

How to Stream IndianaMap Web Services in ArcGIS Pro

The IndianaMap.org website is the authoritative place for Geographic Information about the State of Indiana, and there are many ways to access the data that is hosted on IndianaMap. This document will describe how to access web services to use IndianaMap data in local software, describe what those map services are and why you would use them, and describe how to export hosted data to local folders for offline use in ArcGIS Pro.

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What are GeoService API Addresses/Links?

Many IndianaMap users are interested in using IndianaMap data in desktop GIS applications like ArcGIS Pro. However, many of us learned how to interact with data in static workflows which required us to download full copies of data from online resources to our desktops, and then subset them to the area we were interested in mapping (e.g., taking the entire State of Indiana Parcel data and subsetting it to just one county).

Fortunately, we can accomplish this much more quickly, and use less bandwidth, by using the IndianaMap GeoService API links available on the IndianaMap website to load state-wide data, and then subset them to a given map window or polygon feature class right in ArcGIS Pro. This document will outline the process for doing so, provide an example using

statewide parcel and centerline data, and provide an example of how much data transfer traffic was reduced in the process.

What are GeoService API Addresses/Links?

All of the GeoService API (Application Program Interface) addresses/links on the IndianaMap site are REST (Representational State Transfer) service endpoints, a certain type of webserver page which provides access to data through certain data-access standards, in our case following [Open Geospatial Consortium standards](#) (often the Web Feature Service, WFS, standard). These addresses allow you to access the features stored on IndianaMap in any compatible application such as web mapping platforms, desktop GIS, and mobile mapping platforms, as long as you have an internet connection. IndianaMap's GeoService API links are open and do not require you to sign-in using an IndianaMap account, which makes them very useful for quickly accessing statewide feature classes.

REST endpoints provide a uniform interface (meaning, they work the same wherever they are employed) that allows clients (mapping applications) to interact with GIS servers in a standard way. They're responsive (meaning fast) and they are a simple common language for client-server data exchanges.

Why Should I use GeoService API Addresses/Links?

Using GeoService API Addresses/Links is advisable for a variety of reasons. The most important reason that IndianaMap users might want to move toward using GeoService API Addresses to use IndianaMap data is that *these services distribute the most up to date data*. This means that when you add a GeoService API feature to your map project you are using current data, not a static copy. This is important for more regularly updated datasets on IndianaMap, like roads, addresses, parcels, electric utility territories, underground storage tanks, historic sites and structures, and water quality assessments. For example, if your map includes information on underground storage tanks and water quality assessments, which both get updated more than once or twice a year, your map will be more current using GeoService API Addresses/Links.

Another case revolving around "currency" is the frequently used street and parcel data that come from the Indiana Data Harvest. These annually updated layers are regularly downloaded by IndianaMap users, but they're large and take up quite a bit of disk space. Because of the larger file sizes, users occasionally make use of the data they have already downloaded, which may be a year or more out of date. Using the GeoService API Addresses/Links prevents the unintentional use of out-of-date data.

Beyond currency, GeoService API Addresses/Links are a uniform way to integrate data into your scripts and programs. They tend to be very reliable and scalable (meaning that the same GeoService API Link can be used for projects large or small), and these Addresses/Links are independent of platform or programming language, meaning they work on Windows, Linux, iOS, and Android, and can be used in programming languages ranging from Python to Lisp.

Where can I Find GeoService API Addresses/Links on IndianaMap?

There are a variety of ways to access IndianaMap GeoService API Addresses/Links.

In the **Data Gallery** click on any dataset and in the Summary View, click on the “I want to use this” button:

County Boundaries of Indiana Current

IndianaMap GIO
IndianaMap

Summary

These polygons were compiled from county boundary lines or parcels submitted by each county to the Geographic Information Office in 2021.

[View Full Details](#)

[Download](#)

Details

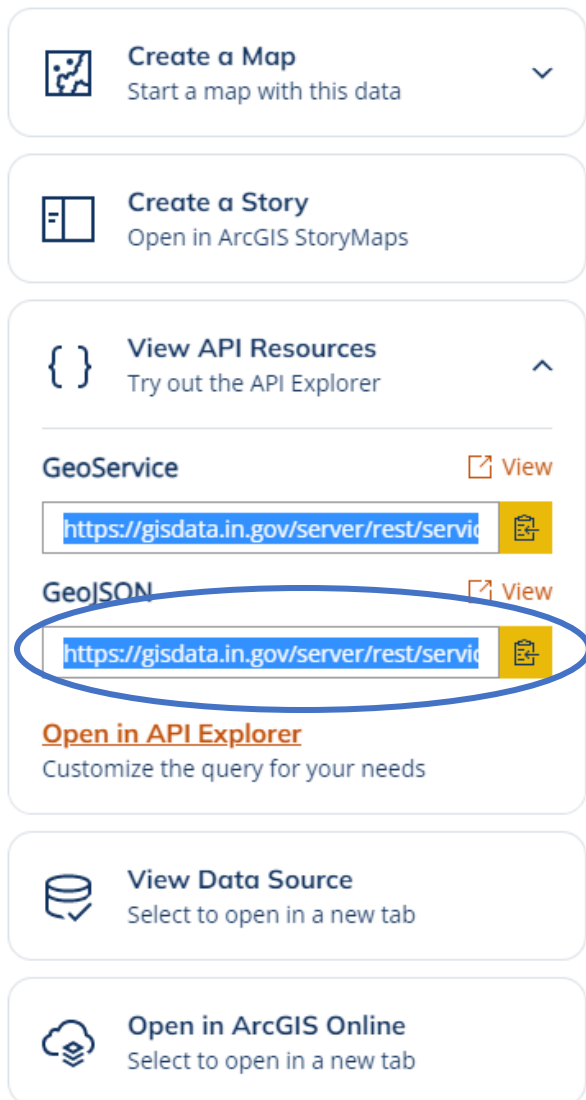
- Dataset**
Feature Layer
- January 24, 2023**
Info Updated
- January 24, 2023**
Data Updated
- September 8, 2022**
Published Date
- 92 Records**
[View data table](#)
- Public**
Anyone can see this content
- Custom License**
[View license details](#)

[I want to use this](#)

92 records

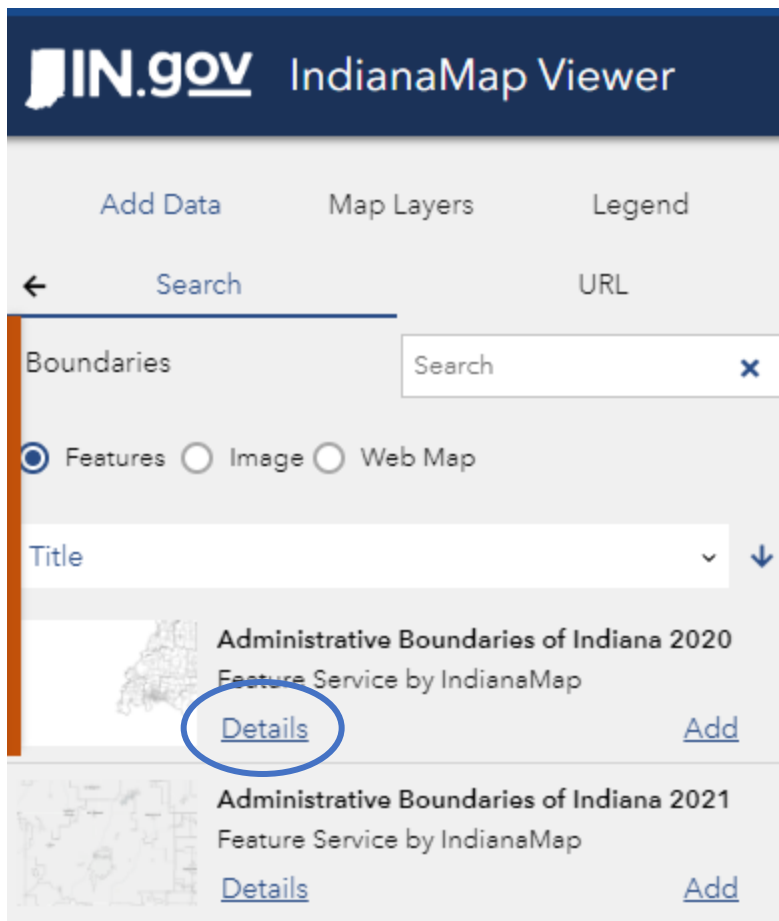
Map showing County Boundaries of Indiana Current. The map displays the state of Indiana with county boundaries highlighted in blue. Major cities and surrounding states (Illinois, Kentucky) are visible.

The result will be a menu:

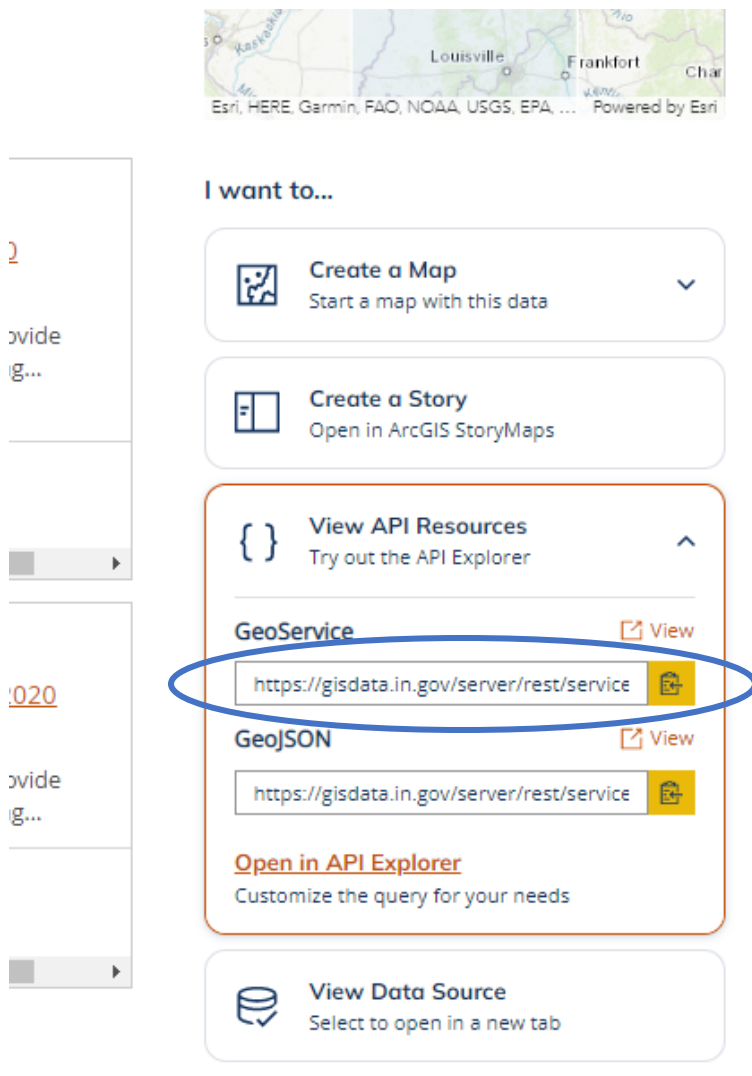


The GeoService API Address/Link is the top one when you expand the “View API Resources” button, circled above.

In the IndianaMap Viewer, you can access the GeoService API Address/Link by searching for a data layer and clicking the “Details” link on the left:



This will display the Information Page for that data layer. Scroll down and toward the bottom-right you should see the same menu with “View API Resources” as an option:



There are a few other places where the GeoService Address/Link for a dataset can be found on IndianaMap, but these are the two most common/direct ways.

GeoService API Addresses/Links with More Power – The IndianaMap API Explorer

The methods of accessing GeoService API Addresses/Links described in the last section are useful for getting access to IndianaMap data through streaming services, but for even more flexibility you can use the IndianaMap API Explorer.

What is the API Explorer?

The API Explorer allows you to create a custom GeoService API Address/Link that extracts only the data you need – as defined by a filter on attribute values, list of output attribute fields, spatial inputs like bounding boxes, and even the ability to retrieve just attributes, or a list of features that meet your filter criteria. In other words, the API explorer is a way to refine your data stream from IndianaMap. This is particularly useful for datasets with large attribute tables (e.g., [Protected Area Boundaries](#)) or if you are using IndianaMap data in an application or map and want to speed up data transfer by eliminating the transfer of unneeded attributes or spatial features.

Accessing the API Explorer

The API Explorer is accessible on IndianaMap in a number of ways and can generally be opened via a link wherever you find GeoService API Addresses/Links listed on IndianaMap. One of the easiest ways to access the API Explorer is to find a dataset you wish to use, for example this “County Boundaries of Indiana Current” dataset:

County Boundaries of Indiana Current

IndianaMap GIO
IndianaMap

Summary

These polygons were compiled from county boundary lines or parcels submitted by each county to the Geographic Information Office in 2021.

[View Full Details](#)

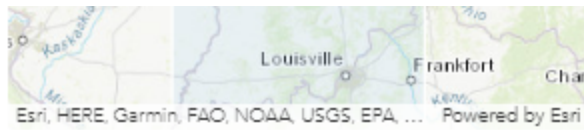
[Download](#)

Details

- Dataset**
Feature Layer
- January 24, 2023**
Info Updated
- January 24, 2023**
Data Updated
- September 8, 2022**
Published Date
- 92 Records**
[View data table](#)
- Public**
Anyone can see this content
- Custom License**
[View license details](#)

[I want to use this](#)

Click the “I want to use this” button and you should see this display:



I want to...



Create a Map

Start a map with this data



Create a Story

Open in ArcGIS StoryMaps



View API Resources

Try out the API Explorer



GeoService

View

<https://gisdata.in.gov/server/rest/service>



GeoJSON

View

<https://gisdata.in.gov/server/rest/service>



Open in API Explorer

Customize the query for your needs



View Data Source

Select to open in a new tab

2

Provide
g...

020

Provide
g...

Expand “View API Resources” and then API Explorer can be accessed by clicking the “Open in API Explorer” link. That should bring up a page like this:

County Boundaries of Indiana Current

< Back to Full Details

API Explorer

County Boundaries of Indiana Current

Create a query URL from the available options to get a JSON response. See our full [REST API documentation](#) for details.

Query

Parameter	Value
Where	No Active Filters
Out Fields	☒ name ☒ alt_name ☒ abrv_name ☒ name_ucase ☒ name_lcase ☒ fips ☒ cnty_fips ☒ cntyfips_n ☒ alpha0 ☒ alpha0_n ☒ alpha1 ☒ alpha1_n ☒ dhs_dis ☒ dhs_dis_n

Query URL

```
https://gisdata.in.gov/server/rest/services/Hosted/County_Boundaries_of_Indiana_Current/FeatureServer/0/query?where=1%3D1&outFields=*&outSR=4326&f=json
```

Copy to clipboard

Options in API Explorer

API Explorer allows you to create a new GeoService Address/Link that is specific to your needs (that's shown in the "Query URL" inside the blue box, above). Changes made on the page will refine the Query URL accordingly. When you're satisfied that your query meets your needs, you would copy and paste the Query URL into your map or application to use the data with the query you have established. There are many ways to refine your API Explorer queries (for even more detail, check out <https://developers.arcgis.com/rest/services-reference/enterprise/query-feature-service-layer-.htm>):

Filters

Filters can be added by clicking the "plus" button (circled in blue, above). Filters work on attribute values. So, if you wanted only county boundaries for Spencer County you could select the "name" attribute and set "Spencer" to be the filtered text. Like so:

Where

name | Text
▼

like Spencer

+

+

Note that you can add multiple filters by clicking on the plus button again. Be aware that each filter will reduce the number of matching records, and it is possible to define a filter that filters away all your features! Features work on numeric attributes as well but require that you specify a range.

Below the Filter section (titled “Where”) you can uncheck any attributes you do *not* want to include in your output query URL. This is helpful if you are not interested in an attribute – for example, perhaps you want to remove the “dhs_dis” fields from the County Boundaries layer (these are Department of Homeland Security Districts) because perhaps they are not useful for your use case. You could just uncheck those attributes and they will not appear in the attribute table generated by your query. Doing so can increase responsiveness or decrease the amount of data used to download/stream your dataset.

Spatial Inputs

These options allow you to restrict the features that the API will serve up by an envelope (basically, just a bounding box – rectangles/squares only – that will select what features are returned). In this area, set your “Geometry Type” to “Envelope” (it’s the only option) and then either type in a series of two coordinates in decimal degrees, or click the “Add extent from map” link (in blue box, below):

Spatial Inputs

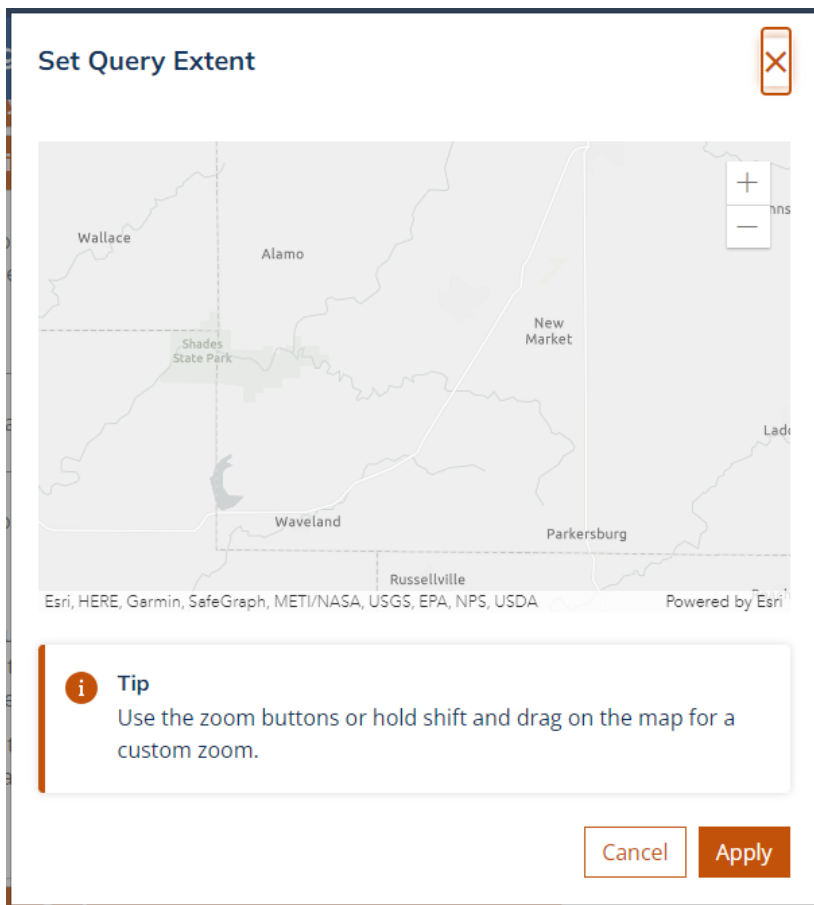
Geometry Type

Envelope

The type of geometry specified by the geometry parameter.

Parameter	Value
Geometry	-87.182,39.843,-86.799,40.027 Add extent from map
Input Spatial Reference	4326 The spatial reference of the input geometry.
Spatial Relationship	Intersects The spatial relationship to be applied on the input geometry while performing the query.

This brings up a zoom dialog box where the extent of the zoom provides the geographic coordinates:



Click apply and your coordinates will be added to the “Geometry” box.

The other two options in the “Spatial Inputs” area are:

- “Input Spatial Reference”, which most users will not want to change. However, if you are manually inputting geometry coordinates in a specific spatial reference then you would put the [EPSG Code](#) of your spatial reference in here (numbers only).
- “Spatial Relationship”, which allows you to select how the features in the dataset will interact with your envelope geometry. There are a number of options here:
 - Intersects: Indicates if one geometry (features from IndianaMap) intersects another geometry (your Spatial Input bounding box).
 - Contains: Indicates if one geometry (features from IndianaMap) contains another geometry (your Spatial Input bounding Box).
 - Crosses: Indicates if one geometry (features from IndianaMap crosses another geometry (your Spatial Input Bounding box).
 - EnvelopeIntersects: Indicates if the envelope (or extent) of one geometry (features from IndianaMap) intersects the envelope of another geometry (your Spatial Input bounding box).
 - IndexIntersects: Indicates if the features of one geometry (features from IndianaMap) are the same as features from another geometry (your Spatial Input Bounding Box). This is not a frequently used option.
 - Overlaps: Indicates if one geometry (features from IndianaMap) overlaps another geometry (your Spatial Input Bounding Box).
 - Touches: Indicates if one geometry (features from IndianaMap) touches another geometry (your Spatial Input Bounding Box).

- Within: Indicates if one geometry (features from IndianaMap) is within another geometry (your Spatial Input Bounding Box).

Other Output Options

This area of the API Explorer allows you to specify what types of things your custom query GeoService Address/Link actually returns. This can be useful if you're interested in just attribute tables or counts or ID numbers for features that match your query (useful when writing web applications).

Output Options

Parameter	Value
Return Geometry	☒ True ☐ False If true, the result includes the geometry associated with each feature returned.
Return Ids Only	☐ True ☒ False If true, the response only includes an array of object IDs. Otherwise, the response is a feature set.
Return Count Only	☐ True ☒ False If true, the response only includes the count (number of features/records) that would be returned by a query. Otherwise, the response is a feature set.
Output Spatial Reference	4326 The spatial reference of the returned geometry.

Most users are looking for actual geographic data, so modifying these options will be rare. However, if you are looking for feature IDs, Counts, or tables only these options can get you what you need. You can also modify your output spatial reference if desired, but this option uses EPSG Codes and only applies to the JSON geometry, which you can learn more about here: [EPSG Codes](#). For example, if you wanted to access JSON features in the Indiana State Plane East projection, you would enter 2965 into the "Output Spatial Reference" box. (Note: this does not provide reprojection services for the spatial features at this time.)

Finalizing Your Custom Query GeoService API Address/Link

Once all your API Explorer parameters are set you can get a JSON or Query URL output by clicking "Get Response" ("Reset" will clear all your selections):

Get Response

Reset

JSON

```

{
  "geometryProperties": {
    "shapeAreaFieldName": "SHAPE__Area",
    "shapeLengthFieldName": "SHAPE__Length",
    "units": "esriMeters"
  },
  "hasZ": false,
  "features": [
    {
      "attributes": {
        "cnty_fips": "133",
        "name_lcase": "putnam",
        "latitude": 39.67777133,
        "fips": "18133",
        "alt_name": "",
        "abrv_name": "Put",

```

Query URL

```

https://gisdata.in.gov/server/rest/services/Hosted/County_Boundaries_of_Indiana_Current/FeatureServer/0/query?where=1%3D1&outFields=*&geometry=-87.182%2C39.843%2C-86.799%2C40.027&geometryType=esriGeometryEnvelope&inSR=4326&spatialRel=esriSpatialRelIntersects&outSR=4326&f=json

```

Copy to clipboard

Most IndianaMap users will find the “Query URL” output most useful, so click the “Copy to clipboard” button and use that URL as you would any other GeoService API Address/Link. Instead of providing access to ALL the data in the layer, the server will provide you only the data you specified using the API Explorer.

This can significantly reduce data transfer speed for larger datasets where only a subset of the attributes or area coverage are needed, so it can be a big timesaver and network traffic reducer. You can’t break anything (another advantage of GeoService API addresses!) so feel free to experiment with this tool.

Adding a Feature Service by URL in an ArcGIS Pro Project

Add Data

After copying the URL of the dataset you would like to use in ArcGIS Pro, click near the caret below ArcGIS Pro’s “Add Data” button. In the pop-up window that appears, paste the web service URL into the “Path” bar. If you would like to append custom request parameters to the web service, click on the “Custom request parameters” button to expand the accordion and enter your request into the “Parameter” and “Value” bars. These parameters will be appended to the web service URL in your project.

Add Data From Path

Add data using a path for a service URL, portal item, data file, or catalog path.

Path
gisdata.in.gov/server/rest/services/Hosted/Road_Centerlines_of_Indiana_Current/FeatureServer

Service type
An ArcGIS Server Web Service

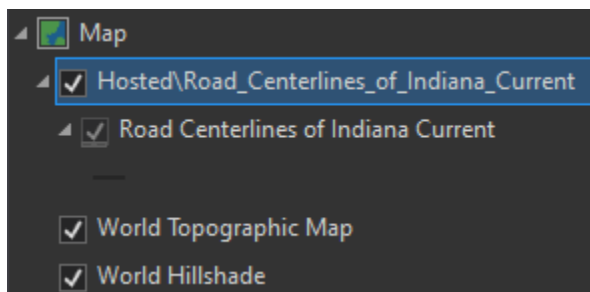
Custom request parameters ⓘ

Parameter	Value
Click to add new row.	

[Learn more about adding data from paths](#)

Add Cancel

After adding the web service data to your project, the data should start to draw in your map view. Depending on the layer, you may need to zoom in to have features start to draw, depending on their set visibility range. This setting can be modified in the layer's appearance options or display options in the properties section as needed.



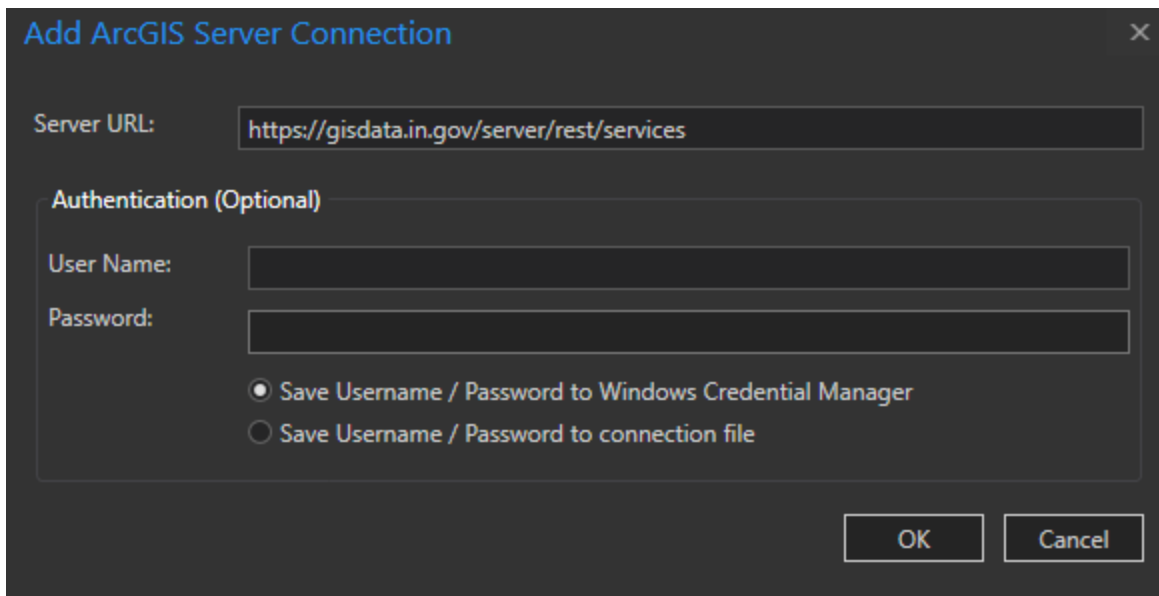
Adding a Server Connection to gisdata

Most of the data on indianamap.org is published on gisdata.in.gov, the IGIO's ArcGIS Portal environment. Setting up a server connection to this environment allows you to easily browse and connect to any **publicly** shared web service (which includes all IndianaMap services published by the IGIO) from ArcGIS Pro.

In your ArcGIS Pro project, navigate to your Catalog pane or view.

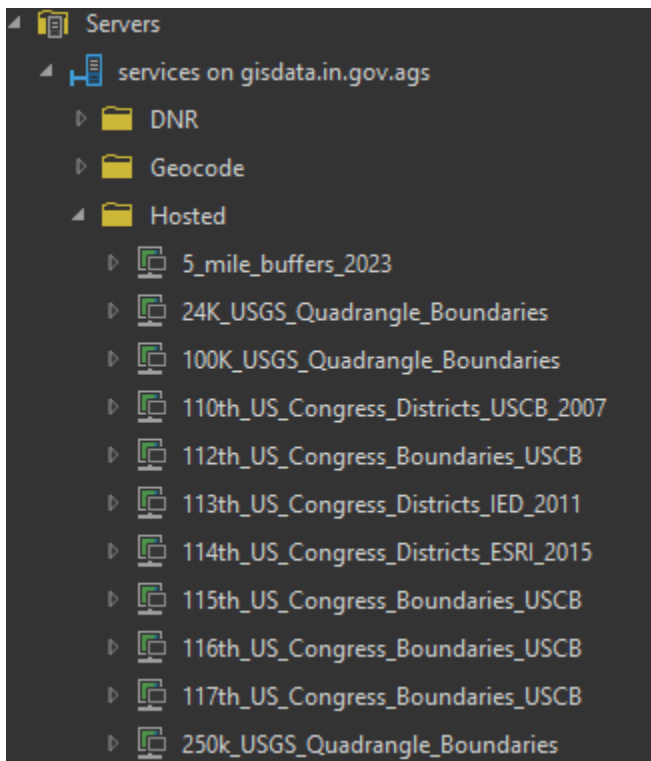
Right click on your screen or Project folder icon, and select "Add ArcGIS Server Connection" from the dropdown menu.

Enter gisdata.in.gov/server/rest/services into the bar, and leave the username and password sections empty. After clicking "Ok", if a pop-up prompting you to log in appears, close it.

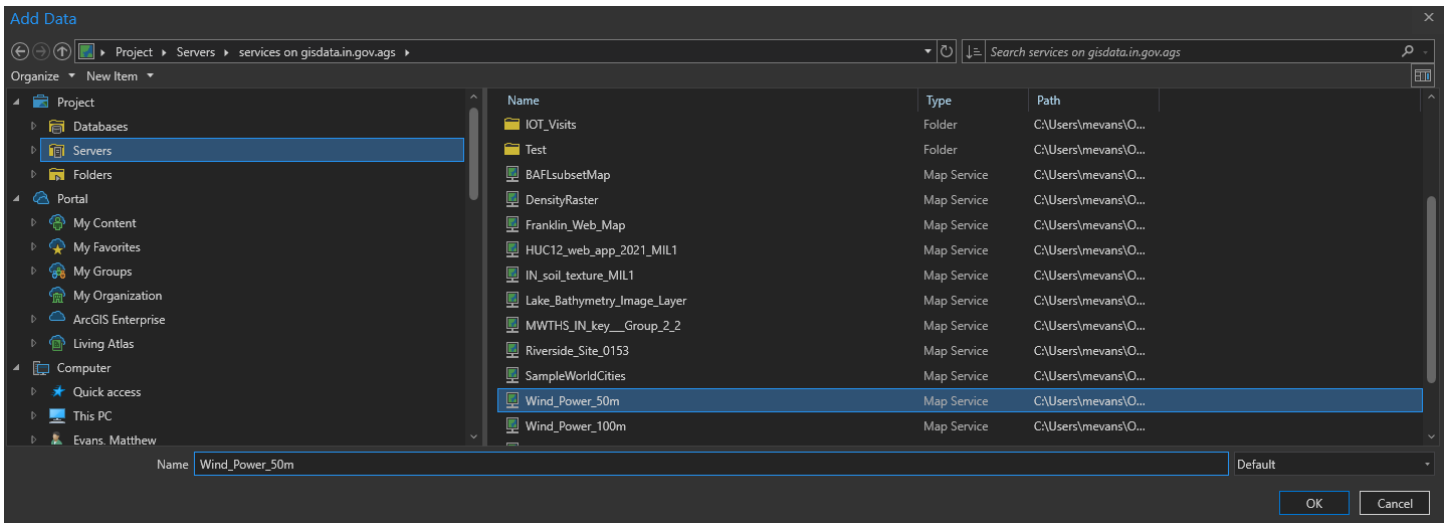


The "Add ArcGIS Server Connection" dialog box is shown. It has a title bar with a close button. The "Server URL:" field contains the text "https://gisdata.in.gov/server/rest/services". Below this is an "Authentication (Optional)" section with "User Name:" and "Password:" fields. There are two radio buttons: "Save Username / Password to Windows Credential Manager" (which is selected) and "Save Username / Password to connection file". At the bottom right are "OK" and "Cancel" buttons.

After adding the server connection, you can access it in the “Servers” folder when adding new data to the map. Most web services (especially feature services) are published to the “Hosted” folder. Please note that the service names that appear here come from the REST URL and may not match the layer title you see on indianamap.org depending on how they were published.



To add data to your map, browse for the layer you want to use, select it by clicking once, and click “Ok”. The features within the web service will now draw in your map frame if you are within their display range.

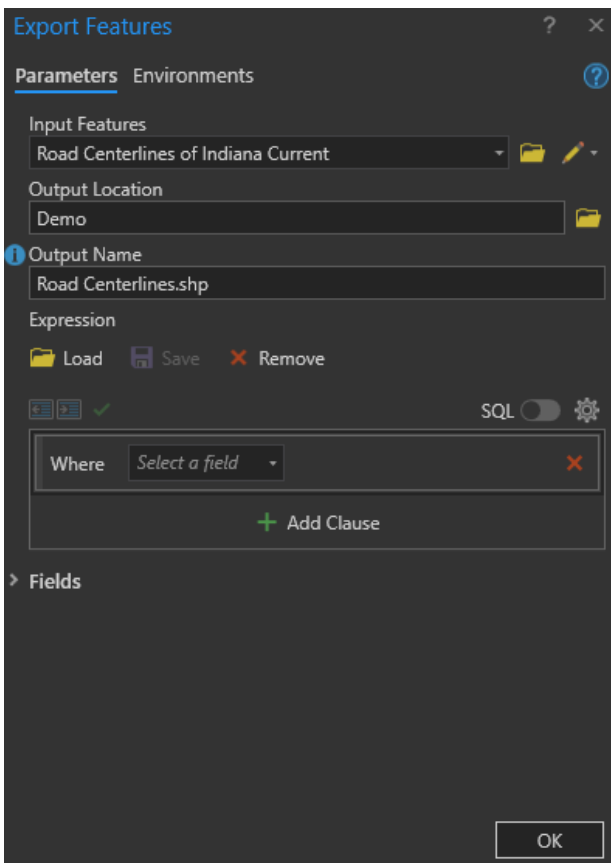


Exporting a Web Service to Local Formats in ArcGIS Pro

Export All Features

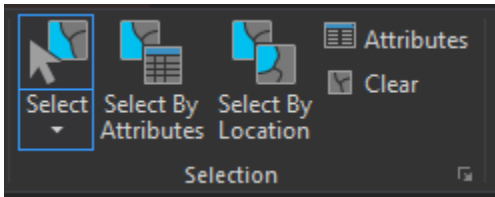
Most, but not all web services on indianamap.org have been enabled for local export at the REST endpoint as of 6/2023. For layers this is enabled on, you can simply select the layer you added to your map, right click on it, press “Data”, and “Export Features”. You can select an existing geodatabase to create a feature class within, or a folder to create a new shapefile in.

To create a shapefile, select a folder in the “Output Location” section and press OK. In the “Output Name” bar, enter the desired name of your shapefile. The .shp file extension will automatically be appended to it after pressing OK or hitting Tab on your keyboard.

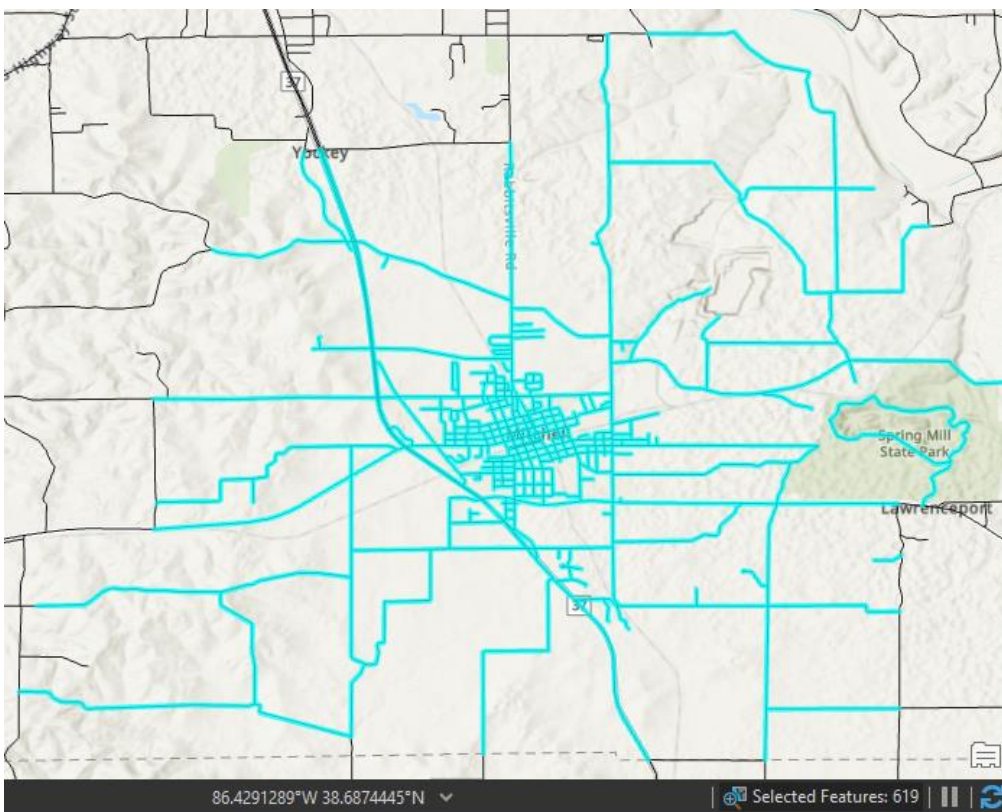


Export a Selection of Features

If you do not want to export the entire dataset to a local format, you can easily export a subset of features by selecting them in the map view first. To select features, click on the Select button at the top ribbon of your ArcGIS Pro Project.



This will allow you to select individual, or multiple, features by clicking on the map, and dragging your mouse to draw a polygon. All features that intersect that polygon will be selected. You can verify how many features are selected by looking at the bottom right corner of your map frame.



To export only the features you have selected, now right click on the layer you selected features from, click “Data”, and “Export Features”. This is the same process outlined in the “Export All Features” section above. When you run this tool, **only** the features you have selected will be exported to your local file.

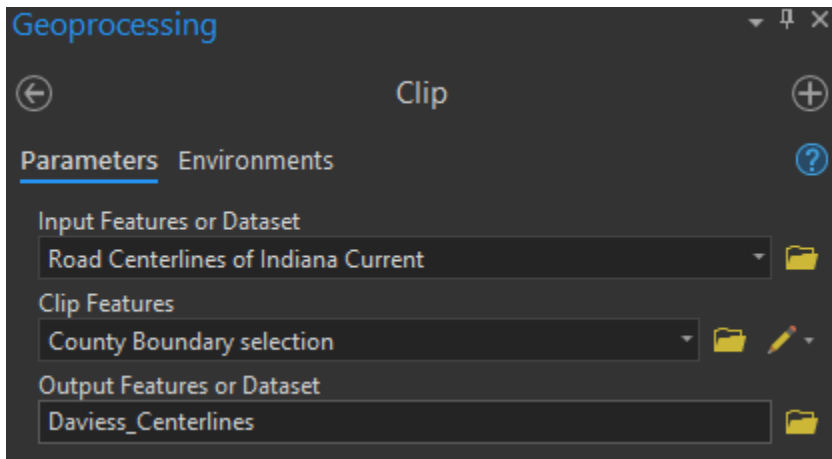
You can also use the “Select by Attributes” if you want to only export features that match a certain attribute value or series of values.

Export Through Geoprocessing

Clip

ArcGIS Pro’s Clip tool allows you to cut out a subset of a given dataset based on its spatial relationship to another dataset. For example, if you want to clip out one county of data from the statewide road centerlines dataset, you can

create a selection layer of a given county boundary, and use that as your clip features. This tool will create a separate output dataset in the format and location of your choice.



In the image above, the road centerlines will be clipped to the county boundary of Daviess County. This county boundary was created as a selection layer from the “County Boundaries of Indiana Current” dataset on IndianaMap. You can also clip by an entire dataset if that dataset only covers your area of interest.