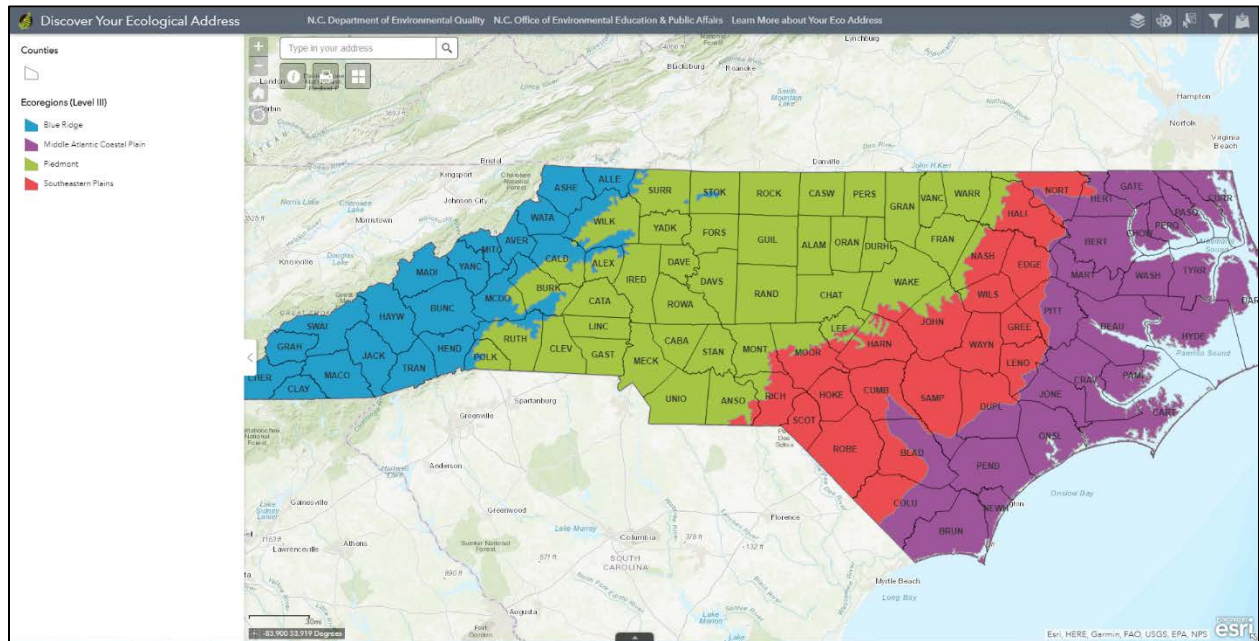


## Discover Your Ecological Address: GIS App Information



### Table of Contents

How to Use.....	2
A Way to Begin Utilizing the App.....	2
All About Layers .....	3
What is a Layer?.....	3
Ecoregions.....	4
Geologic Terranes and Elements .....	6
State Natural Area Rating .....	7
Managed Areas .....	8
All About Widgets .....	9
What is a Widget? .....	9
Layer List .....	10
Draw.....	11
Select.....	12
Filter .....	13

## How to Use

This app of North Carolina serves as a teaching tool for learning about North Carolina's ecological components, like soil and air. Ecological components help define your ecological address.

An ecological address defines the elements of the environment at a specific location at a given time to include the river basin, soil, wetlands, air, energy, topography, groundwater, diversity, and climate. The characteristics of each component help determine the effects your actions have on your environment and increase awareness of your relationship with the natural world.

The app has information for the EPA ecoregions (levels III and IV); surface waters; impaired waters; river basins (including sub-basins); watersheds (including sub-watersheds); areas managed for conservation and biodiversity; ratings of natural areas in the state; geological features; and counties (population change, size, etc.). This information can be found by turning layers on and off; selecting layers and items; searching for locations; and utilizing widgets in the app.

### A Way to Begin Utilizing the App

A good way to start using this app is with a question. For example, what is the ecological address for my home? You might start to answer this by looking at the river basin you live in or the surface waters you live by. The first step is turning these layers on. You can search for your home address in the search bar (or zoom into the location manually) and explore the data available on the map. Zooming in, you can see the surface waters more clearly. However, you may notice the river basins become less clear and may even disappear (this means you are zoomed in too close for this layer). Clicking features in the layer -like a surface water- allows you to learn more about them and begin to answer your question.

## All About Layers

### What is a Layer?

Think of a layer like a piece of wax paper with shapes drawn on it. Only these shapes (points, lines, or polygons) represent things like the North Pole, rivers, and state parks. Layers do not have much meaning by themselves; they must be placed in context (i.e., on a basemap).

If you click on a feature in a layer, a pop-up will appear with more information about that feature.

### **Layers in this App:**

- *\*Ecoregions (Level III):* Environmental Protect Agency defined Level III Ecoregion with information on level I, level II, and level IV ecoregions.
- *\*Ecoregions (Level IV):* Environmental Protect Agency defined Level IV Ecoregion with information on level I, level II, and level III ecoregions.
- *\*Geologic Terranes and Elements:* Generalized geologic terranes and major geologic elements of North Carolina. Information on rock age, type, strata, and more.
- River Basins: Location and size of river basins. Links to learn more about river basins.
- Subbasins: Location and size of sub-river basins.
- Watersheds: Location of watersheds.
- Subwatersheds: Location and size of sub-watersheds.
- Impaired Water: Location, length, and description of impaired waters (rivers, lakes, etc) as determined by the federal Clean Water Act.
- Surface Waters: Location, NC Division of Water Resources classification (e.g., swimmable, drinking water), and date of classification for surface water (rivers, lakes, etc.)
- *\*State Natural Area Rating:* Location, size, owners, and rating of natural areas.
- *\*Managed Areas:*
- Counties: Location, population, and size of North Carolina counties.

*\*More detail given in following section*

## Ecoregions


Environmental Protect Agency Ecoregions are areas with similar ecosystems and similar type, quality, and quantity of environmental resources. There are four levels of ecoregions; level I is covers the largest area (15 in North America) and level IV covers the smallest area.

Level III Ecoregions in North Carolina:

- **Blue Ridge:** Narrow ridges, hilly plateaus, and massive mountainous areas. One of richest centers of biodiversity in eastern U.S., ranging from Appalachian oak forests to Southeastern spruce-fir forests.
- **Middle Atlantic Coastal Plain:** Low elevation, flat plains with many swamps, marshes, and estuaries. Forest cover is loblolly and shortleaf pine with some oak, gum, and cypress.
- **Piedmont:** Transitional area with irregular plains and some hills. Once largely cultivated, much area is planted pine or has reverted back to successional pine and hardwood woodlands.
- **Southeastern Plains:** Irregular plains with broad interstream areas. Much of area converted to cropland and pasture. Some woodland and pine forest.

### Legend

#### Ecoregions (Level III)

-  Blue Ridge
-  Middle Atlantic Coastal Plain
-  Piedmont
-  Southeastern Plains




























**Blue Ridge:** Area is predominantly apart of Blue Ridge ecoregion

**Middle Atlantic Coastal Plain:** Area is predominantly apart of Middle Atlantic Coastal Plain ecoregion

**Piedmont:** Area is predominantly apart of Piedmont ecoregion

**Southeastern Plains:** Area is predominantly apart of Southeastern Plains ecoregion

























### Ecoregions (Level IV)

-  Swamps and Peatlands
-  Carolinian Barrier Islands and Coastal Marshes
-  Virginian Barrier Islands and Coastal Marshes
-  Mid-Atlantic Flatwoods
-  Chesapeake-Pamlico Lowlands and Tidal Marshes
-  Mid-Atlantic Floodplains and Low Terraces
-  Carolina Flatwoods
-  Broad Basins
-  High Mountains
-  Southern Sedimentary Ridges
-  New River Plateau
-  Sauratown Mountains
-  Southern Crystalline Ridges and Mountains
-  Amphibolite Mountains
-  Eastern Blue Ridge Foothills
-  Southern Metasedimentary Mountains
-  Triassic Basins
-  Carolina Slate Belt
-  Northern Inner Piedmont
-  Southern Outer Piedmont
-  Northern Outer Piedmont
-  Southern Inner Piedmont
-  Kings Mountain
-  Sand Hills
-  Southeastern Floodplains and Low Terraces
-  Atlantic Southern Loam Plains
-  Rolling Coastal Plain

## Geologic Terranes and Elements

Geology serves as the literal and figurative foundation for your ecological address. Geology helps determine soil type, topography, river basin, groundwater availability, and more.

### Legend

-  Coastal Plain
-  Diabase
-  Triassic Basin - Deep River Basin
-  Triassic Basin - Ellerbe Basin
-  Triassic Basin - Dan River Basin
-  Triassic Basin - Davie County Basin
-  Late Paleozoic Intrusives
-  Roanoke Rapids Terrane
-  Triplet Terrane
-  Spring Hope Terrane
-  Raleigh Terrane
-  Crabtree Terrane
-  Falls Lake Terrane
-  Easternmost Carolina Terrane
-  Carolina Terrane
-  Charlotte Terrane
-  Kings Mountain Terrane
-  Milton Terrane
-  Cat Square Terrane
-  Tugaloo Terrane - East of Brevard Zone
-  Tugaloo Terrane - West of Brevard Zone
-  Sauratown Mountains Anticlinorium
-  Central Blue Ridge Terranes
-  Western Blue Ridge

Map data from North Carolina Geological Survey. This data set uses the modified polygons from the 1985 Geologic map of North Carolina and geologic research since the 1990's to group the rock units into individual terranes in place of older belt terminology.

Each terranes or element has information on rock age (eon, era, and period), type (e.g., metamorphic), and strata (groups and formation).

**Terranes: A fragment of crustal material formed on, or broken off from, one tectonic plate and accreted or "sutured" to crust lying on another plate.**

- |                        |                  |
|------------------------|------------------|
| • Triplet              | • Carolina       |
| • Spring Hope          | • Charlotte      |
| • Raleigh              | • Kings Mountain |
| • Crabtree             | • Milton         |
| • Falls Lake           | • Cat Square     |
| • Easternmost Carolina | • Tugaloo        |

### Elements

**Coastal Plain:** largest geologic region in NC; 252-66 million years ago was a broad sloping region well above sea level

**Diabase:** a common dark-colored igneous rock

**Triassic Basin:** semi-dry lakebed 250-200 million years ago, formed by the separation of North American and African tectonic plates

**Late Paleozoic Intrusive:** igneous rock from 359-252 million years ago, formed from magma forced into older rocks within the Earth's crust

**Sauratown Mountains Anticlinorium:** a large upward fold in the stratified rocks of the crust with minor folds superimposed

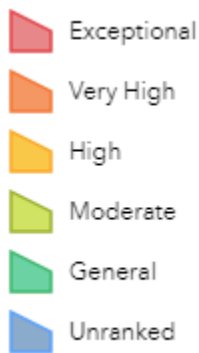
**Western Blue Ridge:** oldest rocks in NC; one billion to 1.5 billion years old; edge of ancient North American continent

## State Natural Area Rating

A natural area is a site (terrestrial and aquatic) of special biodiversity significance. More than half of these areas are entirely or partially in conservation ownership.

Natural areas are evaluated on the basis of the occurrences of rare plant and animal species, rare or high quality natural communities, and special animal habitats, collectively termed the “elements” of natural diversity. Legend shows top rating the natural area received out of the collective and representational ratings.

### Legend (Highest rating)



Exceptional: Exceptional Collective or Representational rating  
 Very High: Very High Collective or Representational rating  
 High: High Collective or Representational rating  
 Moderate: Moderate Collective or Representational rating  
 General: General Collective or Representational rating  
 Unranked: No Collective or Representational rating

**Collective Rating: Element Collective Value Rating sums the number of elements at a given natural area and rarity of elements in North Carolina and the world.**

- C1 (Exceptional) → Rarity score (91+), at least 10 elements
- C2 (Very High) → Rarity score (61-90), at least 5-7 elements
- C3 (High) → Rarity score (31-60), at least 3 or 4 elements
- C4 (Moderate) → Rarity score (11-30), at least 2 elements
- C5 (General) → Rarity score (2-10), at least 1 element

**Representational Rating: Representational Value Rating assigned if site contains elements with global rarity; ranked by how imperiled the element is at a global level from not at all secure (G1) to secure (G5).**

- R1 (Exceptional) → Site contains 1<sup>st</sup> or 2<sup>nd</sup> best examples of G1 or G2 elements
- R2 (Very High) → Site contains the 3<sup>rd</sup> or 4<sup>th</sup> best examples of G1 or G2 elements and/or the 1<sup>st</sup> or 2<sup>nd</sup> best examples of G3-G5 elements
- R3 (High) → Site contains the 5<sup>th</sup> to 8<sup>th</sup> best examples of G1 or G2 elements and/or the 3<sup>rd</sup> to 6<sup>th</sup> best examples of G3-G5 elements
- R4 (Moderate) → Site contains the 9<sup>th</sup> to 12<sup>th</sup> best examples of G1 or G2 elements and/or the 7<sup>th</sup> to 10<sup>th</sup> best examples of G3-G5 elements
- R5 (General) → Site contains one of the best 30 examples of G1 to G5 elements, which do no quality for categories R1-R4

## Managed Areas

The Natural Heritage Program maintains GIS data on conservation lands throughout North Carolina. These “Managed Areas” are a diverse collection of properties and easements where conservation of biodiversity and ecosystem function are among the goals of the land management programs.

### **Legend (Ownership)**



State Ownership: North Carolina owns property

Private Ownership: Private company, etc. owns property

Local Government: County, city, etc. owns property

Federal Ownership: U.S. Government owns property

### **Category: What is the protected mechanism for this property?**

- Fee: Fee simple ownership (i.e., absolute title to the land, free of any other claims against the title)
- Easement: A legally enforceable land preservation agreement between a landowner and government agency or qualified land protection organization (i.e., land trust)
- Other: Mixed protection, leases, agreements, etc.
- Unknown: Mechanism is not known

### **Ownership: Who owns this property?**

- Federal: The Government of the U.S.A. owns the property
- Local Government: A local government entity (e.g., county, city) owns the property
- Private: A private individual or organization owns the property
- State: State of North Carolina owns the property











## All About Widgets

### What is a Widget?

Widgets are tools that help you explore the app. They can be as simple as an “About” button to learn about the application or as complex as a “Filter” tool that sorts what data you see on the map. Widgets can be turned on or off within the app. They allow you to better understand and utilize the app than simply viewing alone.

#### **Widgets in App:**

-  About: Learn about the application.
-  Print: Print a screenshot of the app.
-  Basemap Gallery: Change the basemap (e.g., topographic, imagery).
-  \**Layer List*: Turn layers on or off. Access the attribute table for the layer.
-  \**Draw*: Draw on the map.
-  \**Select*: Select a rectangle of features on the map.
-  \**Filter*: Apply filters to see specific data.
-  Add Data: Add your own data to the app from your computer, AGOL, or the internet.

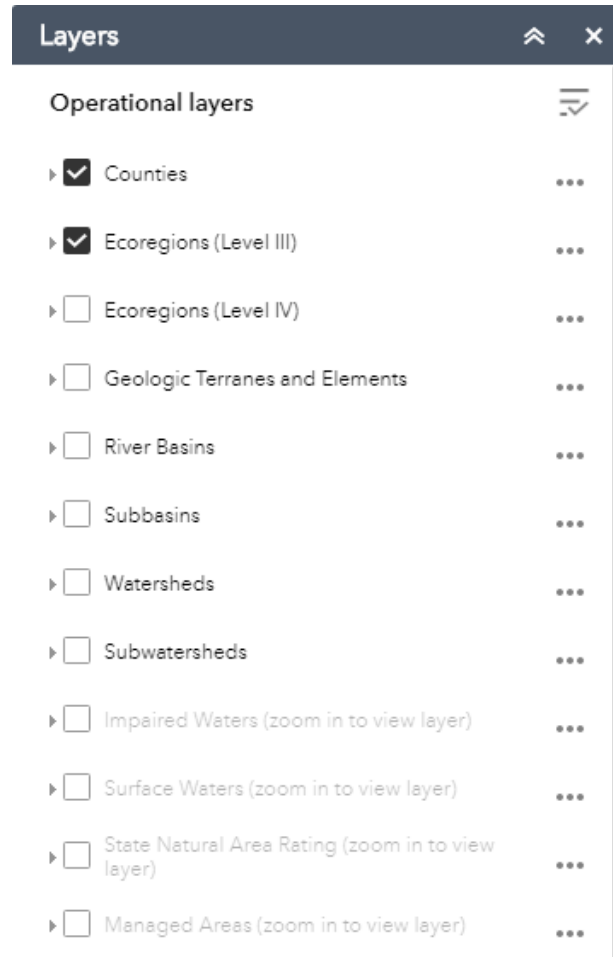
*\*More details provided in following sections*

## Layer List

This widget gives a list of all layers for the app. The checked boxes are “on” (currently visible on the app). To learn more about a layer, click the three dots to the right of the name. This will give a drop-down menu where you can zoom to the layer, change the transparency of the layer, disable the pop-up (aka – when you click on the layer, nothing will come up about it), move the layer up or down (This changes the visibility of the layer. Again, think of a cake, the icing is what you see first because it is on top, other layers underneath are not visible), view in attribute table (see more below), and show item details (takes you to the layers page with metadata, etc.).

Selecting “**View in Attribute Table**” allows you to view the data in another format. The visual data you see on the map (colors, shapes, etc.) comes from a table (the attribute table). This table has information about the layer beyond what you see on the map (side note: this is the same table that the data you see when you click on a layer comes from). For the layer about “Counties” for instance, you may only see the outline of the counties on the map. In the attribute table, you see the county names, area, and population

**Important note:** The attribute table is normally set to ONLY shows the items you have selected or can see on the map (i.e., Filter by map extent)! If you are zoomed in, you may not see all of the features in the attribute table.



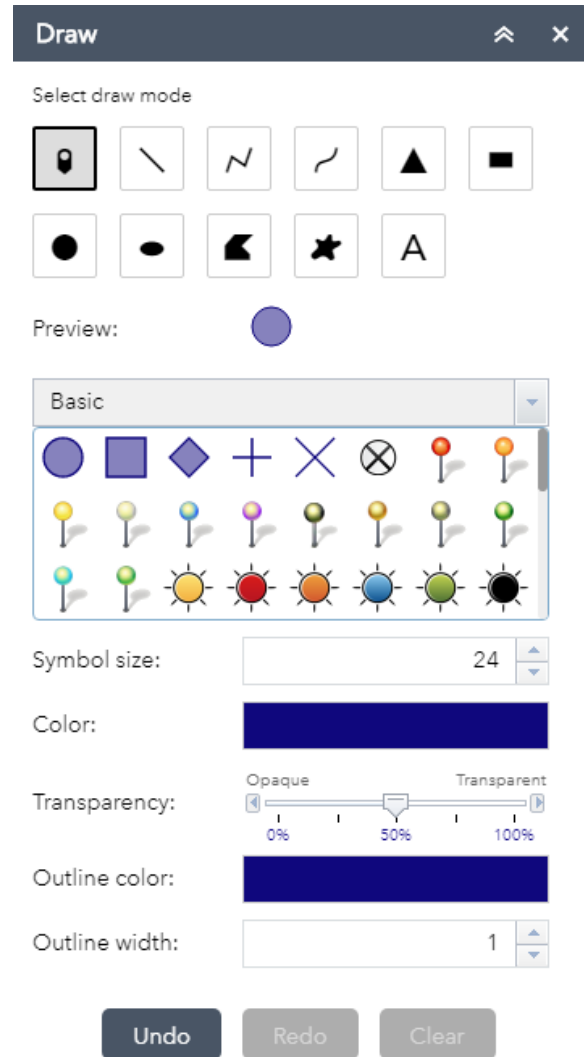
The screenshot shows a 'Layers' panel with a dark header containing an expand/collapse icon and a close icon. Below the header, the text 'Operational layers' is followed by a list of layers. Each layer has a right-pointing chevron, a checkbox, the layer name, and a three-dot menu icon. The 'Counties' and 'Ecoregions (Level III)' layers have their checkboxes checked. The other layers have their checkboxes unchecked. The layers listed are: Counties, Ecoregions (Level III), Ecoregions (Level IV), Geologic Terranes and Elements, River Basins, Subbasins, Watersheds, Subwatersheds, Impaired Waters (zoom in to view layer), Surface Waters (zoom in to view layer), State Natural Area Rating (zoom in to view layer), and Managed Areas (zoom in to view layer).

## Draw

Use the Draw widget to draw lines and shapes on the app. You can also place text on the app. You can change the symbol type, color, transparency, and size. Features made in Draw will remain on the map regardless if you move the map, zoom in/out, etc. Additionally, the drawn features will appear on the map if you want to print. Select “clear” to get rid of all drawn features.

**Note:** You can not selectively erase features! There is an “undo” button to get rid of immediate features.

This tool can be highly useful for educators and students as they interact with the map.



The screenshot shows the 'Draw' widget interface. At the top, there is a title bar with the word 'Draw' and a close button. Below the title bar, there is a section labeled 'Select draw mode' with several icons for different drawing tools: a location pin, a straight line, a jagged line, a curved line, a triangle, a square, a circle, an oval, a polygon, a star, and a text 'A'.

Below the drawing mode icons is a 'Preview' section showing a blue circle. Underneath that is a 'Basic' dropdown menu with a scrollable list of various symbols including different colored circles, squares, diamonds, crosses, and various types of pins and suns.

Below the symbol list are several configuration options:

- Symbol size:** A text input field with the value '24' and a spinner.
- Color:** A color selection bar showing a dark blue color.
- Transparency:** A slider control ranging from '0%' (Opaque) to '100%' (Transparent), with a marker at 50%.
- Outline color:** A color selection bar showing a dark blue color.
- Outline width:** A text input field with the value '1' and a spinner.

At the bottom of the widget are three buttons: 'Undo', 'Redo', and 'Clear'.

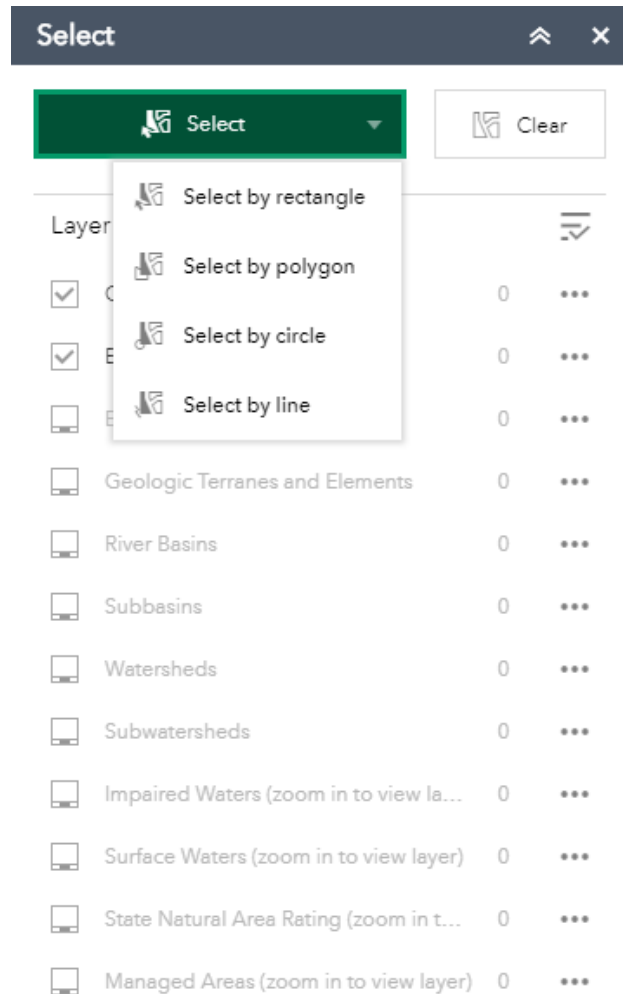
## Select

The Select widget allows you to select all features in all layers in a specific area at once. You can choose to select a rectangular area, polygon, or circle by clicking the down arrow on the select button. You can also select features with a line. The layers that are grayed out in the list are NOT turned on and, therefore, are not available to be selected. Similarly, the layers that are black but the box is not checked are also not available to be selected. When you select a region, all features that are on and checked will be selected. The number of items selected in that layer will appear to the right of the layer name.

To learn more about the selected items in each layer, click the three dots to the right of the layer name and number. This allows you to: zoom to the selected features, pan to the features, flash the select features in different colors, show statistics for a feature layer attribute, create a new layer from the selected items, view selected features in attribute table, or clear the selection.

Remember, in order to select more items, you must first clear your selection!

**Tip:** This widget works best when you are zoomed-in!



## Filter

The Filter widget is utilized to visualize specific data. The widget will filter out data in the layer that does not apply to what you want to see. For example, the “Highly Impaired Waters” filter only shows the waters that are most highly impaired in the impaired waters layer (and attribute table).

To see the Filters in the widget, make sure the layers that the filter correspond with are turned on.

Filters and corresponding layers:

- Example: Filter → Layer
- Highly Impaired Waters → Impaired Waters
- Bedrock Type → Geologic Terranes and Elements
- Bedrock Era → Geologic Terranes and Elements
- Managed for Biodiversity → Managed Areas

