope for (depending on its severity). Some bugs may require may require significant developer effort to remedy and the manpower is not always available for this.

21.1.1.07 If the user have found a bug and fixed it, submit it to the *QGIS* Sourceforge patch queue where someone will review it and apply it to *QGIS*. Please don't be alarmed if the patch is not applied straight away - developers may be tied up with other commitments.

21.1.1.08 Feature requests can be submitted using the feature tracker.

21.1.1.09 There is also a community site for **QGIS** where the developers encourage **QGIS** users to share their experiences and provide case studies about how they are using QGIS. The community site is available at: <http://qgis.org>

21.1.1.10 Lastly, the developers maintain a WIKI web site at <http://wiki.qgis.org> where you can find a variety of useful information relating to **QGIS** development, release plans, links to download sites and so on.



**TASK #48\*\*\*\*\****Send me an e-mail with attached png map and a statement that you have finished to course*

## Appendix A

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