

# GPS, GIS and Nav (Oh my!)

This book contains information about navigation, GPS, GIS tools like QGIS etc.

- [Setting the Map Datum to GDA 94 on Garmin watches](#)
- [Add Sixmaps mapping layer to QGIS](#)
- [Importing Threatened Plant and Animal Species](#)
- [NSW 2022 Topographic GeoPDF Maps - Direct Download Links](#)

# Setting the Map Datum to GDA 94 on Garmin watches

Ok, because this is typically a "Set once and forget" setting, it will be easy to forget it in the future when you get a new watch or if you need to reset to factory defaults.

The default map **Geocentric Datum of Australia** is GDA94 and is the same we use in the RFS. That means the latitude/longitude grid reference on our printed maps are the same on the watch face.

To set the GPS display format on the watch:

1. Go to: *Menu > Settings > System > Format > Pos. Format*
2. Change the *Format* to **MGRS**
3. Change the *Datum* to **GDA 94**
4. Change the *Speroid* to **GRS 80**

Now when you long-press the GPS button it will display a 10 figure grid reference. For example:

```
Position:  
56H KH 63241  
MGRS 67108Alt. 709
```

## Map Datum Supported by Garmin GPS Devices

<https://support.garmin.com/en-AU/?faq=CuRXNp4JBU25QHE8cwRI26>

# Add Sixmaps mapping layer to QGIS

Download the QLR file in the attachments on this page, then drag it onto the QGIS program window and the later will be added to the open project.

## Attachments

<b>SIX maps Public NSW Imagery QGIS Layer</b>	<a href="#">Sixmaps_Public_NSW_Imagery.qlr</a>
<b>ArcGIS REST Services Directory</b>	<a href="#">public/NSW_Imagery (MapServer)</a>
<b>Complete ArcGIS Config for QGIS [Best Choice]</b>	<a href="#">ArcGIS REST Services - SIX Maps.xml</a>
<b>Example Project</b>	<a href="#">Heron Place Hazard Reduction.qgz</a>

## ArcGIS REST Services

To import these into QGIS:

1. Save the `ArcGIS REST Services - SIX Maps.xml` file to your computer.
2. Open QGIS (duh)
3. Right-click **ArcGIS REST Servers** In the **Browser** on the left (Assuming you have the default layout)
4. Choose **Load Connections**, and browse to the file you saved
5. Select all (or don't and pick the ones you want)
6. Click on the **Import** button

You can now choose any REST connection and import that as a layer to your project!

A few example servers:

- [https://maps.six.nsw.gov.au/arcgis/rest/services/public/NSW\\_Base\\_Map/MapServer/WMTS/1.0.0/W](https://maps.six.nsw.gov.au/arcgis/rest/services/public/NSW_Base_Map/MapServer/WMTS/1.0.0/W)
-

- [http://maps.six.nsw.gov.au/arcgis/services/public/NSW\\_Imagery/MapServer/WMServer?request=](http://maps.six.nsw.gov.au/arcgis/services/public/NSW_Imagery/MapServer/WMServer?request=)
- <https://mapprod1.environment.nsw.gov.au/arcgis/rest/services>

## Manually Adding the Layers to QGIS (Web Services)

- Retrieve the WMS URL for the service you want to use from its REST endpoint.  
e.g. Visit [NSW Imagery REST Endpoint](#)
- Look for the WMS link towards the top left of the page. Right-click + copy link address or left-click the link to open the link and copy the URL from the address bar.

### ArcGIS REST Services Directory

[Home](#) > [services](#) > [public](#) > [NSW Imagery \(MapServer\)](#)

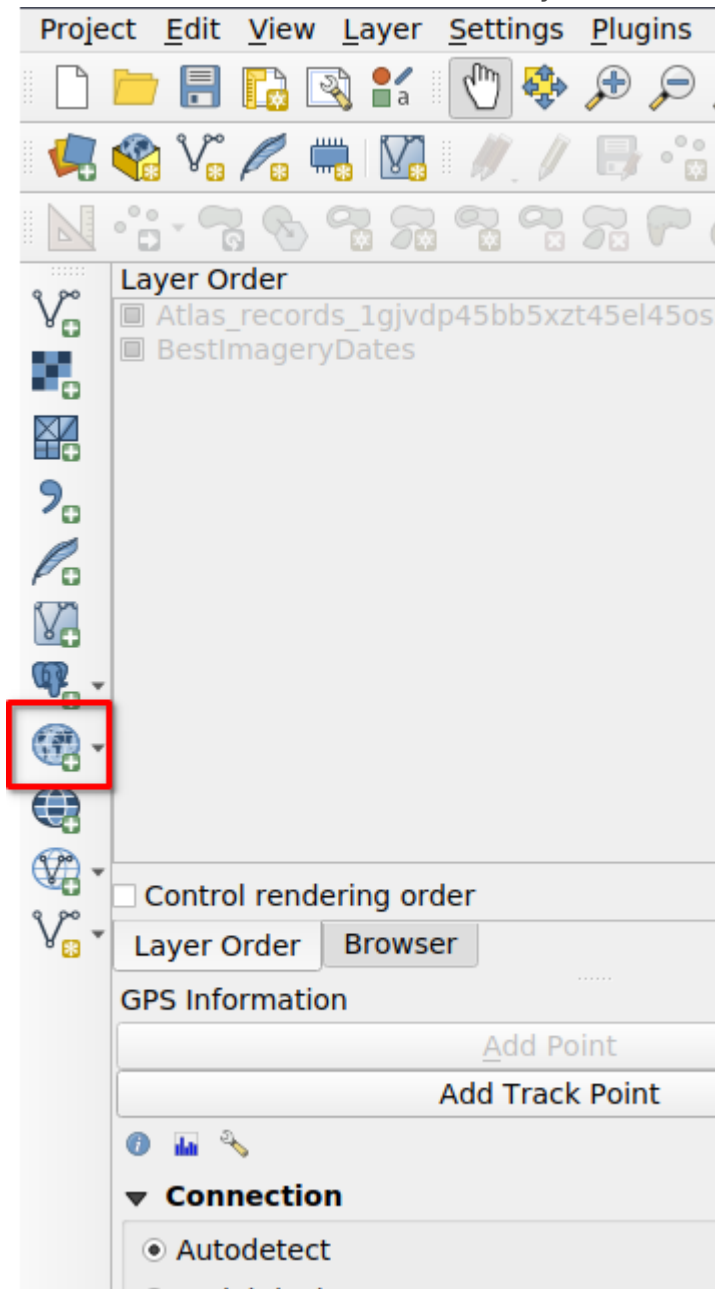
[JSON](#) | [SOAP](#) | [WMS](#) | [WMTS](#)

### public/NSW\_Imagery (MapServer)

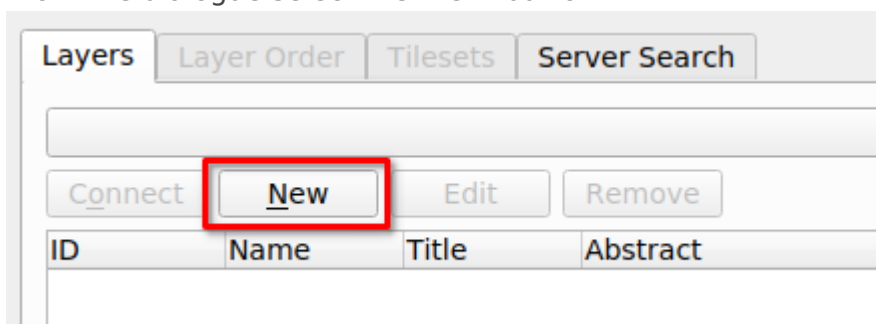
View In: [ArcGIS JavaScript](#) [ArcGIS Online map viewer](#)

-

In QGIS, click the "Add WMS/WMTS Layer" button in the 'Layers' toolbar.



- From the dialogue select the 'New' button.



-

Enter a name for the connection and the service's WMS URL, then click 'OK'.

**Create a New WMS/WMTS Connection**

**Connection Details**

Name: SIX Maps Web Services

URL: SServer?request=GetCapabilities&service=WMS

**Authentication**

Configurations Basic

Choose or create an authentication configuration

No authentication [edit] [delete] [add]

Configurations store encrypted credentials in the QGIS authentication database.

**WMS/WMTS Options**

Referer: [text field]

DPI-Mode: all

- ☐ Ignore GetMap/GetTile URI reported in capabilities
- ☐ Ignore GetFeatureInfo URI reported in capabilities
- ☐ Ignore axis orientation (WMS 1.3/WMTS)
- ☐ Ignore reported layer extents
- ☐ Invert axis orientation
- ☐ Smooth pixmap transform

OK Cancel Help

- Click the 'Connect' button, to fetch the details of the WMS service. Click to highlight the layer you want to add, then check the Coordinate system listen in the bottom pane.
- Click the 'Change' button, and select 'EPSG:3857' from the dialog. Hit OK, then click the 'Add' button at the bottom of the 'Add Layer' dialog.

Layers
Layer Order
Tilesets
Server Search

SIX Maps Web Services

Connect
New
Edit
Remove
Load
Save
Add Default Servers

ID	Name	Title	Abstract
0		Layers	
1	0	Footprint	

**Image Encoding**
  
☐ PNG
☐ PNG8
☒ JPEG
☐ GIF
☐ TIFF
☐ SVG

**Coordinate Reference System (4 available)**
  

Tile size

Request step size

Feature limit for GetFeatureInfo
10

EPSG:4326 - WGS 84

☐ Use contextual WMS Legend

Layer name
Footprint

1 Layer(s) selected

Close
Add
Help

- This will add it to your map. You can now close the 'Add Layer' dialog.

## Obtaining New Maps from the Interwebs

# Importing Threatened Plant and Animal Species

- Open the [Bionet Atlas](#)
- Enter the search parameters
  - [Species sightings search](#)

BioNet Atlas contains recorded sightings of plants, mammals, birds, reptiles, amphibians, some fish, and some (mainly endangered) invertebrates. Use the search form below to find and map plant and animal records from the Species Sightings and Systematic Flora and Fauna Survey collections

**1. Which species or group?**

☐ All entities ☒ Animals ☐ Plants ☐ Fungi ☐ Communities ☐ Threats ☐ Endangered populations ☐ Search for a species or group of species (e.g. birds)

---

**2. Legal status?**

☐ All records ☒ Select records that fall under one or more categories

**Species categories**

☒ Threatened in NSW ☒ Threatened Nationally ☐ Protected in NSW ☐ CAMBA ☐ JAMBA ☐ ROKAMBA ☐ Exotic ☐ Native

---

**3. What area?**

☐ Entire area ☒ Select a geographic area ☐ Define my own area (Remember that you must select an area at least 10km x 10km. If you select a smaller area, the search area will be automatically extended to approximately 10km x 10km.)

**Geographic area**

LGA

Area selected: BLUE MOUNTAINS

---

**4. Period of records?**

☐ All records ☒ Select records for a specific time period

**Specific time period**

Records since 01/01/2020  Records before

---

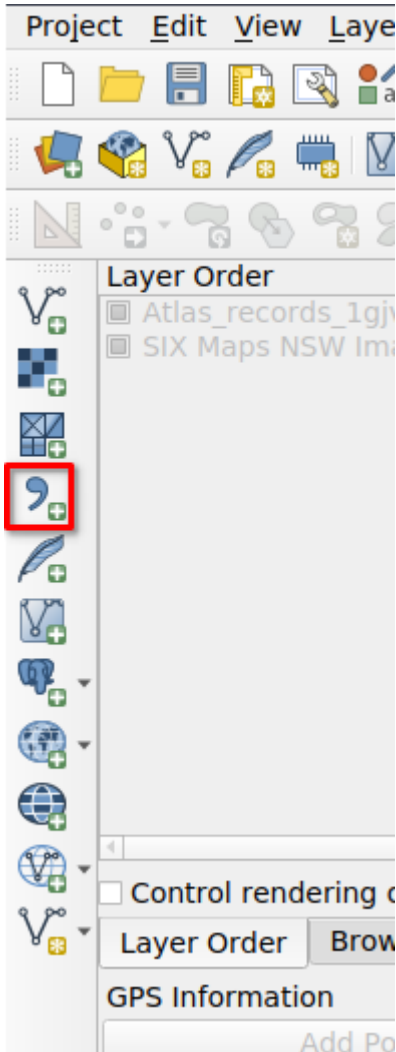
**5. Status?**

☒ Valid records only ☐ Quarantine records only ☐ All records (incl. quarantine)

- Click on **Download Records**, for a sanity check you have checked the right items you can click the View Map.



- Then you need to unzip the file, there should be a TAB delimited TXT file
- In QGIS, click the **Add Delimited Text Layer** `Ctrl + Shift + T` button



- Browse for the file, then:
  1. Browse for file
  2. Layer name
  3. Tab-delimited
  4. Header lines to discard
  5. Coordinates
  6. Change to EPSG:3857

-

File name /home/nick/Downloads/Atlas\_records\_1gjvdp45bb5xt45el45os5520200928-192614.txt

Layer name **Plants** Encoding UTF-8

**File Format**

☐ CSV (comma separated values) ☒ **Tab** ☐ Colon ☐ Space

☐ Regular expression delimiter ☐ Semicolon ☐ Comma Others

☒ Custom delimiters Quote " Escape "

**Record and Fields Options**

Number of header lines to discard **4** ☐ Decimal separator is comma

☒ First record has field names ☐ Trim fields

☒ Detect field types ☐ Discard empty fields

**Geometry Definition**

☒ Point coordinates X field Longitude\_GDA94 Z field

☐ Well known text (WKT) Y field Latitude\_GDA94 M field

☐ DMS coordinates

☐ No geometry (attribute only table) Geometry CRS **EPSG:3857 - WGS 84 / Pseudo-Mercator**

**Layer Settings**

**Sample Data**

	DatasetName	SightingKey	SpeciesCode	KingdomName	ClassName	FamilyName	SortOrder	ScientificName	Exoti
1	DPIE Data from Scientific Licences dataset	SJJSI0504166	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
2	DPIE Data from Scientific Licences dataset	SJJSI1324183	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
3	DPIE Data from Scientific Licences dataset	SJJSI1324184	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
4	DPIE Data from Scientific Licences dataset	SJJSI1324185	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
5	DPIE Data from Scientific Licences dataset	SJJSI1324186	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
6	DPIE Data from Scientific Licences dataset	SJJSI1324187	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
7	DPIE Data from Scientific Licences dataset	SJJSI1324188	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	
8	DPIE Data from Scientific Licences dataset	SJJSI1324189	11238	Flora	Flora	Apiaceae	5890	Xanthosia scopulicola	

Close **Add** Help

## Troubleshooting

If the items don't appear on the map, edit the layer properties and change the Coordinate Reference System (CRS) to *EPSG:4939 - GDA94*.

**Layer Properties - Plants | Source**

**Settings**

Layer name **Plants** displayed as **Plants**

**Geometry and Coordinate Reference System**

Set source coordinate reference system

**EPSG:4939 - GDA94**

Create Spatial Index Update Extents

**Provider Feature Filter**

# NSW 2022 Topographic GeoPDF Maps - Direct Download Links

## Source

- Obtained through the [Spatial Information Exchange](#) website, other [viewers](#)
- Other tools like historic aerial imagery are [here](#)
- See page attachments on the left for file downloads

## GeoPDFs including the Collar (Border/Legend etc)

See the attached spreadsheet for GeoTIF images that have no collar.

If any of the links below do not work. Please visit the [Spatial Information Exchange](#) catalog, or try the 2017 edition maps on the [eTopo site](#).

Georeferenced PDFs	Georeferenced TIFs
--------------------	--------------------

2022 - 100k - 7139+FORT+GREY	
2022 - 100k - 7239+OLIVE+DOWNS	
2022 - 100k - 7339+TIBOOBURRA	
2022 - 100k - 7439+TONGOWOKO	
2022 - 100k - 7539+THURLOO+DOWNS	
2022 - 100k - 7639+BERAWINNIA+DOWNS	
2022 - 100k - 7739+TALYEALYE	
2022 - 100k - 7839+BRINDINGABBA	
2022 - 100k - 7939+YANTABULLA	
2022 - 100k - 8039+ENNGONIA	
2022 - 100k - 8139+GERARA	
2022 - 100k - 8239+WEILMORINGLE	
2022 - 100k - 8339+GOODOOGA	
2022 - 100k - 8439+LIGHTNING+RIDGE	
2022 - 100k - 8539+DUNUMBRAL	
2022 - 100k - 7138+HAWKER+GATE	
2022 - 100k - 7238+MILPARINKA	
2022 - 100k - 7338+YANTARA	
2022 - 100k - 7438+CLIFTON+BORE	
2022 - 100k - 7538+URELLA	
2022 - 100k - 7638+URISINO	
2022 - 100k - 7738+WANAARING	
2022 - 100k - 7838+TINCHELOOKA	
2022 - 100k - 7938+FORDS+BRIDGE	
2022 - 100k - 8038+LOWER+LILA	
2022 - 100k - 8138+WARRAWEENA	
2022 - 100k - 8238+BREWARRINA	
2022 - 100k - 8338+NARRAN	
2022 - 100k - 8438+CUMBORAH	
2022 - 100k - 8538+DUNGLEAR	
2022 - 100k - 7137+SMITHVILLE	
2022 - 100k - 7237+MOUNT+ARROWSMITH	
2022 - 100k - 7337+COBHAM+LAKE	
2022 - 100k - 7437+YANCANNIA	
2022 - 100k - 7537+MONOLON	
2022 - 100k - 7637+TONGO	
2022 - 100k - 7737+KANGO	

