

# Story Mapping Disaster



Introduction: All maps tell stories; this is one of the fundamental take-aways from this course. Story maps make those stories more explicit (and interactive) than had been possible prior to the development of web-based GIS platforms. Today you will use ArcGIS Online to produce a story map. ArcGIS from ESRI corporation is the industry standard for desktop (and now web) GIS. QGIS is one of several alternatives, but you will notice that, even online, the skills you have developed in the QGIS platform will often translate to ArcGIS. In this exercise, you will learn how to transfer work from QGIS into ArcGIS online and build a small story map about Hurricane Katrina.

## GOALS

Today's exercise will focus on the mapping of the 2005 Hurricane Katrina disaster. Katrina was the costliest natural disaster in US history (over \$125 billion in damages) and also one of the deadliest with over 1,200 victims. The Katrina "natural" disaster can only partly be ascribed to natural causes. Extreme rainfall, storm surges and other natural hazards placed a population already vulnerable due to socio-economic conditions in harms way. How can

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maps illuminate this story? How can we visualize the intersection of social and natural conditions leading to disaster?

In this exercise, you will use QGIS and ArcGIS online to manage geospatial data and create a story map of the Katrina disaster. This assignment is largely open-ended. The instructions on this worksheet will orient you to the ArcGIS online platform and help you navigate the transfer of data from one system (QGIS) to the other (the web), **but the story you tell will be your own.**

## INSTRUCTIONS

### Sign into ArcOnline Account

To complete this exercise, you will need to sign in to the course ArcGIS Online account.

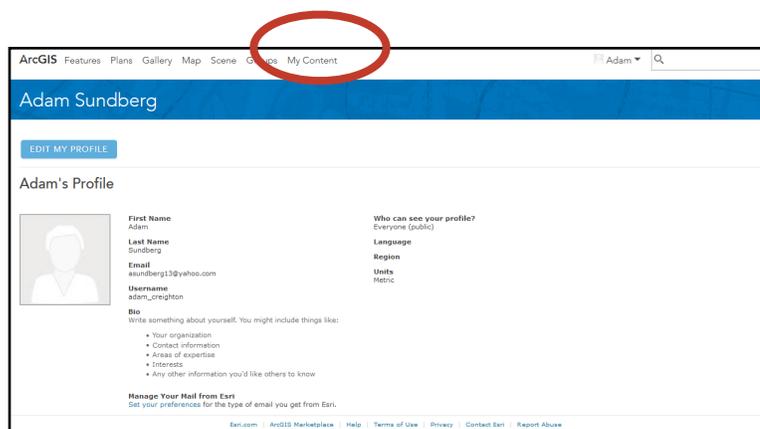
Go to: <http://www.arcgis.com/home/index.html> and "sign in" at the top.

The Username is: **MappingHistory**

The Password is:

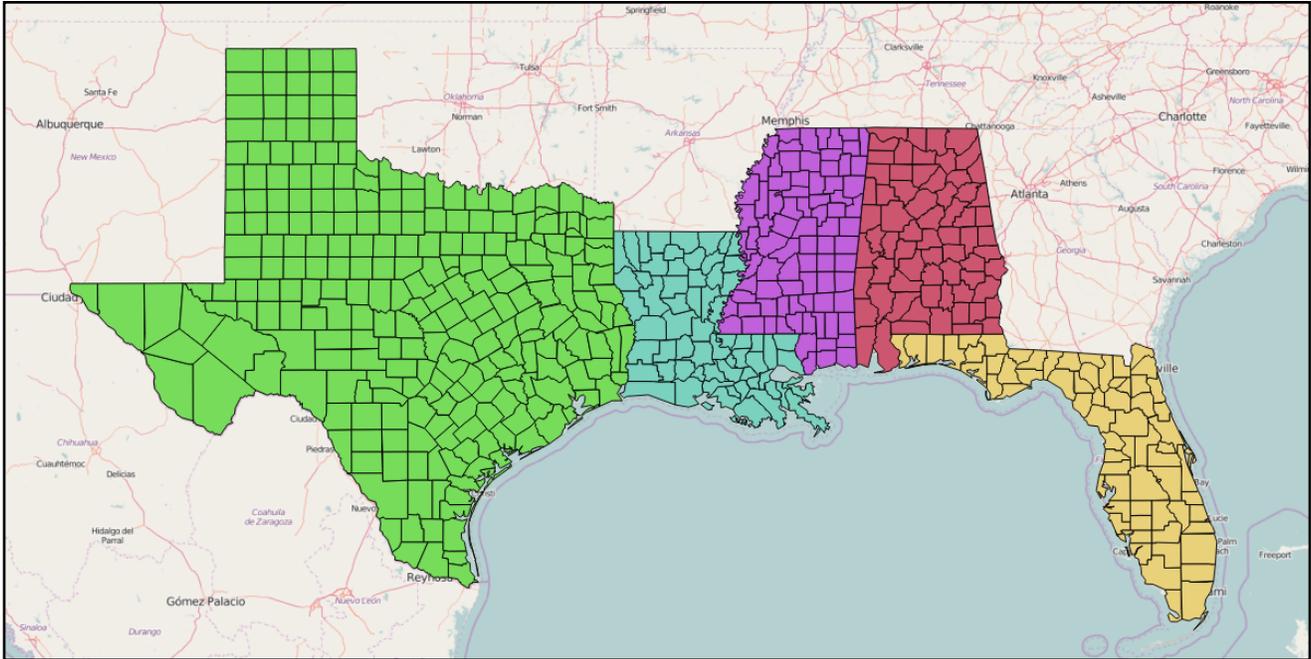
**h0981\_Vc**

Click on "My Content" at the top of your ArcGIS homepage. This next screen will be what you work from when you begin to import data into ArcGIS online.

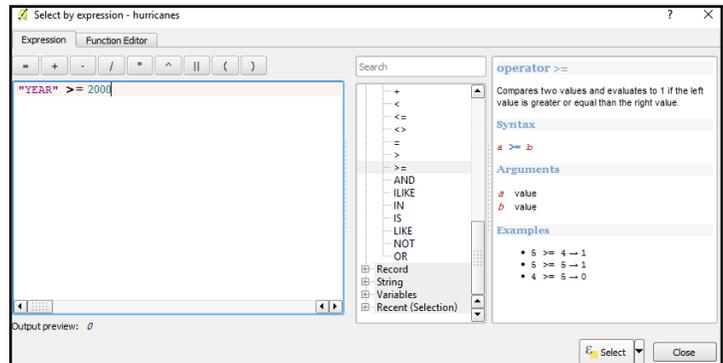


### QGIS

1. Open your shared google drive, download and save all folders from Week 10 to your hard drive. **Do not click and drag or cut and paste.**
  2. Open QGIS. Before we work on our story maps, let's explore what these datasets look like using a desktop program.
  3. Add a basemap of your choosing. Under the "Political data" folder, add "Gulf\_Coast.shp" This is a simple political boundary shapefile for the Gulf coast states affected by Hurricane Katrina. Change the symbology to "classified" to give each state its own color.
  4. Go to your "physical data" folder and add hurricanes. Zoom out to furthest extent. What is this file? Open your attribute table. This data set lists every hurricane based on year, month, and data and keeps track of wind speed (in knots), the name of the storm, air pressure, and hurricane intensity according to the Saffir-Simpson scale (H1-H5) also tropical storms (TS), tropical depressions (TD) etc. What is the earliest data of this series? What is the latest date?
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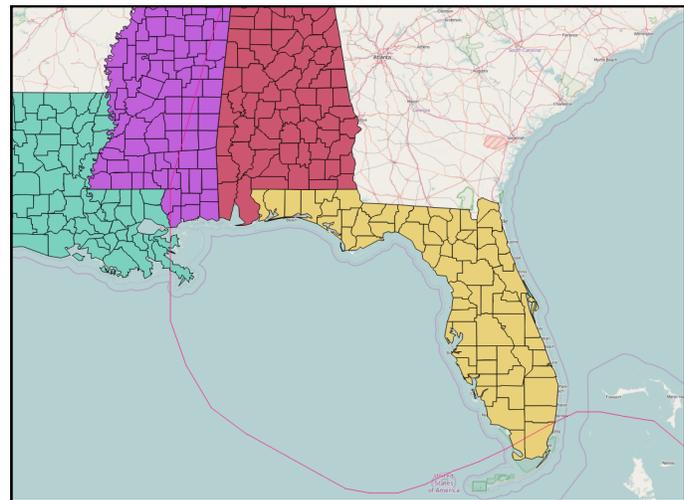


5. This data set is unruly, and since we're really only interested in Hurricanes around the time of Katrina, use "select expression" to single out all of the hurricanes in the Atlantic since 2000 and save this as a layer called "Hurricane\_Paths\_since\_2000." Remember to click the "Save only selected features" button when you save this as a new file. This cuts down on the confusion a lot, but there are still over 4,000 entries! We could do the same process (select by an expression) to remove all storms that were not actual hurricanes (anything that isn't H1,H2, etc), but let's go ahead and focus on Katrina.



6. Use the "select by expression" tool to single out Hurricane Katrina. You'll notice that there are actually three hurricanes named Katrina, but only one in 2005. What "operator" would you use in your expression to select just the 2005 Katrina? Save the hurricane Katrina selection as Hurricane\_Katrina.shp.

7. It isn't an exciting file, just a single line. Let's make it a little more useful. Open the attribute table and



explore what information it contains. Hurricane Katrina, like all hurricanes, changed in intensity over the several days of its existence. Lets change the symbology to highlight that.

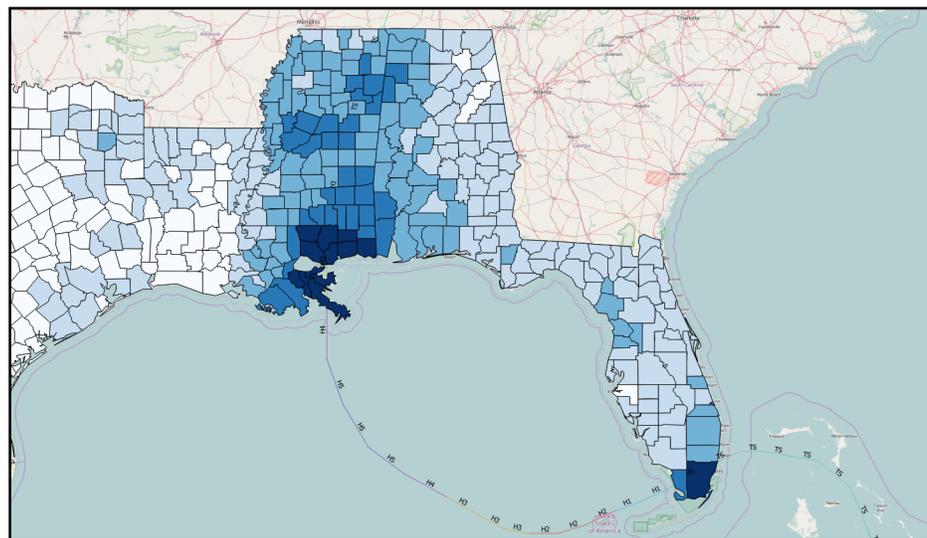
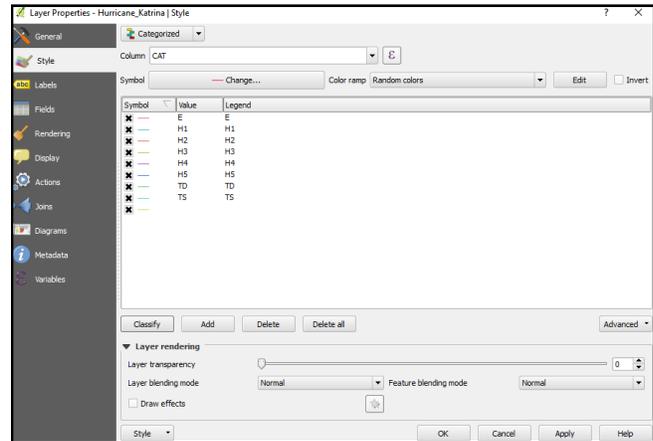
8. Open the properties panel of "Hurricane\_Katrina.shp." Change the style to "categorized" according to the CAT (category) column. Remember to click "classify." Click apply. Before exiting the properties box, let's label Katrina. Click "labels" on the left hand panel, select "show labels for this layer" in the dropdown menu in the upper left, "label with" CAT, and click ok. If you haven't already, save your project.

9. Now add "Rainfall\_082305to083105.shp" Open the attribute table. What information is available? This file shows precipitation information between Aug 23 and Aug 31st of 2005. Let's see how much Hurricane Katrina affected rainfall patterns across the Gulf.

10. Reclassify your Rainfall layers to show those areas that received more precipitation as a result of the Hurricane.

**CAUTION** - What is cartographically problematic about showing precipitation as choropleths? What might be a better way to visualize rainfall?

11. Hurricane Katrina was not simply an environmental event (if that were the case, we



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probably wouldn't be mapping it right now). It was significant because it became a disaster and it was a disaster because of the confluence of natural hazards (storm surges and extreme precipitation) and social vulnerability. Let's add some social data.

12. Go to your "social vulnerability" folder and add "Gulf\_Coast\_Socioeconomic.shp." Open your attribute table. Inside you'll see a variety of attributes. You'll see the population (as of the 2000 census), the number of people in poverty, single parents households, median income, etc. I've already normalized this data so that it can be mapped as choropleths (prefaced with IDX).

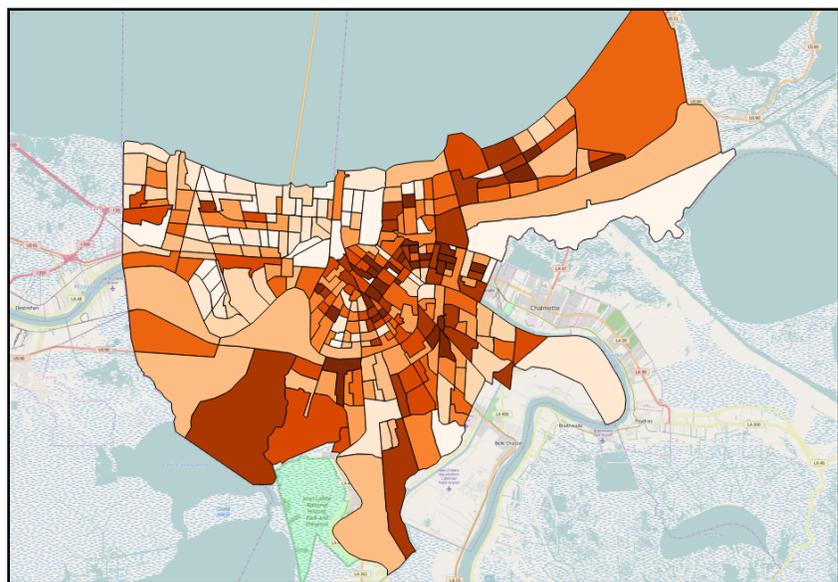


picture of the the South. Social vulnerability can be described as the combination of each of these factors. In this table, IDX\_VUL\_CT is our "vulnerability index."

13. Close the attribute table and reclassify the data along a "graduated" scale to show the most "vulnerable" counties in the south. Where are they? Use your "identify features" tool to identify three of the most vulnerable counties. What are they?

14. Last but not least, let's add a New Orleans-specific vulnerability dataset. Go to your Social Vulnerability folder and add "Jeff\_Orleans\_vuln" (which show most of Jefferson and Orleans Parishes). Uncheck all other layers. If you haven't already, save your project.

15. Open your attribute table. This dataset is far more complex and is organized around census tracts rather than parishes. If you look at the categories, some of them will be obvious ("TOTPOP"), but most will not. I added a pdf that lists what each of these categories refers to called SVI2010Documentation. This is a CDC dataset that you can access here. <http://svi.cdc.gov/SVIDataToolsDownload.html> Take a moment to explore this pdf. Which of these attributes can be depicted as **choropleths**? Which might correlate



to hurricane vulnerability?

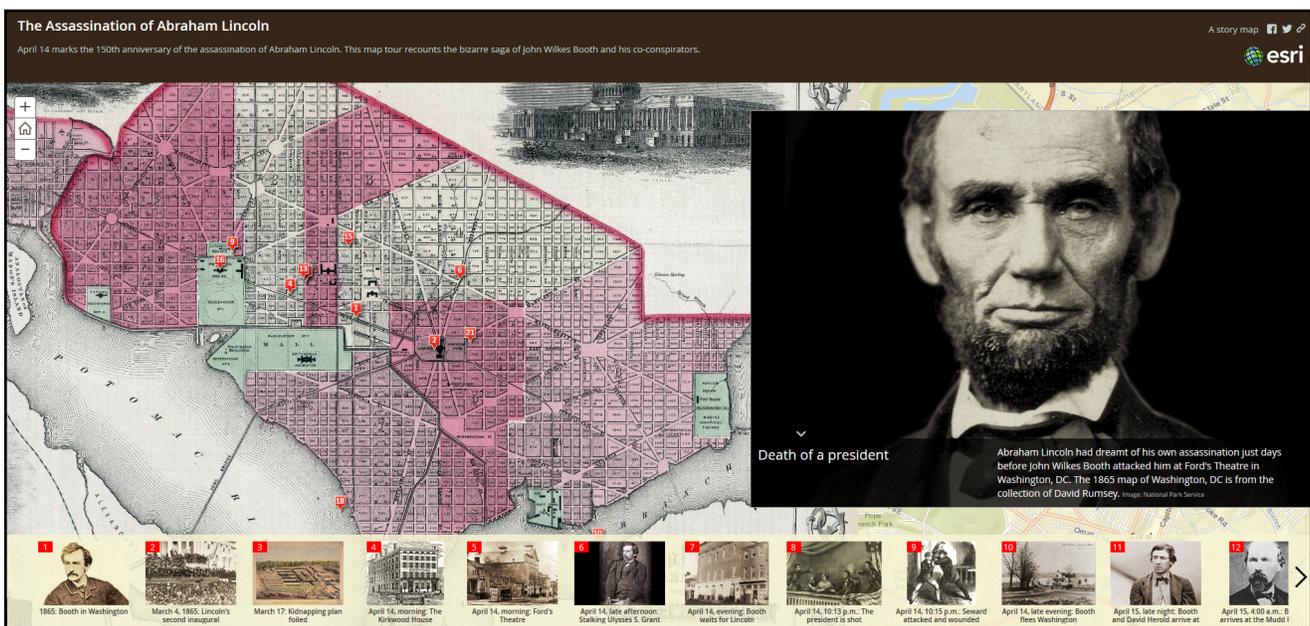
16. Choose one variable and change the graduated symbology to highlight the spatial distribution of that condition across the city. Save your project.

17. We could continue to work in QGIS and eventually build a static map (or several) to highlight how natural and social variables interact, but there are also a variety of online data sources that we can access if we map these on the web, so let's migrate our data to our ArcGIS online account.

18. Open the file folder that contains your social vulnerability data. To import For each shapefile, you'll see a number of different files with different extensions. To import a shapefile into ArcGIS online, you need to create **compressed .zip folders** that include the **.shp, .dbf, .shx, and .prj** files. If using a PC, highlight those four files, right click, "send to," "compressed zipped folder." On a mac, right click, click "compress." You've now create a folder that can be imported into ArcGIS Online. Do the same for all of the other shapefiles you have been working with in QGIS. The name of your zipped file **MUST** be the same as your individual file name.

## ArcGIS Online Story Mapping

Over the last several years, ArcGIS online has expanded in scope and power and you can now perform many of the most basic visualization functions using the free version available to the public, which we'll be exploring today. (You can also perform spatial analysis in the paid versions).



ArcGIS is not the only web platform that allows you to build story maps, but it is one of the most powerful, and if you are familiar with QGIS, you will likely find it fairly intuitive.

There are a number of pre-packaged web apps that you can build without any programming experience (with programming experience, you can download the source code, customize, and host your own versions online)

There are three primary forms of story maps available via ArcGIS.

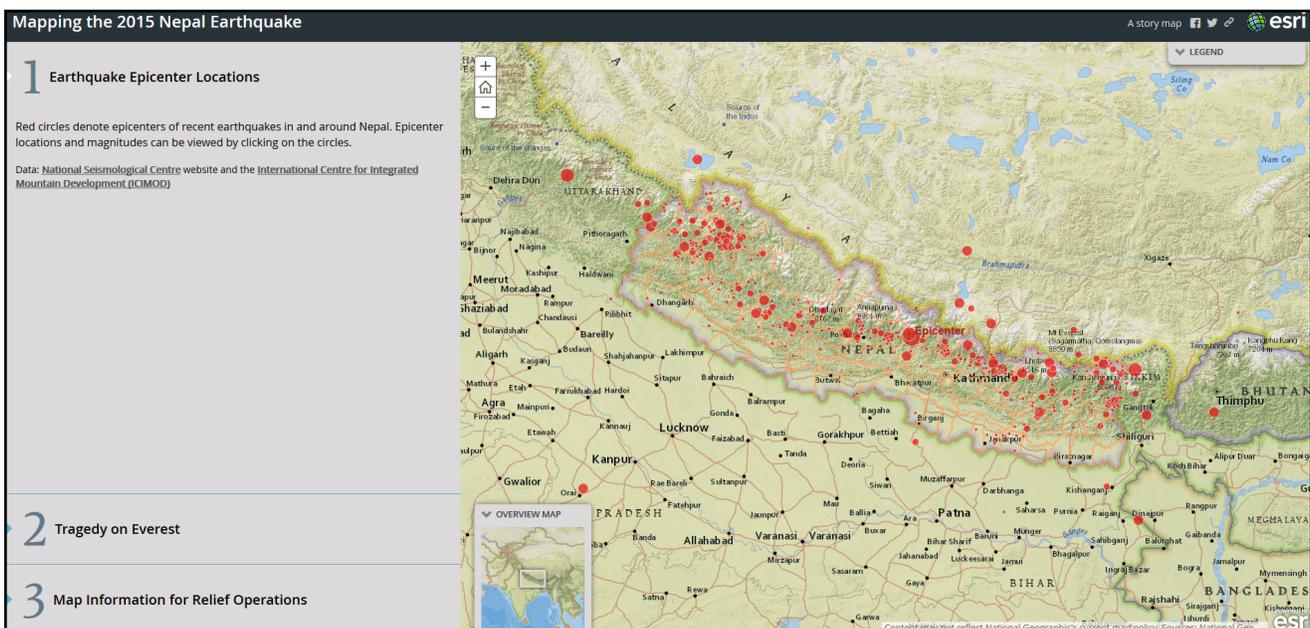
## Story Map Tour - (above)

<http://story.maps.arcgis.com/apps/MapTour/index.html?appid=c50be5615f024cc482ccb88222a8719d#>

This type of story map allows you to tag a base map and follow a "tour" across space (and time). Examples: For Katrina, you could use the tour builder to focus on specific areas of New Orleans that witnessed greater or lesser devastation, or you could use information from a time line of Katrina ([https://en.wikipedia.org/wiki/Timeline\\_of\\_Hurricane\\_Katrina](https://en.wikipedia.org/wiki/Timeline_of_Hurricane_Katrina)) to follow the Hurricane path you've already mapped in QGIS. CAUTION - for this, you will need hosted image files.

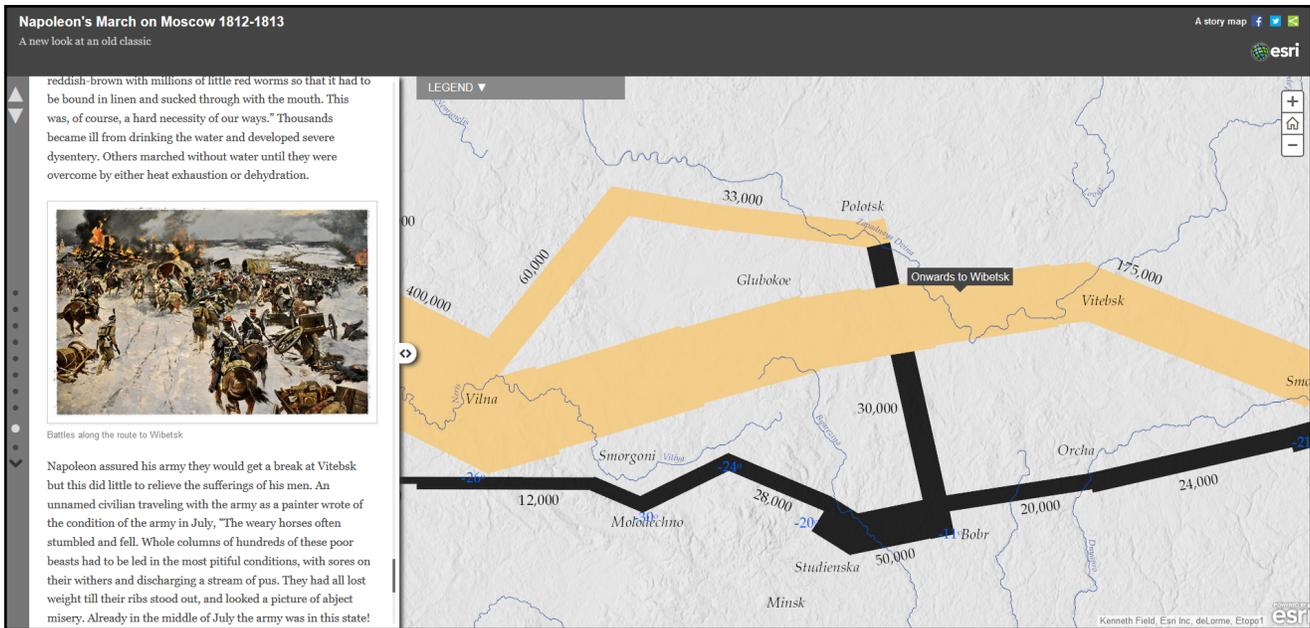
## Story Map Series -

The story map series is one of the most powerful ways to show a collection of custom built maps, and for this reason, it is one of the most versatile and powerful tools for someone like you (who will be making maps for this project and for your final project). If for instance, you want to show a series of maps of change over time, this app will allow you to do this in an attractive, animated fashion, while also offering multimedia capabilities as well. There



are multiple "Series" layouts you can choose from, bulleted, a side accordion layout, and a tabbed layout (visualized below).

## Story Map Journal



- For those of you who want to make a story map with an in-depth narrative, which is often the case with historical story maps, this is a good app for that purpose. As the reader scrolls down, geotagged locations change on the base map to the right.

<http://storymaps.esri.com/templates/development/stable/geoblog/?appid=42459c24c8a44f328e55c9043bf26208>

For a good introduction to story mapping, see the following video:

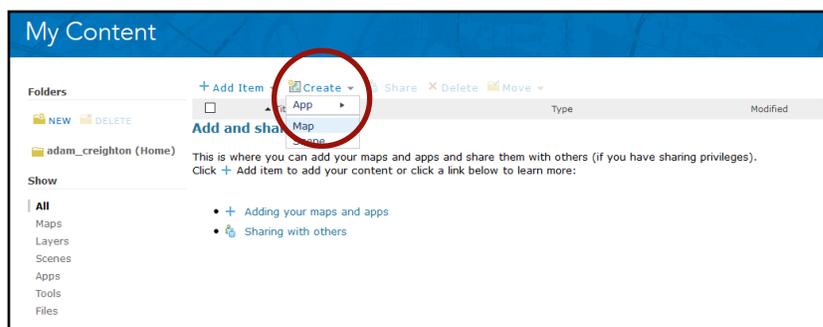
[http://training.esri.com/Courses/ts\\_StoryMaps/player.cfm](http://training.esri.com/Courses/ts_StoryMaps/player.cfm)

- You can also explore story map gallery for examples to draw upon <https://storymaps.arcgis.com/en/gallery/#s=0>

## Using ArcGIS online

1. Before you can build a story map, you need to build a web map. Return to the "My Content" page of the class ArcGIS online account.
2. Click the "HIS317 (SP\_"your year")" folder. Click "create," "map."
3. In the "New Map" window, call your map "Katrina Base

Map\_"yourlastname" and give it the tag "HIS 317 SP2018" Click Ok. Give the map a title. **This should include your name (ex. Sundberg\_KatrinaMap)** The tag should be "HIS317" AND "Katrina"



4. You should now be looking at a base map. Take a few moments to click on some of the icons to observe their functions. Many should be familiar or intuitive (basemaps, saving, sharing, measuring. etc) We want to add data to our map.

5. Let's add the data we prepared as .zip files first. Click the "add" icon beside basemap, then "add layers from file."

6. You can add shapefiles, csv or txt files, or GPS files to ArcGIS online maps. Select "browse" and add the "Rainfall.zip" zipped file you created.

7. When you add the shapefile, all of its styling will disappear. You will have to recreate this in ArcGIS online. Its fairly intuitive. Under the main "content window," you will see a multicolored shape icon to "change style" click this.

8. The attribute that you want to visualize is "Rain\_total." Select this from the drop down "choose an attribute to show" window. You'll notice that the GIS automatically gives you options for visualizations based on what kind of data your column contains. Select each to see how it changes the visualization of your data. When you decide upon "counts and amounts (color)", i.e. a choropleth map, you'll notice it is not classified the same way it was in QGIS. To tweak your visualization and reclassify, select "options" from the middle of the counts and amounts box.

9. For our purposes, it won't be necessary to change all that much under the "change style" box, but look around to see what options you are presented here. Check the "classify data" box, use natural breaks, and 10 classes. To change the color, click the "symbols" bar. Click Ok. Click "done."

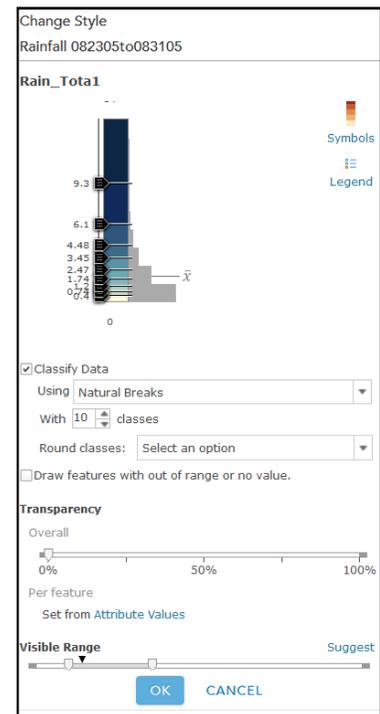
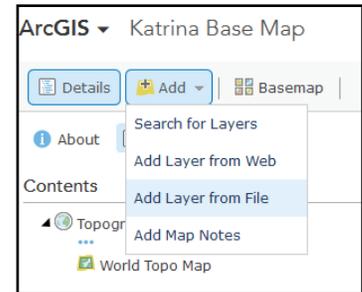
10. Add each of the other compressed data layers you prepared.

11. Before we move on, let's take a look at one more feature. Click on the "more options" icon beside the "change style" icon on one of your layers (its three blue dots). You'll notice you have a number of other options you can use, whether creating labels, pop up windows, or editing your shapefiles/attribute tables. You can also remove or rename, move, or set the transparency of your layers here.

12. The last thing we want to add to our Katrina Base Map are hosted web layers. One of the nice things about using a corporate product like ArcGIS is that it has a giant corporate infrastructure serving it and as a result, they "host" layers that you can use on their servers. Several deal with Katrina.

13. To add them to your map, click the "add" icon, then "search for layers." You can search "Katrina" and it comes up with many more than you will be able to use. Search for, then add, the following layers:

"Levee\_failures\_updated," "Katrina Flooding Inundation Extent (Comprehensive), 01 Sept 2005," "NOLA Levees," "NOLA Population by Race," and "Imagery Post Katrina," "Imagery Pre Katrina." These last two layers are raster files, which you cannot easily import into ArcGIS (though there are a few workarounds if you and your group are



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interested). Luckily, ESRI hosts these layers so we can see aerial photographs of the city before and during the flood. Make sure to save your map.

15. You now have a number of different layers to choose from and organize into maps that explain part of the Katrina story.

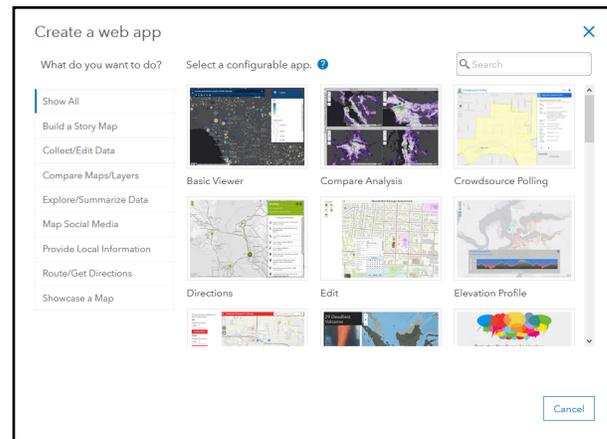
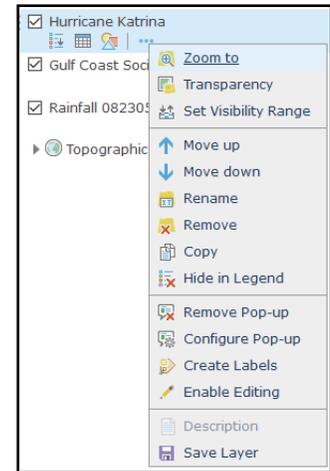
### What story do you want to tell?

### Using ArcGIS Story Maps

1. To make a story map, click on the large "ArcGIS" icon at the top left of the browser, then "content." Click the name of your webmap and you'll see a new window open. There should be options to "open in Map Viewer" (what we were just using), as well as "Create Web App" beneath that. Click that, then "using a template."

2. Click "Build a Story Map" on the left hand panel. Select the one that best suits your story (caution - Tour Builder requires you to begin with images stored in Flickr or Picasa or Facebook, so this may be an added level of work). Click "create app," give it a name and the tag (HIS317).

3. As an example, I created multiple maps showing the hurricane path, the many paths of hurricanes in the Gulf since 2000 and pre- and post-Katrina imagery as **SEPARATE** maps, each **SAVED WITH A DIFFERENT NAME**. This way, they can be added at different moments in my story. Notice the different maps below.



Your task is to create at least **TWO** maps that help explain the Katrina disaster and integrate them into a storymap. Look at the information you have, look at the storymapping options to choose from and think about what maps might help tell the story of Katrina. The maps you create are the most important (data rich) parts of the story, but Arc's platform is most useful (and deep) when you add additional information, for instance from internet sources. Use images or videos from the web. The strength of story mapping comes partly from its multimedia capabilities. Feel free to cut and paste (and cite with URLs) text to include in side panels. If you'd like, you can work in pairs or in your final groups to complete this last part of the project.

When you're finished, embed the story map in the blog.

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Map Journal Builder SETTINGS SHARE VIEW STORY HELP story isn't saved yet

esri

**ADD HOME SECTION**

**STEP 1: Main Stage Content**

This first section is your Home Section, think of it as the 'cover page' to your story. The title you just defined will be displayed with large fonts. [Learn More.](#)

CONTENT: Map Image Video Web page

Map Select or create a map

This is the Main Stage This is the Floating Panel

ADD SECTION ORGANIZE

**Select a map**

My Content Enter search term or web map URL

 Katrina_Rainfall asundberg13	 Katrina_Hurricane... asundberg13	 Katrina_Hurricane... asundberg13	 Katrina_Pre asundberg13
 Katrina_Post asundberg13	 Katrina asundberg13	 English Coal Exp... asundberg13	 Assyrian Empire asundberg13

1 - 8 of 20 results

Cancel