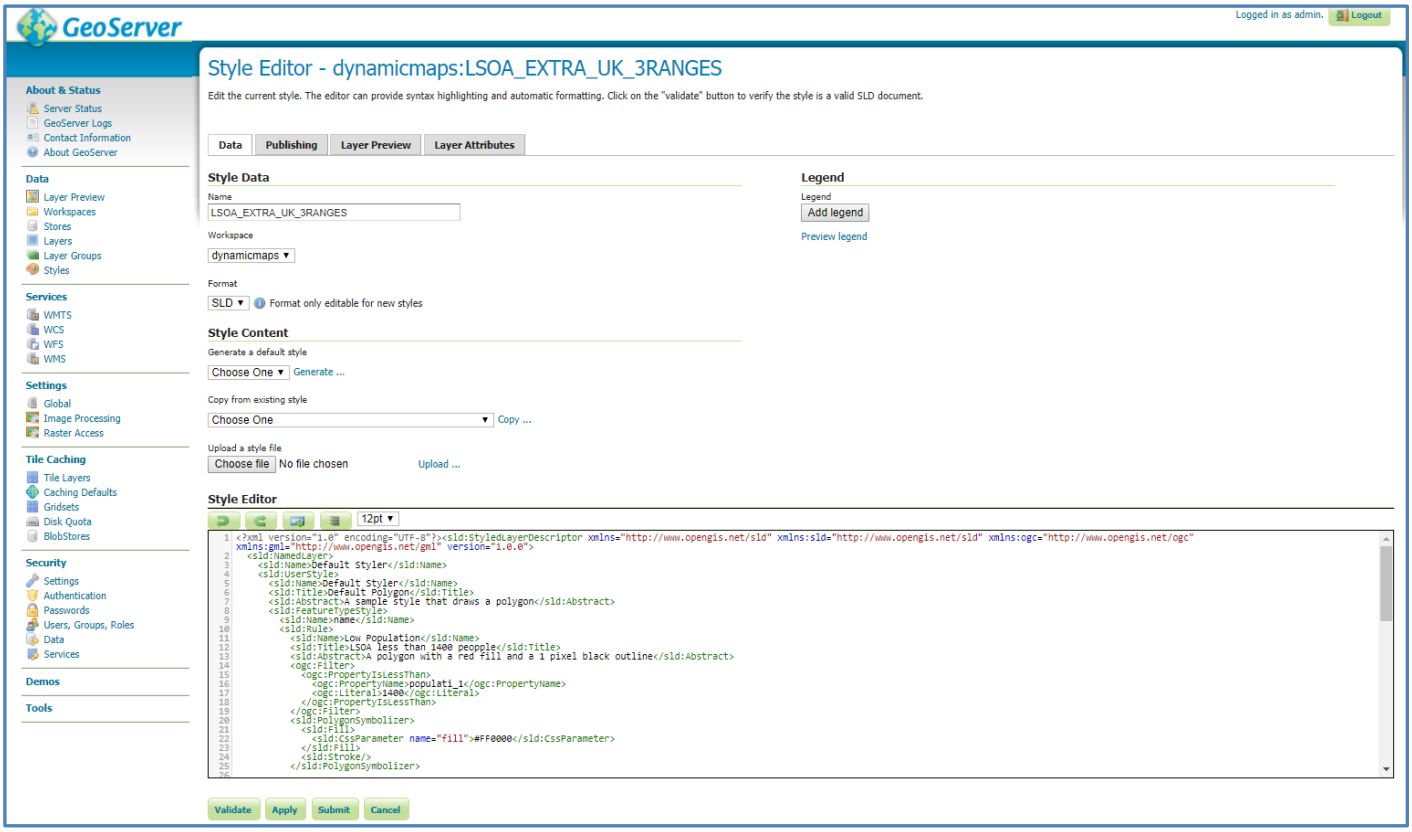
GeoServer utilises **Style Layer Descriptors** (**SLD** files) to create Style files in order to apply layer options such as; styling, labelling, transparency, thematics, zoom layering etc.... Generally, you will utilise the **Styles Admin** page within GeoServer to copy, create and edit existing SLD's.



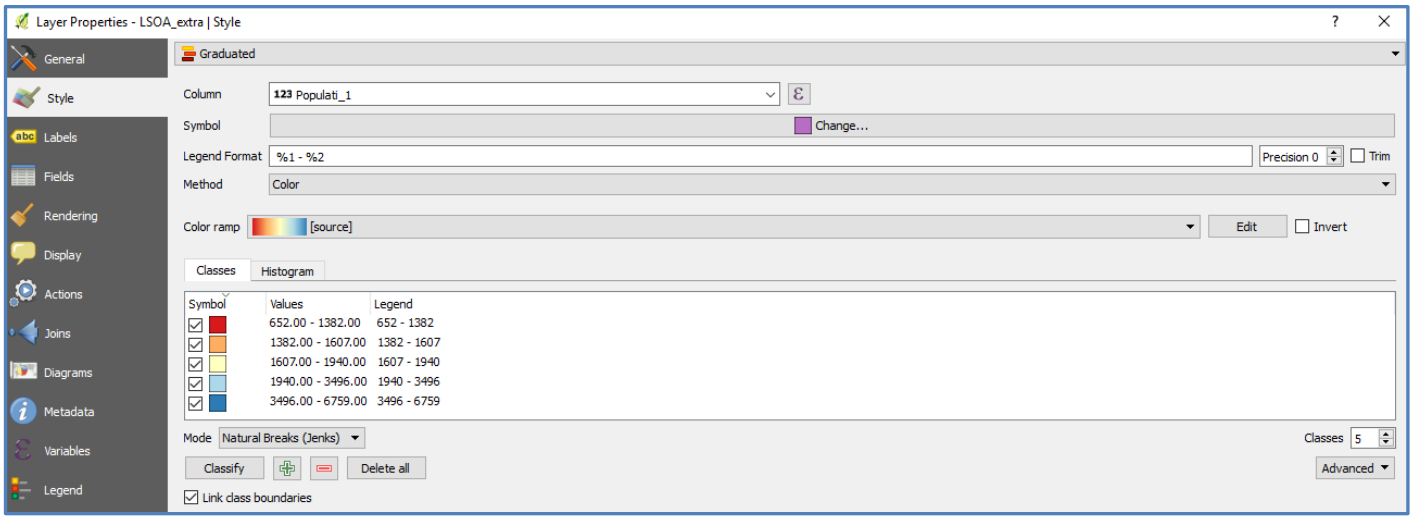
The GUI provided within the GeoServer Admin pages can often be quite difficult to use, as it relies on the user having a good knowledge of XML in order not to create invalid SLD files, and when a mistake is made the SLD will not validate and will therefore mean the WMS layer does not render.

line 25: cvc-complex-type.2.3: Element 'sld:PolygonSymbolizer' cannot have character [children], because the type's content type is element-only.

This White Paper explores two additional options which will allow you create accurate SLD files without requiring an extensive knowledge of XML.

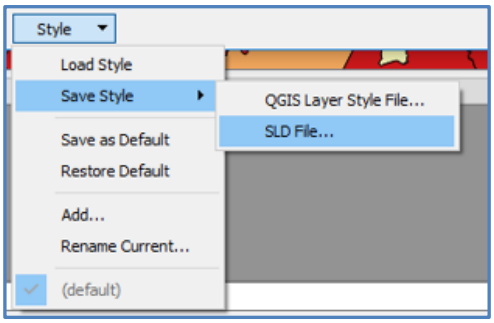
1 – QGIS Save Style As SLD

Firstly, in QGIS use the **Layer Properties** to apply a Style change to your layer, for example I have used a graduated thematic classification to create different colour styles based on a population for each LSOA polygon.

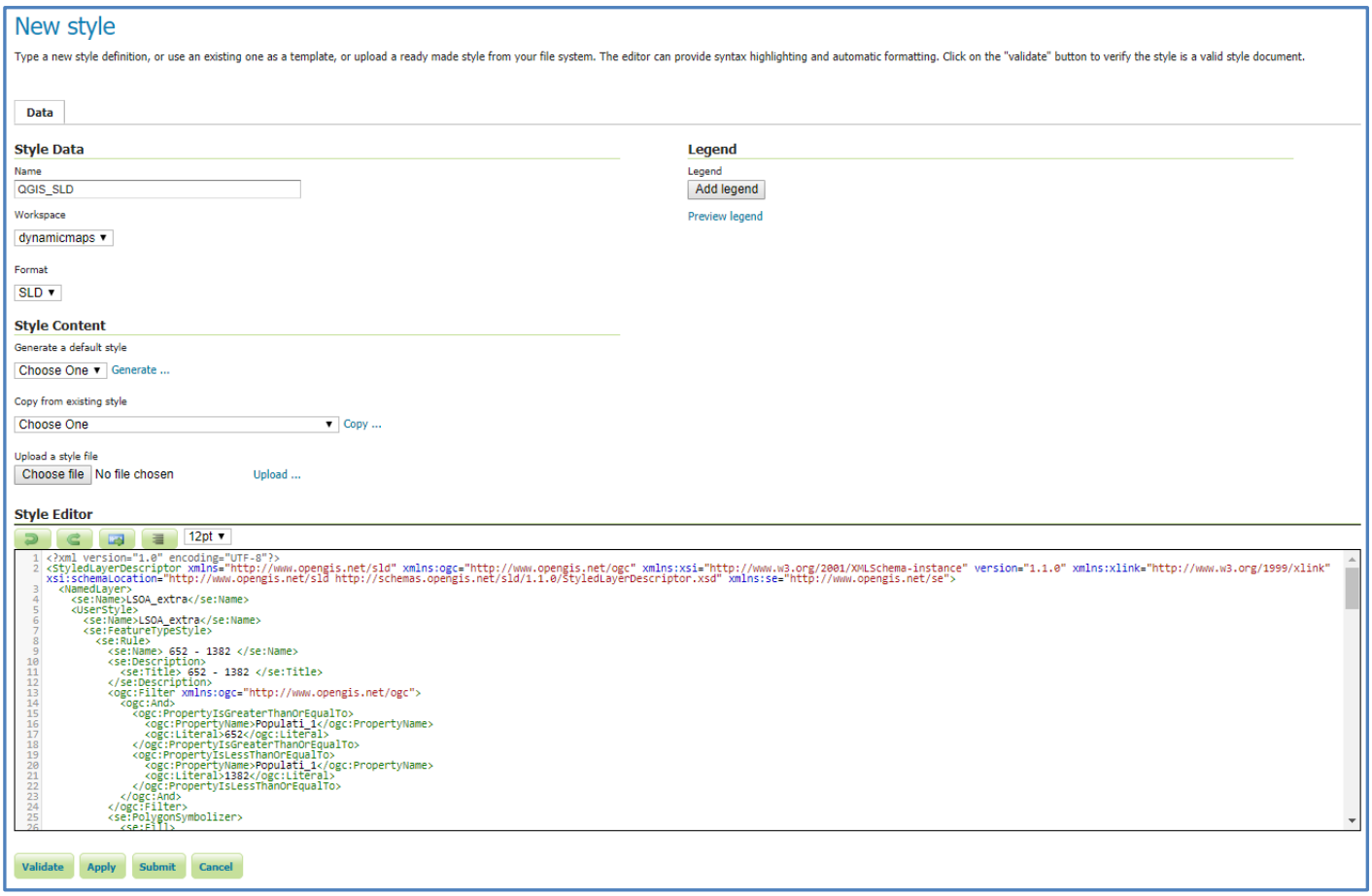


The result then renders each LSOA polygon a specific colour based on the population attribute.

Within the Layer Properties window there is an option to **Save the Style** as an **SLD.**

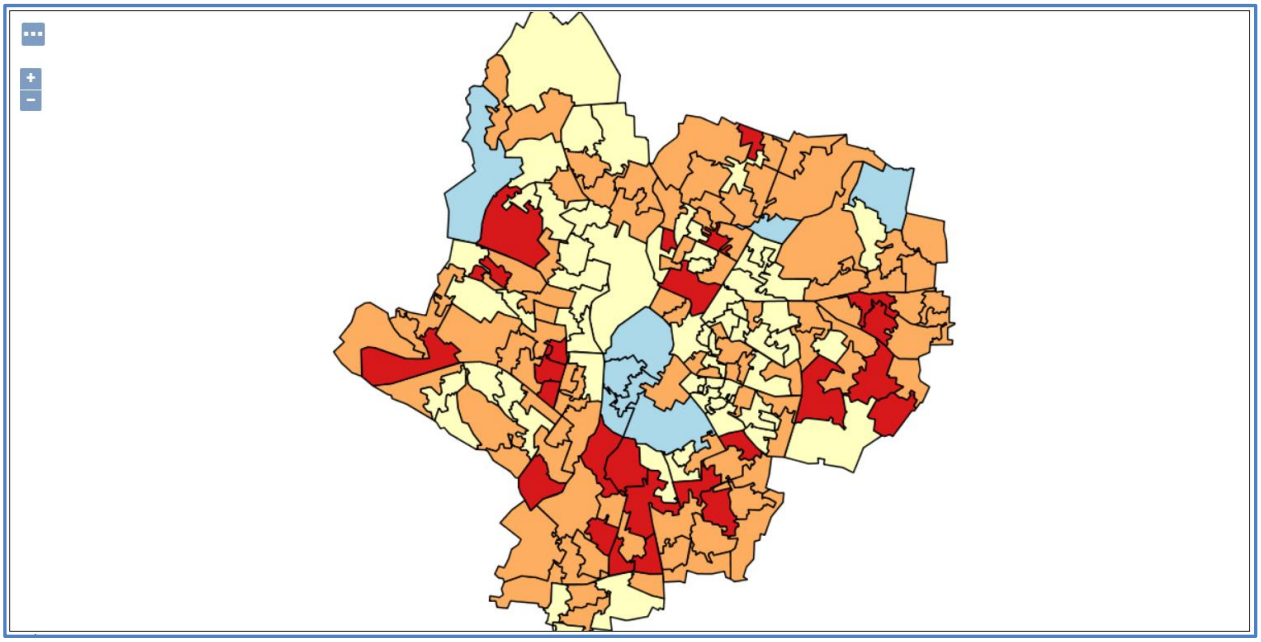


Having saved the SLD file, you can then create a **New Style** layer in GeoServer by using the **Upload a Style File** option.



The contents of the saved SLD are then uploaded into the **Style Editor** so that the XML has now all been created for you based on the style options that you applied in QGIS.

If you now associate the new Style with a WMS layer in GeoServer and **preview the WMS**, you can see that the QGIS styling has been applied to your WMS.



Please note that in some previous versions of GeoServer, I have experienced the following issues:

Issue 1 – Some versions of GeoServer will fail the validation rules if the **SE** and **SVG** tags are present in your XML. These tags are often created by QGIS, and if your Style file does not validate, then you will need to remove the se tags and also replace the SVG tags with CSS tags.

SE Tags – In many QGIS created SLDs you will have **an se:** reference throughout the XML.

Style Editor

12pt

```
1  <?xml version="1.0" encoding="UTF-8"?>
2  <StyledLayerDescriptor xmlns="http://www.opengis.net/sld" xmlns:ogc="http://www.opengis.net/ogc"
   xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.0"
   xmlns:xlink="http://www.w3.org/1999/xlink" xsi:schemaLocation="http://www.opengis.net/sld
   http://schemas.opengis.net/sld/1.1.0/StyledLayerDescriptor.xsd" xmlns:se="http://www.opengis.net/se">
3    <NamedLayer>
4      <se:Name>LSOA_extra</se:Name>
5      <UserStyle>
6        <se:Name>LSOA_extra</se:Name>
7        <se:FeatureTypeStyle>
8          <se:Rule>
```

Notice how in many of your other Style files which may have been created in GeoServer, the SE tag is not used, so you can remove these.

```
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
 <!-- a Named Layer is the basic building block of an SLD document -->
 <NamedLayer>
   <Name>default_polygon</Name>
   <UserStyle>
   <!-- Styles can have names, titles and abstracts -->
     <Title>Default Polygon</Title>
     <Abstract>A sample style that draws a polygon</Abstract>
     <!-- FeatureTypeStyles describe how to render different features -->
     <!-- A FeatureTypeStyle for rendering polygons -->
     <FeatureTypeStyle>
       <Rule>
         <Name>rule1</Name>
```

SVG Tags - In many QGIS created SLDs you will have a **SVG** tag prefixing the **Parameter** reference throughout the XML.

Style Editor

12pt

```
27              <se:SvgParameter name="fill">#d7191c</se:SvgParameter>
28            </se:Fill>
29            <se:Stroke>
30              <se:SvgParameter name="stroke">#000001</se:SvgParameter>
31              <se:SvgParameter name="stroke-width">1</se:SvgParameter>
32              <se:SvgParameter name="stroke-linejoin">bevel</se:SvgParameter>
33            </se:Stroke>
34          </se:PolygonSymbolizer>
35        </se:Rule>
36        <se:Rule>
```

Notice how in many of your other Style files which may have been created in GeoServer, the SVG tag is replaced with a **CSS tag**, so you may need to replace the SVG with CSS.

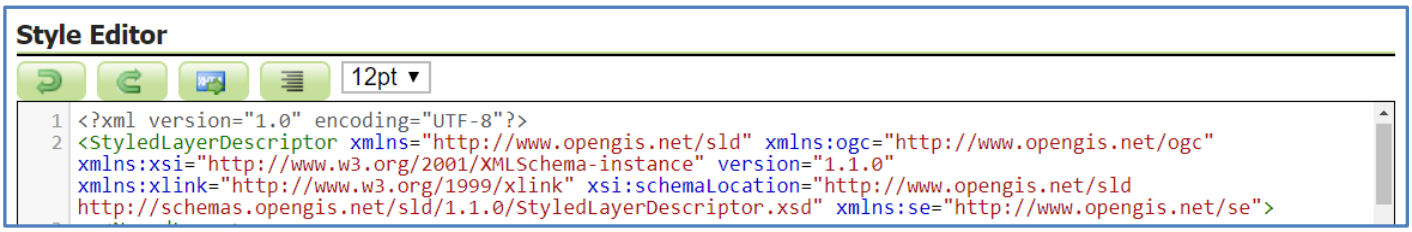
Style Editor

12pt

```
22              <sld:CssParameter name="fill">#FF0000</sld:CssParameter>
23            </sld:Fill>
24            <sld:Stroke/>
25          </sld:PolygonSymbolizer>
26
27        </sld:Rule>
28        <sld:Rule>
29          <sld:Name>Medium Population</sld:Name>
```

The SE and SVG tags may also be present within the **Header lines** in your SLD, so you may either need to edit those tags or more simply copy the Header lines from an existing SLD and replace that into your new Style file.

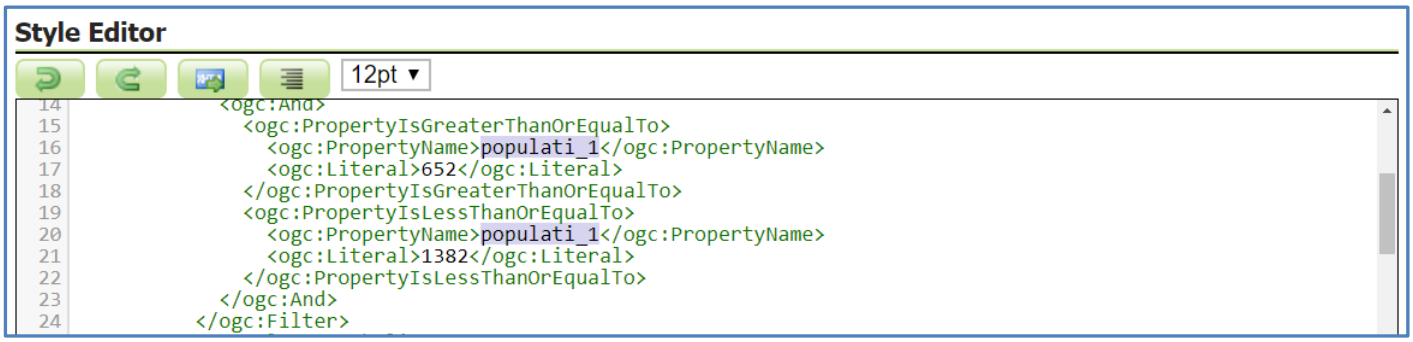
Here are the header lines created when QGIS saves the SLD:


Style Editor
12pt
<?xml version="1.0" encoding="UTF-8"?>
<StyledLayerDescriptor xmlns="http://www.opengis.net/sld" xmlns:ogc="http://www.opengis.net/ogc"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" version="1.1.0"
xmlns:xlink="http://www.w3.org/1999/xlink" xsi:schemaLocation="http://www.opengis.net/sld
http://schemas.opengis.net/sld/1.1.0/StyledLayerDescriptor.xsd" xmlns:se="http://www.opengis.net/se">
Below are the header lines that a normal GeoServer Style file will have:
Style Editor
12pt
<?xml version="1.0" encoding="UTF-8"?><sld:StyledLayerDescriptor xmlns="http://www.opengis.net/sld"
xmlns:sld="http://www.opengis.net/sld" xmlns:ogc="http://www.opengis.net/ogc"
xmlns:gml="http://www.opengis.net/gml" version="1.0.0">
I am currently using GeoServer 2.11.1 and the SE and SVG tags are not causing issues.

Issue 2 – Similar to the above issue, where the QGIS generated SE and SVG tags can cause validation errors, you may also experience validation errors if the **CASE** of the field name that you are using in your underlying spatial data differs to the case being used in the Style file. QGIS may create the SLD Style file with field names used for thematic rules all in **lower case**, but if your columns have capital letters you will get the following error message when you render the WMS.

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?><!DOCTYPE ServiceExceptionReport SYSTEM "http://localhos
      The requested Style can not be used with this layer.  The style specifies an attribute of Populati_1 and
</ServiceException></ServiceExceptionReport>
```

To correct this issue, simply find the reference to any field name in your SLD and correct any case sensitive values that are incorrect.

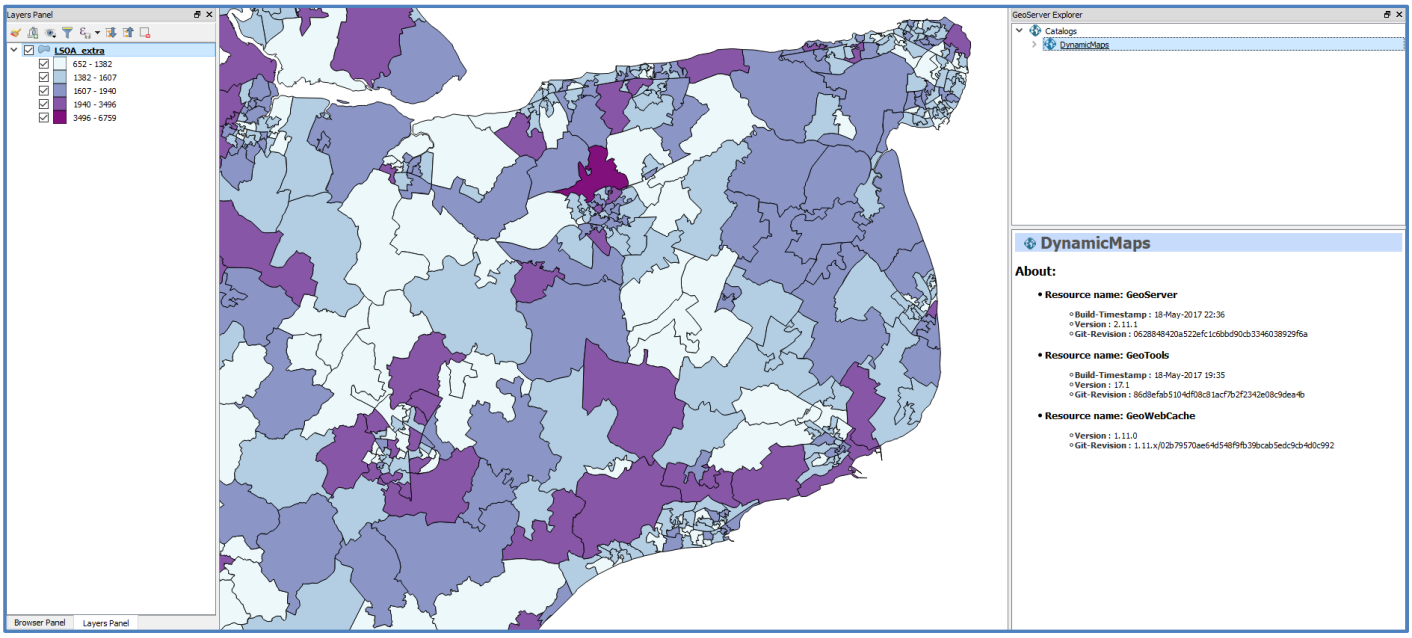


2 – QGIS GeoServer Explorer Plugin

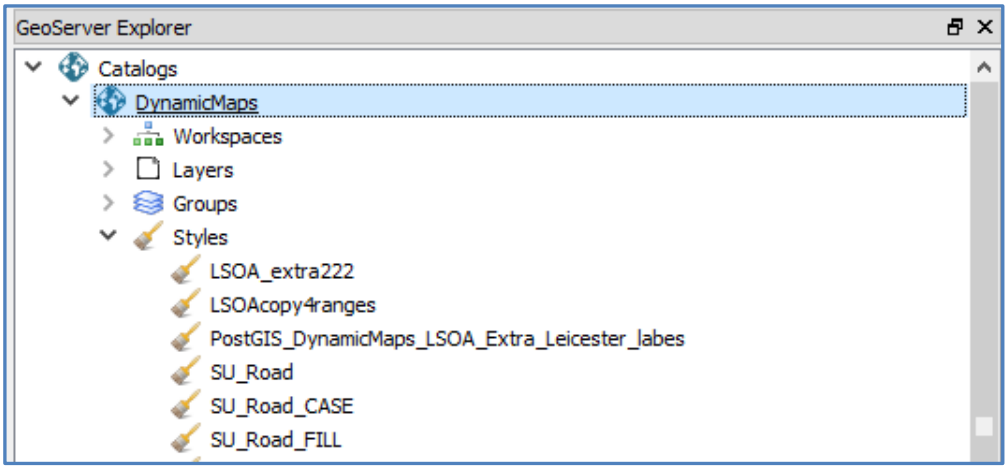
In addition to using the Layer Properties to Save an SLD file, QGIS provides a **plugin tool** called GeoServer Explorer which among other option allows you to create new Style files directly into GeoServer without using the GeoServer Admin pages.

Firstly, install the plugin by searching for **GeoServer Explorer.**

To access the tool, choose **Web** > **GeoServer** > **GeoServer Explorer** and the tool is embedded as a new panel into QGIS.

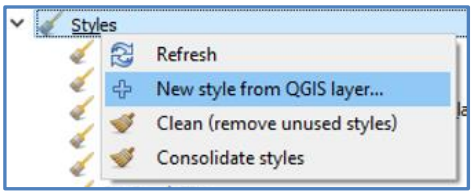


Connect to your GeoServer instance using the Catalog list in the top right and a list of your GeoServer Workspaces, Layers and Styles will be shown.

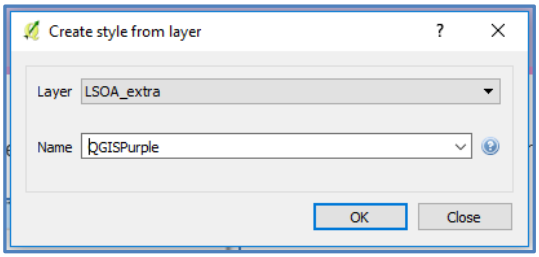


Again, using the Layer properties, you can more easily style your spatial layers, in this case I have edited the thematic so that the ranges are now purple.

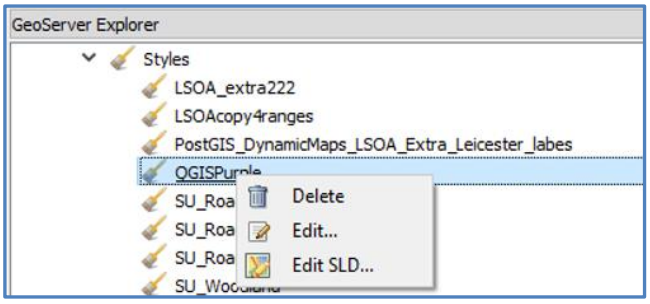
Within the GeoServer Explorer, use the Create **New Style from QGIS Layer** option.



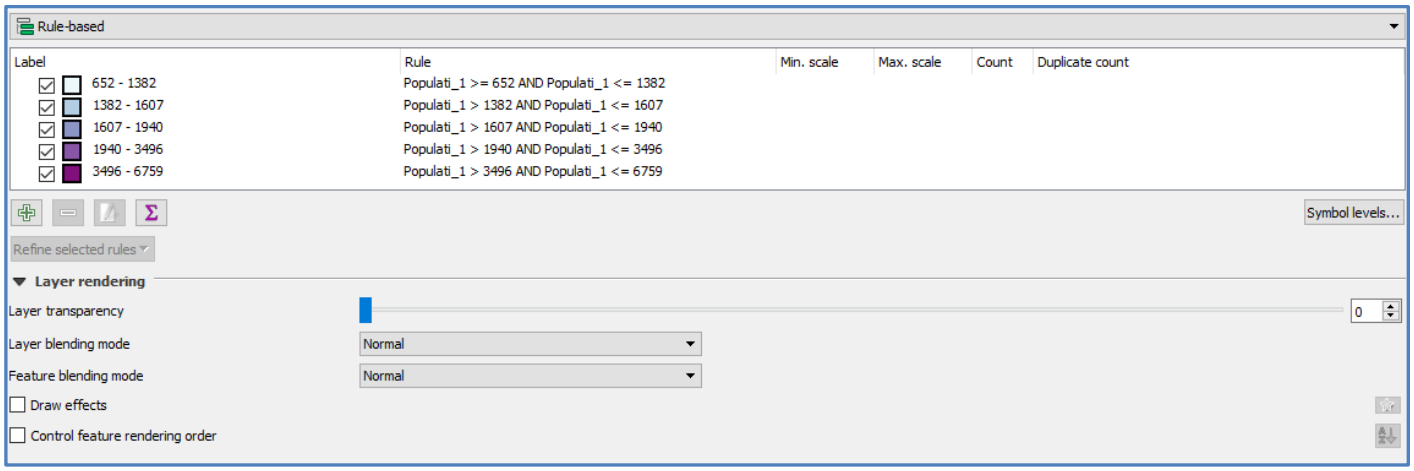
,.. and provide a name for the new Style Layer.



If you **refresh** the Styles list the new GeoServer Style will be added, so you can now **Edit the Style** layer,..



either by choosing **Edit**, where you can go into the Layer Properties to use the GUI to change the SLD.



Or choose **Edit SLD,** which will open the SLD Editor window, so that you can directly edit the XML and see the changes reflected directly within the QGIS map window.

If we now associate this new Style to the Layer and preview the WMS, you may find that you get a similar error message as before.

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?><!DOCTYPE ServiceExceptionReport SYSTEM "http://localhost
      The requested Style can not be used with this layer.  The style specifies an attribute of Populati_1 and
</ServiceException></ServiceExceptionReport>
```

Where QGIS may create the SLD Style file with field names used for thematic rules all in **lower case**, but if your columns have capital letters you will get the error message. By correcting this case issue in your XML the WMS will then preview successfully.