

Analyze fire preparedness with the ArcGIS GeoEnrichment Service

Determine the adoption rate for smoke detectors in the forested areas of Marin County, California.



Authors

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Duration

30mins

Difficulty

Intermediate

Marin County, California, is known for its heavily forested areas and has many homes in areas with a high risk of fire. County supervisors plan to partner with the American Red Cross to educate the community about fire prevention, preparation, and response as part of its [Home Fire Campaign](#).

This document reflects the final published version of this tutorial, last tested on February 5, 2024. This tutorial document will no longer be updated.

You can find current tutorials in the tutorial gallery:
<https://learn.arcgis.com/en/gallery/>

In this tutorial, you'll perform regional analysis of Marin County's forested areas. In particular, you'll determine the percentage of homes that have a smoke detector. This information will help officials target their campaign geographically.

This tutorial was last tested on February 5, 2024, using ArcGIS Pro 3.2. If you're using a different version of ArcGIS Pro, you may encounter different functionality.

Requirements

- ArcGIS Pro ([see options for software access](#))
- 18.67 [credits](#)

Outline

[Map Marin County forests](#)

Extract a polygon of the forested area within Marin County, California.

10 minutes

[Map smoke detector adoption](#)

Enrich the area with information about smoke detector adoption.

20 minutes

Map Marin County forests

In this tutorial, you'll add data for counties and land cover in the United States to an ArcGIS Pro project. Then, you'll extract information for your area of interest, Marin County.

Create a Marin County polygon

First, you'll create a polygon layer to show the Marin County boundaries. You'll download United States county data from the [ArcGIS Living Atlas of the World](#) and extract the data for Marin County.

The ArcGIS Living Atlas is an online collection of authoritative geographic information from around the world. It contains many ready-to-use data layers, including the political boundary and land cover layers you'll use in this tutorial.

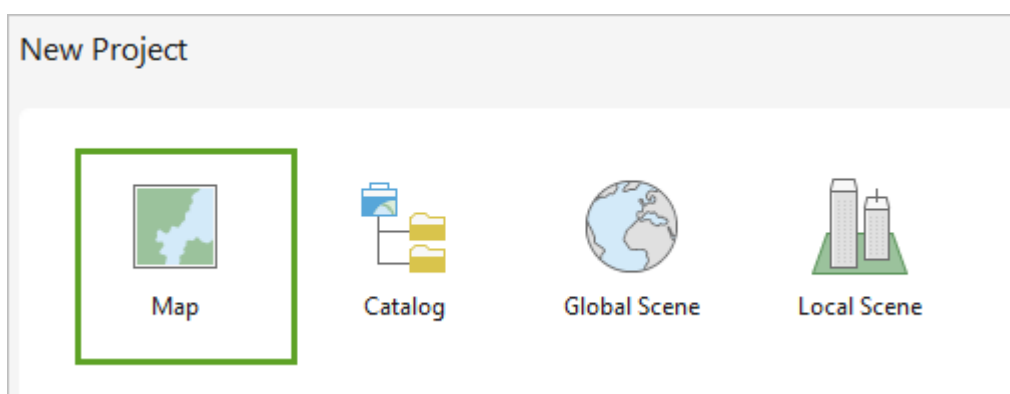
1. Start ArcGIS Pro. If prompted, sign in using your licensed ArcGIS organizational account.

Note:

If you don't have access to ArcGIS Pro or an ArcGIS organizational account, [see options for software access](#).

When you open ArcGIS Pro, you're given the option to create a new project or open an existing one. If you've created a project before, you'll see a list of recent projects.

2. Under **New Project**, click **Map**.

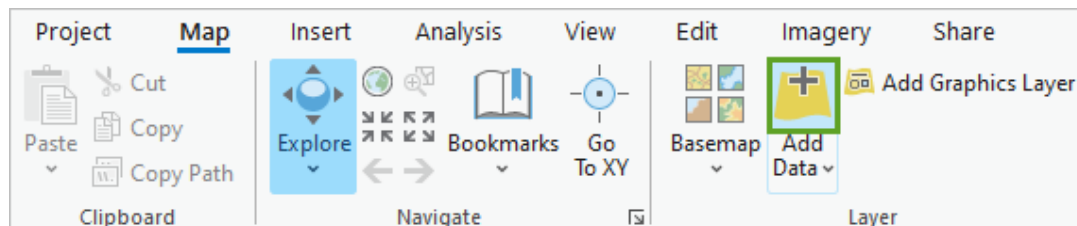


The **Create a New Project** window appears.

3. For **Name**, type Marin County Smoke Detector Analysis. Click **OK**.

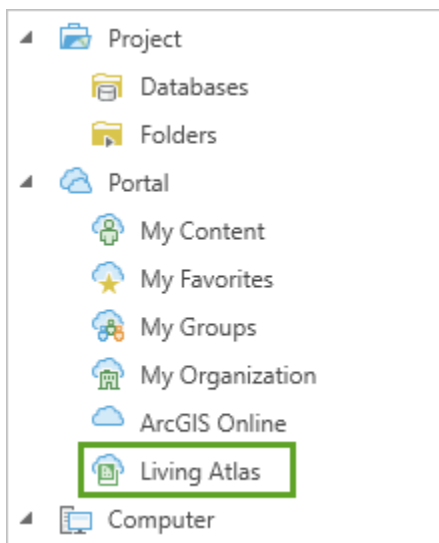
The project is created. Next, you'll add data.

4. On the ribbon, click the **Map** tab. In the **Layer** group, click the **Add Data** button.



The **Add Data** window appears. You can add data from several sources, including ArcGIS Living Atlas.

5. Under **Portal**, click **Living Atlas**.



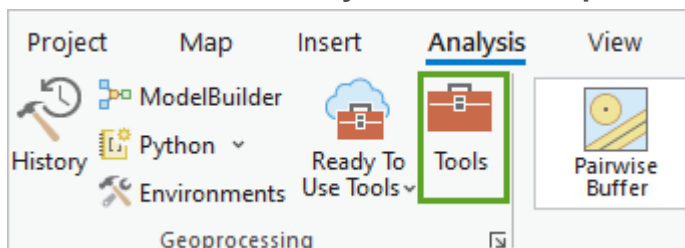
6. In the search box, type USA Census Counties and press Enter. In the list of search results, click **USA Census Counties**.

Results for 'USA Census Counties' ▼			
Title	Type	Date Modified	Owner
USA Census Counties	Feature Layer (Hosted)	5/19/2022 4:36:28 PM	esri_dm
USA Counties (Generalized)	Feature Layer (Hosted)	7/1/2021 10:43:31 AM	esri_dm
USA Census 2020 Redistrict...	Feature Layer	1/25/2022 11:13:07 AM	esri_demogr
USA Census Tracts	Feature Layer (Hosted)	5/19/2022 4:30:52 PM	esri_dm

7. Click **OK**.

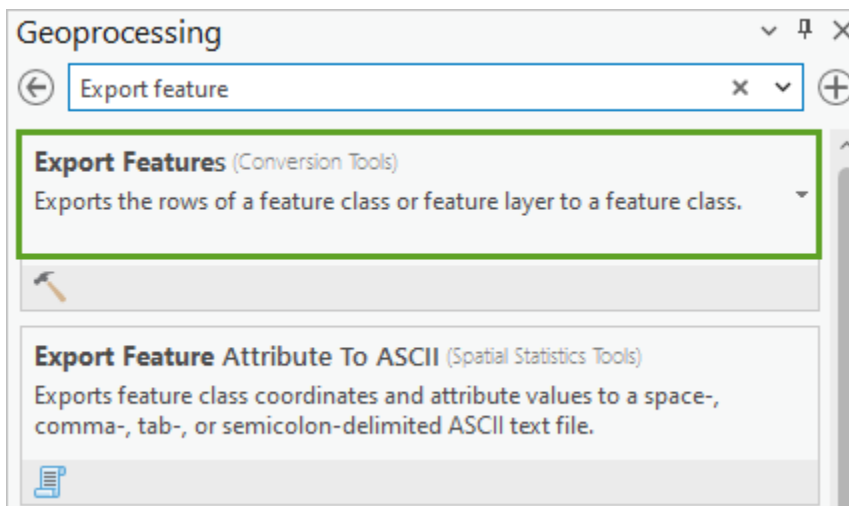
The layer is added to the map. It contains all county and county equivalents in the United States. You only need the data for one county, however. You'll export Marin county to a new feature layer.

8. On the ribbon, on the **Analysis** tab, in the **Geoprocessing** group, click **Tools**.



The **Geoprocessing** pane appears.

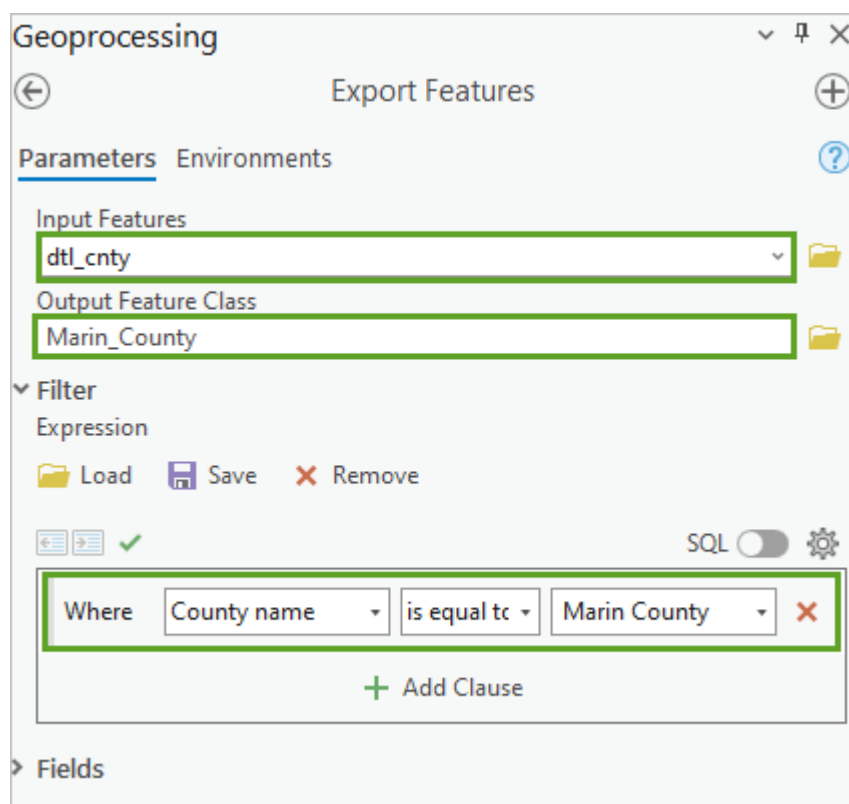
9. In the **Geoprocessing** pane, search for and open the **Export Features (Conversion Tools)** tool.



The **Export Features** tool pane opens.

10. In the **Export Features** tool pane, set the following parameters:

- For **Input Features**, choose **dtl_cnty**.
- For **Output Name**, type **Marin_County**.
- Expand the **Filter** section and input the expression **County name is equal to Marin County**.



11. Click **Run**.

The tool runs and the new layer is added to the **Contents** pane. You no longer need the original layer, so you'll remove it.

Tip:

To remove a layer, right-click on the layer (**dtl_cnty**) and choose Remove.

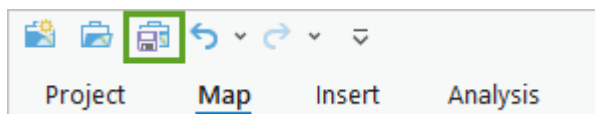
Next, you'll zoom to Marin County on the map.

12. In the **Contents** pane, right-click **Marin_County** and choose **Zoom To Layer**.

The map zooms to Marin County.



13. On the **Quick Access Toolbar**, click the **Save** button.



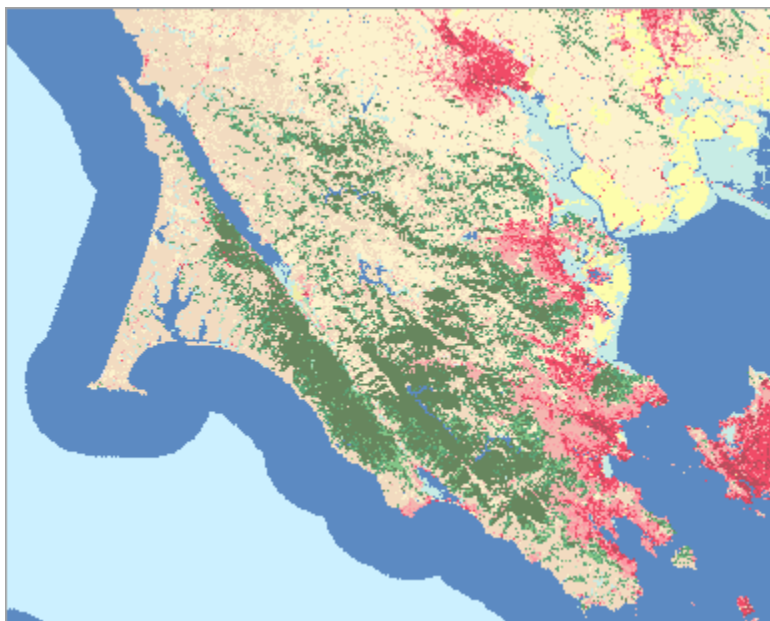
Create a polygon of Marin County forests

Next, you'll map forests in Marin County. You'll add a National Land Cover Database (NLCD) layer from ArcGIS Living Atlas and use a raster function to display only forest land cover. Then, you'll extract a polygon layer representing Marin County's forests.

1. On the ribbon, on the **Map** tab, in the **Layer** group, click the **Add Data** button. In the **Add Data** window, under **Portal**, click **Living Atlas**.
2. Search for NLCD. Add the **USA NLCD Land Cover** layer to the map.

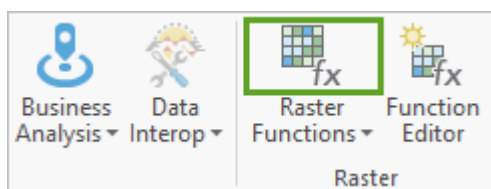
The layer is added. The NLCD is produced by the [Multi-Resolution Land Characteristics Consortium](https://www.mrlc.gov/), a group of United States federal agencies that produces land cover information at the national scale.

3. In the **Contents** pane, turn off the **Marin_County** layer.



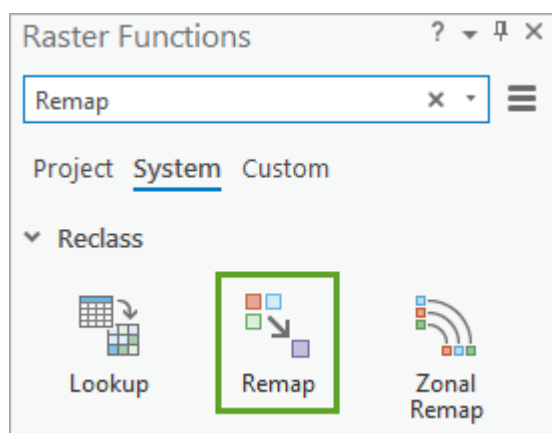
Marin County has some developed areas (displayed in red) on the county's eastern coast, but a large portion of the county's interior is forest (displayed in green). Next, you'll display only forested areas.

4. On the ribbon, click the **Analysis** tab. In the **Raster** group, click the **Raster Functions** button.



The **Raster Functions** pane appears. Raster functions apply processing operations to raster layers, such as the **USA NLCD Land Cover** layer. They apply these operations on the fly, which means that no new dataset is created, saving time and storage space.

5. In the **Raster Functions** pane, search for Remap. In the list of results, click **Remap**.



Raster layers are composed of cells, and each cell has a value. For instance, in the **USA NLCD Land Cover** layer, each land cover type has a unique numeric value (which can be found in the layer's [metadata](#)). The values for forested land cover types range between 41 and 44.

The **Remap Properties** raster function changes cell values based on parameters you choose. You'll remap the **USA NLCD Land Cover** layer so that all forested land cover values are changed to 1, and all non-forest land cover types are removed.

6. In the **Remap Properties** raster function, for **Raster**, choose **USA NLCD Land Cover**.
7. In row 1, for **Minimum**, type 41, and for **Maximum**, type 44. For **Output**, type 1. Check **Change unmatched /missing values to NoData**.

	Minimum	Maximum	Output	NoData
1	41	44	1	<input type="checkbox"/>
*				<input type="checkbox"/>

☒ Change unmatched / missing values to NoData

8. Click **Create new layer**.

The **Remap_USA NLCD Land Cover** layer is added to the map. It displays forested areas with white cells. Non-forested areas have no data and do not draw.

Your area of interest is Marin County, so you'll clip the dataset to the correct extent.

9. In the **Raster Functions** pane, search for and open the **Clip** raster function. Set the following parameters:
 - For **Raster**, choose **Remap_USA NLCD Land Cover**.
 - For **Clipping Geometry / Raster**, choose **Marin_County**.
 - Check **Use input features for clipping geometry**.

Raster Functions Clip Properties

General Parameters

Raster
Remap_USA NLCD Land Cover

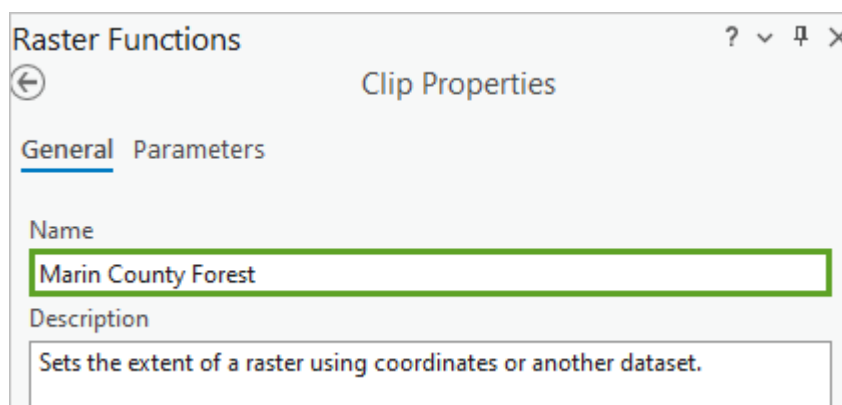
Clipping Type
Outside

Clipping Geometry / Raster
Marin_County

☒ Use input features for clipping geometry

You'll also change the output layer name.

10. Click the **General** tab. For **Name**, type Marin County Forest.



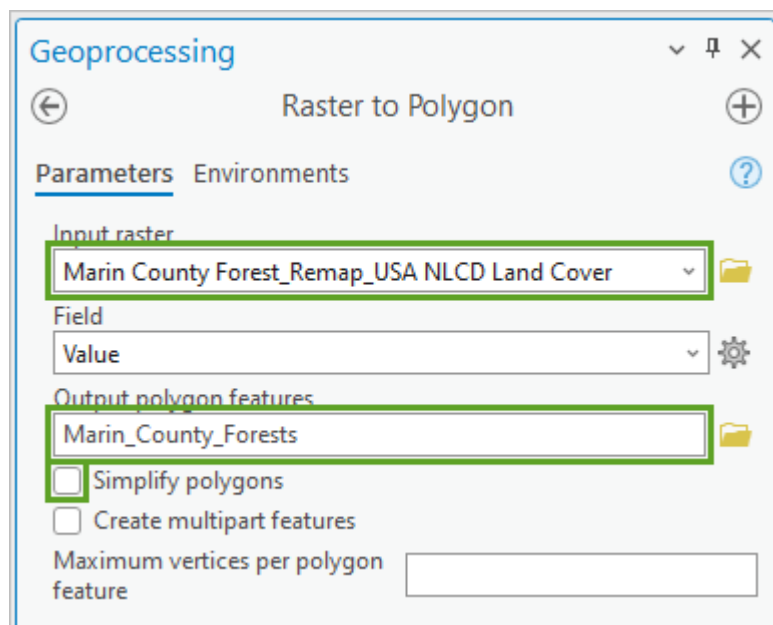
The screenshot shows the 'Raster Functions' dialog box with the 'Clip Properties' tab selected. The 'General' section is active, showing the 'Name' field set to 'Marin County Forest' and the 'Description' field set to 'Sets the extent of a raster using coordinates or another dataset.'

11. Click **Create new layer**.

The **Marin County Forest_Remap_USA NLCD Land Cover** layer is added to the map. This layer displays all forested cells in black. Next, you'll convert the raster layer to a polygon layer, so that it can be enriched later.

12. If necessary, on the ribbon, on the **Analysis** tab, in the **Geoprocessing** group, click **Tools** to open the **Geoprocessing** pane.

13. In the **Geoprocessing** pane, search for and open the **Raster to Polygon** tool.



The screenshot shows the 'Geoprocessing' pane with the 'Raster to Polygon' tool selected. The 'Parameters' tab is active, showing the following settings: 'Input raster' is 'Marin County Forest_Remap_USA NLCD Land Cover', 'Field' is 'Value', 'Output polygon features' is 'Marin_County_Forests', 'Simplify polygons' is unchecked, 'Create multipart features' is unchecked, and 'Maximum vertices per polygon feature' is empty.

14. In the **Raster to Polygon** tool, set the following parameters:

- ◊ For **Input raster**, choose **Marin County Forest_Remap_USA_NLCD Land Cover**.
- ◊ For **Output polygon features**, change the output name to **Marin_County_Forests**.
- ◊ Uncheck **Simplify polygons**.

Geoprocessing

← Raster to Polygon +

Parameters Environments ?

Input raster
Marin County Forest_Remap_USA NLCD Land Cover

Field
Value

Output polygon features
Marin_County_Forests

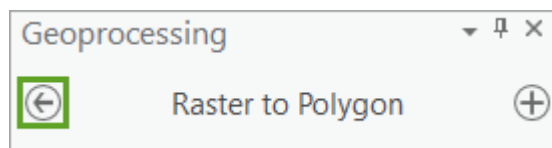
☒ Simplify polygons
☐ Create multipart features

Maximum vertices per polygon feature

15. Click **Run**.

The **Marin_County_Forests** layer is added to the map. It represents all locations in Marin County where land cover is predominantly forest. However, it may exclude adjacent areas classified as scrub or grassland because they lacked sufficient tree canopy. You'll create a small buffer around the forest polygon to encompass adjacent areas.

16. In the **Geoprocessing** pane, click the **Back** button.



17. Search for and open the **Pairwise Buffer** tool. Set the following parameters:

- ◊ For **Input Features**, choose **Marin_County_Forests**.
- ◊ For **Output Feature Class**, change the output name to **Marin_County_Forested_Area**.
- ◊ For **Distance**, type 30 and choose **Meters** for the type of unit.
- ◊ For **Dissolve Type**, choose **Dissolve all output features into a single feature**.

Geoprocessing

Pairwise Buffer

Parameters Environments

Input Features

Marin_County_Forests

Output Feature Class

Marin_County_Forested_Area

Distance [value or field] **Linear Unit**

30 Meters

Method

Planar

Dissolve Type

Dissolve all output features into a single feature

Maximum Offset Deviation

0 Meters

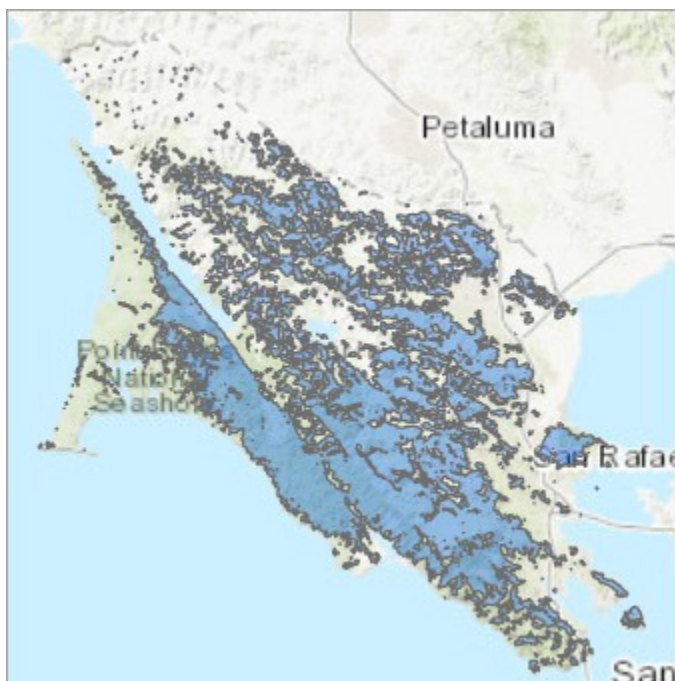
18. Click **Run**.

The tool runs and the layer is added to the map. You've created the forest polygon. Next, you'll remove intermediary layers that you no longer need.

19. In the **Contents** pane, remove the following layers:

- **Marin_County_Forests**
- **Marin_County**
- **Marin County Forest_Remap_USA_NLCD Land Cover**
- **Remap_USA NLCD Land Cover**
- **USA NLCD Land Cover**

Only the forested area polygon remains.



20. Save the project.

You have added ArcGIS Living Atlas data for county boundaries and land cover to an ArcGIS Pro project. Then, you extracted a polygon layer of forested area in Marin County.

Map smoke detector adoption

Next, you'll enrich your polygon layer of forested area in Marin County with information about the percentage of households with smoke detectors. County supervisors also want to know where these households are distributed across the county. To show them, you'll create a tessellation of hexagons and enrich them as well. Together, your enriched layers will provide the supervisors with the information they need to create a targeted fire education program for the community.

Enrich the forested area layer

First, you'll enrich the **Marin_County_Forested_Area** layer to see what percentage of households in high risk areas across the county have smoke detectors.

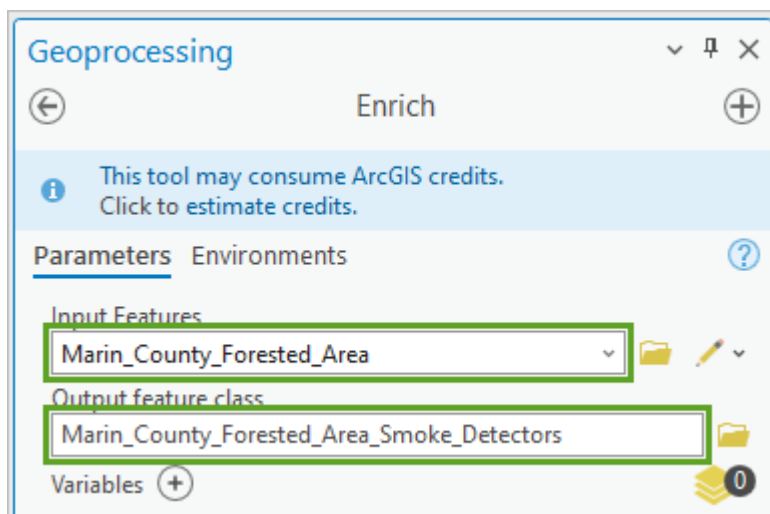
1. If necessary, open your **Marin County Smoke Detector Analysis** project in ArcGIS Pro.
2. If necessary, open the **Geoprocessing** pane (or click the **Back** button if a tool is already open). Search for and open the **Enrich** tool.

The **Enrich** tool determines demographic information for a polygon using the [ArcGIS GeoEnrichment Service](#). The GeoEnrichment Service can be used for over 130 countries, some of which have thousands of demographic and consumer behavior variables for the most recently available annual estimates.

Note:

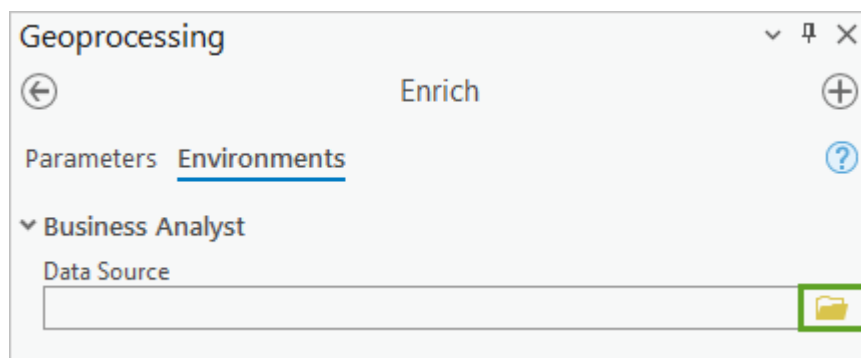
The **Enrich** tool consumes credits assigned to your ArcGIS account. In this section, you'll enrich one with four fields, which will cost 0.04 credits. In the next section, you'll enrich 463 features with 4 variables for a total cost of 18.63 credits. The ArcGIS Online help topic [Understand credits](#) contains more information about credit usage.

- For **Input Features**, choose **Marin_County_Forested_Area**. For **Output feature class**, change the output name to **Marin_County_Forested_Area_Smoke_Detectors**.



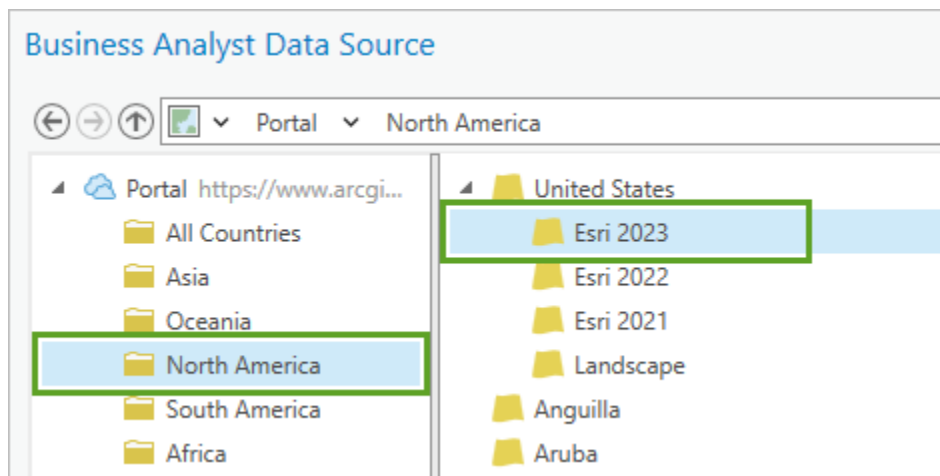
Next, you'll change the demographic data source from the default source to a source that specializes in United States data.

- Click the **Environments** tab and click the **Browse** button.



The **Business Analyst Data Source** window appears.

- Under **Portal**, click **North America**. Under **United States**, choose **Esri 2023**, and click **OK**.



The data source is updated. Next, you'll choose the demographic variables with which to enrich the area.

6. Click the **Parameters** tab. For **Variables**, click the plus button.

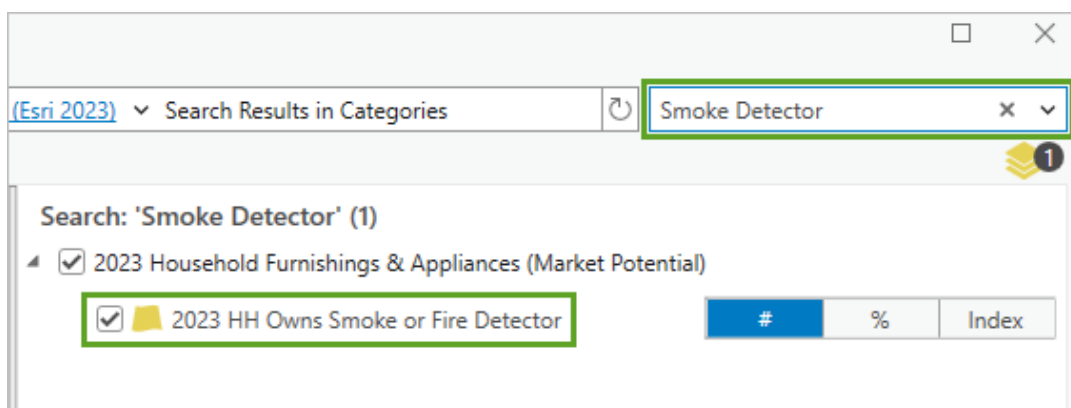


The **Data Browser** window appears.

7. In the search box, type Smoke Detector and press Enter. Under **2023 Household Furnishings & Appliances (Market Potential)**, check **2023 HH owns smoke/fire detector**.

Note:

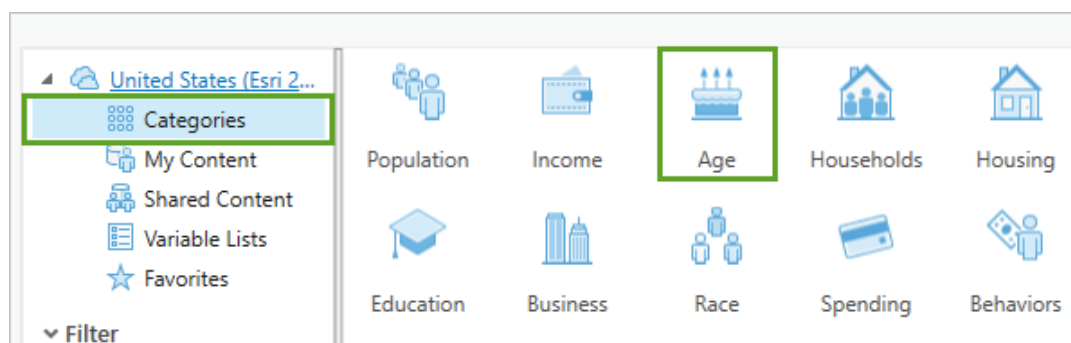
Demographic data is updated periodically. Feel free to choose more recent demographic data if it is available.



The data provider, **Market Potential**, is indicated in parentheses. At the end of the tutorial, you'll add the data source to the map.

You'll also add variables to contextualize the count of households that own smoke or fire detectors. These variables will include information about people who may be at particular risk during a fire (such as people with asthma or the elderly) and the total number of households.

8. Search for Asthma. Under **2023 Health (Market Potential)**, check **2023 Used Asthma Prescription Drug**.
9. In the left pane, under **United States (Esri 2023)**, click **Categories**. Double-click the **Age** category.

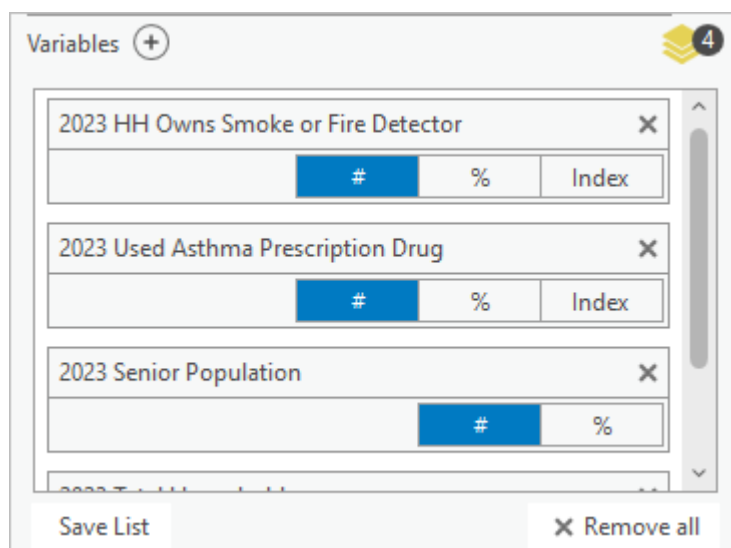


10. Double-click **Age Dependency**. Check **2023 Senior Population**.
11. In the left pane, click **Categories**. Double-click the **Households** category.
12. Double-click **Household Totals** and check **2023 Total Households**.

You have chosen four variables. An indicator in the upper right corner of the window confirms the number.

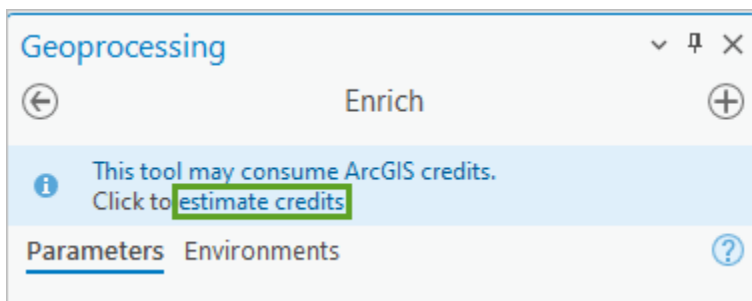


13. Click **OK**.



All of your selected variables are listed.

14. In the **Geoprocessing** pane, click **estimate credits**.



Running the tool will consume 0.04 credits.

15. Click **Run**.

The tool runs and the **Marin_County_Forested_Area_Smoke_Detectors** layer is added to the map. You no longer need the original forested area layer.

16. In the **Contents** pane, right-click **Marin_County_Forested_Area** and choose **Remove**.

You'll explore the results of enriching the layer with demographic data by opening the layer's pop-up.

17. If necessary, on the ribbon, on the **Map** tab, in the **Navigate** group, click **Explore**.

18. On the map, click anywhere inside the result polygon.

A pop-up appears with information about the polygon's attributes, including the fields with which you enriched the layer.

Tip:

You can resize the pop-up to better see all of the fields.

Pop-up

Marin_County_Forested_Area_Smoke_Detectors (1)

BlockApportionment:US.BlockGroups;PointsLayer:US.BlockPoints

Marin_County_Forested_Area_Smoke_Detectors - BlockApportionment:...

OBJECTID	1
aggregationMethod	BlockApportionment:US.BlockGroups;PointsLayer:US.BlockPoints
HasData	1
ORIGINAL_OID	1
sourceCountry	US
apportionmentConfidence	2.576
populationToPolygonSizeRating	2.191
2022 HH Owns Smoke or Fire Detector	7126
2022 Used Asthma Prescription Drug	785
2022 Senior Population	7215
2022 Total Households	11713
Shape_Length	3619822.163432
Shape_Area	572522850.294515

1 of 1

122.6993923°W 38.0393360°N

19. Close the pop-up.

20. Save the project.

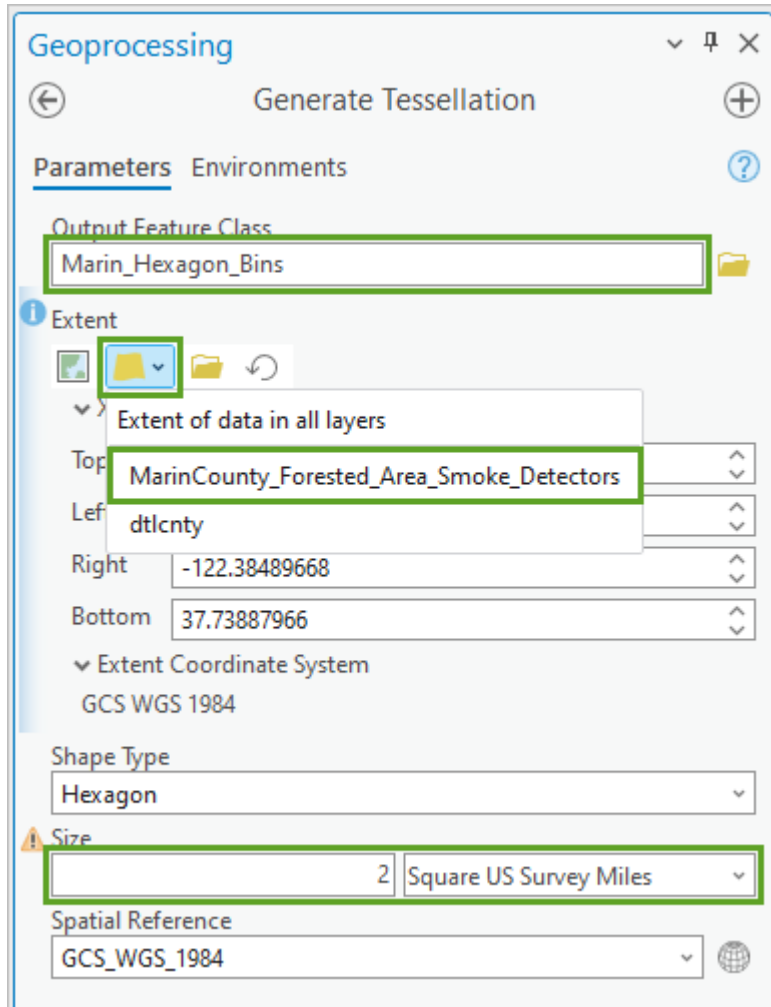
Create and enrich a tessellation

Your results include demographic data for all households in the forested area of Marin County. That information will be useful for providing county supervisors with an overall picture of the region. However, the forested area covers a large amount of space within the county and there is no indication of where households are concentrated.

To map the spatial distribution of the data, you'll create a tessellation. A tessellation divides a polygon into smaller geometric shapes. You'll divide your forested area polygon into hexagons and enrich them with the same demographic variables to better show where the households are located.

1. In the **Geoprocessing** pane, click the **Back** button. Search for and open the **Generate Tessellation** tool.
2. In the tool, set the following parameters:
 - For the name of the **Output Feature Class**, type **Marin_Hexagon_Bins**.
 - For **Extent**, click the down arrow for **Extent of a Layer** and choose **Same As layer: Marin_County_Forested_Area_Smoke_Detectors**.
 - For **Size**, type 2 and choose **Square US Survey Miles** as the unit of measurement.

Two square miles is the smallest recommended size when using the **Enrich** tool on a polygon. Smaller polygons will contain less reliable results.

**Note:**

A warning message may appear saying converting areal units in square miles to unknown is not supported. You can ignore the message as it'll not affect the workflow.

3. Click **Run**.

The tool runs and adds the **Marin_Hexagon_Bins** layer to the map. The layer contains a hexagon grid that covers the entire rectangular extent of Marin County. Many of these hexagons either do not intersect Marin County or contain areas other than forested land. You'll clip the layer to the extent of the forested area polygon.

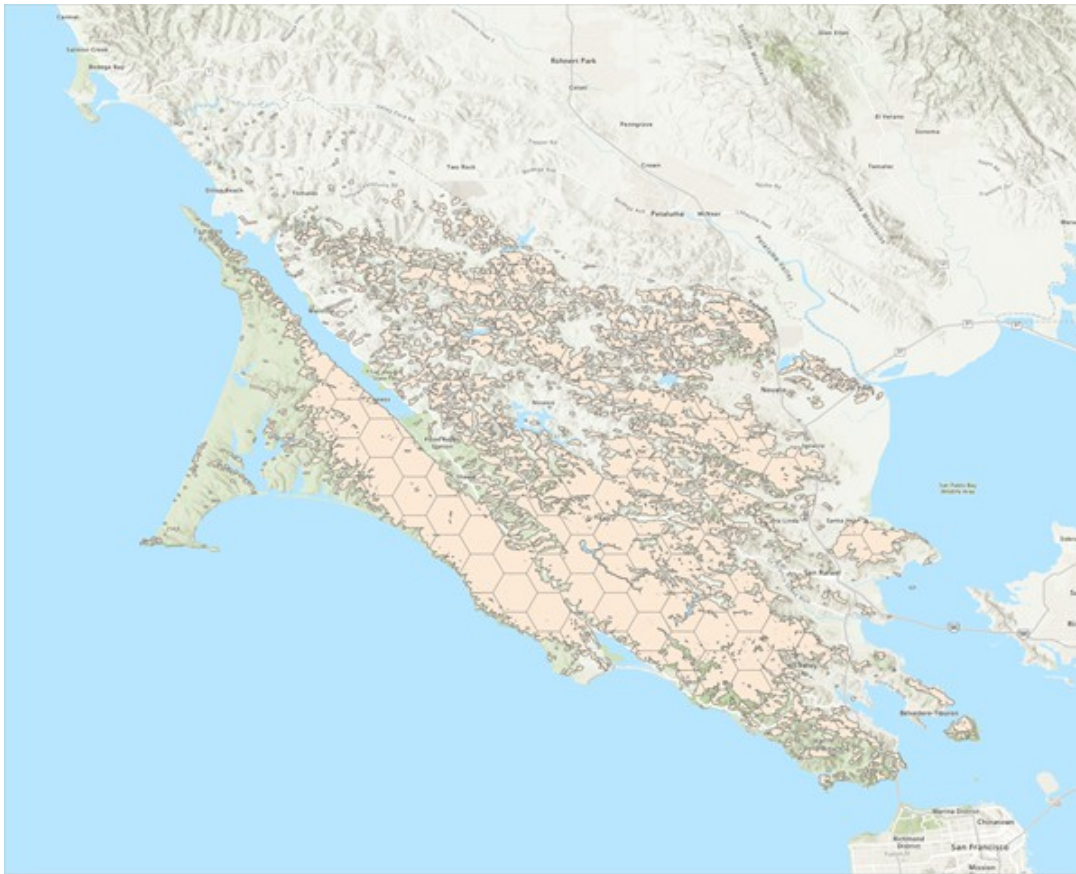
4. In the **Geoprocessing** pane, click the **Back** button. Search for and open the **Pairwise Clip** tool.
5. For **Input Features**, choose **Marin_Hexagon_Bins**. For **Clip Features**, choose **Marin_County_Forested_Area_Smoke_Detectors**.
6. Click **Run**.

The tool runs (it may take a few minutes) and the layer is added to the map.

7. In the **Contents** pane, right-click **Marin_Hexagon_Bins** and choose **Remove**.

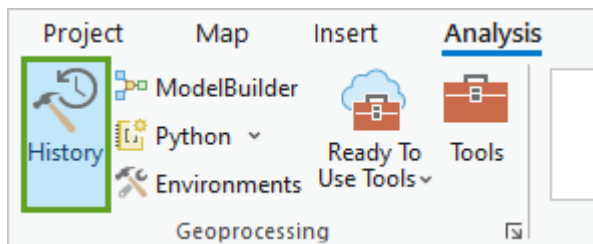
Note:

The default symbology of the layer is random and may differ from the example image.

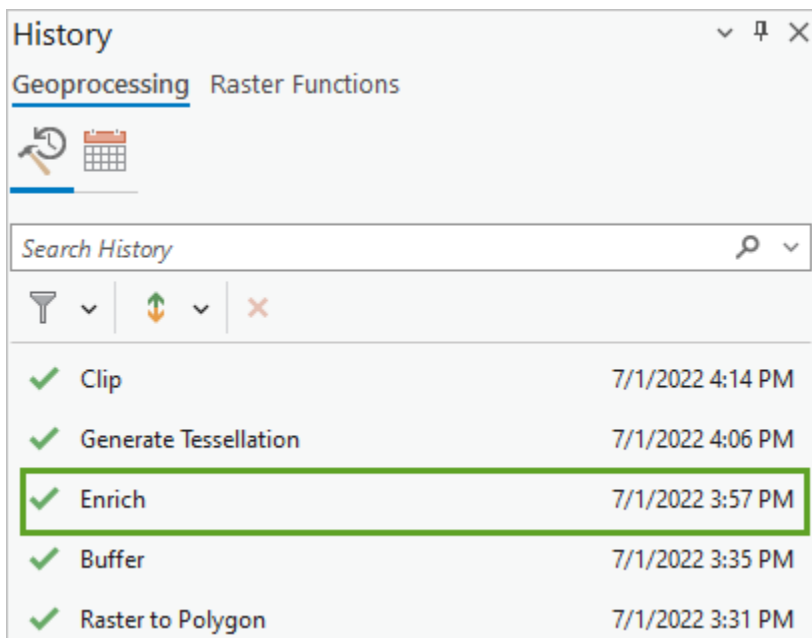


Next, you'll enrich the hexagons with the same demographic variables. Rather than choose the variables again, you can access your geoprocessing history and run the **Enrich** tool with the same parameters that you used before.

8. On the ribbon, click the **Analysis** tab. In the **Geoprocessing** group, click the **History** button.

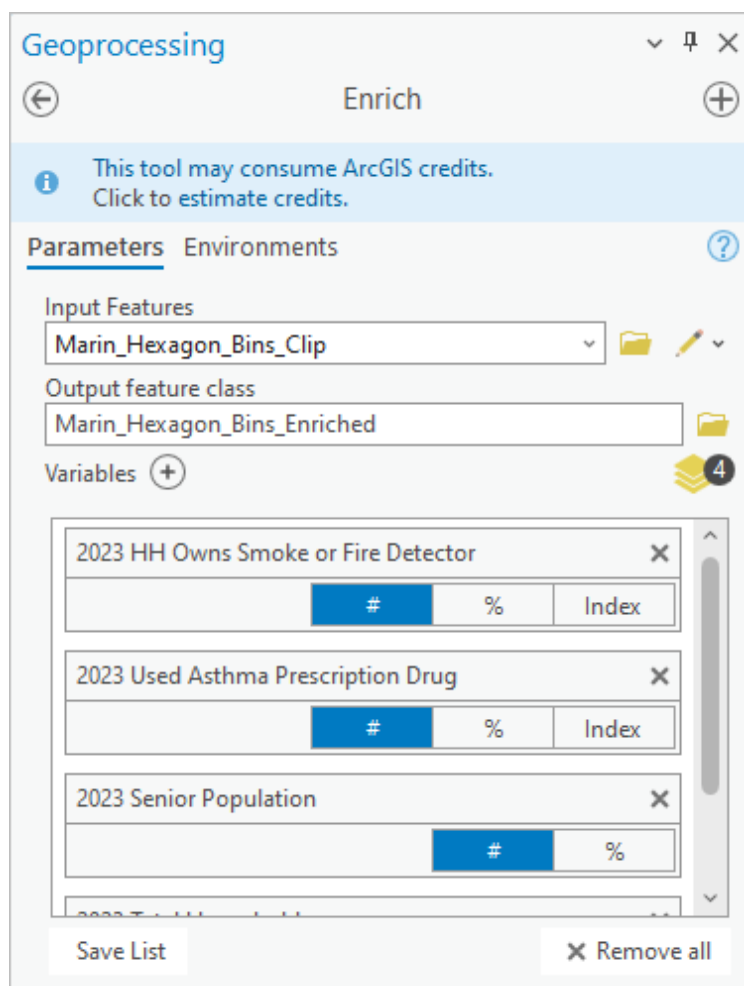


9. Double-click **Enrich**.



The **Geoprocessing** pane appears, displaying the **Enrich** tool. All of the parameters you chose the first time you ran the tool are unchanged. You only need to change the input and output parameters. Because you'll enrich more features this time, the tool will consume more credits.

- Change **Input Features** to **Marin_Hexagon_B_PairwiseClip**. For **Output feature class**, change the output name to **Marin_Hexagon_Bins_Enriched**.



- Click **estimate credits**, followed by **Run**.

The tool consumes around 9 credits. The tool runs and the layer is added to the map. You no longer need the original hexagon layer.

- In the **Contents** pane, right-click **Marin_Hexagon_B_PairwiseClip** and choose **Remove**.
- Save the project.

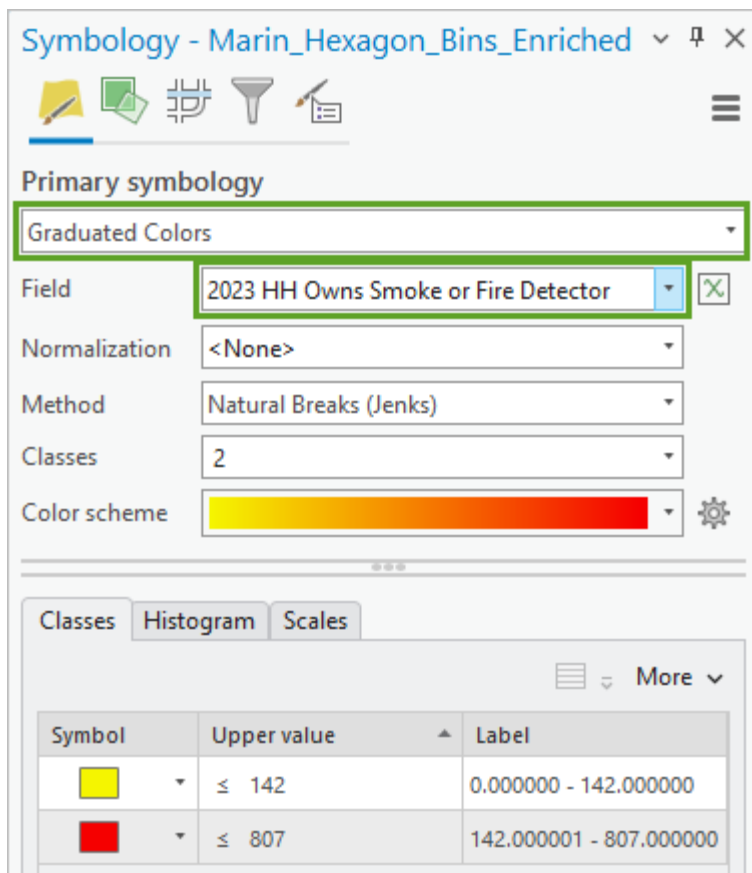
Symbolize the results

You intend to share your results with county officials. You'll symbolize the enriched data so that your findings are intuitive to understand.

- In the **Contents** pane, right-click **Marin_Hexagon_Bins_Enriched** and choose **Symbology**.

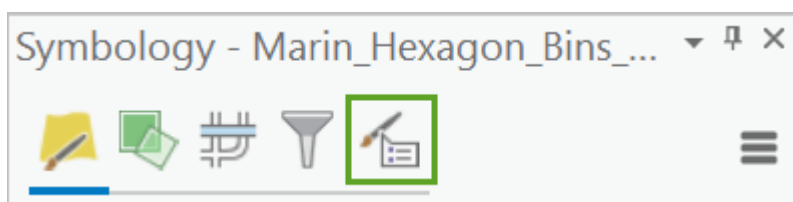
The **Symbology** pane appears. Currently, the hexagons are symbolized with a single color. You'll change the symbology so that hexagons with a higher percentage of houses without smoke detectors have a red or orange color, indicating danger.

- In the **Symbology** pane, for **Primary symbology**, choose **Graduated Colors**. For **Field**, choose **2023 HH Owns Smoke or Fire Detector**.

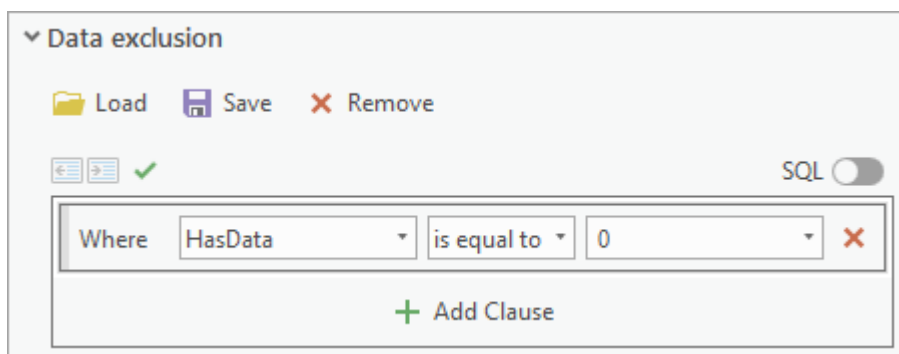


Many of the hexagons on the map have no residents. You'll symbolize these hexagons with a different symbol than the rest of the data.

- Click the **Advanced symbology options** tab.

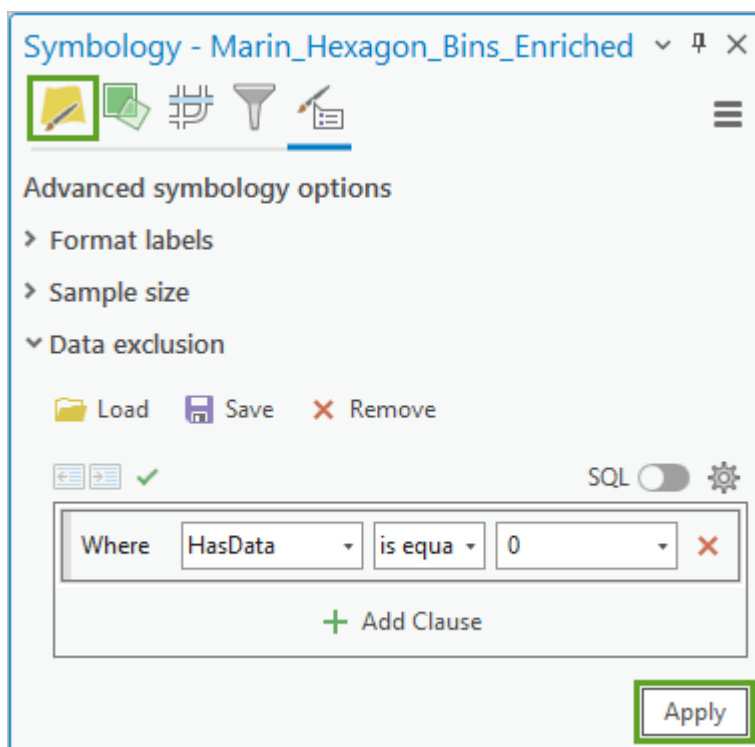


- Expand **Data exclusion** and click the **New expression** button. Create the expression Where HasData is equal to 0.



This expression will create a symbology class for hexagons with no data. Next, you'll adjust the number of classes and color scheme for the hexagons that do have data.

- Click **Apply**. Click the **Primary symbology** tab.



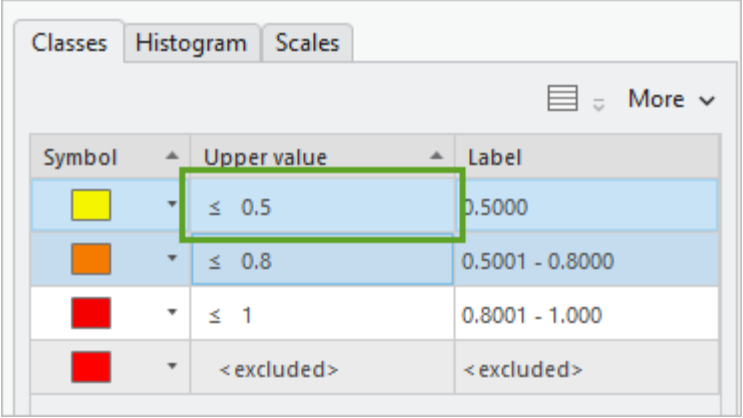
- For **Classes**, choose **3**.





The legend updates. It shows five classes total, four for hexagons with data and one for hexagons without data. The values in the legend are the total count of households with smoke detectors. To show the percentage of households, you'll normalize the data by the total number of households.

7. In the **Primary symbology** tab, for **Normalization**, choose **2023 Total Households**.

The legend updates. The classes show values from 0 to 1, which correspond to percentages. Currently, the range of values for each class is determined by statistical trends in the data. You'll change the values to easily understandable intervals.

8. In the **Symbology** pane, in the **Classes** tab, for the first class, double-click the cell in the **Upper value** column, type 0.5, and press Enter.

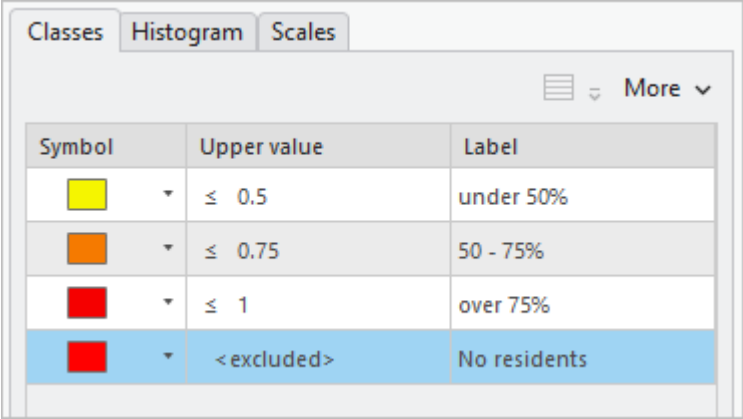






Symbol	Upper value	Label
	≤ 0.5	0.5000
	≤ 0.8	0.5001 - 0.8000
	≤ 1	0.8001 - 1.000
	<excluded>	<excluded>

9. Change the upper value for the second row to 0.75.

You'll also update the labels for each class so that they are expressed as percentages.

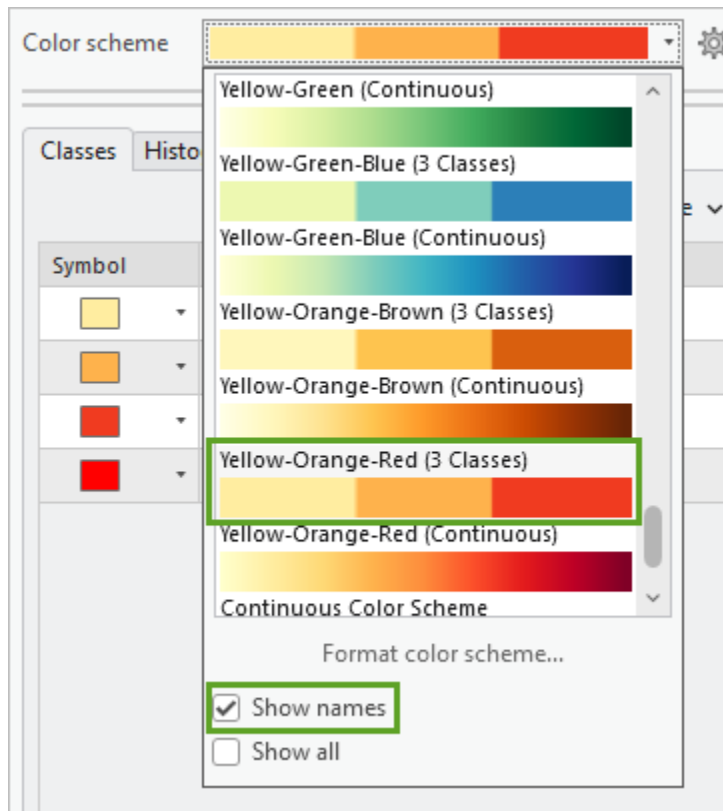
10. Change the first label, change to under 50%, the second to 50 - 75%, the third to over 75%, and the forth to No residents.



Symbol	Upper value	Label
	≤ 0.5	under 50%
	≤ 0.75	50 - 75%
	≤ 1	over 75%
	<excluded>	No residents

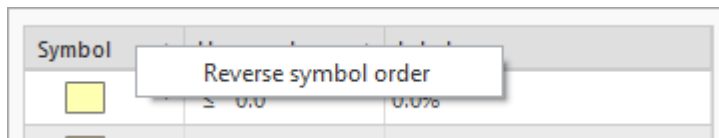
Last, you'll change the colors. First, you'll change the color ramp for the graduated colors. Then, you'll change the color for the excluded class.

11. For **Color scheme**, expand the dropdown list and check **Show names**. Then choose the **Yellow-Orange-Red (3 Classes)** color scheme.



You'll reverse the symbol order so that the lowest percentages (the places with fewer smoke detectors) have the darkest colors.

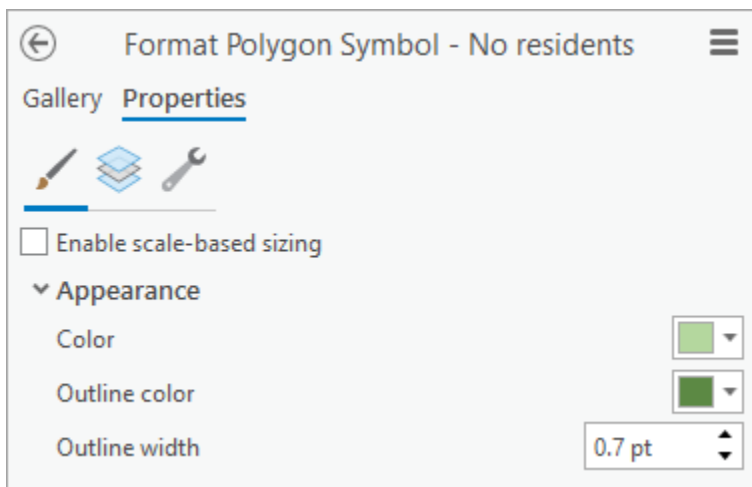
- Right-click the **Symbol** column heading and choose **Reverse symbol order**.



- Click the symbol in the first column of the **excluded** class.

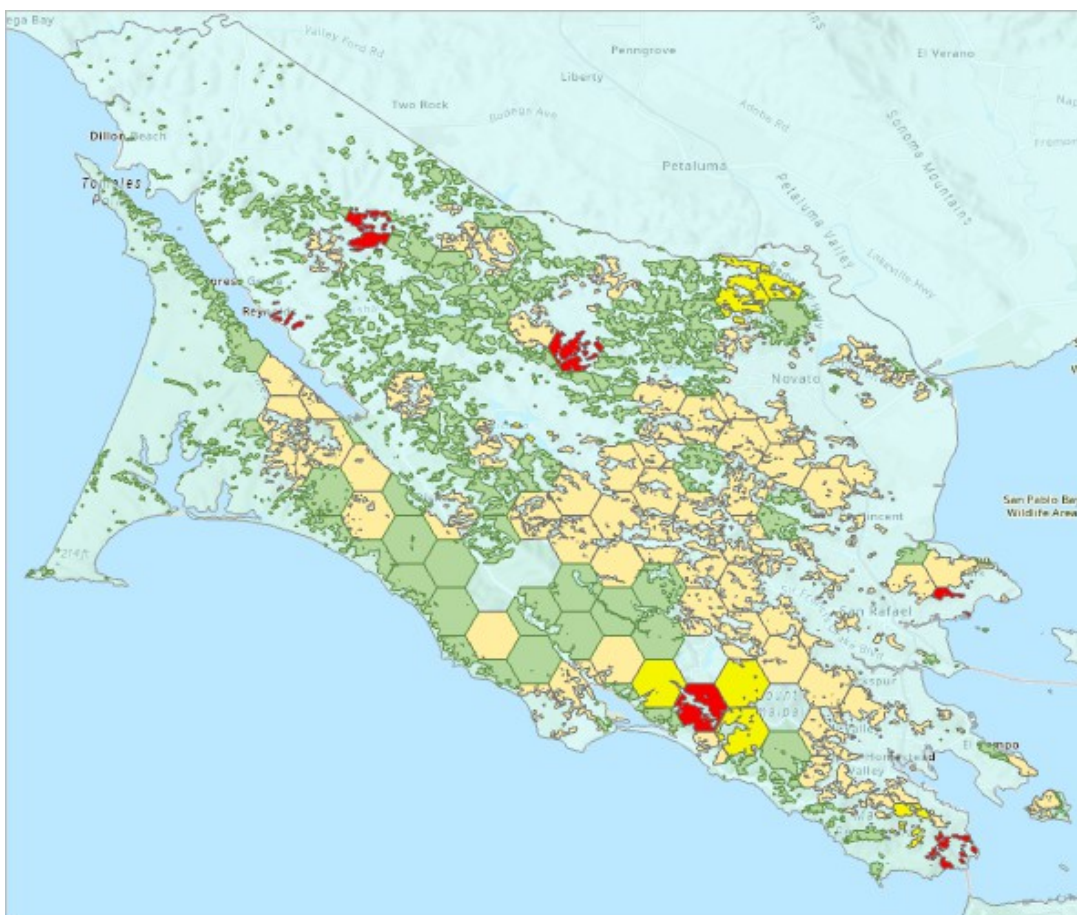
Classes		
Histogram		
Scales		
More		
Symbol	Upper value	Label
	≤ 0.5	under 50%
	≤ 0.75	50 - 75%
	≤ 1	over 75%
	< excluded >	< excluded >

- In the **Format Polygon Symbol** pane, click the **Properties** tab. For **Color**, choose **Sage Dust** (7th column, 7th row), and for **Outline color**, choose **Lotus Pond Green** (7th column, 10th row).



15. Click **Apply** and close the **Symbology** pane. In the **Contents** pane, turn off the **Marin_County_Forested_Area_Smoke_Detectors** layer.

The color for hexagons with no data is updated in the legend and on the map.



Most hexagons either have no residents or 50.1 to 75.0 percent smoke detector ownership. Only a few have ownership levels under 50 percent, and very few have no smoke detector ownership. There were no residents that had 0 percent values. But also keep in mind some of the areas had no data which you excluded out. You'll look at some of the under 50% percent ownership hexagons to learn more.

16. On the map, click any red hexagon.

Its pop-up appears. Almost all of the red hexagons have extremely low numbers of total households. Most have only one household, which does not have a smoke detector. While it's not necessary to explain this trend on the map, there are two potential factors for why hexagon bins may have such low counts of households.

The first factor is that the **Enrich** tool uses the United States Census Bureau's Block Point Centroids as the basis to apportion variables. In rural areas, there are usually more residences than block points, so the **Enrich** tool may omit some residences.

The second factor is that the United States Census Bureau does not publish small counts of people to protect privacy. Some hexagons with few or no residences may actually have some residents, but the data is not publicly available.

Because of these factors, small counts in **Enrich** results for rural areas may not be exact.

17. Close the pop-up.

Format the data

You'll finish your work by hiding unneeded fields from the data and citing the data source.

1. In the **Contents** pane, right-click **Marin_Hexagon_Bins_Enriched** and choose **Attribute Table**.

The table contains several fields that are not of interest to county officials.

2. Right-click the heading of each of the following fields and choose **Hide Field**:

- **OBJECTID**
- **GRID_ID**
- **aggregationMethod**
- **ORIGINAL_OID**
- **sourceCounty**
- **apportionmentConfidence**
- **populationToPolygonSizeRating**
- **Shape_Length**
- **Shape_Area**

Marin_Hexagon_Bins_Enriched						
Field:	Add	Calculate	Selection: Select By Attributes			
	Shape *	HasData	2023 HH Owns Smoke or Fire Detector	2023 Used Asthma Prescription Drug	2023 Senior Population	2023 Total Households
1	Polygon	0	0	0	0	0
2	Polygon	1	1	0	3	1
3	Polygon	0	0	0	0	0
4	Polygon	1	157	13	137	223
5	Polygon	0	0	0	0	0

3. Close the attribute table. Open the attribute table for the **Marin_County_Forest_Area_Smoke_Detectors** layer and hide the following fields:

- **OBJECTID**
- **aggregationMethod**
- **ORIGINAL_OID**
- **sourceCounty**
- **apportionmentConfidence**
- **populationToPolygonSizeRating**
- **Shape_Length**
- **Shape_Area**

4. Close the attribute table.

Next, you'll rename the layers to be more meaningful.

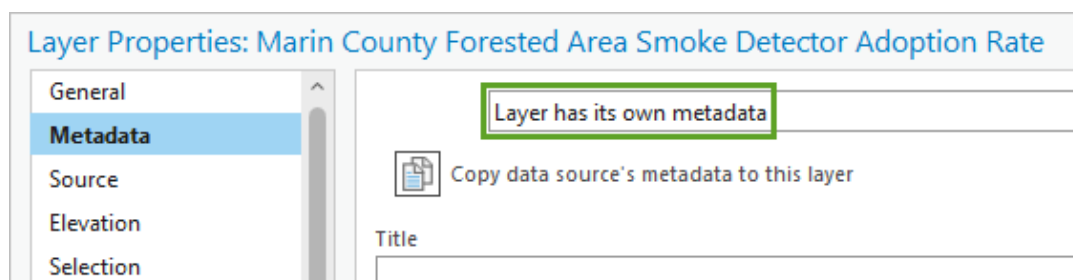
5. In the **Contents** pane, double-click **Marin_Hexagon_Bins_Enriched**. In the **Layer Properties** window, on the **General** tab, change **Name** to **Marin County Forested Area Smoke Detector Adoption Rate** and click **OK**.
6. Open the **Layer Properties** window for the **Marin_County_Forested_Area_Smoke_Detectors** layer, change **Name** to **Marin County Total Forested Area Smoke Detector Adoption Rate**, and click **OK**.

Last, you'll cite the data sources for variables provided by the **Enrich** tool.

Tip:

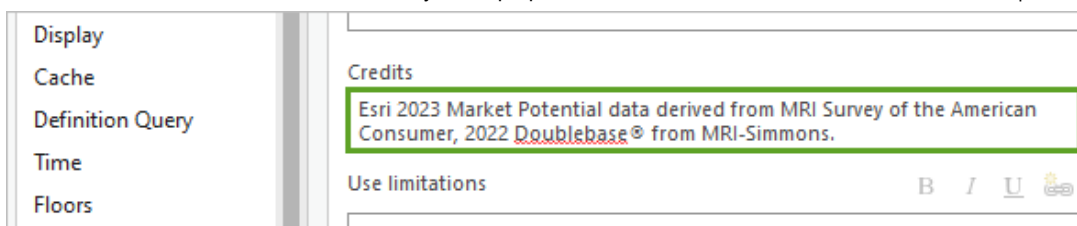
You can find the source for all demographic data used by Esri services on the [Esri Demographics](#) documentation page. To find a specific data source, click the **Data** tab and navigate to the appropriate section based on the data's geography. For instance, to find the source of the data used in this tutorial, you would expand the **United States** section, click **Market Potential**, and scroll to **Methodology**. Then, access the [2023 Esri Market Potential Methodology Statement](#) documentation. The data source listed is the MRI Survey of the American Consumer, 2022 Doublebase® from MRI-Simmons.

7. In the **Contents** pane, right-click the **Marin County Forested Area Smoke Detector Adoption Rate**, and choose **Properties**. In the **Layer Properties** window, on the **Metadata** tab, for **Show metadata from data source (read-only)**, choose **Layer has its own metadata**.



8. For **Credits**, paste the following text:

Esri 2023 Market Potential data derived from MRI Survey of the American Consumer, 2022 Doublebase® from MRI-Simmons.



9. Click **OK**.
10. Open the **Layer Properties** window for the **Marin County Total Forested Area Smoke Detector Adoption Rate** layer. On the **Metadata** tab, choose **Layer has its own metadata** and add the same citation to the **Credits** box.
11. Click **OK**. Save the project.

In this tutorial, you provided Marin County supervisors with insight about residential adoption of smoke detectors within the county's forested areas. You accomplished this task with ArcGIS Pro, ArcGIS Living Atlas of the World, and ArcGIS GeoEnrichment Service. Your analysis relied on authoritative data that you presented with intuitive symbology to help inform county officials.

The results of your analysis can be made available by [sharing it as an ArcGIS Pro project package](#). Alternatively, it can be [shared as an interactive web map](#) that officials can explore.

You can find more tutorials in the [tutorial gallery](#).

Acknowledgements

- [US Census Counties](#) layer is sourced from US Census Bureau and hosted on ArcGIS Online by ArcGIS Living Atlas.
- [USA NLCD Land Cover](#) layer is sourced from [National Land Cover Database](#) and hosted on ArcGIS Online by ArcGIS Living Atlas.
- Data used while running the Enrich tool is from [Infogroup](#).

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