

# CUAHSI HydroShare GeoServer Tutorial

## – Creating a Compatible Resource

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### Introduction

When running hydrologic tests, often a GIS application may be required to provide a visual display of the data being tested. GIS compatible data is represented as either feature class layers or raster layers. HydroShare users can store these layers in their resources and connect the resources to OGC web services enabled GIS clients. This is done by using a HydroShare owned GeoServer server. Resources with GIS data layers will automatically be uploaded to the HydroShare GeoServer if the content data registers as the correct content types in the HydroShare database. The newly created layers/rasters can be found on <https://geoserver.hydroshare.org> by using the resource ID. The purpose of this tutorial is to demonstrate how to create a GeoServer compatible resource and addresses difficulties that may occur while using these services.

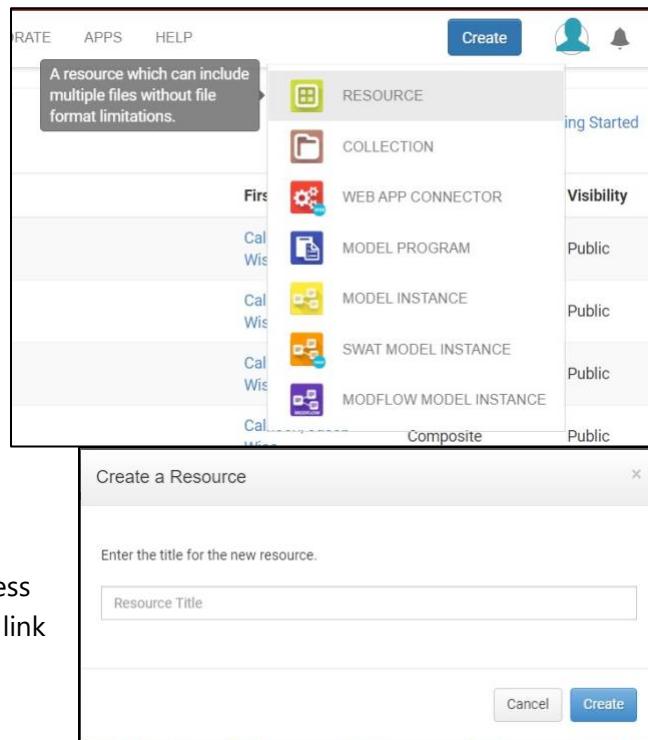
### Creating a GeoServer Compatible Resource

#### Creating the Resource

Login into HydroShare and click on the **Create** button in the top-right corner and click **Resource**. In the pop-up dialog box, provide an appropriate title for the resource and click **Create**.

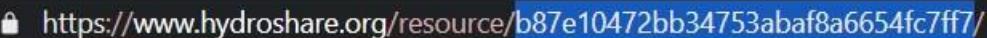
#### Adding Data to the Resource

If the previous step was done correctly, you should be taken to a new webpage. This is the new resource's homepage. Notice the URL in the search bar. There should be a long string consisting of numbers and letters following **hydroshare.org/resource/**. This string is the resource's specific ID code. Users who have access to the resource will use the resource ID code to link it to different applications within HydroShare or other applications that are compatible with HydroShare through the HydroShare API interface.



Here is a screenshot of the test resource being used in this tutorial. The blue highlighted portion is the resource ID code, or simply the **Resource ID**.

[Link to the example resource](https://www.hydroshare.org/resource/b87e10472bb34753abaf8a6654fc7ff7/)

 https://www.hydroshare.org/resource/b87e10472bb34753abaf8a6654fc7ff7/

The resource homepage is where the user will add all data and metadata. To connect the resource to the HydroShare GeoServer, the resource must be set to public and the content data must register as either **Geographic Feature Content** or **Geographic Raster Content**.

Upon creation, the default sharing status of the resource is set to private. To set the resource to public, a minimum of three metadata fields must be filled. These three fields are the abstract, subject keywords, and content. At least one content file must be uploaded to complete the requirement. Once the three fields have been filled, the sharing status can be changed from private to public under the **Manage who has access** button at the top of the screen.



At the top of the resource homepage is a list of various metadata fields. As data is added to the resource, more metadata fields may appear if the content data meets the requirements for that type of metadata. One such field is **Content Types**, which describes the content of the data in the resource and will only appear once data is added to the resource. The content data must register as **Geographic Feature Content** or **Geographic Raster Content** to appear on the HydroShare GeoServer. When adding GIS data to the resource, be sure to include all data files and metadata associated with the layer or add as much as is available. Partial data may not be enough to register the content.

Authors:	Dan Ames	Sharing Status:	Public
Owners:	Dan Ames	Views:	24
Resource type:	Composite Resource	Downloads:	1
Storage:	The size of this resource is 60.7 MB	+1 Votes:	Be the first one to  this.
Created:	Oct 01, 2020 at 7:26 p.m.	Comments:	No comments (yet)
Last updated:	Oct 01, 2020 at 7:31 p.m. Dan Ames		
Citation:	<a href="#">See how to cite this resource</a>		
Content types:	 		

If the data added to the resource registers as **Geographic Feature Content** or **Geographic Raster Content**, then URL's to use the OGC Web Services will become available below the **Content** section in a new section titled **Data Services**.

## Data Services

The following Open Geospatial Consortium Web Services are available for this resource. The links below can be copied and pasted into Geographic Information Systems software programs to access geospatial data included within this resource.

### Web Map Service

<https://geoserver.hydroshare.org/geoserver/wms?service=WMS&version=1.3.0&request=GetCapabilities&namespace=HS-ff3cdc42641f468b823593354e96be87> 

### Web Feature Service

<https://geoserver.hydroshare.org/geoserver/wfs?service=WFS&version=1.1.0&request=GetCapabilities&namespace=HS-ff3cdc42641f468b823593354e96be87> 

### Web Coverage Service

<https://geoserver.hydroshare.org/geoserver/wcs?service=WCS&version=1.1.0&request=GetCapabilities&namespace=HS-ff3cdc42641f468b823593354e96be87> 

For a general definition of Geographic Feature/Raster Content and what qualifies as such, visit the following two links:

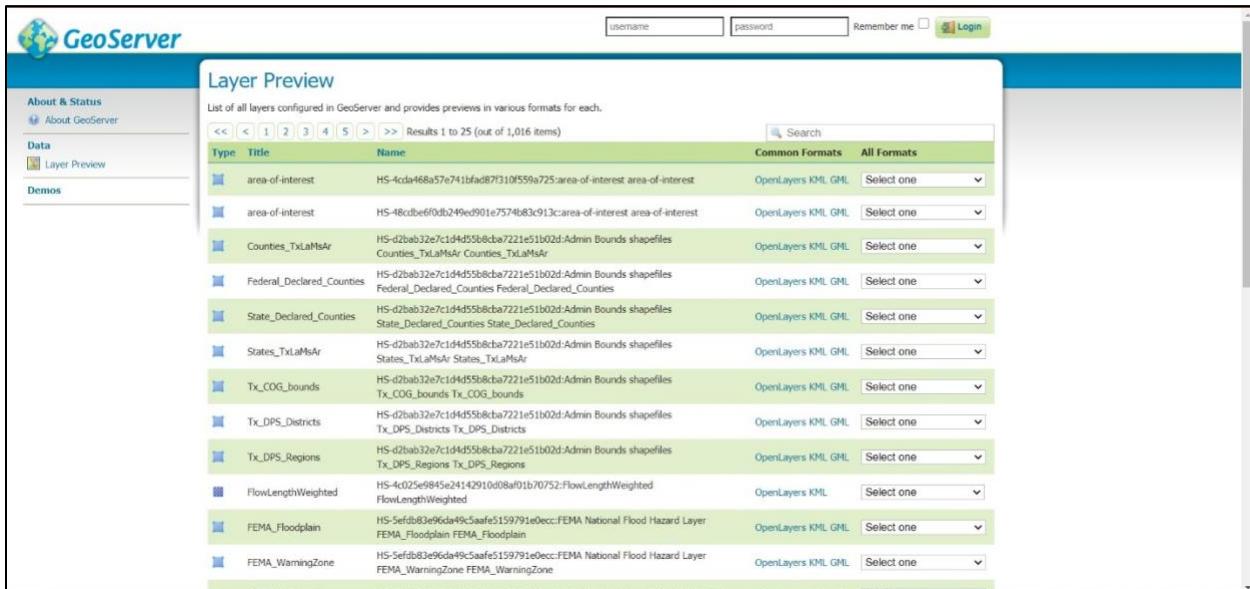
[Geographic Feature](#) | [Geographic Raster](#)

For a more thorough guide on creating and managing resources, visit:

<https://help.hydroshare.org/creating-and-managing-resources/>

## Finding the Resource on GeoServer

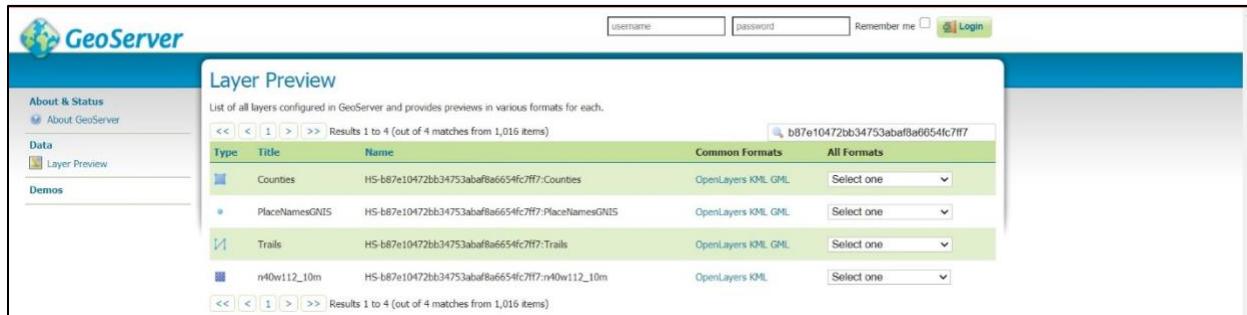
A good way to know if all the previous steps were done correctly is to check if the GIS layers are available to use on the HydroShare GeoServer. Click on the following link ([geoserver.hydroshare.org](https://geoserver.hydroshare.org)) and click **Layer Preview**. The Layer Preview page should appear as so:



The screenshot shows the GeoServer Layer Preview interface. At the top, there is a login form with fields for 'username' and 'password', a 'Remember me' checkbox, and a 'Login' button. Below the login form, the title 'Layer Preview' is displayed. A sub-header indicates there are 1,016 items, with results 1 to 25 shown. The main area is a table with columns: Type, Title, Name, Common Formats, and All Formats. The table lists various layers, including 'area-of-interest', 'Counties\_TxLaMsAr', 'Federal\_Declared\_Counties', 'State\_Declared\_Counties', 'States\_TxLaMsAr', 'Tx\_COG\_bounds', 'Tx\_DPS\_Districts', 'Tx\_DPS\_Regions', 'FlowLengthWeighted', 'FEMA\_Floodplain', and 'FEMA\_WarningZone'. Each row shows the layer's name, its description (e.g., 'Admin Bounds shapefiles'), and options to select a format (OpenLayers KML, GML, or both). The table has a green header bar and a green footer bar.

Type	Title	Name	Common Formats	All Formats
area-of-interest	HS-4cda468a5741bfad87f310f559a725:area-of-interest	area-of-interest	OpenLayers KML, GML	Select one
area-of-interest	HS-48cc0e6f0d8249e0901e7574083013:area-of-interest	area-of-interest	OpenLayers KML, GML	Select one
Counties_TxLaMsAr	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	Counties_TxLaMsAr	OpenLayers KML, GML	Select one
Federal_Declared_Counties	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	Federal_Declared_Counties	OpenLayers KML, GML	Select one
State_Declared_Counties	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	State_Declared_Counties	OpenLayers KML, GML	Select one
States_TxLaMsAr	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	States_TxLaMsAr	OpenLayers KML, GML	Select one
Tx_COG_bounds	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	Tx_COG_bounds	OpenLayers KML, GML	Select one
Tx_DPS_Districts	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	Tx_DPS_Districts	OpenLayers KML, GML	Select one
Tx_DPS_Regions	HS-d2bab32e7c1d4d5b8bcb7221e51b02d:Admin Bounds shapefiles	Tx_DPS_Regions	OpenLayers KML, GML	Select one
FlowLengthWeighted	HS-4c025e9485e24142910d08a01b70752:FlowLengthWeighted	FlowLengthWeighted	OpenLayers KML	Select one
FEMA_Floodplain	HS-5efdb83e96da49c5aafe5159791e0ecc:FEMA National Flood Hazard Layer	FEMA_Floodplain	OpenLayers KML, GML	Select one
FEMA_WarningZone	HS-5efdb83e96da49c5aafe5159791e0ecc:FEMA National Flood Hazard Layer	FEMA_WarningZone	OpenLayers KML, GML	Select one

Copy and paste the Resource ID into the search bar and hit enter. If done correctly, the GIS data layer added to the resource should be available. If not, return to the previous section and be sure each step was done correctly.



The screenshot shows the GeoServer interface with the "Layer Preview" section selected. It displays a table of layers with columns for Type, Title, Name, Common Formats, and All Formats. The layers listed are Counties, PlaceNamesGNIS, Trails, and n40w112\_10m. Each row has a dropdown menu under "All Formats". Navigation buttons and a search bar are visible at the top and bottom of the preview area.

Type	Title	Name	Common Formats	All Formats
Counties	HS-b87e10472bb34753abaf8a6654fc7ff:Counties	OpenLayers KML, GML	Select one	
PlaceNamesGNIS	HS-b87e10472bb34753abaf8a6654fc7ff:PlaceNamesGNIS	OpenLayers KML, GML	Select one	
Trails	HS-b87e10472bb34753abaf8a6654fc7ff:Trails	OpenLayers KML, GML	Select one	
n40w112_10m	HS-b87e10472bb34753abaf8a6654fc7ff:n40w112_10m	OpenLayers KML	Select one	

## Errors and Technicalities

### Using Folders to Organize Data

When creating a resource, it is often preferred that the data can be organized efficiently. This is especially true if the resource contains several datasets. While Hydroshare does allow users to store their data in specific folders, it should be done with caution. At the time of this writing, there exists a bug in the backend coding that will not allow a WFS or WCS connection to be made in any GIS client if the data is stored in a file. Furthermore, the bug has differing effects depending on the application and the version of the application.

For demonstration purposes, the following resource was used: <https://www.hydroshare.org/resource/4188cf578a6344d18fda466dcd3a8ab5/>

#### ArcGIS Pro:

there are currently two reported outcomes for attempting to connect a WFS/WCS layer that is stored in a file on HydroShare.

- An error dialog box appears stating ArcGIS Pro failed to retrieve the layer. ArcGIS Pro crashes.
- ArcGIS Pro crashes.



#### ArcMap:

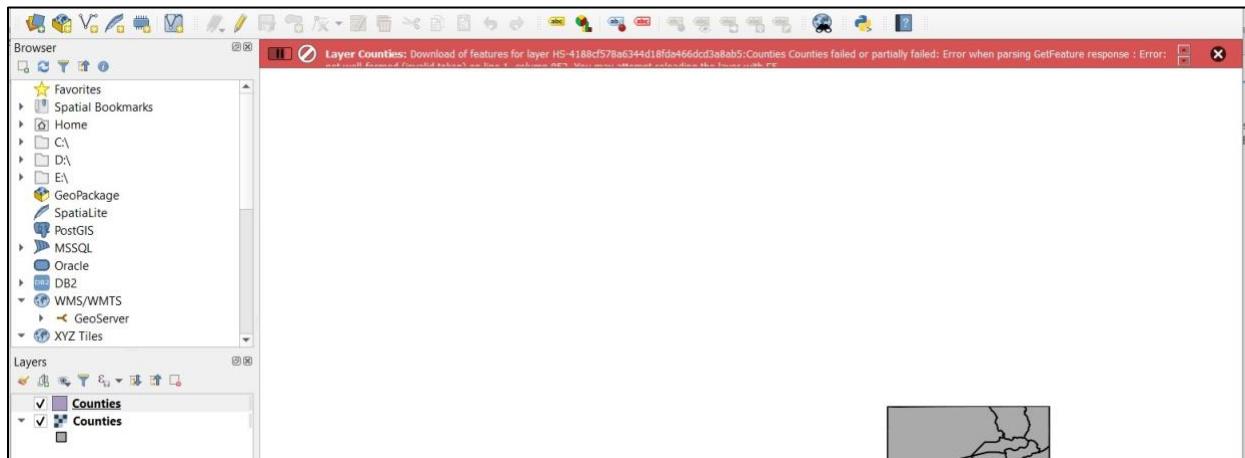
- The connection will appear to be successful but will fail to retrieve the data and generate an empty layer in the Contents Pane.

## ArcGIS Story Maps/Online

- The connection will appear to be successful but will fail to retrieve the data and generate an empty layer in the Contents Pane.

## QGIS

- The connection will appear to be successful but a banner across the top of the map will say QGIS failed to retrieve the layer.



## References

- Corlay, S., & Granger, B. (n.d.). *Ipyleaflet: Interactive maps in the Jupyter notebook—Ipyleaflet documentation*. Retrieved January 6, 2021, from <https://ipyleaflet.readthedocs.io/en/latest/index.html>
- CUAHSI. (n.d.). *Home | CUAHSI HydroShare*. HydroShare. Retrieved December 23, 2020, from <https://www.hydroshare.org/home/>
- Esri Inc. (n.d.). *What is ArcGIS StoryMaps?—ArcGIS StoryMaps | Documentation*. Retrieved December 23, 2020, from <https://doc.arcgis.com/en/arcgis-storymaps/get-started/what-is-arcgis-storymaps.htm>
- Esri Inc. (2019). *ArcGIS Desktop—ArcMap* (2.4.2) [Computer software]. Esri Inc. <https://desktop.arcgis.com/en/arcmap/>
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- QGIS Development Team. (2020). *QGIS Geographic Information System* (3.16) [Computer software]. Open Source Geospatial Foundation Project. <http://qgis.osgeo.org>