Map Viewer Training Exercises:
Sea Level Scenario Sketch Planning Tool

Version 3, 2020

Exercise 1: Getting Started

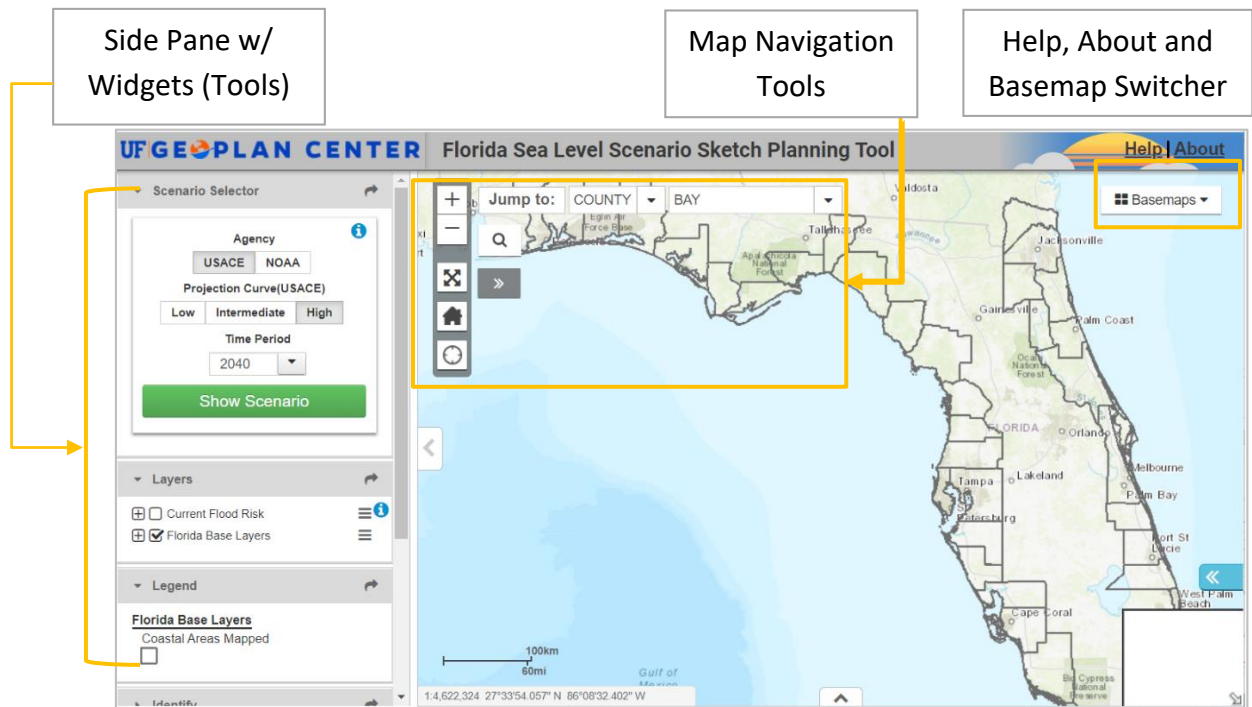## Step 1: Open the Map Viewer

To access the map viewer:

- Open a web browser (Firefox or Chrome preferred).
- Go to https://sls.geoplan.ufl.edu/viewer/
- Give the browser a minute to load the map before moving on.

Step 2: Get Oriented with the Map

Take a few moments to locate the map controls and components listed in the picture below. The county areas outlined in gray are the areas that were mapped for this project.
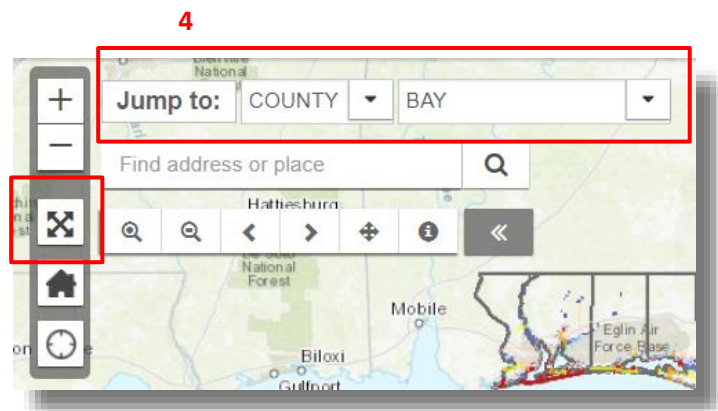

Step 3: Enable Full Screen Mode

Click on the X icon to enable full screen mode. The map viewer will expand to the full extent of your laptop screen.

Step 4: Zoom to Area of Interest [3]

Using the Jump to: tool, choose "County" from the first dropdown menu and then choose a county from the second dropdown menu.

Exercise 2: Explore Current Flood Risk Layers

By default, the current flood risk layers are loaded to the map viewer, but not displayed. In this exercise, we will explore and display these layers, which represent current flood risk areas from 100-year and 500-year floodplains and storm surge zones.

Step 1. Access Layers

In the Layers Widget, **check the box** next to **"Current Flood Risk"**.

This will open the folder and show the contents of the map service. You will see two folders: "Affected Roads - Floodplains" and "Affected Roads - Storm Surge" and three layers: Storm Surge Zones, 100-Year Floodplain, and 500-Year Floodplain.

Click on the folder icon next to "Affected Roads - Floodplains" to reveal additional layers.

Check the box next to **% RCI Roadway in 100-year Floodplain** to display (turn on) the layer.

Note: If there are gray checkboxes next to data layers, then zoom in closer. These layers are only visible when zoomed into a small extent, as there are too many features to display for a large map area.

Layers Widget

Check box & open map service

Click on folder icon to expand

Check + sign to display the layer symbology

Check box to turn on layer

If checkboxes are grey, zoom in to view layers

Step 2. Explore the Map Data

After Step 1, the map layer "% RCI Roadway in 100-year Floodplain" should be visible on the map. You should see a layer with many red, orange, and yellow lines. Next, zoom into the map and explore the data.

To zoom in, use navigation controls in top left of map.
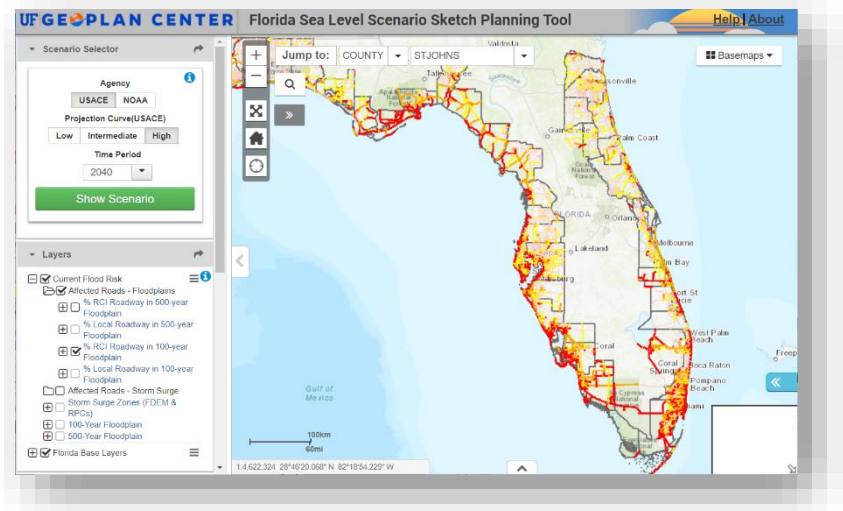
Using a left mouse click, click on a map feature (one of colored segments) to open the identify window. Scroll through the window and examine the attributes.

In the example below, Vilano Rd in St. Johns County was identified and 98% of this road segment is in the 100-year floodplain. An additional 2% of the road segment is in the 500-year floodplain. The entire length of the road segment is 5413 feet (just over a mile). The road is also an Evacuation Route.

To display the 100-year and 500-year floodplains layers (on which the road analysis was performed), look in the Layers Widget for the "100-Year Floodplains and "500-Year Floodplains" and click on the checkboxes next to their names.

To view the metadata for any layer, click on the layer name in the Layers widget, and then choose "Open Metadata".

Click on more road segments to explore the affected areas. When done, **close the Identify window** by clicking on the smaller x in the upper right corner.

Step 3. Explore the Attribute Table

1. In the Layers Widget, **click on the layer name % RCI Roadway in 100-year Floodplain** to reveal the layer menu. Click the **Open Attribute Table** option to open the attribute table.
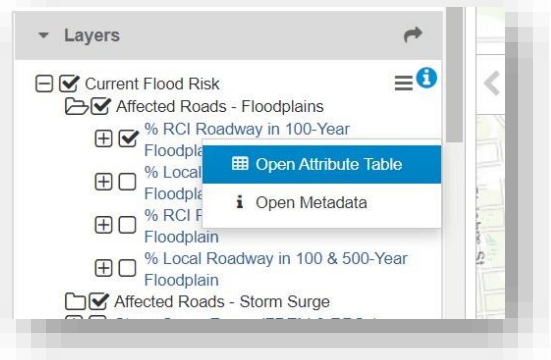
   When the table opens, only records for the features that are visible in the map view are added. The "Extent Box" is the map extent used to get records from the layer.

2. **Look for the field named % 100-year Floodplain DFIRM**. You may need to expand the width of the field to see it. **Click on the field name twice** to sort the values in descending order. This will show you the road segments with the highest percent in the current 100-year floodplain (identified using a spatial overlay with FEMA data).

Tip: Close the side pane by clicking the arrow tab between the side pan and map. This will widen the attribute table for better visibility. Adjust the height of the table by dragging the table up/down.

3. After sorting the records in descending order, **select the record at the top with the highest %** (values will be 1% – 100%). The selected record will be highlighted in blue.

4. Zoom to the selected feature. Click **Zoom Menu → "Zoom to Selected Feature(s)".** Pan and Zoom around the map to explore the context of the feature. You may want to change the basemap.

5. Clear the selected feature. Click **Clear menu → "Clear Selected Feature".** Next click **Zoom Menu → "Zoom to Extent Box".** The map will zoom back to the extent when the table was first opened.

6. **Re-open the Side Pane** by clicking on the tab with the right pointing arrow (on the far left side of the map window). **Close the attribute table by clicking on the [x]** next to layer name in the table. In the Layers Widget, uncheck the box "Current Flood Risk" and then click on the name to close.

  Important: The attribute table <u>does not</u> load records automatically as you zoom in/out/pan on the map. If you zoom in or out or pan, you must click **"Refresh Table"** to reload the records in the map view.

Exercise 3: Add SLR Scenarios and Explore Scenario Data

Before you begin:
- Find the "Map Viewer Data Layers Guide" and take a few minutes to review.
- Turn off visible layers or refresh your map by clicking your browser's refresh page.

There are 45 total SLR scenarios available to load in the map viewer. They cover five decades (2040, 2060, 2070, 2080, 2100) and nine projections of SLR. Only 6 scenarios can be loaded at a time. We recommend viewing no more than 3 at a time.

Step 1. Choose a SLR Scenario

1. **Choose an Agency:**
   This is the source agency of the SLR projection.
   USACE = U.S. Army Corps of Engineers (2013)
   NOAA = National Oceanic & Atmospheric Administration (2017)

   For this exercise, choose NOAA

When USACE is selected; 3 curves are shown

2. **Next, choose a Projection Curve**
   If you selected (USACE), there are three projection curves to choose from: **Low, Intermediate,** or **High**

   If you selected (NOAA), there are six projection curves to choose from: **Low**, **Int-Low**, **Int**, **Int-High**, **High** or **Extreme**

   For these curves, "int" = Intermediate

   For this exercise, choose the Int, Int-High, or High projection curve

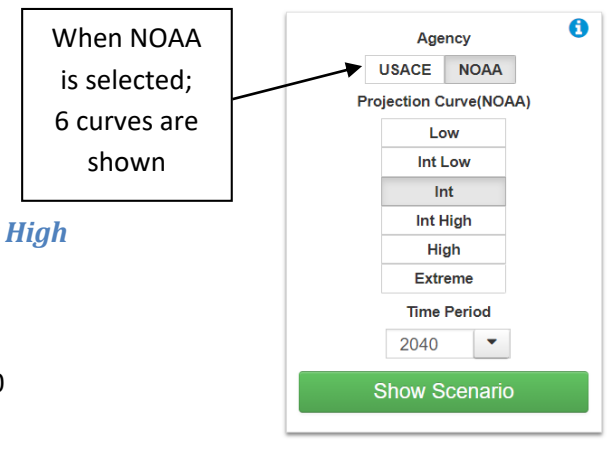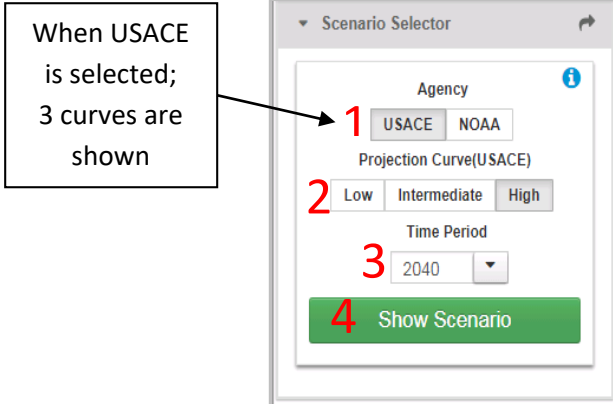When NOAA is selected; 6 curves are shown

3. **Next, choose a Time Period**
   Decades available: 2040, 2060, 2070, 2080, 2100

   For this exercise, choose 2060 or 2070

4. **Finally click "Show Scenario"**
   The map layers for the scenario selected will be added to the map.

Scenario Selector Pop-up Help

Step 2. Exploring the SLR Scenario Layers

1. After choosing a scenario and clicking "Show Scenario", a message will appear in the top right to indicate whether the scenario loaded properly.

3. Scenario layers added to Layers Widget. By default, 3 layers are visible: Affected Roads, RSLR by County & SLR Depth Inches.

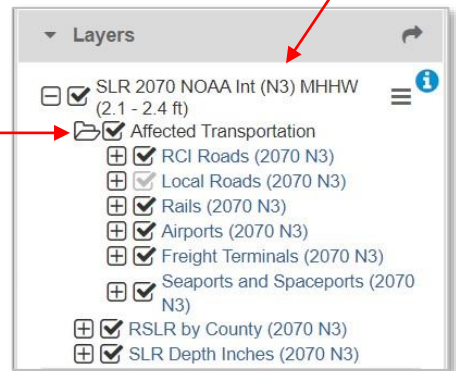**2.** Scenario layers are displayed on the map
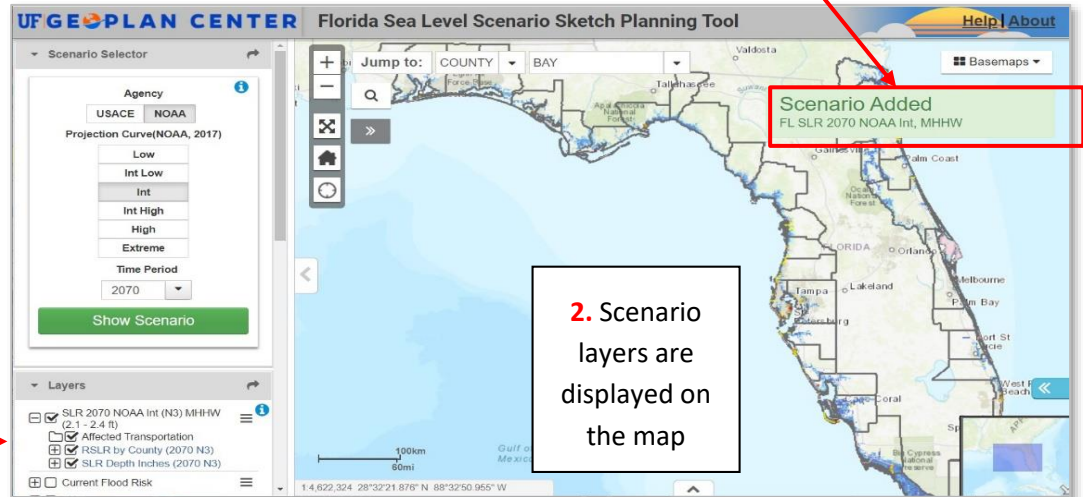
Scenario Data Layers

There are eight data layers added with each SLR scenario map service. Three of these layers are visible on the map by default (these are listed in bold):

Expand Affected Transportation folder to show more layers

Scenario Name

1. **RCI Roads:** RCI Roads affected by SLR scenario
2. **RSLR by County:** SLR over MHHW amount by county
3. **SLR Depth Inches:** Extent and depth of flooding in inches
4. Local Roads: Local roads affected by SLR scenario
5. Rails: Rails affected by SLR scenario
6. Airports: Airports affected by SLR scenario
7. Freight Terminals: Freight terminals affected by SLR scenario
8. Seaports and Spaceports: Seaports and spaceports affected by SLR scenario.

Scenario Name

The **Scenario Name** includes the **year, projection curve, and amount of relative SLR above MHHW**. **Ex:** In the Scenario Selector, we chose NOAA, Int, 2070. As a result, the SLR Scenario loaded is: "SLR 2070 NOAA Int (N3) MHHW (2.1 – 2.4 ft)"

Note: SLR is a range because projections were generated by county and vary slightly based on local sea level trends.

SLR Curve Key

N1	NOAA 2017 Low			
N2	NOAA 2017 Intermediate-Low			
N3	NOAA 2017 Intermediate	C1	USACE 2013 Low
N4	NOAA 2017 Intermediate-High	C2	USACE 2013 Intermediate
N5	NOAA 2017 High	C4	USACE 2013 High
N6	NOAA 2017 Extreme			

Step 3. Zoom to an Area of Interest

Now that the scenario is loaded, zoom to an area of interest. For this exercise, use the **Zoom in tool** in the Additional Map Navigation toolbar (shown below). Using this zoom tool, draw a box on the map where you want to zoom into.

2. Choose Zoom In tool

1. Click to open toolbar

3. Draw box on map to zoom in
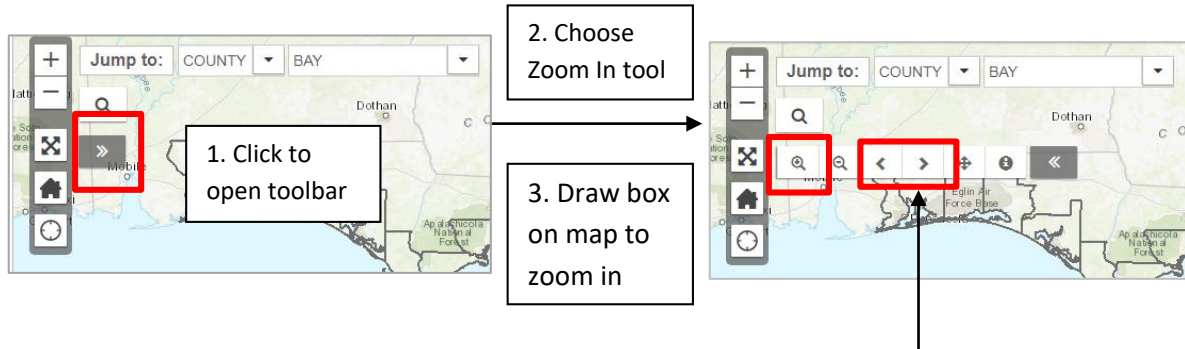
OPTIONAL: Working with the map tools. Use the Last Extent tool to take you back to the last map extent. Now use the Next Extent tool to jump you to forward. These tools are your friends!
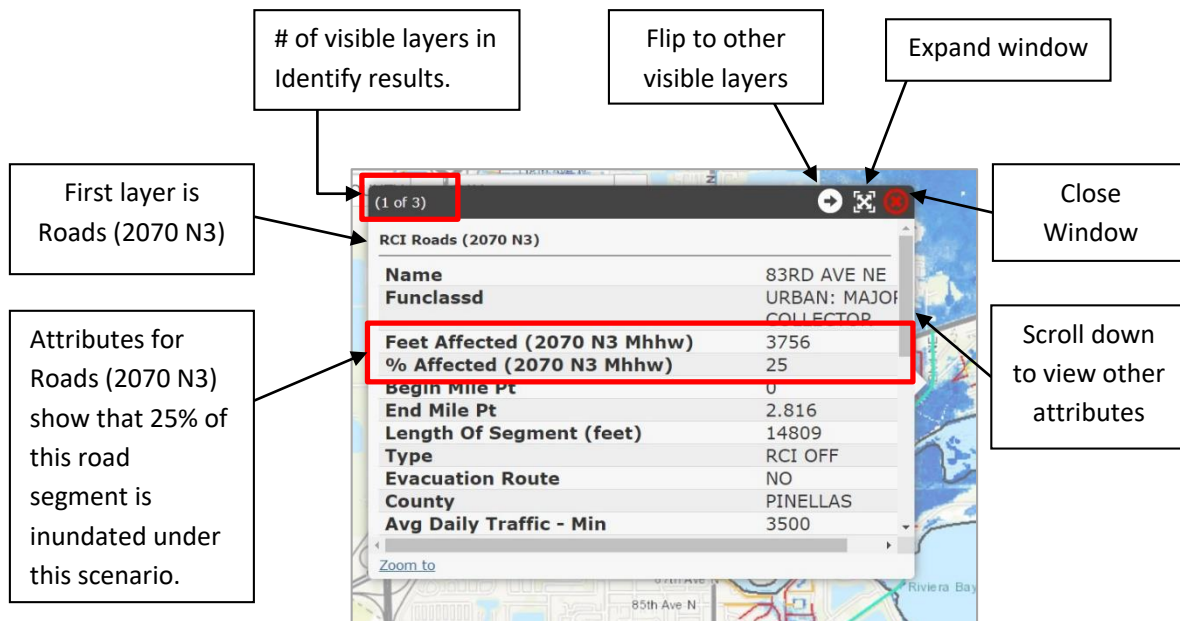
Step 4. Identify Features

Once you've zoomed to an area of interest, look for affected road segments (in red, orange, or yellow). Depending on the scenario, you may need to pan around the map to find these.

Left-click on a colored road segment in the map to open the Identify window.

By default, the identify shows attributes of all layers currently visible in the map. The upper left corner of the Identify window shows how many visible layers. Click the right arrow to flip through the attributes of each layer. If there are features at the location where you clicked, the attributes will be shown.

4a. View Attribute for Layer 1: Roads affected under a SLR scenario:

of visible layers in Identify results.

Flip to other visible layers

Expand window

First layer is Roads (2070 N3)

Close Window

Attributes for Roads (2070 N3) show that 25% of this road segment is inundated under this scenario.

Scroll down to view other attributes

RCI Roads (2070 N3)	
Name	83RD AVE NE
Funclassd	URBAN: MAJOR COLLECTOR
Feet Affected (2070 N3 Mhhw)	3756
% Affected (2070 N3 Mhhw)	25
Begin Mile Pt	0
End Mile Pt	2.816
Length Of Segment (feet)	14809
Type	RCI OFF
Evacuation Route	NO
County	PINELLAS
Avg Daily Traffic - Min	3500

Zoom to

4b. View Attributes for Other Visible Layers (ex: RSLR by County)

Using the right arrow, flip to the next layer to view its attributes. Depending on what layers you have turned on (visible in the map), a different number of layers will be available in the identify window.

The RSLR by County layer indicates the County and SLR projection parameters (tide station, mean sea level trend, decade, and projection curve) used for this area.

Flip to see next layer's attributes at this location

Under this SLR scenario, there is 2.4 Ft of SLR over MHHW. Sea level trends from the St. Pete tide station was used in this projection of the NOAA intermediate (int) rate.

(2 of 3)

RSLR by County (2070 N3)

Name	PINELLAS
Tigername	Pinellas
Rslr Ft	2.4
Slr Descript	2070, NOAA2017 Int, St. Petersburg, FL
Curve	N3
Station	St. Petersburg

Zoom to

4c. View Attributes for Other Visible Layers (ex: SLR Depth Inches)

The SLR Depth layer represents the extent and depth (in inches) of flooding under this SLR scenario <u>at the location (or pixel) clicked</u>**.** The depth of flooding varies by pixel (or cell) so you may need to click multiple locations. Cell size for the depth layers is approximately 5.4 meters; so each cell covers about 29 sq meters or 314 sq feet.

"Pixel Value" is the depth.

(3 of 3)

SLR Depth Inches (2070 N3)

Pixel Value	14

Zoom to

14 inches of inundation at this location

4d. Close out
Close the Identify Window by clicking on the X in the upper right corner of the window.

Exercise 4: Compare Two SLR Scenarios Using the Swipe Tool

Step 1. Add Another SLR Scenario

You should still have one SLR Scenario in the map. Now we will add another.

Using the Scenario Selector, choose:
- Agency: NOAA (same as before)
- Projection Curve: same as before (Int, Int-High, or High)
- Time Period: **Choose a different decade than before**
- Click "**Show Scenario**"

This new scenario will load on top of the previous scenario, both in the Layers widget and in the map.

Step 2. Open the Swipe Tool

- Click on the three lines icon to the right of the **top** (or higher) scenario.
- Click on "**Layer Swipe**" → then either "Horizontal" or "Vertical
- **You should now see a bar across the map**. If you chose Horizontal, you can slide the bar up and down to "swipe" in between the two visible scenarios. If you chose Vertical, then you can swipe left and right.
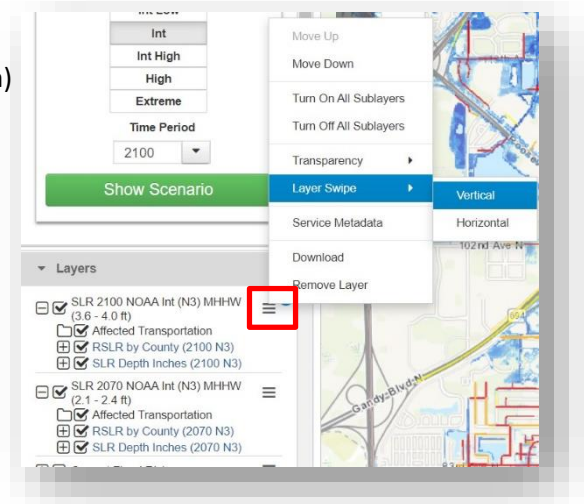
For best results, the swipe tool should be opened from the scenario with more SLR.

Step 3. Play with the Swipe Tool

When you're in the swipe tool, you can zoom in, zoom out, and pan on the map.

Zoom around and look for areas where you can see differences between the two scenarios.

Try both the vertical and horizontal swipe. To switch from one to the other, first click "Exit Layer Swipe" and then re-open the Swipe tool from the Layers Widget.

When you are finished, close the Swipe Tool by clicking "**Exit Layer Swipe**".

Step 4. Remove one Scenario

To reduce clutter and confusion, remove **one** of the SLR scenarios. Click on the three lines icon to the right of one scenario. Select "Remove Layer". (This is accessed through the same menu used to open the Swipe Tool)
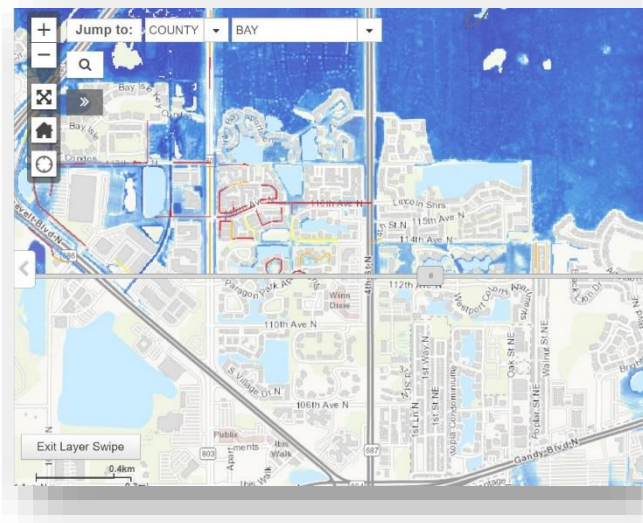
Exercise 5. Export Table of Affected Features

In Exercise 2, we explored the Attribute Table. In this exercise, we'll export a table of affected roads. You should still have a SLR scenario in your Layers widget. If you do not, then add one through the Scenario Selector.

1. **First zoom to an area of interest** that has affected roads.

2. In the Layers Widget, **open the Affected Transportation folder** (under the Scenario Name).

3. **Click on the RCI Roads Layer and then choose "Open Attribute Table"**

4. **Click on the 'Export" Button** in the upper right corner of the attribute table. There are three output file formats to choose from: Microsoft Excel (xlsx), Microsoft Excel (xls), and Comma Separated File (csv).

5. The output file will only include records that are currently in the table (and in map view).

6. Close the attribute table when you are finished.

Note: The attribute table does not load records automatically as you zoom in/out/pan on the map. If you zoom in or out or pan, then click "Refresh Table" to reload the records in the map view.

Tip: Close the side pan by clicking the arrow tab between the side pan and map. This will allow the attribute table to widen for better attribute visibility. You can adjust the height of the attribute table by clicking on the arrow tab between the map and the table.

Exercise 6. Additional Features

6a. Get Google Street View Here

This function allows you to open Google Street View in another browser window. This tool is useful for exploring road conditions where potential inundation is expected to occur.

To use the Get Google Street View Here:

- In the map, right-click **along a road**. Then click "Get Google Street View here"

- A new window/ tab will open with Google Street View (if it is available for that location).

- If Google Street View is not available for the location selected, then a new window will still open, but the Google Street View screen will be all black. You can simply exit the black screen and return to Google maps by clicking on the left pointing arrow in the top left corner of the screen.
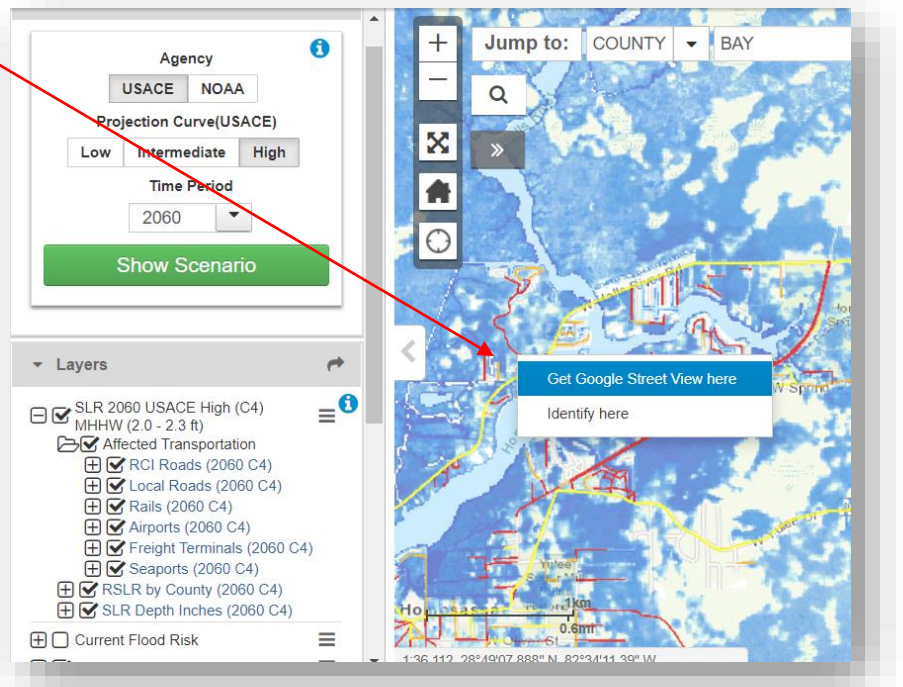

Note: In Version 2 of the Sketch Tool Map Viewer, this was a widget. Due to recent Google Street View licensing fees, this widget was discontinued and replaced with the functionality described above.

6b. Bookmarks

The Bookmarks Widget allows you to "bookmark" or save a specific geographic area (map extent), so you can easily zoom to that area.

1. To add a bookmark, first zoom to the map area that you want to save. Then open the widget (it is closed by default) and click "Add Bookmark". Next, type a name for your bookmark (ex: "Crystal River").

2. To zoom to your bookmark, simply click on the Bookmark name. The bookmarks can be renamed by clicking the pencil icon. They can be deleted using the X icon. Your bookmarks are stored within your browser, so if you clear your browser cache, they will no longer persist.
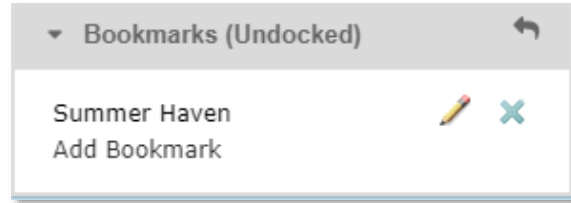
6c. Draw

The Draw Widget allows you to draw lines and shapes directly on the map. This widget is closed by default.

1. To draw on the map, first open the Draw widget. Then click on the type of shape you want to draw. Start drawing on the map with a single left-click. You will be prompted on screen with additional instructions on how to continue and/or finish our drawing.

2. As you zoom in and out on the map, your drawings will persist until you click "Clear All drawings" button or reload your browser.
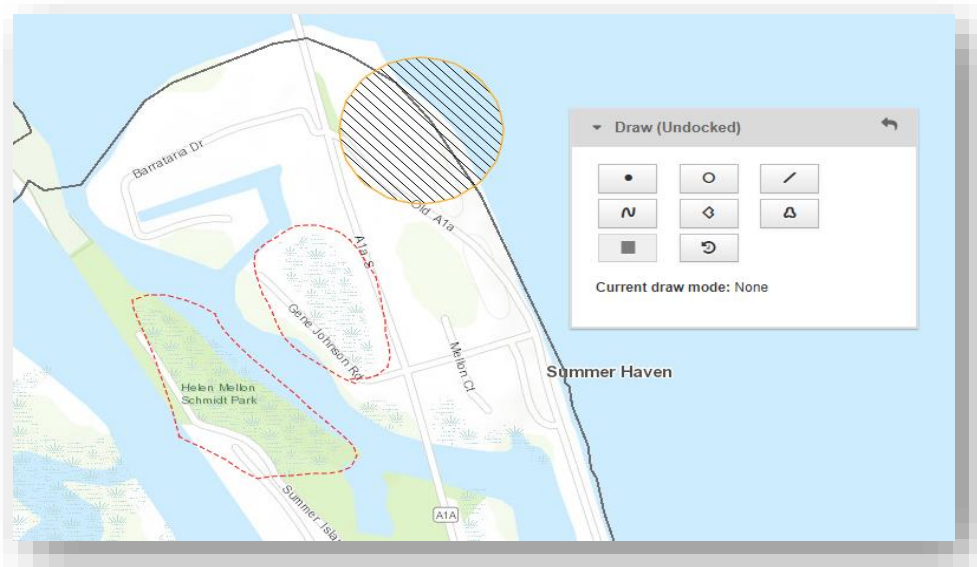
Exercise 7: Download Map Packages

The GIS data displayed in the Sea Level Scenario Sketch Planning Tool map viewer can be downloaded as map packages directly from the map viewer. This exercise explains how to download a map package. *If you want to view the data, you will need ArcMap or ArcGIS Pro.*

A map packages (.mpk) contains a map document (.mxd) and the data referenced by the layers it contains, packaged into one convenient, portable file. The map packages were created with ArcGIS 10.7 and include versions compatible with ArcGIS 10.5 and above. Alternatively, the GIS data in ArcGIS file geodatabase 10.7.1 format can be downloaded from the data download page https://sls.geoplan.ufl.edu/download-data/

How to Download Map Packages

1. First, add a scenario to the map using the Scenario Selector. After the scenario has loaded in the layers widget, move on to Step 2.
2. In the Map Viewer, click on the Layer Controls menu (the icon with three horizontal bars).
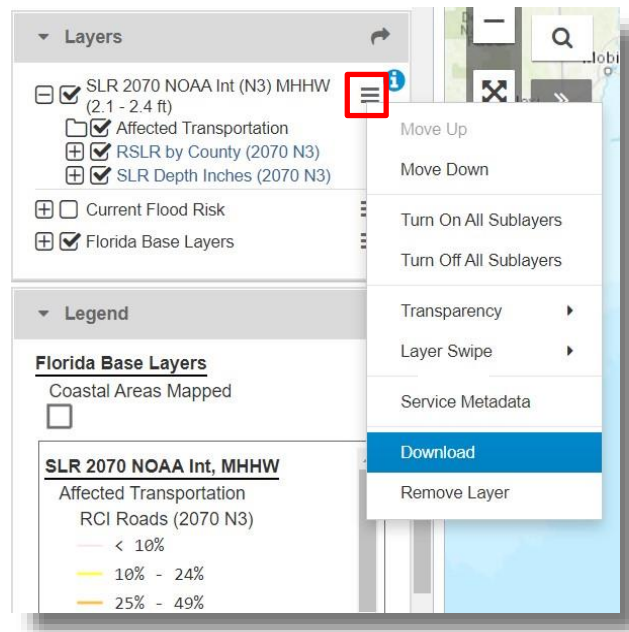
3. Click on "Download". Save zip file to desired location.
4. Unzip/ extract the downloaded file.
5. Open the map package in ArcMap.
6. For explanation of attributes, please see the metadata included with each data layer.

    To view the layer's metadata in ArcMap: in the Table of Contents:

   Right Click on Layer Name → Data → View Item Description

Exercise 8. Add New Layer from Map Service

This widget allows you to add some types of external map service layers to the map viewer. Using the map service's REST endpoint, you can drag and drop the service URL into the widget.
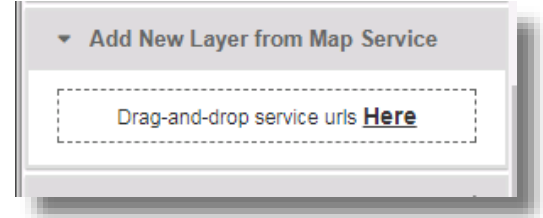
In this example, we will connect to FEMA's National Flood Hazard Layer (NFHL) map services:

1. Click on the "Add New Layer from Map Service" widget to open the tool. It will say "Drag-and-drop service urls **Here**". This is where you will drag the service.

2. In a separate web browser, navigate to the following URL:
   a. https://hazards.fema.gov/gis/nfhl/rest/services/public/NFHL/MapServer

3. In the blue bar at the top, where it says: Home > services > public> NFHL (MapServer), **click and drag where it says "NFHL (MapServer)** and **pull it over to the map viewer widget** where it says: "Drag-and-drop service urls Here".

4. This will load a new map service with 30+ layers at a nationwide extent. Click the Home button to return to the extent of Florida. Then, for the areas displayed in red (where NFHL data is available), zoom into an area until data begins to appear. Explore the layers. If the check box next to a layer is greyed out, then you need to zoom in further.
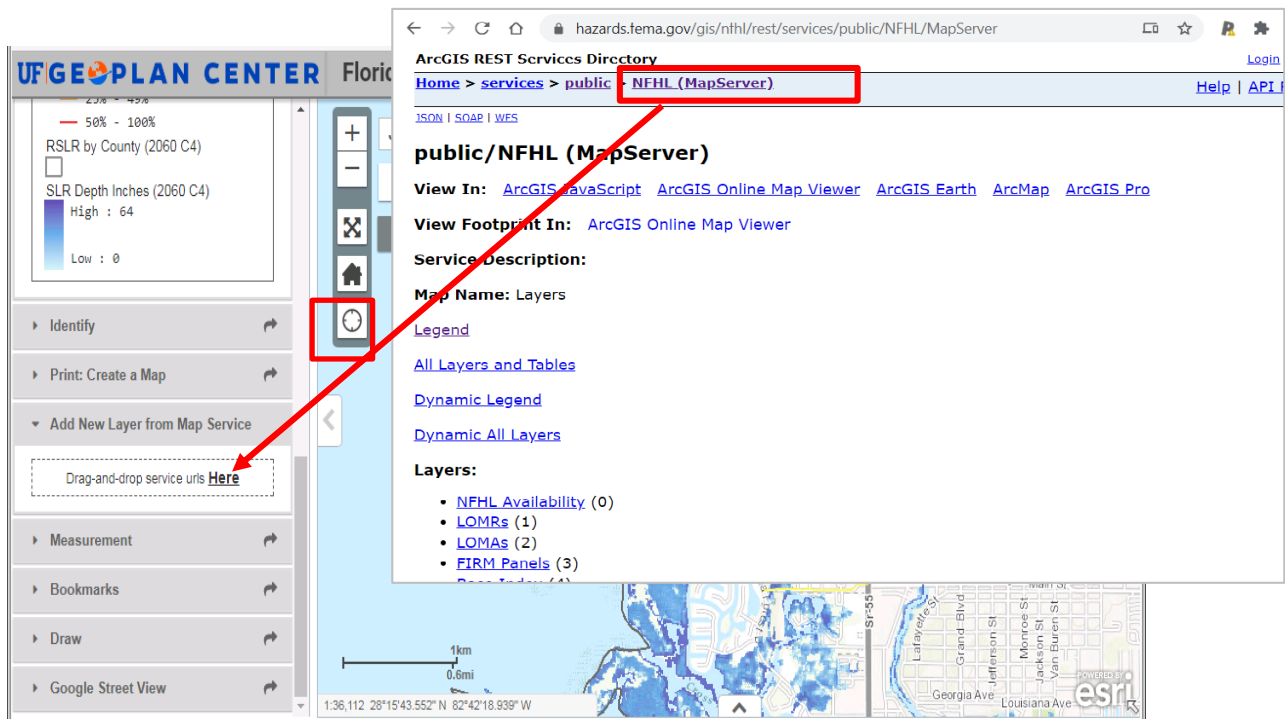
Please note: Some map services types (including fused map caches) are not supported.

Usage Tips & Known Bugs

Tips:

- If something crashes, try refreshing the page and then retry your operation.
- Use the "Bookmarks" widget to save locations; they will persist even after refreshing the page.
- You can drag and drop the widgets. Use the "dock" widget button (arrow) to return the widget to its location in the Side Pane (on left).
- The "Add New Layer from Map Service" Widget only works for Dynamic Map Services. You may experience inconsistent behavior depending on the ArcGIS server version or service settings used.
- Attribute table will only display what is in the Map View Extent. Use the "Refresh Table" button to load more features after moving the map view.
- When using "Print: Create a Map widget" - wait one minute before printing a second map. Avoid creating multiple prints in short succession.

Known Bugs:

There are a few known bugs (listed below), with the suggested workarounds:

- In the Layers widget, you click on a folder icon but it does not open/expand. Typically, this means you need to fresh the page.

- In the Scenario Selector, you choose a scenario and click "Show Scenario", but you get a red box that says "Scenario Failed to Load! Retry". Wait 2-3 seconds and then click again "Show Scenario".