

NIWA Quantum Map

Frequently Asked Questions (FAQ) for Version 1.0

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Background

What is NIWA Quantum Map?

NIWA (New Zealand's National Institute of Water and Atmospheric Research) Quantum Map is a free, open source, desktop mapping application based on the popular Quantum GIS (Geographic Information System) application. It is a simpler tool for new users to learn, as it has had some GIS functionality hidden &/or removed, and has a custom plugin added to provide easy access to NIWA map data over the internet.

Why has NIWA developed and provided NIWA Quantum Map?

NIWA has established a programme supporting the Zealand Government's policy on open data, using standards and protocols consistent with the government guidelines, such as eGIF (e-Government Interoperability Framework) and the SDI (Spatial Data Infrastructure) Cookbook.

Making data available is only one step in NIWA's programme, equally important is ensuring the public can find and use the data being provided. NIWA Quantum Map is a free tool that people can use to access and use NIWA data, as well as data from any other agencies that provide their data using the same standards. As a desktop tool rather than a web based application, users are easily able to use local datasets, perhaps private or confidential, in conjunction with NIWA's data. NIWA Quantum Map also provides an extensible platform for purpose specific tools to work with NIWA data, and NIWA is continuing to actively develop and enhance it.

The simplified tool allows users to become familiar with the basic program, without the often intimidating complexity of a complete GIS application. Once users are comfortable using NIWA Quantum Map, those that have a need for more powerful analytical capabilities are able to install Quantum GIS, or any other GIS application of their choice.

Why is it free?

NIWA wants to provide access to its data. To do this, it is ideal to provide users with a desktop tool that allows them to interact directly with NIWA's datasets, rather than to develop or enhance web portals for every dataset NIWA provides. This tool means that NIWA can focus on *providing* data, rather than on developing websites and portals where users can interact with data.

Quantum GIS (also called QGIS) is free, as is Quantum Map. They are both Open Source applications, the developers and maintainers of these programs are paid for the work they do directly by users of the tools, so sell support rather than the programme itself. For example, NIWA

paid for the developments necessary for this release, and they can now be freely given to anyone.

What does it do?

NIWA Quantum Map is primarily a tool data to display data in various formats as maps. It does not have analytical capabilities (you can use the original Quantum GIS with other analytical tools like R, SAGA:GIS and GRASS if you want such capabilities). It does, however, include the editing (digitising) tools that are part of Quantum GIS.

Using NIWA Quantum Map, you can:

- open local data files as map layers, eg: ESRI shapefiles, text files, Mapinfo files, etc,
- open georeferenced images as map layers, eg: aerial or satellite photographs,
- open WMS & WFS data services on the internet as local map layers (and store them locally if desired),
- control which layers are visible at any one time,
- zoom in and out, scroll sideways or vertically,
- identify individual features in a map layer and see any information attached to each one,
- define symbologies to set the colours, styles & symbols used to represent points, lines and polygons in any layer,
- specify the transparency of any layer, to see other layers beneath them,
- create new map layers (datasets), by digitising new points, lines and polygons,
- edit map layers (move or delete points, move, reshape or delete lines and polygons),
- store a particular setup of layers as a project, so you can reopen it for later use.

How does Quantum Map access NIWA (and other) data?

Quantum Map provides two main approaches for accessing data which you can then display on a map.

Local files are read directly from your PC, and most popular GIS file formats are natively supported.

NIWA data (and data from other agencies that provide data using OGC Web Services) are accessed via the internet. Much like an internet browser can open a URL for a web server and display the content (a web page), Quantum Map can connect to an OGC Web Service URL and display the content the URL provides as a layer in a map.

What is the OGC and Web services?

The OGC (Open Geospatial Consortium) is an industry-led body which defines standards enabling interoperability between different GIS and web mapping applications. Two main OGC standards are relevant:

- Web Map Service (WMS): the client (e.g., Quantum Map) requests a map from the server showing the data as an image. The server renders the image (map) from the data and sends it to the client.
- Web Feature Service (WFS): the client requests the actual data from the server and plots it on the map itself.

For large or complex spatial datasets with thousands or millions of points, or for satellite or aerial photography, WMS is generally better, as much less data has to be transferred to the client. For smaller datasets which will be plotted locally, WFS can be better.

How do I use NIWA Quantum Map?

How do I install it?

Quantum Map can be downloaded from the NIWA web site at <https://www.niwa.co.nz/software/quantum-map> as a Windows installer package. Simply download and run the file to install the application. If you prefer to install the full Quantum GIS application, then this can be downloaded at <http://www.qgis.org>

How do I run it?

This can become complicated, depending on what you want from the program - the full Quantum GIS User Guide is well over 200 pages long, and it is beyond the scope of this document to replace that. However some simple instructions are provided below to get you started.

Click on the  icon on the desktop to start Quantum Map. The first time will be slower than usual as the program creates the required user files, etc.

To access NIWA data via a Web Map Service, using some Ocean Survey 20/20 Bay of Islands data as an example:

- Click the  icon to start the NIWA plugin,
- Choose (left click on) the “Data sources” tab, and click “Add NIWA services”,
- Click the “Services” pulldown list and choose “Bay of Islands background map layer”,
- click “Connect”,
- Choose “basemap” and add this to your list of layers (click the  icon),
- Click the Services bar, and choose “Bay of Islands Bathymetry”, click “Connect”,
- Choose “bathymetry” and add this to your list of layers,
- Click the Services bar, choose Bay of Islands Aerial photos, click “Connect” and add the “0” layer,
- Click the “Layers” tab, click one of the three layers you have added to the list, and click “Add to map”,

- Repeat for the other two layers, then exit the plugin,
- Choose the hand tool  to move the map around,  the tool to zoom in to the selected area and the  tool to zoom out,
- In the layers list at the left side, you can make layer visible or invisible (without removing them) by clicking the tick box at the left of the layer name,
- You can also change the order layers are plotted on the screen by selecting one and dragging it up or down the list
- Right click on a layer name to bring up a menu that you can use to control or see more information about the layer.
- Chose “Properties”, then “Symbology” to control how the layer looks. Given a WMS layer is just an image, one of the more useful facilities is to control transparency, so you can see through a layer to those beneath it. WFS layers and local files allow you to change colours, sizes, symbols, etc used to plot features.

What are raster and vector data?

There are two key types of data that can be displayed in a map: raster and vector.

- Raster data is made up of grids or pixels, and is used for data like aerial & satellite photos, or perhaps gridded, modeled data such as elevation models.
- Vector data comprises points, lines & polygons which can be plotted on a map. Note, however, that vector data can be plotted as a map – that map is then displayed, in which case the layer is a raster layer which looks like a vector layer. This is often done with WMS layers. For example, a map of a coastline with many vertices can be plotted by the WMS server, and supplied as a transparent image, so just the plotted lines appear, much as if it was a vector layer.

How do I access a WFS service?

The last example dealt with WMS layers, which are essentially just pictures, and therefore are raster data. A WFS service provides you with the actual vector data, which makes your computer work harder as it needs to manage and plot all the features for you. This isn't usually a problem with a few hundred, or even thousand small featurers, but can be a problem if it involves hundreds of thousands or millions of points. To try a WFS service, along with the WMS layers described above:

- Start the  plugin , select the “Data sources” tab,
- Click the “Services” bar, choose the OS2020 Bay of Islands survey “stations” service,
- Click “Connect” and choose one of the available layers. (All stations or just one method),
- Add this layer to the layers list (),
- Select the layers tab, choose this layer and add it to the map.

You will see the points where the stations occurred plotted on the map.

How do I query a feature for information about it?

The Info icon  on the toolbar allows you to select a feature in the current layer and see what information is available for it. Given a WFS layer comprises the actual data (not just a map showing the data) you can use this tool to query the WFS station points loaded onto your map above. This works with local vector datasets as well as WFS layers.

- Ensure the layer you want to query is the currently active one (click on it in the left hand layer list and make sure it is highlighted),
- Choose the Info tool ,
- Click on one of the points on the map to see the available information (attribute data), you will see depths, times, locations, etc, describing the sampling that took place at that station

This will work for any WFS or local layer which has attributes pertaining to it.

How do I change the symbology of a layer?

For WMS and raster (image) layers, the only control you really have is over transparency. For WFS and local vector datasets, you can control the choice of symbol, size and colour for any points, lines and polygons. You can also choose to classify your data and set the colour, or symbol, for each class. This is not an exhaustive tutorial of how you can manipulate symbology, just a simple example of one possibility.

- Open a WFS layer as described above.
- Click on the layer name in the left hand list, to make it the active layer, right click on it and choose "Properties"
- Choose the style tab, pick the symbol, size, fill colour, border colour and click "Apply"
- The layer will be plotted on the map with the new symbol. Feel free to change the type from "Single symbol" to another type, and see some of the effects that are possible.

Useful links.

These pertain more to the full Quantum GIS application than just NIWA Quantum Map. By the time you are wanting to ask questions about how to do more, it is likely that you are ready to upgrade to the full Quantum GIS application. The websites and links below provide information on how to do more with QGIS.

The main QGIS website, with many useful links and much more information.

<http://www.qgis.org/>

Please see the full QGIS documentation for download, which has far more detail than this document, available in several languages.

<http://www.qgis.org/en/documentation/manuals.html>

The interactive, online QGIS manual.

http://docs.qgis.org/user_guide/html/en/

"Beginning QGIS", a beginners guide to using Open Streetmap data with QGIS.

http://www.learnosm.org/files/beginning-qgis/Beginning_QGIS_en_v1.pdf

QGIS wiki Users corner.

http://www.learnosm.org/files/beginning-qgis/Beginning_QGIS_en_v1.pdf

How do I do that in QGIS?

http://hub.qgis.org/wiki/quantum-gis/How_do_I_do_that_in_QGIS

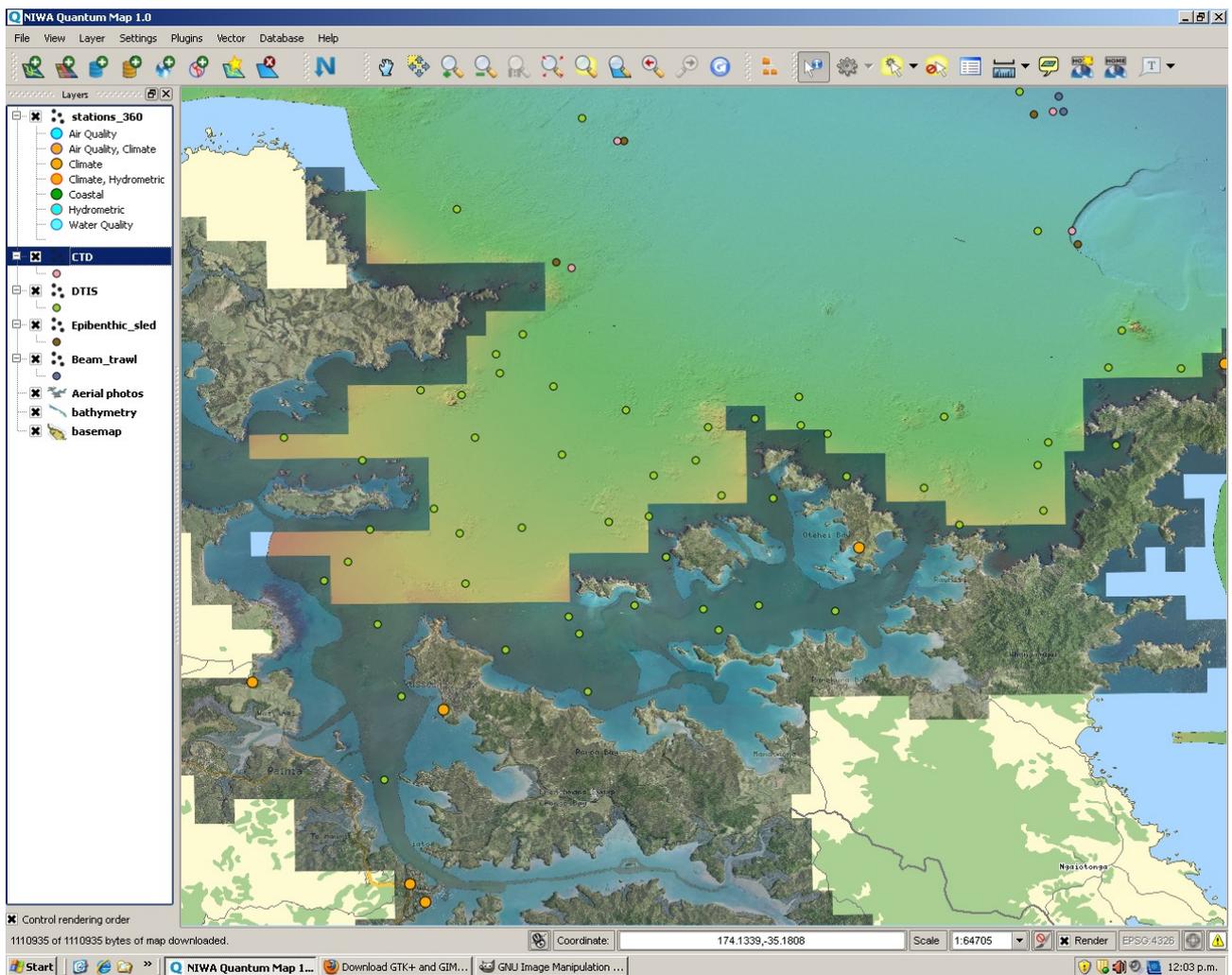
Using LINZ data service with QGIS (and other tools).

<http://www.linz.govt.nz/sites/default/files/about-linz/lds/Using-LDS-services%20introduction.pdf>

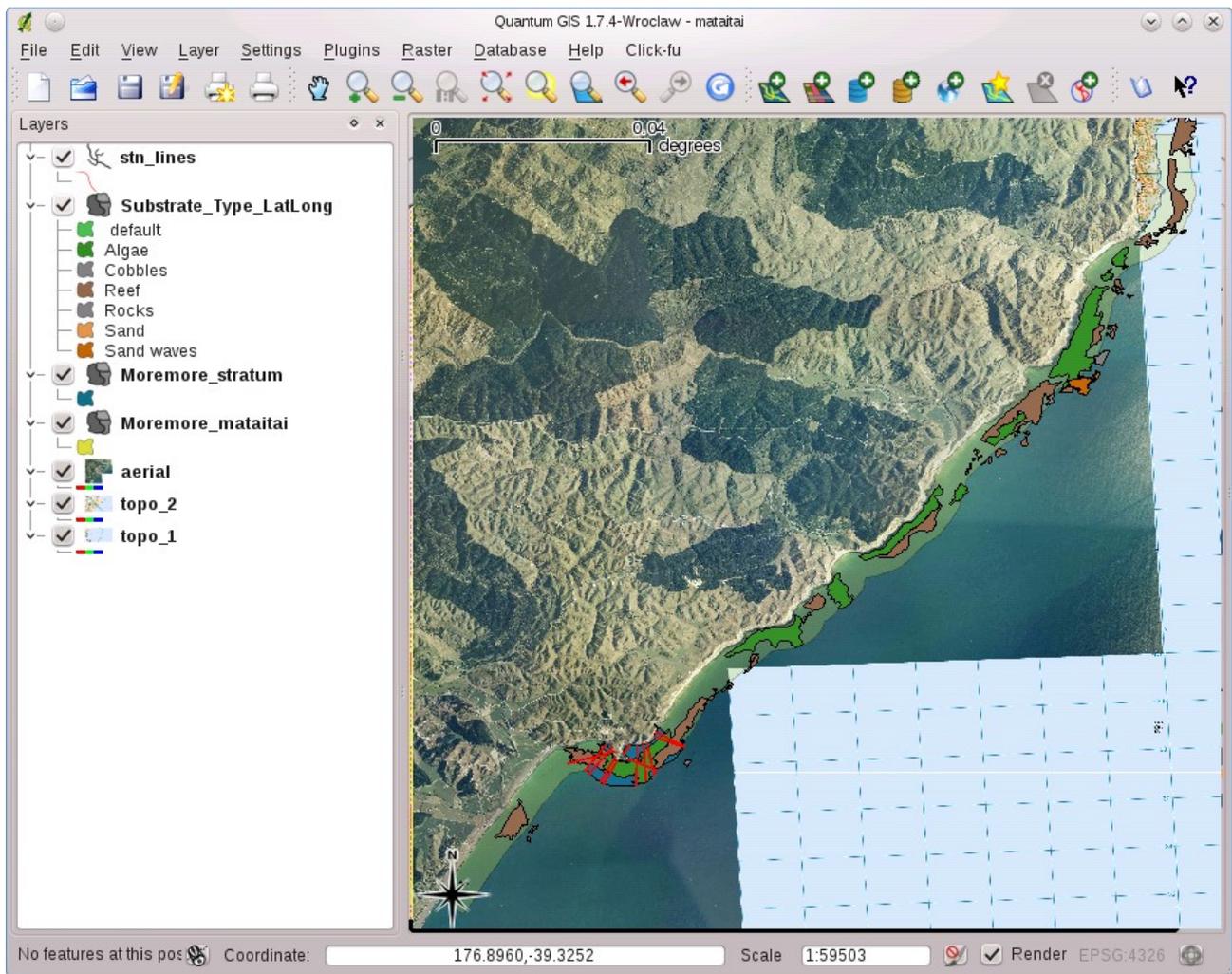
A range of online QGIS tutorials.

<http://qgis.spatialthoughts.com/>

Sample maps.



1. Remote WMS and WFS data online from NIWA, showing a background of LINZ topographic data (coastline, roads, placenames, etc) overlaid with aerial photography, a bathymetry layer showing seabed depth (both WMS), sampling locations (WFS) as well as the locations of climate stations (WFS).



2. A mataitai (local customary marine reserve), overlaid on an aerial photograph and topographic map, showing nearshore seabed types (determined from a sidescan survey), a stratum (selected region of the mataitai) to survey, and some possible transects for divers to survey.