

# INTRODUCTION

---



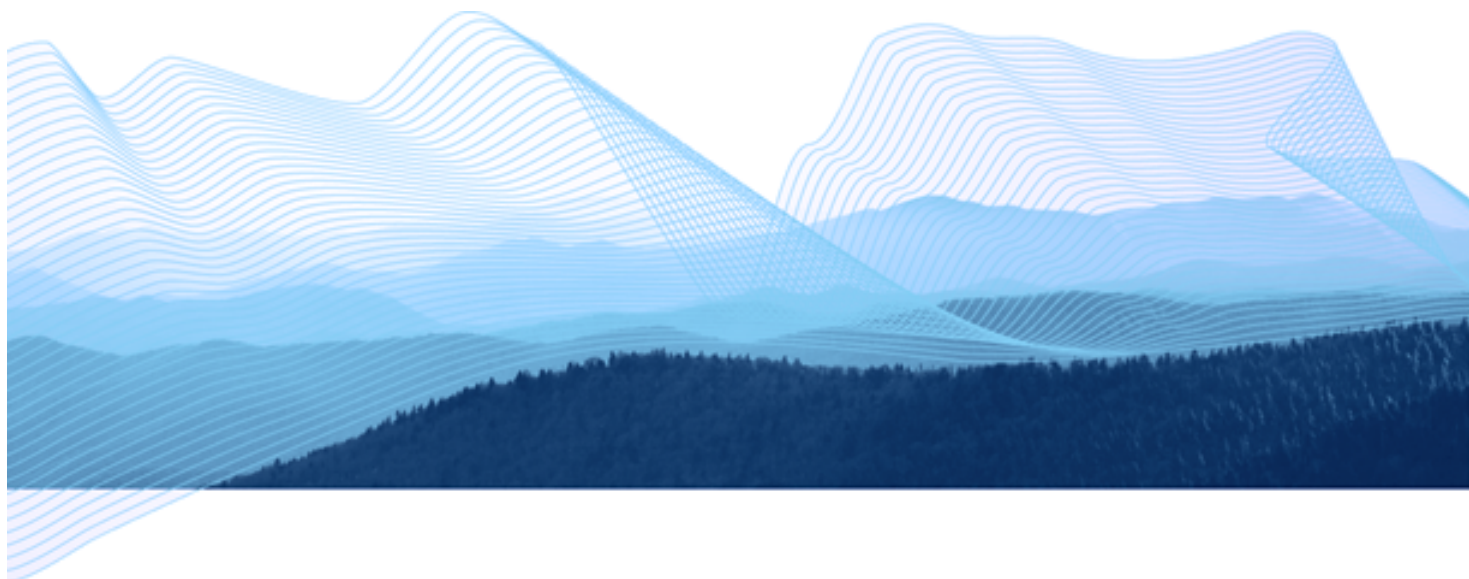
*A Friendly Survey of Popular Geospaital Services*

*Jody Garnett*

*Mark Leslie*

*Andrea Antonello*

*20 October 2009*



**HydroloGIS**  
Environmental Engineering

## TABLE OF CONTENTS

---

1 Welcome.....	3
2 Live DVD.....	4
3 Documentation and Tutorials.....	8
4 The Workbench.....	9
5 Creating a MaP.....	10
6 Connecting to a Web Map Server.....	13
7 Catalog View and Search Views.....	17
8 Themed Data.....	19
9 Information Request.....	23
10 Re-projection.....	24
11 What to do Next? .....	26

# 1 WELCOME

This workshop provides a survey of popular open source geospatial software. The background of each project will be provided and you will have a chance to see how the different applications perform and what they are capable of.

The User-friendly Desktop Internet GIS (uDig) application is used to provide an introduction to geospatial concepts and ideas. The uDig application is integrated with the desktop experience with drag and drop support, features an embedded internet browser, and is available on a range of platforms.

For those new to the geospatial field we will cover how Features and Projections are used to draw your information onto a Map. We will also look into your enterprise needs ranging from use of PostGIS to working with Shapefiles. With access to more powerful data sources we will explore the range of styling and visualization options

## **Jody Garnett**

Jody is the lead uDig architect and on the steering committee for GeoTools; GeoServer and uDig. Jody Garnett is an employee of LISAsoft with a background in training and mentoring.

## **Mark Leslie**

Mark has broad experience at LISAsoft integrating proprietary and open source solutions. An active PostGIS committee, he has developed and extended software across the Open Source Geospatial stack, including UMN MapServer, PostGIS, uDig and GeoTools.

## **Andrea Antonello**

Andrea from HydroloGIS develops geospatial open source solutions for environmental analysis. Andrea is well known as the lead developer of the JGrass project and is part of the uDig project steering committee.

## 2 LIVE DVD

Your conference program includes a Live DVD that includes a “pre” release of the uDig application; along with a full spread of popular open source geospatial software. We are going to be using the LiveDVD in today's workshop.

If you are following this tutorial at home you can either:

*The Live DVD is useful for evaluating software – performance will be slower than a normal install..*

- Download the Live DVD from <http://arramagong.org/> ; or
- Download and Install uDig and make use of the public servers mentioned

To start the live DVD:

1. Drop it in your computer
2. Restart (Some computers ask you to fiddle with your BIOS to start from a DVD?)
3. When presented with the first screen just press ENTER  
(Or just wait 30 seconds for the boot screen to give up and do it for you)



```
LSOLINUX 3.6.3 Debian 2008 07-15 Copyright (C) 1994-2008 H. Peter Buvin  
Arramagong GISUM Live 2.0
```

```
For the default live system, press ENTER or enter 'live'.
```

```
To start in safe graphics mode, enter 'xforcevesa'.
```

```
To start the installer directly, enter 'install'.
```

```
To verify the CD for errors, enter 'check'.
```

```
To run memtest86+, enter 'memtest'
```

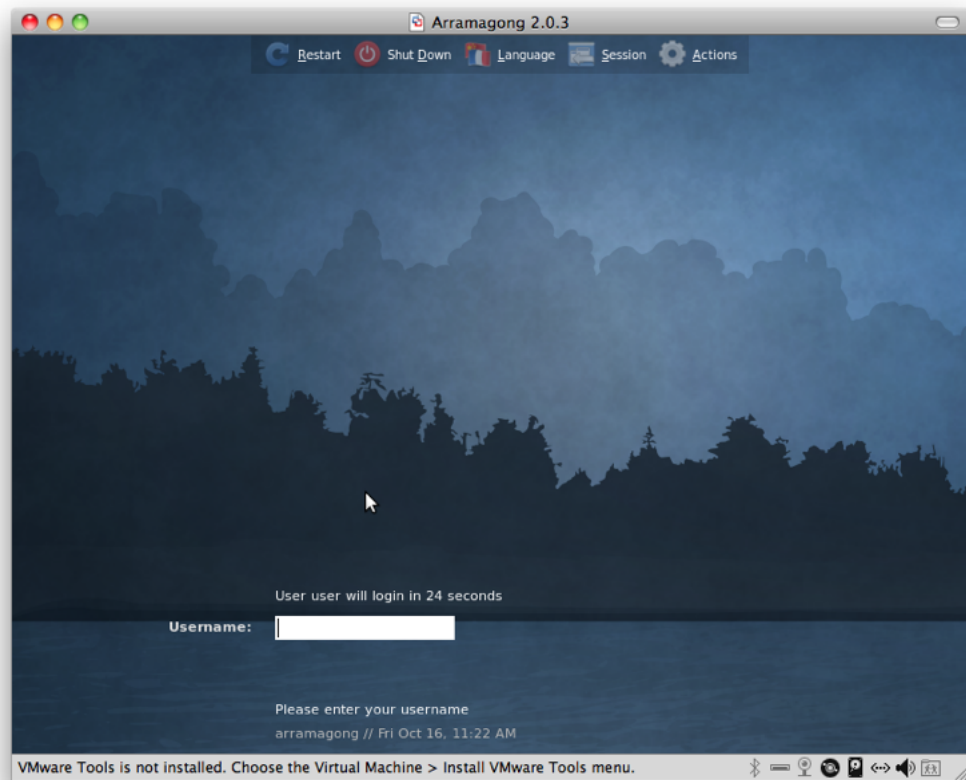
```
To boot from the first hard disk, enter 'hd'
```

```
boot:
```

```
Loading /casper/vmlinuz.....
```



4. At the user login screen you can enter “user” for the name, and “user” for the password. (Or just wait 30 seconds for the login screen to give up and do it for you)

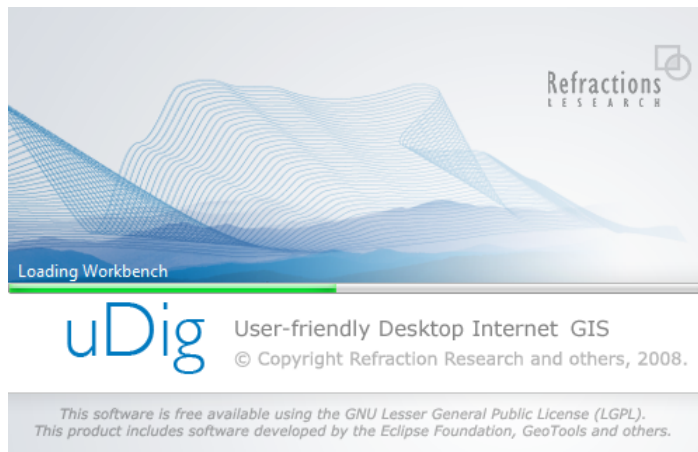
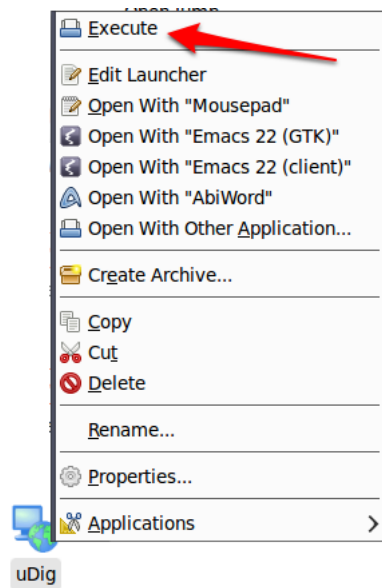


5. When presented with the desktop we are going to focus on the uDig application.

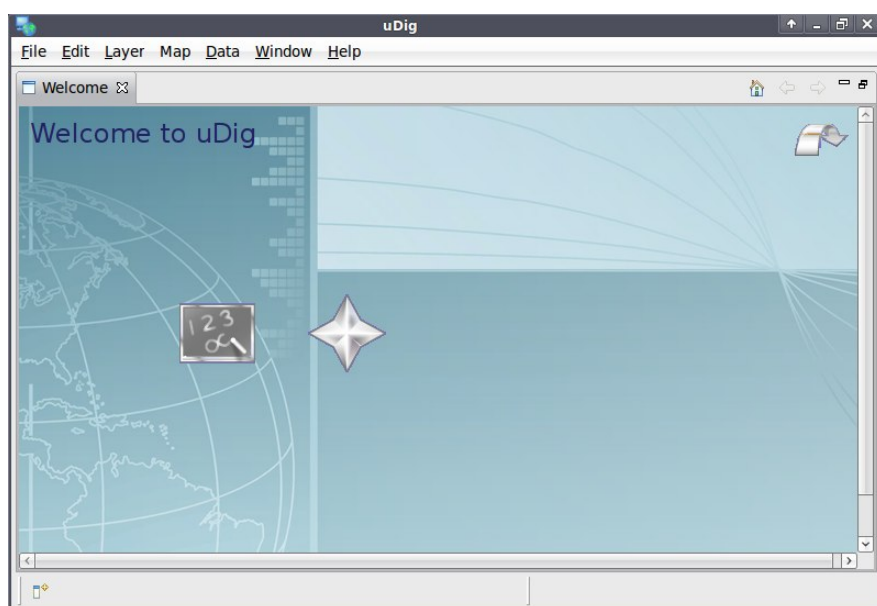
*If you like you can configure the network access at this time – allowing you to contact some of the services on the internet mentioned in this workbook.*



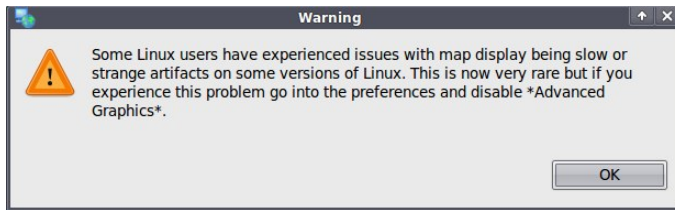
6. I am not coordinated enough to double click on a linux desktop application to start it up; I recommend right clicking and choosing Execute.



7. Initially you are presented with the welcome screen.



8. The initial welcome for linux users contains a warning – that frankly has not affected anyone on a computer made in the last four years. Please press OK to show the initial Welcome screen.



9. The welcome screen contains a link to the **Getting Started** tutorial from the online documentation.

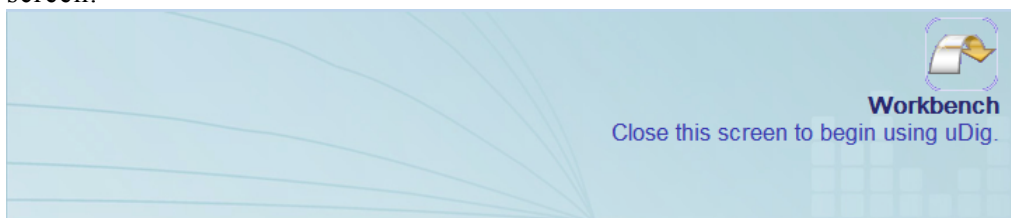


We cover the use of the online documentation in the next section

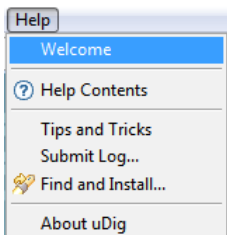
10. The welcome screen contains a link to the **Official Website**



11. To continue click on the **Workbench** arrow in the top right corner of the uDig welcome screen.



*You can return to the welcome screen at any time using the Help menu.*

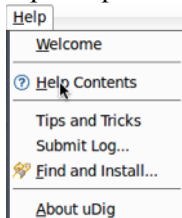


## 3 DOCUMENTATION AND TUTORIALS

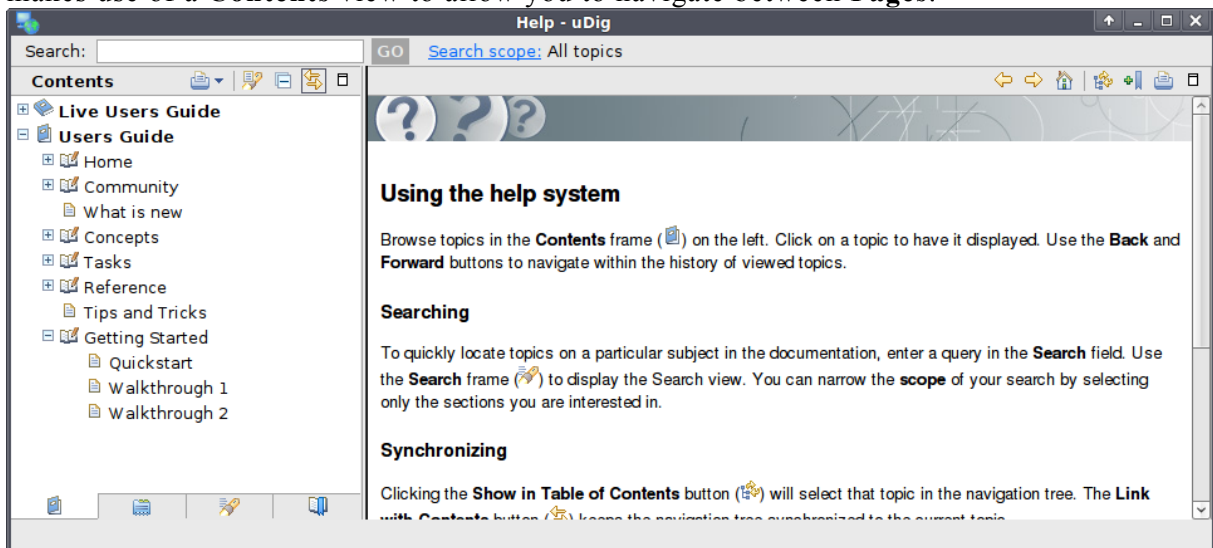
In this section you will open up the online tutorial, and access reference information.

1. Open up the **Help** menu and select **Help Contents**

*You can access the tutorials directly by pressing “Getting Started” on the welcome screen.*



2. This will bring up the online help system; the help system is a web application that makes use of a **Contents** view to allow you to navigate between **Pages**.



3. The Contents view organizes Pages into Books. The following books are included with the uDig application

- **User Guide**
- **Live User Guide** – live access to the uDig web site

Additional books may be provided by community plug-ins you have installed.

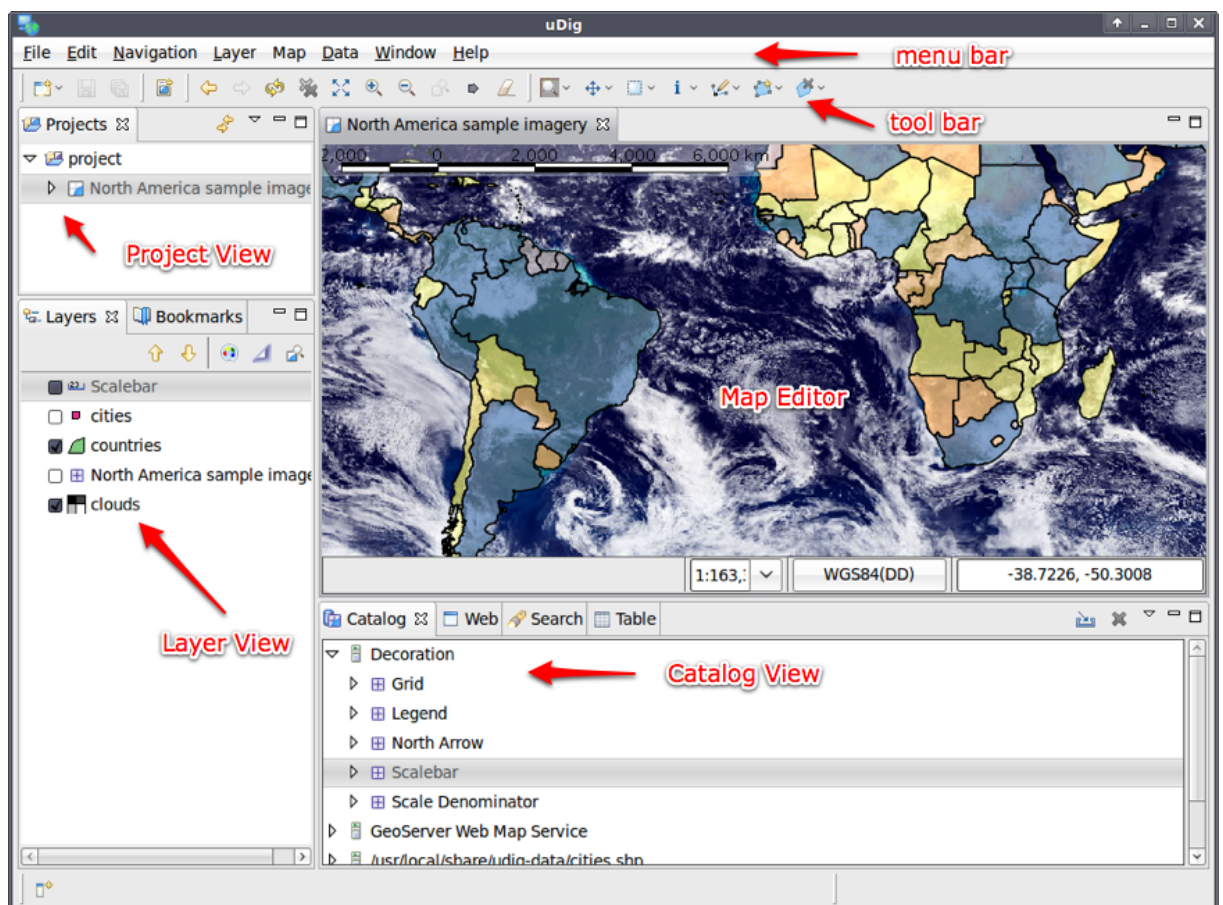
4. You can access additional reference information in the following categories:

- Getting Started – Quickstart and the two formal walkthroughs
- Concepts – background information and definitions
- Tasks – step by step instructions on how to accomplish specific goals
- Reference – user interface reference describing each screen, wizard and dialog

## 4 THE WORKBENCH

Before we start playing with maps, let's take a look at the default layout of the uDig workbench and what some of the key components are.

Shown below is a typical session of uDig with the Map, Projects, Layers, and Catalog views labeled. These views will be described further as we demonstrate their uses.

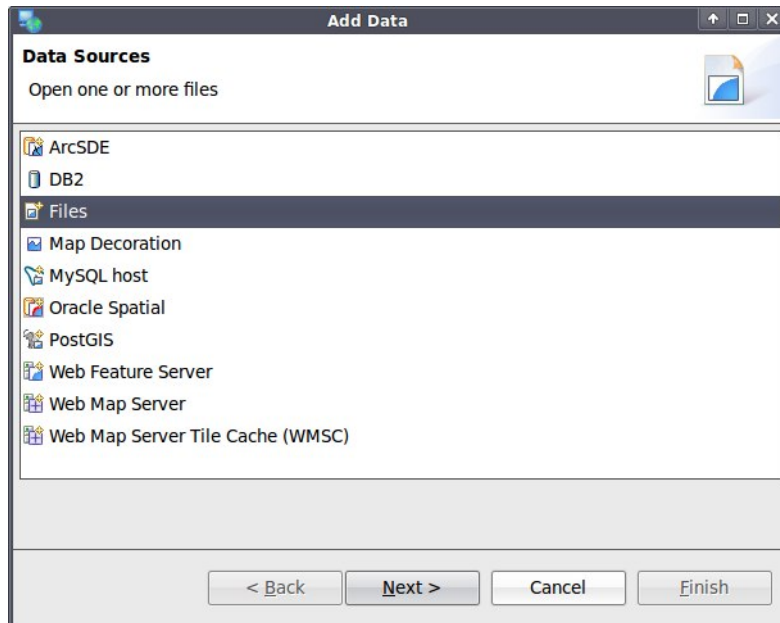




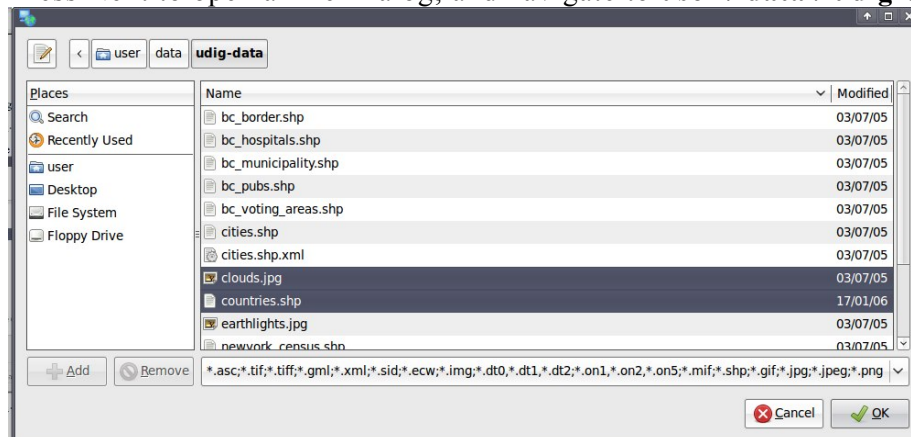
## 5 CREATING A MAP

We can now start putting together a map.

1. Choose Layer > Add from the menu bar to open the Add Data wizard
2. Select Files from the list of data sources

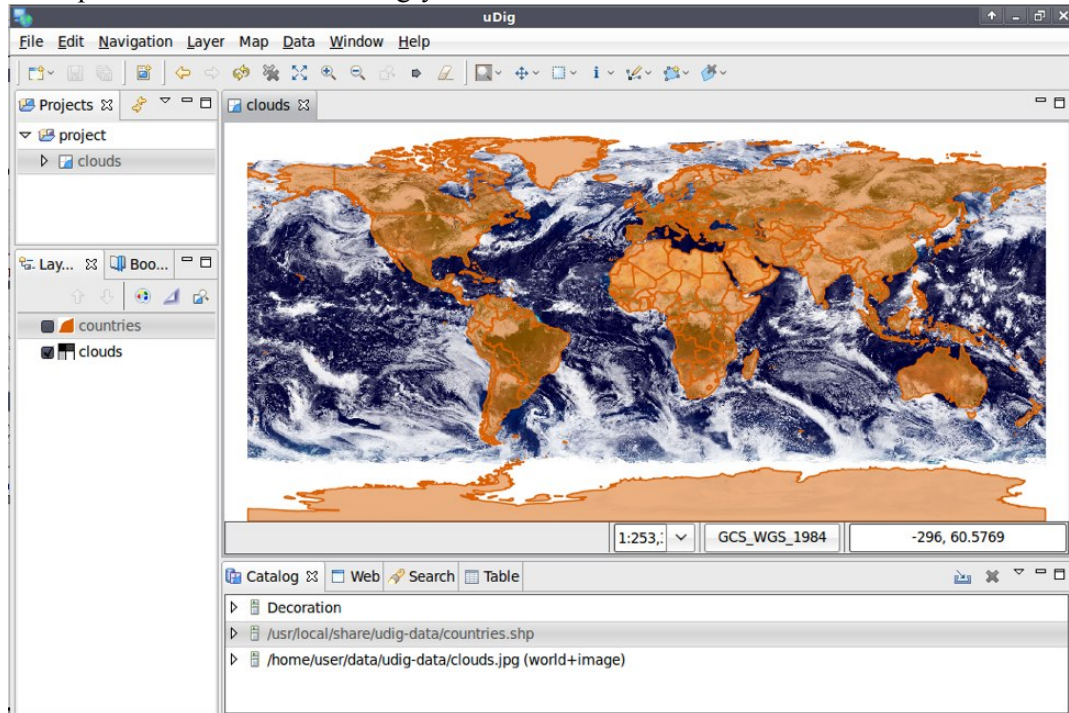


3. Press Next to open a File Dialog; and navigate to **user / data / udig-data** as shown.

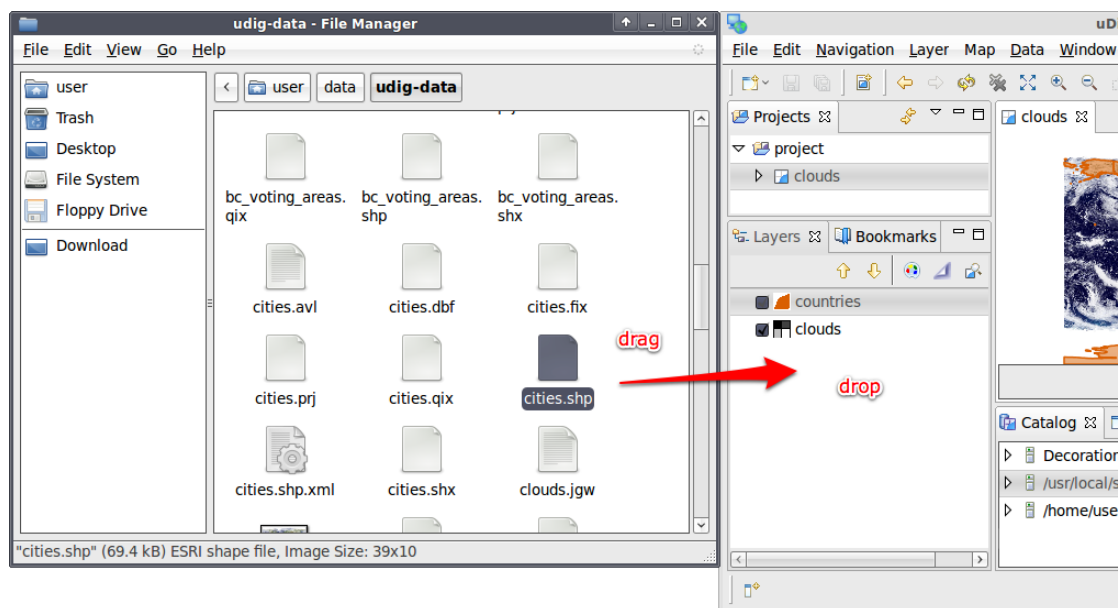


4. Select the **clouds.jpg** and **countries.shp** file and press OK.  
(you can use the control key when clicking to select two things)

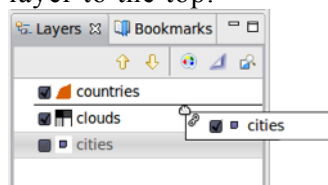
5. A map will be created showing your two files.



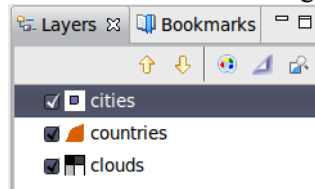
6. You can also directly drag files onto the screen from the desktop; start by double-clicking the Home icon on the desktop and navigate to the data directory again and drag in the cities file.



7. The map will now display cities.shp in the layer view – but we cannot see it!
8. The **Layers** view shows the order in which layers are drawn. Please select the **Cities** layer and press the **Move up** button from the Layer view toolbar, or simply drag the layer to the top.






9. The order is now changed.



10. Now that you have some data on screen try the following tools:

*When using the zoom or pan tools the mouse scroll wheel can be used to zoom in and out quickly.*

-  Zoom Tool: (keyboard short cut Z)  
Click or drag the left button to zoom in, or right button to zoom out.
-  Pan Tool: (keyboard short cut P)  
Click and drag to move the display.
-  Extent Tool: Press to show all

11. Congratulations and welcome to uDig!



## 6 CONNECTING TO A WEB MAP SERVER

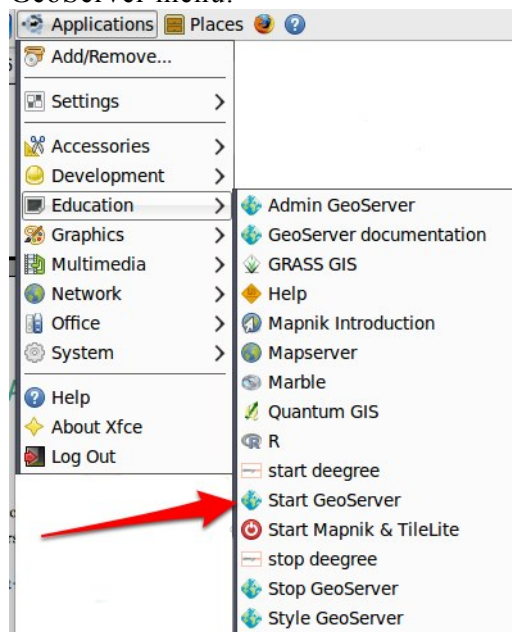
In this section you will learn how to drag and drop a Web Map Server (WMS) link into uDig for the purpose of viewing its layers.

If you are connected to the internet we recommend the DM Solutions MapServer listed on the following page:

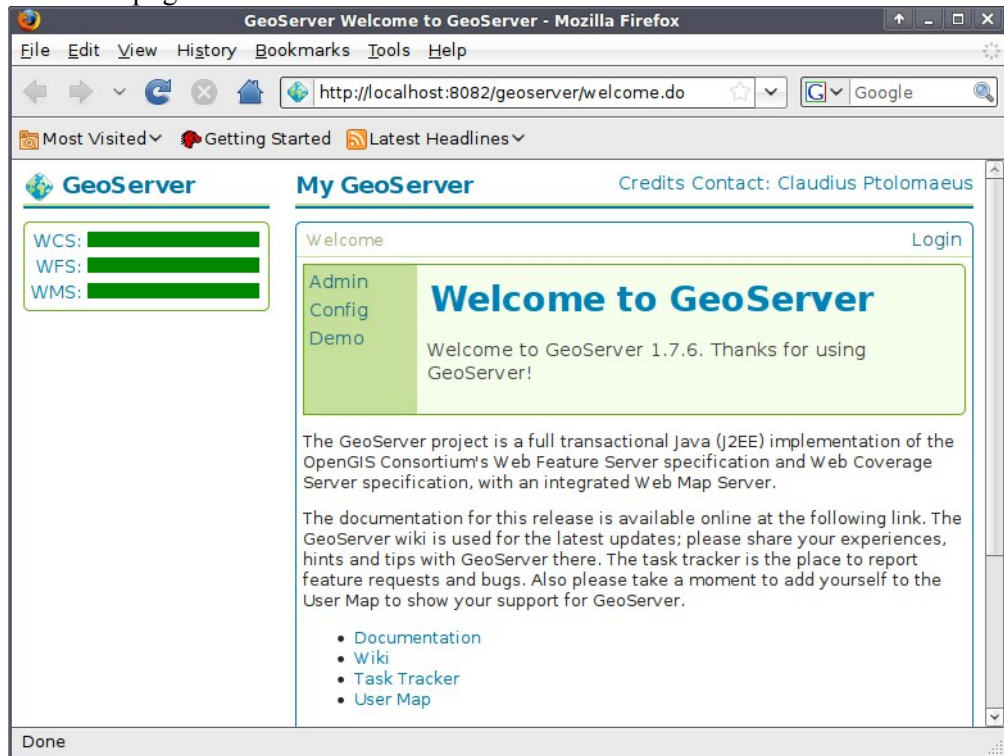
- <http://udig.refractory.net/confluence/display/DATA/Home>

If not we can quickly start up a server included on the Live DVD.

1. Start GeoServer; either from the desktop or the Applications > Education > Start GeoServer menu.



2. GeoServer will start with a small progress bar and then open Firefox to show you the welcome page.



For me Firefox was a little quick, and I had to hit refresh a couple of times while keeping the ctrl button held.

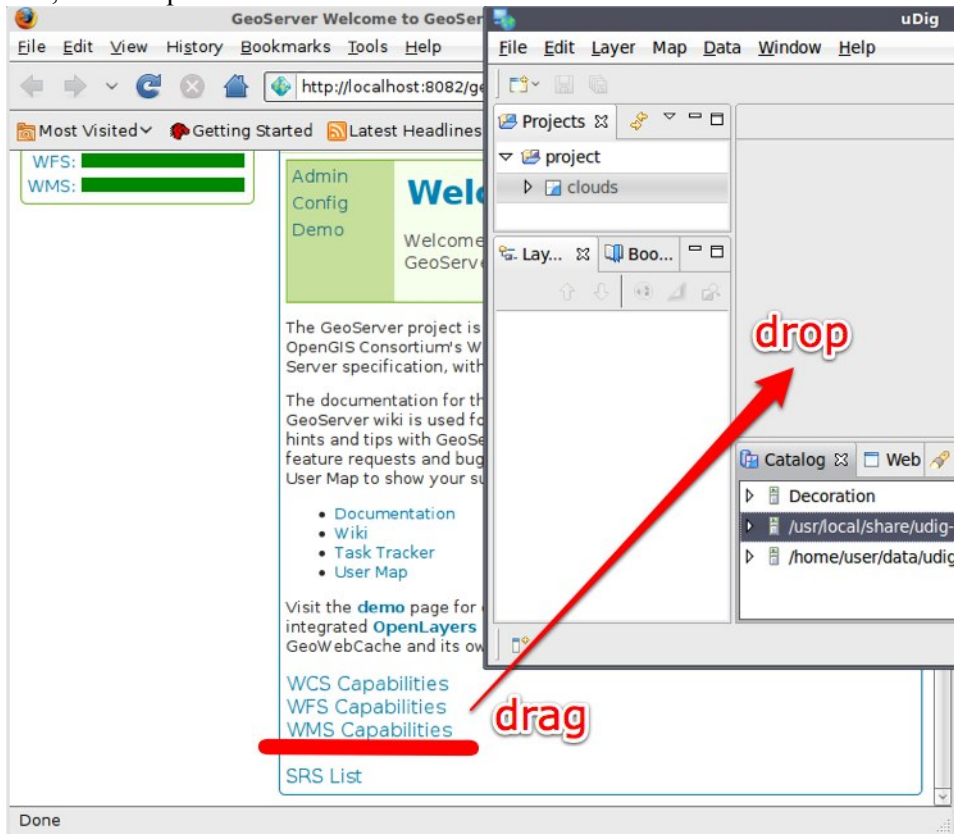
We can now add WMS layers:

1. There are many ways to load map data into uDig, including drag and drop. To drag a Web Map Server (WMS) link into uDig, open up a web browser.
2. Close your previous “clouds” map (you can reopen later using the projects view).

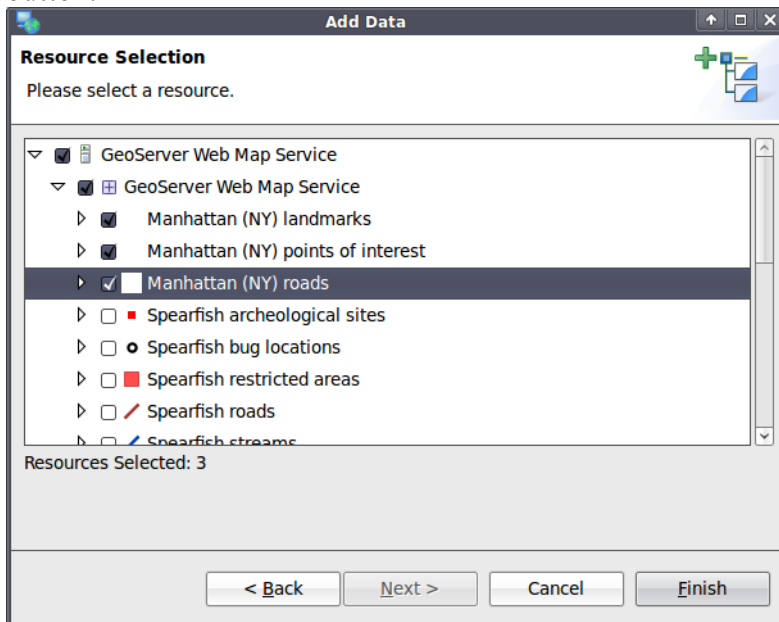
- Click and drag the WMS link from the page onto the Map area, or Layers View on the left, and drop it there.

*If working with your windows maximized:*

- 1) Drag from the web browser
- 2) Hover on the uDig application in the task bar to switch applications
- 3) Drop into the Map area.



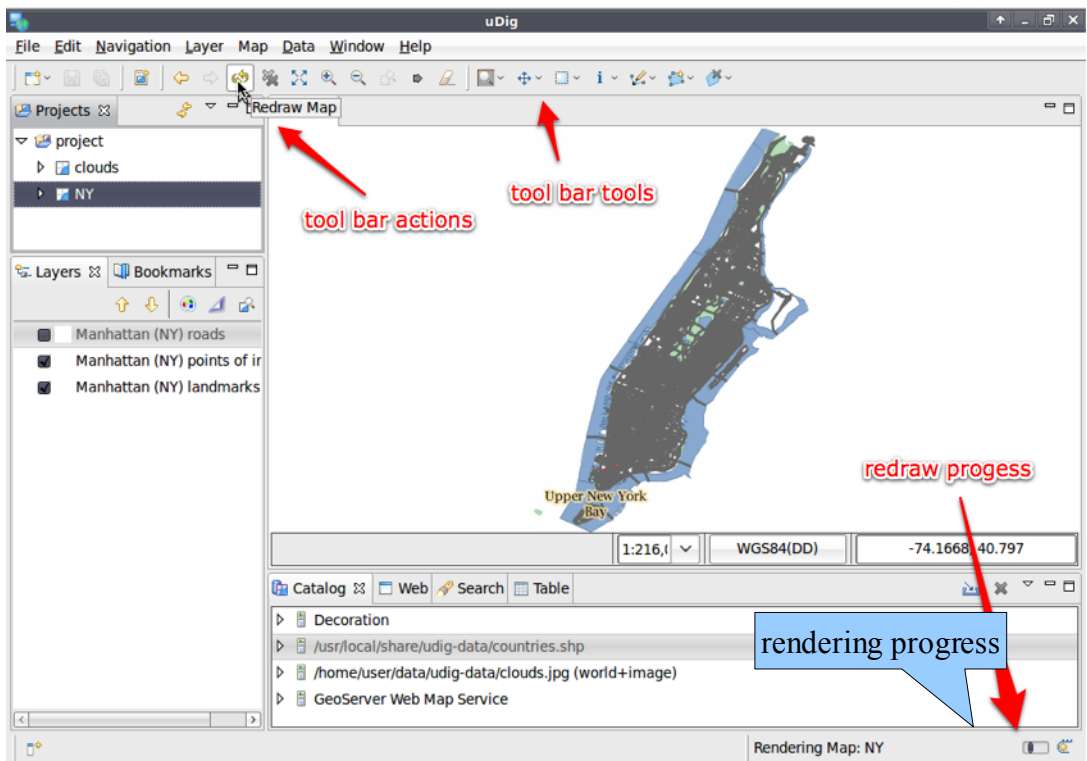
- The **Add Layers** wizard will appear and ask you what layers from this WMS you want to show in your map. Select the first three layers – **Manhattan (NY) landmarks**, **Manhattan (NY) points of interest**, **Manhattan (NY) roads** and press the **Finish** button.



5. The first thing to do is fix up our title; select the map in the project view, choose **File > Rename** and provide the title **NY**



6. The map layers will now **render** in the Map view. Notice the bottom right corner of the uDig Application will display a **processing notice** while it is requesting and drawing the layers.



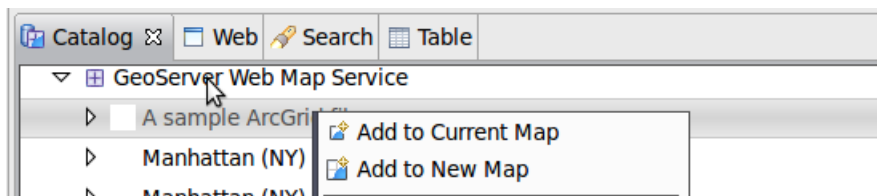
When the layers are done rendering, the **Map** view will display the visible layers

## 7 CATALOG VIEW AND SEARCH VIEWS

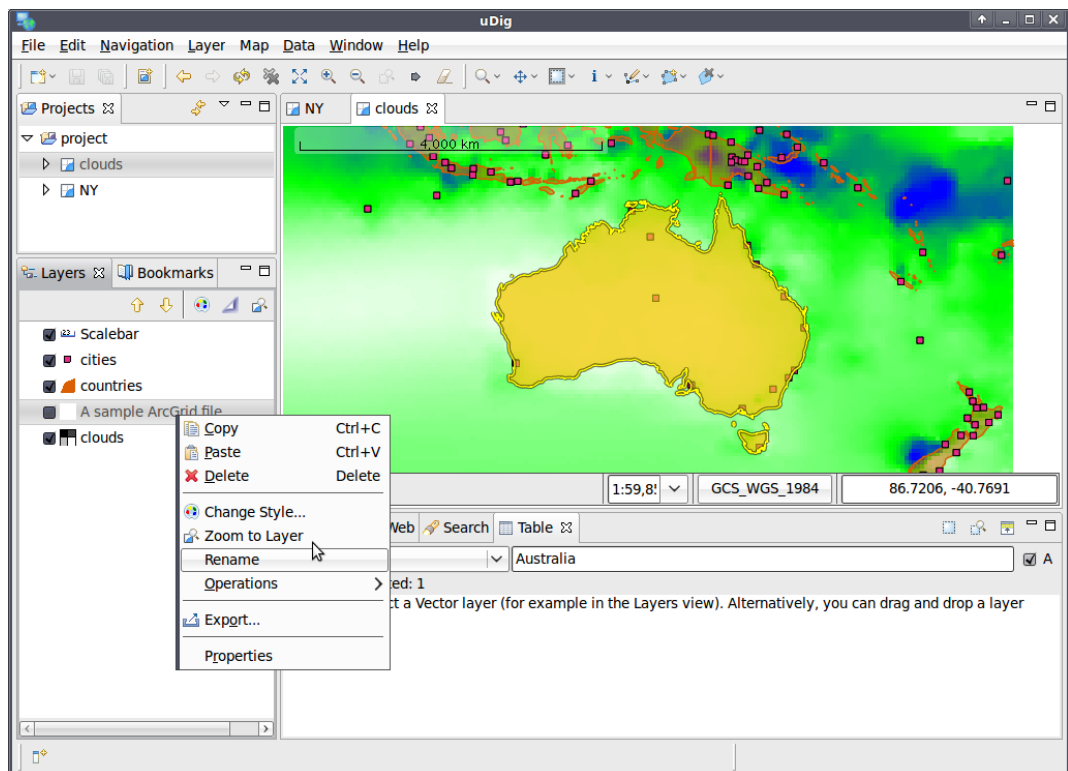
In this section you will learn how to add additional layers to your map from a previously connected data source.

Adding a Layer from a previously connected WMS:

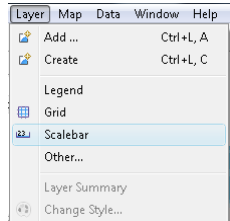
1. Double click to open your “clouds” map again; or change tabs if open on screen.
2. In the **Catalog** view expand the connection you have to **GeoServer Web Map Service** and right-click on “A sample Arcgrid file” and select **Add to Current Map**.



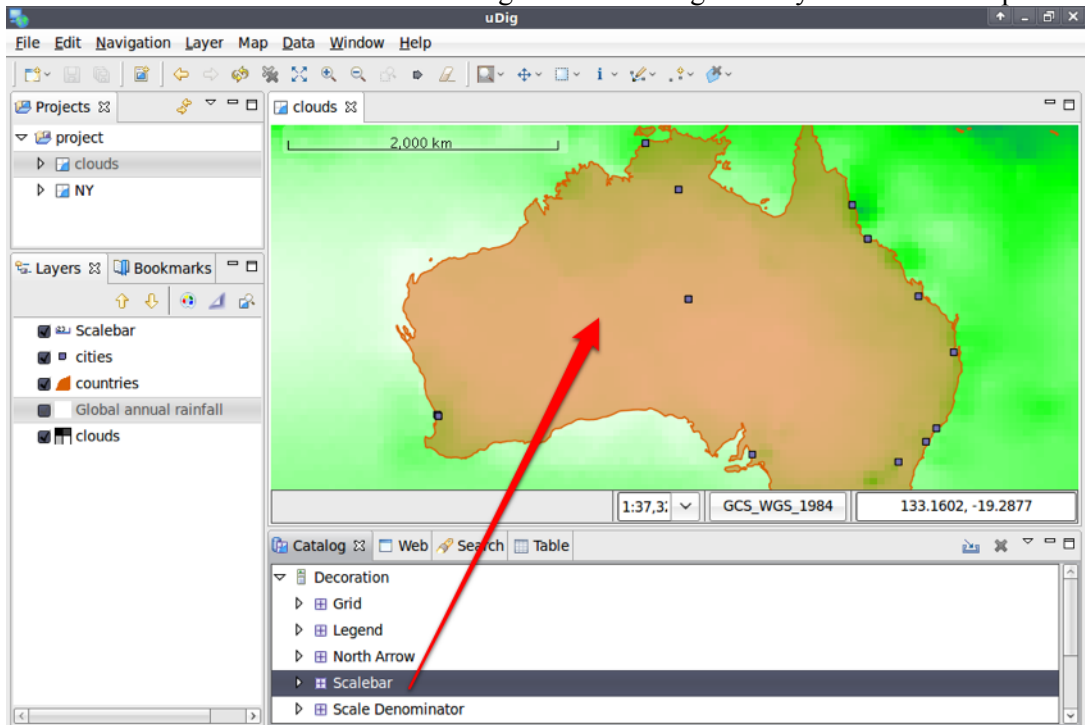
3. The new layer will appear in the **Layers** view, and it will automatically start to render. You may need to shuffle it to the bottom of the layer list using drag and drop or the provided buttons.
4. Since we really do not like the generic name of the layer, we rename it. That can be done by right-clicking on the layer in the **Layers** view and selecting **rename**.



*Decoration are also available directly from the Layer menu.*

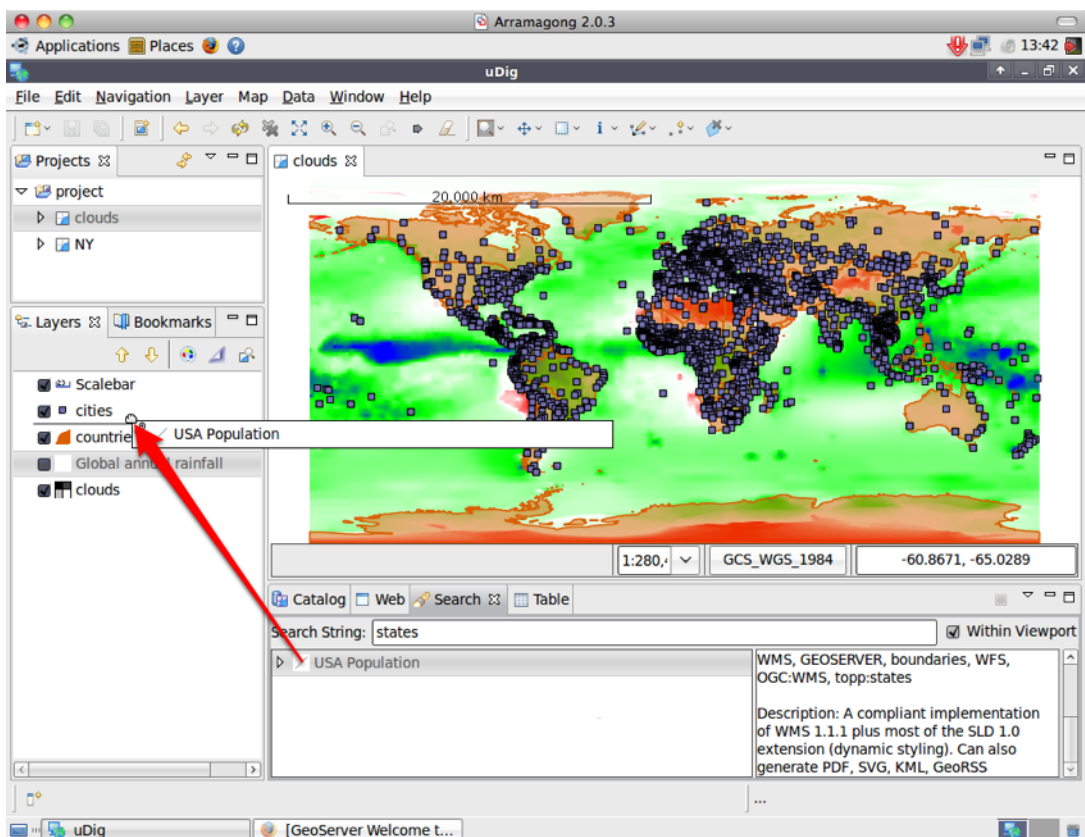


5. The catalog also comes equipped with a built in service called “Decoration.” Select **Decoration > Scalebar** in the Catalog view and drag this layer onto the Map



Yes Australia is really dry.

6. Switch to the Search view and type in “states.”
7. All matching results are shown – layers work the same way here as they do in the catalog view. This time let us drag from the Search results directly to the layer view between countries and cites.



## 8 THEMED DATA

*Style is recorded  
as an industry  
standard Style*

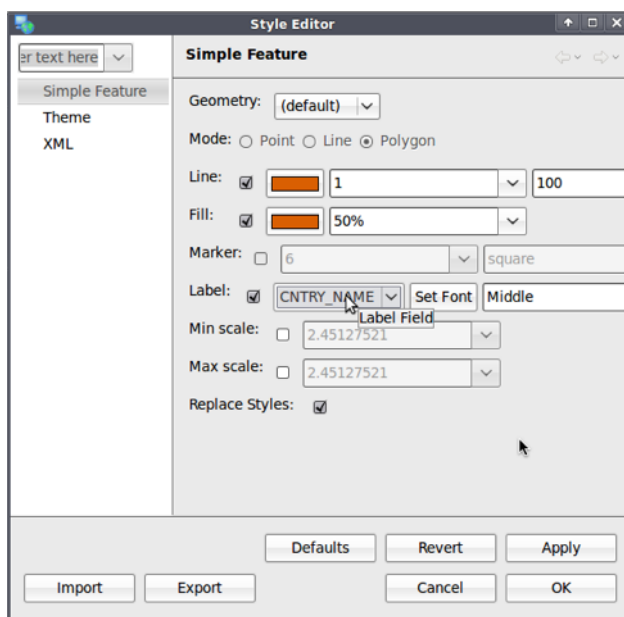
*Layer Descriptor  
(SLD) file.*

The idea of colour coding the elements (or “features”) drawn on the map to communicate information is called a “Theme.” In this case we are going to choose an attribute to communicate; and then use the attribute values to dynamically color the features on a case by case basis.

1. Create a new map with your **countries.shp** and **.jpg** files.  
To do this is to use File > New Map – and then drag the files in from the catalog. Check that your countries layers is on top of your clouds basemap.
2. The default style for the **countries** layer is slightly transparent so you can still see the pretty WMS layer underneath.
3. Right click on the **countries** layer and select **Change Style**.
4. The Style Editor is arranged into a series of pages, you can use the **Simple** style page to add labels to the countries **layer**.
  - Check the box next to Label
  - Choose “CNTRY\_NAME” from the list.

*You can  
experiment with  
other settings,  
use the Set Font  
button to change  
to a lighter color  
that will show up  
against the WMS  
layer.*

5.



6. You can press the **Apply** button to see what your map will look like with labels.



7. Please switch to the **Theme** style page and select the following options:

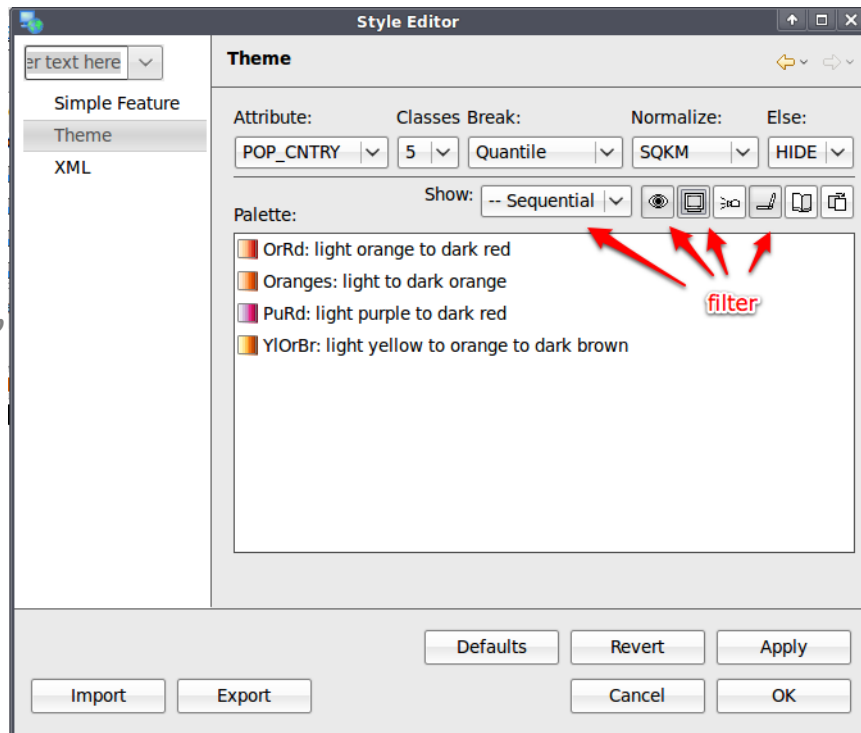
- Attribute: POP\_CNTRY
- Normalize: SQKM

*These options will color the countries layer by population density.*

8. Filter the available colour palettes to show a subset of those available:

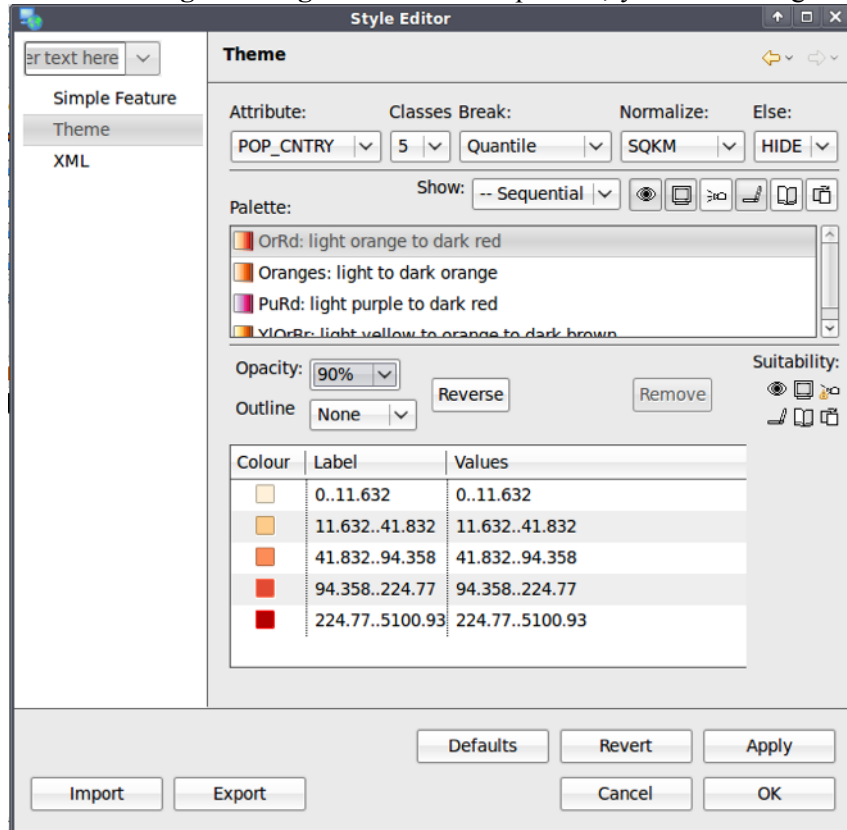
- Changing from show “All” to show “Sequential”
- Press the **Colour-blind**, **LCD** and **CRT** buttons

*These options show palettes which are a ramp of color suitable for viewing by color blind people on either an LCD or CRT monitor.*

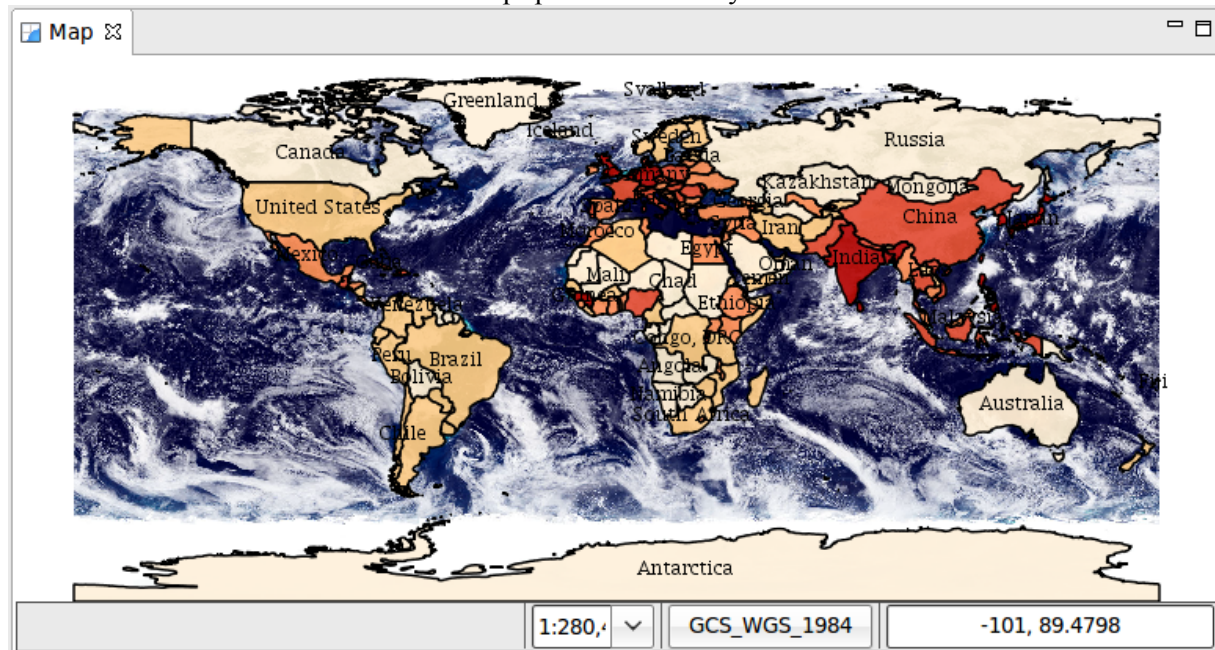





- Select the “light orange to dark red” palette, you can change the opacity if you like.



- Press the **Ok** button to have a look at population density.



- Choose **Layer > Legend** from the menu bar to add a decoration showing the population breakdowns.
- Press the  **Mylar** button in the **Layers View**. Select each layer and observe the effect. This feature is used to allow you to make sense of a complicated map with many layers shown at once.

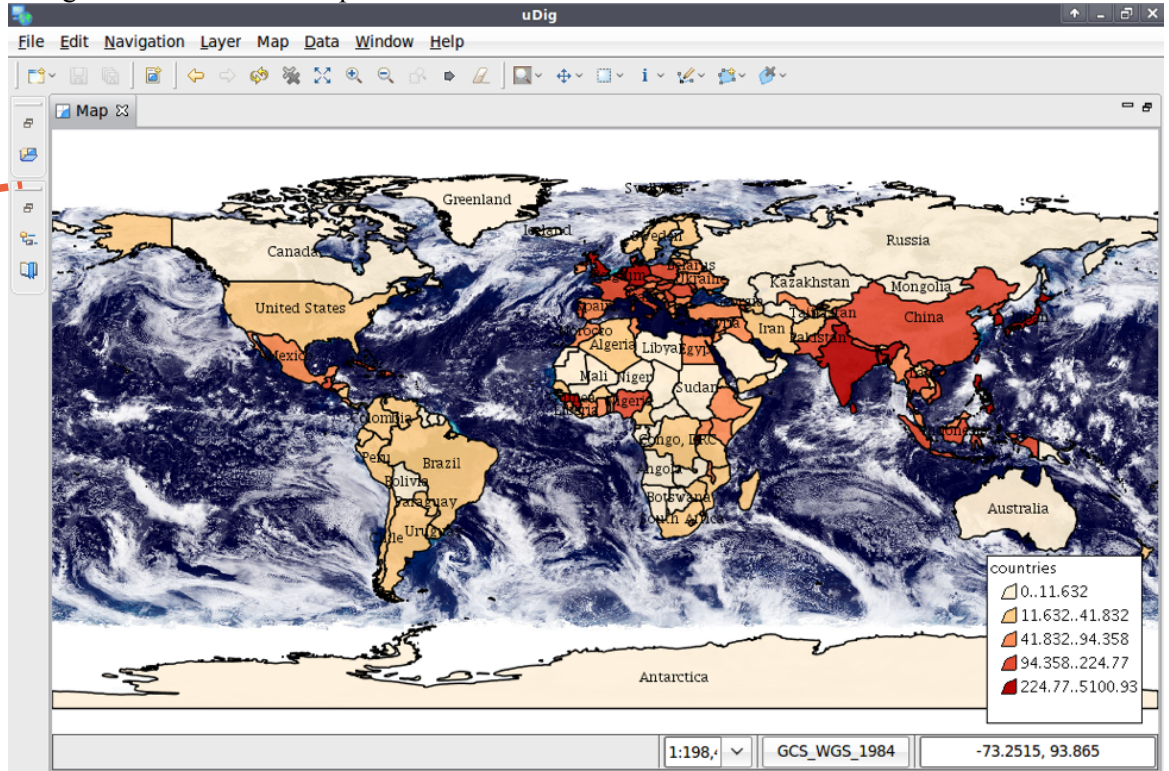
*Mylar will fade out all the layers except for the one selected.*

*Your layer view is still available on the left hand side of the screen.*

*Press the button to toggle the layer view on and off as needed.*



- Double click on your Map name along the top of the screen to maximize the editor. Try using the zoom tool to explore the world.



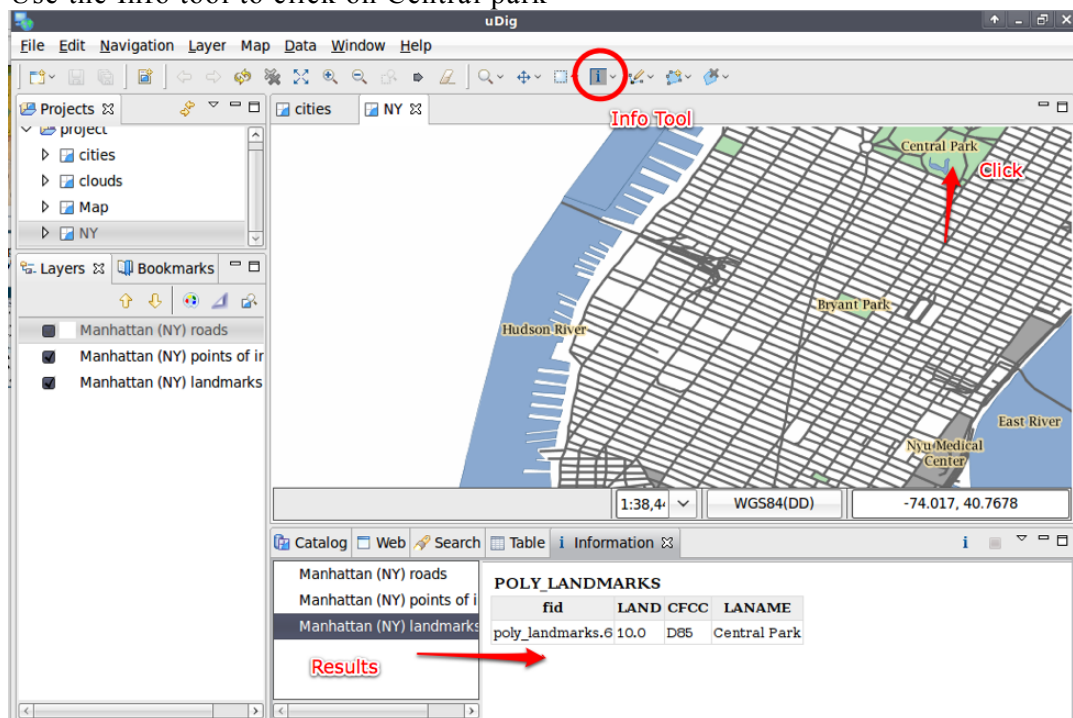
- Double click on the Map tab to restore the previous size. You can use **Reset Perspective** from the **Window** menu to restore any views you accidentally close during experimentation.

## 9 INFORMATION REQUEST

In this section, you will learn how to use the Information Tool.

1. Let us open up our first map **NY** map again
2. Zoom in somewhere interesting like Central park.
3. Use the Info tool to click on Central park

*You can also  
double click on a  
Map to open it.*

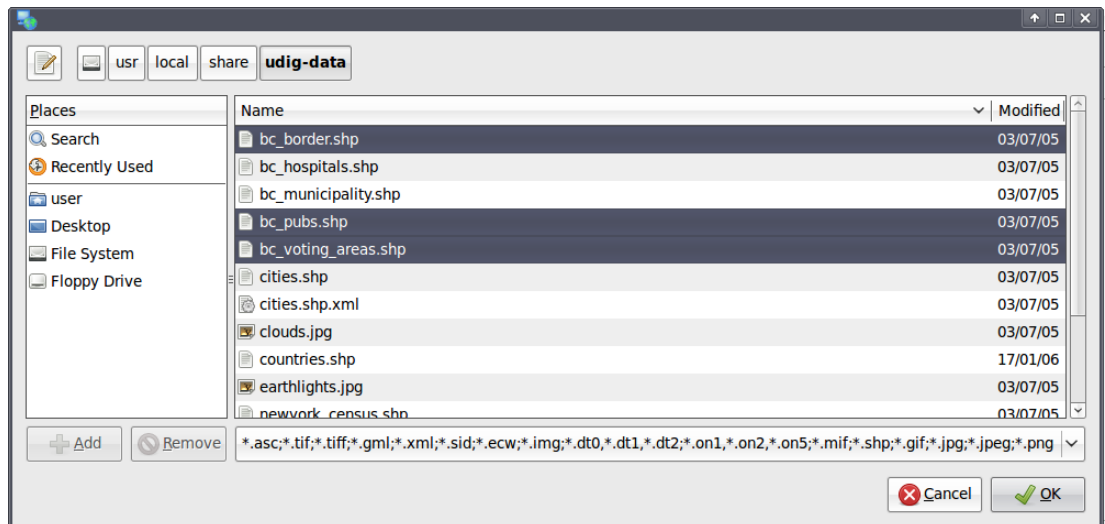


4. The results are listed in a new view that was opened. Select the result to view the web page (or other information).
5. You can switch to requesting information on another layer on the **left pane**. Available information, if any, is displayed on the **right pane**.
6. Not all Web Map Servers support the “GetFeatureInfo” operation; as such information may not be available for all layers. The application uses a normal browser to display HTML content; you can drag the view out of the workbench if you find you need more elbowroom.

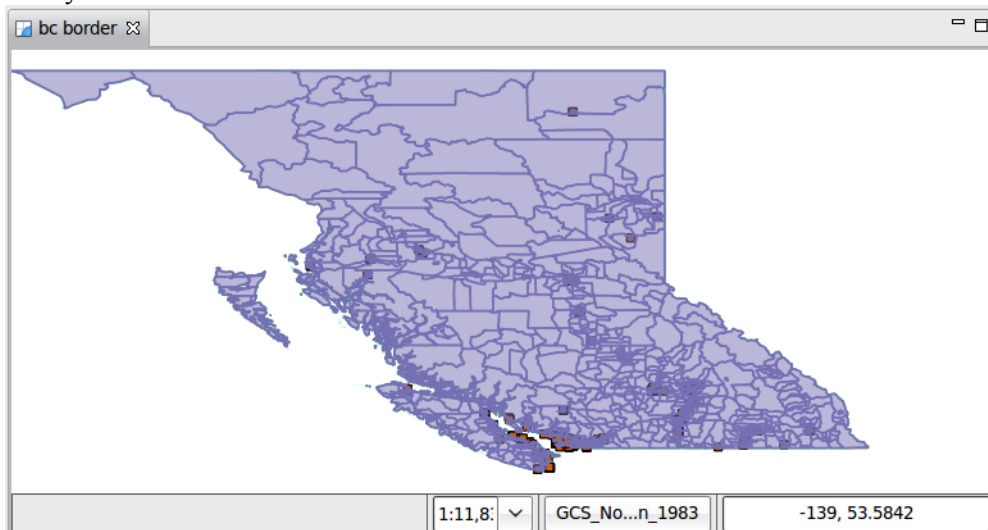
# 10 RE-PROJECTION

Since the world is not flat, maps are projected in a Co-ordinate Reference System (CRS). We will now make 2 identical maps, perform a re-projection on one, and compare.

1. Create a map from the udig-data directory files – bc\_border, bc\_pubs bc\_voting\_areas.



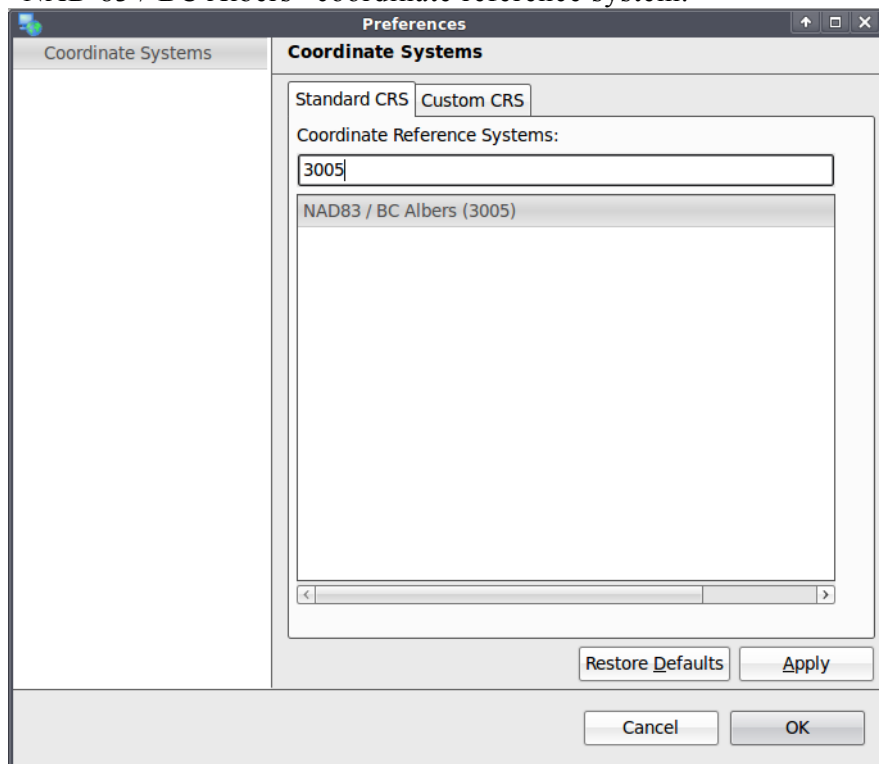
2. Press show-all to see the entire map -Information this close to the poles looks a little funny and stretched.



3. Click on the bottom of the map where it **GCS\_No...N\_1983**.

- This brings up the a preference page allowing you to change the Coordinate Reference System for your map. Please enter in **3005** and press enter to re-project the map to the “NAD 83 / BC Albers” coordinate reference system.

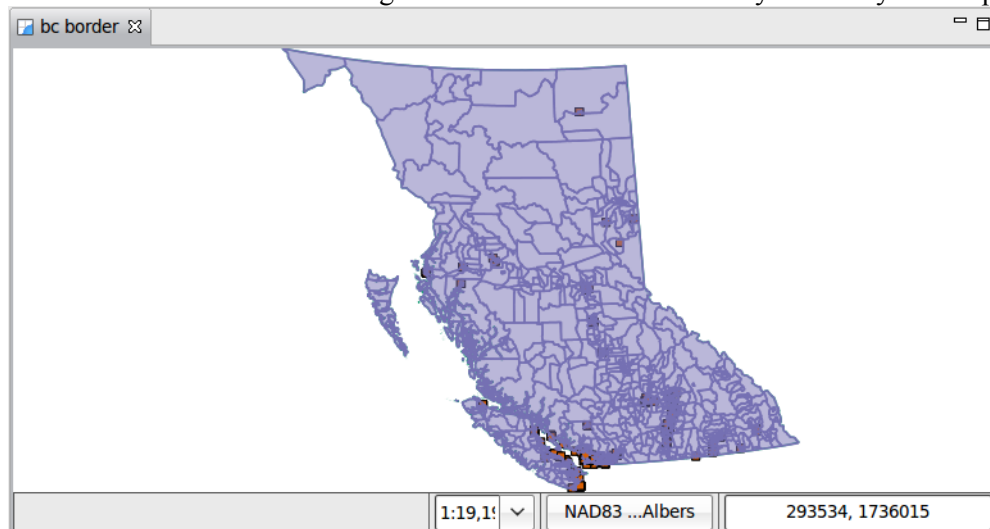
*You can also search by name, try typing in “NAD83” to list matching projections*



*The definition is provided in “Well Known Text” - you can use this format for your own custom CRS.*

You can have a look at the formal definition of “EPSG:3005 by switching to the “Custom CRS” tab

- Press the **OK** button to change the coordinate reference system of your map



- One thing that is nice about this projection is that it is measured in meters; and the area of the polygons will be correct.
- You can also choose a default scale for the map; or type in a scale to zoom in to a fixed level.



## 11 WHAT TO DO NEXT?

Congratulations you have finished the first walkthrough. This is a bit of a tour of uDig, GeoServer, PostGIS and working with local files.

- There is more data available in the data directory - have a look !
- Try right-clicking on a Layer – there is plenty to do (try the operations menu).
- Does your organization publish any spatial information on the web?
- Try out the navigation tools such as Zoom and Pan (the Navigation menu lets you go back to previous locations like a web browser).
- Advanced: Open the **Style Editor**, have a look at the **Advanced ( XML )** page and see what you make of it.

Perhaps you have an idea for the tool you always wanted?