



WMS User Guide

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Introduction

The Saskatchewan Geospatial Imagery Collaborative

The Saskatchewan Geospatial Imagery Collaborative (SGIC) is a partnership of organizations sharing knowledge and costs relating to acquisition and use of remotely sensed imagery for mutual and public benefit. The collaborative operates servers providing a web mapping client and an OGC-standard Web Map Service (WMS) for sharing geospatial imagery. Members of the public are welcome to use a limited set of the SGIC's geospatial imagery holdings, while SGIC members gain access to an expanded set of imagery products.

What This Manual Covers

This manual covers basic usage of the SGIC's OGC®-Standard Web Map Services. This manual applies to both free public access and to SGIC members-only access. It also has two appendices for further reading:

- Appendix A – Accessing WMS data with a Web Browser, and
- Appendix B – Accessing WMS data with ESRI ArcGIS.

Additional Documentation

Additional documentation is available to SGIC members and covers the following topics:

- Basic usage of the SGIC Web Mapping Client
- Downloading images through the SGIC Web Mapping Client;
- Administering users through the SGIC Web Mapping Client; and,
- Administering data through the SGIC Web Mapping Client.

Support

If you need help using the SGIC web mapping client or Web Map Services, please send an e-mail to the SGIC help desk at: sgic@src.sk.ca.

Chapter 1

Introduction to the OGC® Web Map Service

Introduction

The Open Geospatial Consortium provides the following description of the Web Map Service on its web site:

“The OpenGIS® Web Map Service Interface Standard (WMS) provides a simple HTTP interface for requesting geo-registered map images from one or more distributed geospatial databases. A WMS request defines the geographic layer(s) and area of interest to be processed. The response to the request is one or more geo-registered map images (returned as JPEG, PNG, etc) that can be displayed in a browser application. The interface also supports the ability to specify whether the returned images should be transparent so that layers from multiple servers can be combined or not.”

Some of the key features of the Web Map Service are:

- It is an open standard, supported by a variety of vendors through the OGC®;
- It uses the internet standard HTTP protocol;
- It allows the user to request a map image consisting of a set of layers;
- The returned map image can be provided in a variety of formats; and,
- Map images can be transparent so that maps with similar extents, served by different servers, can be overlain to form a composite image.

Web Map Service is the key technology used within the SGIC web mapping client to provide map images. End users can take advantage of the same service to provide map images within their own applications.

Version

The Saskatchewan Geospatial Imagery Collaborative supports both version 1.1.1 and version 1.3.0 of the Web Map Service specification. Version 1.1.1 tends to have better support within client software.

Standard Documentation

Documentation describing the complete Web Map Service is open and freely available through the OGC® web site, at <http://www.opengeospatial.org/standards/wms>.

Chapter 2

Using the SGIC Web Map Services

Introduction

This section describes general characteristics for using the SGIC Web Map Services. For specific details on using Web Map Services with your GIS client software, refer to your vendor documentation.

Free Public Service

The free public service provides the SGIC 62 cm color OrthoPhoto imagery, SPOT satellite imagery at 10 meter-per-pixel resolution, along with SaskGrid, Administrative Boundary, and National Road Network vector layers. The URL for access is:

<http://www.flysask.ca/cgi-bin/public.cgi?service=WMS>

No user name or password is required to access the free public service.

Secure Members' Service

The secure members service provides the SGIC SPOT satellite imagery at 2.5 meter-per-pixel resolution, the 62 cm FlySask orthophoto imagery, and imagery resources that have been contributed by SGIC members, such as 10 cm imagery of the cities of Regina and Saskatoon. This service also contains vector layers for imagery metadata such as image capture dates. The URL for access is:

<https://www.flysask.ca/auth/members.cgi?service=WMS>

You must provide a user name and password in order to use the secure members' service. Use the same user name and password that you use to access the SGIC web mapping client. If you need a user name or password, contact the SGIC user account administrator for your organization.

Appendix 1

Accessing WMS With A Web Browser

Introduction

Because the Web Map Service is provided through the internet-standard HTTP protocol, it is possible to use web map services using a web browser such as Internet Explorer. This is often a good way to test your connectivity to the service.

Download Capabilities Document

The first request type we will examine, that all WMS servers support, is a GetCapabilities request. It looks like this:

<http://www.flysask.ca/cgi-bin/public.cgi?service=wms&version=1.1.1&request=GetCapabilities>

Note that you will have to save the resulting file on your computer with a name and the extension “.xml”. For example, I saved mine on the Desktop as sgic-public.xml.

Open the resulting XML file. You should see a human-readable description of all the capabilities the WMS server supports. At the highest level, it contains a <Service> element providing some metadata about the server, and a <Capabilities> element that includes <Layer> elements describing all the layers the server supports and what formats the layers can be downloaded in.

Tip: If you open the XML file in Internet Explorer, you can click on the +/- signs next to individual tags to expand or contract them and make the display more readable.

Download Map Image

The second request type we will examine, that all WMS servers support, is a GetMap request. It is entered similar to a GetCapabilities request, but it supports a few more parameters:

&Service=WMS	- The service type
&Version=1.1.1	- The WMS Specification version
&srs=EPSG:26913 closen)	- Spatial Reference System EPSG code (UTMZ13
&format=image/jpeg	- Image format type
&style=	- Style to apply (usually left blank)

&bbox= 120000,540000,770000,6678000 - Bounding box in the co-ordinate system of the SRS ; This example shows Saskatchewan bounding box
&width=600 - Width of image
&height=600 - Height of image
&layers= spot10m - Layers to download, separate multiple layers with a
,

<http://www.flysask.ca/cgi-bin/public.cgi?request=GetMap&service=WMS&version=1.1.3&styles=&srs=EPSG:26913&format=image/jpeg&&format=JPEG&width=600&height=600&layers=prov&bbox=120000,540000,770000,6678000&layers=SPOT10m>

There are several layers in the SGIC database to choose from, and you can combine layers to form detailed maps.

Tip: The capabilities document lists the EPSG codes supported by the server. By changing the SRS in your request, you can change the map projection. More information on EPSG codes is available at:

<http://www.epsg-registry.org/>

Tip: The bounding box in the example above is specified in decimal degrees. If you change to a projection that uses degrees, such as Latitude and Longitude Geographics with epsg =4326 , you must change your bounding box to match!

<http://www.flysask.ca/cgi-bin/public.cgi?service=wms&version=1.1.3&request=GetMap&srs=EPSG:4326&format=image/jpeg&styles=&bbox=-111,49,-100,61&width=600&height=600&layers=spot10m>

Tip: Not all layers in a WMS can be downloaded – some are there to provide logical groupings of sub-layers. The layers that can be downloaded all have a <Name> tag.

Tip: If the response you receive is an attempt to download a document instead of a JPEG image in your web browser, the server is trying to send you an error message. Save the resulting file with a name such as error.xml and then open it with Internet Explorer to view the error message.

Appendix 2

Accessing WMS from ESRI ArcGIS

Introduction

Adding a Web Mapping Service (WMS) to your Geographic Information System (GIS) is quite easy to do. The process will take approximately ½ hour to 1 hour to make the connections you want and organize things properly for efficient operation.

Once the connection is made and the service properly authored to run efficiently within your system, you can expect 2-5 second refresh displays of the imagery, without having to store and manage multi terabytes of imagery data within your organization.

Most times when people add a WMS (Web Mapping Service) to their GIS they will already have a project started with considerable data layers already set up to which the FlySask imagery will be very complementary.

FlySask Public WMS URL:

<http://www.flysask.ca/cgi-bin/public.cgi?service=WMS>

FlySask Members WMS URL:

<https://www.flysask.ca/auth/members.cgi?service=WMS>

Connecting to the FlySask WMS

The instructions which follow describe how to add a FlySask WMS to ESRI Arcmap 9.2. Other GIS systems which support WMS, will have variations on this but be somewhat similar.

1. Open Arcmap, either an existing project with layers already established or an empty map.
2. Go to “Add Layers”
3. Select “GIS servers” from the “Look in” dialogue box
4. Select “Add WMS server”
5. Then in the next screen add the URL for the WMS; i.e. (See the Public and Members URL’s above)

6. The Members secure service will require a username and password, and the dialogue box will ask for those credentials.
7. Once the service has connected you will see the service name on the left with a + sign beside it. You should also see a spinning globe at the bottom of the screen indicating that the data is loading.
8. When you start a WMS service, ArcMap automatically turns on the first 20 layers of information and if these layers contain a lot of information, like raster imagery, this may take a long time to load (2-5 minutes or so). This is normal because you are initially asking for all the information. This will not be a problem once your WMS is added and set up to function properly.
9. On the left side beside the WMS name, click the + sign and then turn all of the layers off except for perhaps the Spot 10m. Then highlight the Spot 10m and with a right click of the mouse click zoom to layer. This is a way to check that the data is coming in appropriately and you can easily see what coordinate system it is in, Geographics or UTM for instance. (This may take a couple of minutes or so). If you wish to change the Coordinate System, then highlight the name of the WMS service, right click and select "Change Coordinate System" from the menu. (More on coordinate systems below)

Authoring (or organizing) your WMS display

Once the above has been done and the data service is connected, you will want to organize your WMS display to suit your needs. Most WMS services contain multiple layers of information, not all of which every user wants to implement. For instance, you may only want to use the Spot 2.5m and the Orthophoto and the Orthophoto Tile Index to view dates of acquisition.

Organizing Layers

For this, you once again highlight the WMS name on the left of your screen, and with a right click, go to "Properties". As this pop-up menu opens you will see 4 tabs. Open the "Layers" menu and you will see the list of layers in the WMS on the left side. You can then select the layers you wish to display in your Arcmap and add them to the right side. You can also move the layers up or down to organize which layers will overlay the others. (**Note:** You may want your vector data on top of the imagery to see it more easily when you wish to turn it on)

Authoring Display Scales

With this done now you will want to go to the "General" tab within the properties menu and organize the scales at which each layer should display. If you don't do

this you will in fact, be asking the system to display all the data, from all the layers you've selected, all the time. This is a lot of data and will result in long redraws and frustration at system performance.

A better approach is to set the display scale for each layer you've selected, to maximize performance efficiency, and to only show this information at the optimum views.

We know that SPOT10m has a 10 metre pixel resolution, Spot2.5m has a 2.5 metre pixel resolution and SGIC Orthophotos have a 62.5 cm pixel resolution. Therefore we should organize these for best viewing as follows:

<u>Imagery Type</u>	<u>Optimum Viewing Scales</u>
SPOT10m	1:500,000 – 1:50,000
SPOT2.5m	1:50,000 – 1:10,000
OrthoPhoto 60cm	1:10,000 – 1:2,000
Regina 30 cm	1:2,000 – 1:500
Saskatoon 20cm	1:2,000 – 1:500

The above are only suggested display scales and each user will have some unique reasons to change some of the above to suit their needs. Organizing the imagery with scales as above will result in display rates to most desktops in the 3-5 second range, which for most projects would be very acceptable. Keep in mind that the smaller the area is before turning on the Imagery, the better your performance will be.

Save for “Always Ready” state

Once your WMS connection is established within your project and set up and “authored” as you like it, then save the entire project. From then on each time you load or start your GIS project, the WMS layers will be there at your disposal, whenever you need them.

If you don't need the WMS layers for a while you can just turn them off but leave everything connected and they are always at your service.

Public versus Members WMS

The FlySask Public WMS contains all those layers available to the public. The FlySask Members WMS contains those layers only available to the SGIC members.

Therefore, SGIC members may wish to not only add the Members WMS but may also wish to try the Public WMS and add some components (i.e Townships, or roads, or Parks for instance) from that as well. You can do this in the same way as previously described.

Coordinate Systems

If you are adding the WMS to a blank project, Arcmap will automatically load the WMS and display in the Geographic coordinate system (Lat/long). You then have the option of transforming the coordinate system to anything else you wish, for instance, UTM NAD83 (CSRS).

If you are adding the WMS to an existing project where a coordinate system is already defined, the WMS will automatically display in the pre-defined projection (as long as that projection has been previously identified in the WMS by the system administrator, which UTM Nad83 CSRS is for various zones).

FlySask WMS Supported Projections

EPSG	Projection
2955	NAD83 (CSRS) / UTM Zone 11N
2956	NAD83 (CSRS) / UTM Zone 12N
2957	NAD83 (CSRS) / UTM Zone 13N
4326	WGS84 / (GeodeticCRS) Geographic 2D
3857	WGS 84 / Pseudo-Mercator
26711	NAD27 / UTM Zone 11N
26712	NAD27 / UTM Zone 12N
26713	NAD27 / UTM Zone 13N
26911	NAD83 / UTM Zone 11N
26912	NAD83 / UTM Zone 12N
26913	NAD83 / UTM Zone 13N
3348	NAD83(CSRS) / Statistics Canada Lambert
2151	NAD83 (CSRS98) / UTM Zone 13N <i>deprecated</i>

Other GIS Systems

These WMS services should work with any GIS system that has enabled WMS connections in accordance with the standards of the Open Geospatial Consortium for web mapping services. Some of the processes may be different, but likely very similar. We would like to hear of any user experiences in using the FlySask WMS services with other systems.

Appendix 3 Accessing WMS From ESRI ArcCatalog

Introduction

This appendix describes accessing the SGIC Web Map Service from ESRI ArcGIS.

Procedure

1. Load ArcCatalog
2. In the catalog listing expand the "GIS Servers" to show its sub listings
3. Double-click the "Add WMS Server" which opens a dialogue box that will allow you to enter the web server address(url), user name and password.
4. Click the "OK" button after entering your information, the dialogue box will disappear and a new line will be added to the "GIS Servers" listing
5. This new listing can be renamed and when expanded will show the data sets available from the web server.

