

GIS 1: a very basic introduction

By Vanessa Arias Casillas (Ph.D)

Agenda

What is GIS?

Classic ArcGIS online overview

Base and Layers

Analysis

Edits

Save and Send to New ArcGIS Online

Print and Share

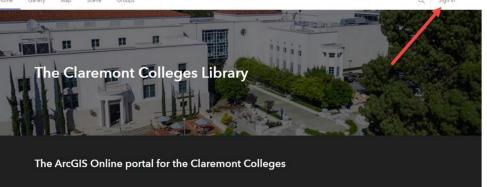
Endnotes

CMC – ArcGIS Online

Get an ArcGIS Account

[Access the Claremont ArcGIS Portal](#)

You can access ArcGIS Online directly with your Single Sign-On (SSO) credentials when you click "Sign In" from the Claremont Colleges Library ArcGIS Portal.



The ArcGIS Online portal for the Claremont Colleges

The Claremont Colleges Library Portal, sign in link is in the top right

If you have existing credentials from ArcGIS Online, you can continue to log in with those.

Sign in to The Claremont Colleges Library with 

Two ways to log in to ArcGIS



Log in with your Claremont ID (CAS) information
(For creating a brand new account or if you've already used this option)

OR

Log in with your existing ArcGIS ID and password
(If you have an existing account.)

ArcGIS sign on screen. Two ways to log in to ArcGIS: 1. Login with your Claremont ID (CAS) information (for creating a brand new account or if you've already used this option). OR 2. Log in with your existing ArcGIS ID and password (if you have an existing account.).

Sign in to The Claremont Colleges Library with 

The Claremont Colleges: Central Authentication Service (SSO)

ArcGIS login

Not a member of this organization?
Sign in to your account on ArcGIS Online

Privacy

The Claremont Colleges Library

Home Gallery Map Scene Groups Content Organization [Search](#) [Bell icon](#) [More icon](#)

Vanessa Casillas
VanCasillas@cmc.edu_cl...

Overview Members

The Claremont Colleges Library

Subscription ID: 9377927143

System health: ✓ All systems operational

Newest members

View all members

CP Chardy Paige

MV Mirek Vanis

NS Nathan Shankar

JB Jon Burkart

Administrative contacts

JF Jeanine Finn

Open Data groups

View all

B Basemaps 2019
Contributors: 1 Items: 32

HMC Clinic
Contributors: 9 Items: 0

Latest content

Rincon Crater

by claremontcolleges

Created: Dec 31, 2021
Updated: Dec 31, 2021
View Count: 9

RinconCrater

by claremontcolleges

Created: Dec 31, 2021
Updated: Dec 31, 2021
View Count: 5

2022 Dia Mundial de la Tierra Con...

by CWeisman21@cmc.edu_clare...

Created: Dec 21, 2021
Updated: Jan 4, 2022
View Count: 3

View all content

Trust Center | Contact Esri | Report Abuse | Contact Us

Home view

Groups – add yourself

The screenshot shows a user interface for managing groups. At the top, there is a navigation bar with tabs: Home, Gallery, Map, Scene, Groups (which is underlined), Content, and Organization. To the right of the tabs are icons for search, notifications, and a menu. A user profile is shown on the far right.

The main content area has a blue header with the word "Groups". Below it are four buttons: "Create group" (with a plus icon), "Search My Groups" (with a magnifying glass icon), "My Groups" (selected and highlighted in blue), "Featured Groups", and "My Organization's Groups".

On the left, there is a "Filters" section with a toggle switch for "Only show groups with new membership requests". Below that is a dropdown menu for "Owner" with three options: "VanCasillas@cmc.edu_claremont", "Another organization member", and "Someone outside the organization".

The main list area shows one group entry:

- QCL Workshop** (represented by a grey square icon with a white letter Q)
- Owner: VanCasillas@cmc.edu_claremont
- Created: Mar 3, 2022 Last updated: Mar 3, 2022 Viewable by: Everyone (public)
- Workshop
- Delete group

At the bottom of the list area, there are buttons for "Title" and "Filter".

Geography

Remote Sensing

Cartography

Surveying & Photogrammetry

Computer Science

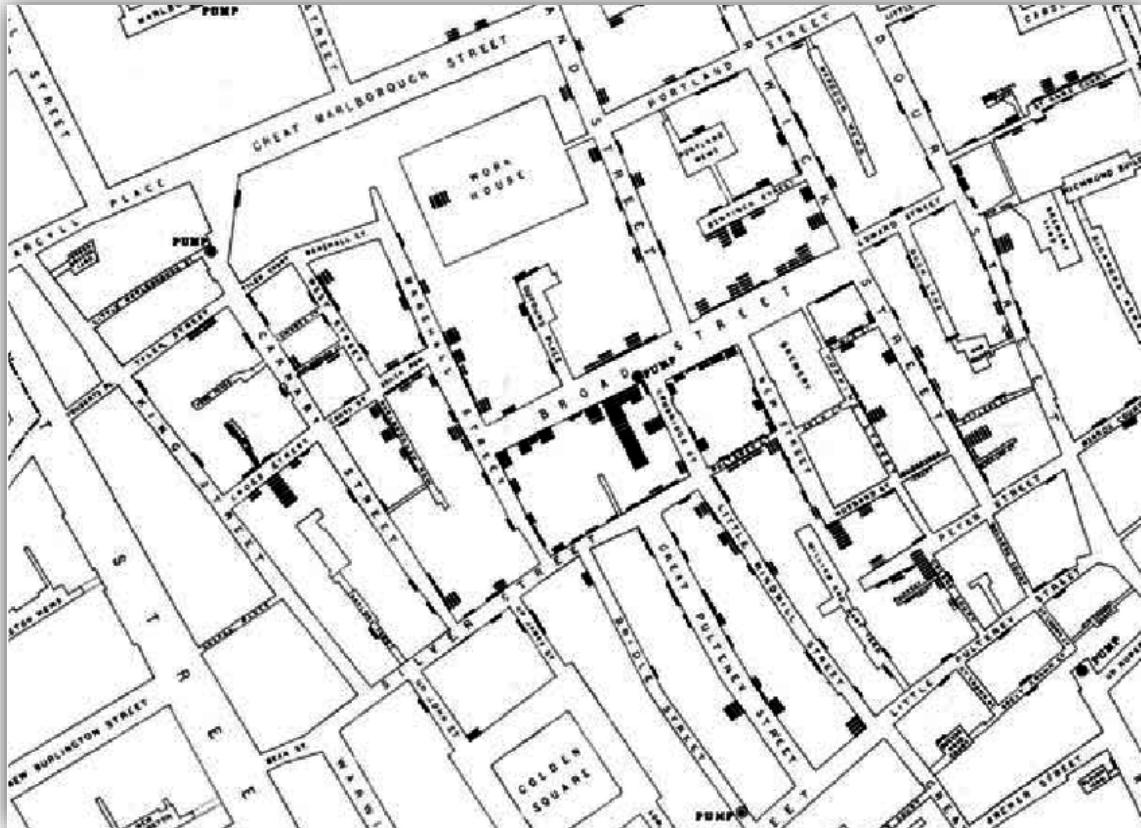
Mathematics & Statistics



GIS? Quick Overview

GIS: Geographic Information Systems

- computer-based tools used to store, manage, visualize, analyze, and interpret geographic data
 - Five Components: hardware, software, Data, People, and Workflows
 - Two types of Information: attributes and location
 - GIS capability: Spatial analytics, field operations, mapping and visualization, Real-time GIS, 3D GIS, Imagery and remote sensing and data collection and management
 - Types of Files: CSV, Excel, and JSON
 - Presentation of Maps: Static (printed map, PDF and JPG) and Dynamic (web and apps)



Mentions

ESRI: Environmental Science Research Institute (The Science of Where), Redlands

ArcGIS Online, cloud-based

- Create, use, share geospatial content with organization, community and publicly
 - used the software-as-service (SaaS) model
 - Make maps, share maps, apps, collaborate, analyze data, and work with your data

1854 Cholera (kaa-lr-uh) Epidemic – London: Dr. John Snow

- Mapped cholera deaths
- Determined water pump source

Goal



Navigate ArcGIS
Online



Make a simple map



Run a simple analysis
with the data on your
map



Show your map your
group or organization



Make a PDF print for
presentations and
reports



Planning a Map: a simple map

1. Problem – why are we making a map?

- a. You got called that a couple trees might fall over due to the winds. You know that what type of tree it is yet not the exact location.
- b. You decide that while checking on the trees you should update your data for the Diameter at breast height (DBH): is measured on standing trees outside of the bark. Diameter can be calculated by measuring the circumference of the tree, then divide circumference by π (3.1416)

2. Data – what layers do we need?

- a. Claremont Trees
- b. Neighborhood
- c. Parks
- d. Claremont Boundary

3. Analysis – what layers do we need to adjust or make?

- a. Mean of the DBH and count of Trees in Neighborhoods

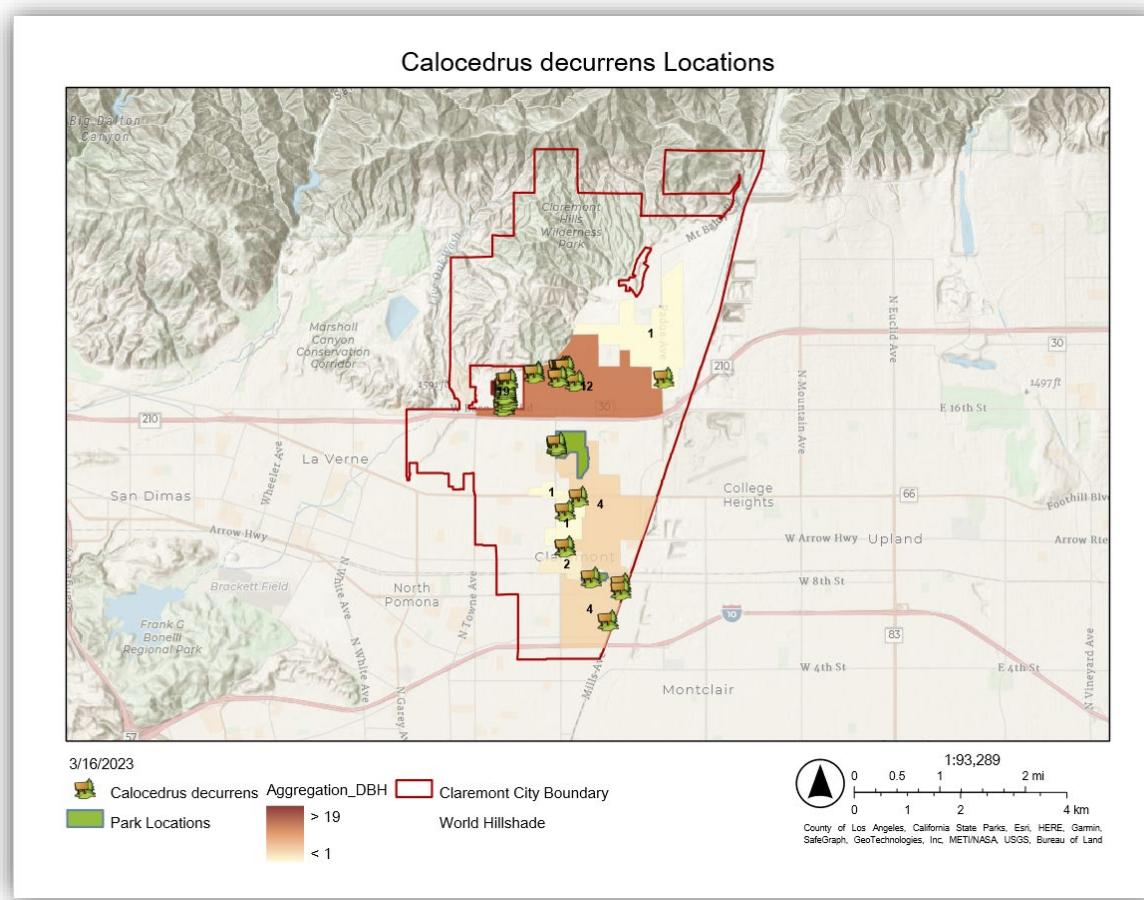
4. Edits – who is looking at the map?

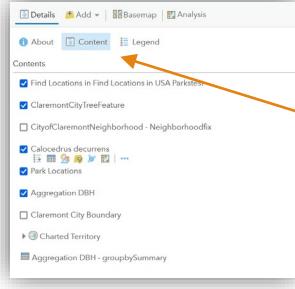
- a. Fieldworks
- b. Public

5. Results – does it tell a visual story?

- a. PDF or Share

End Result



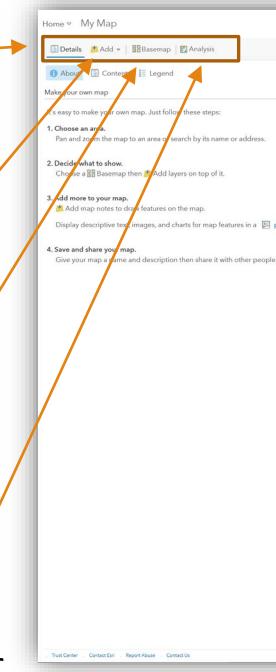


Details > Content
is where you will
find layer on your
map and legend

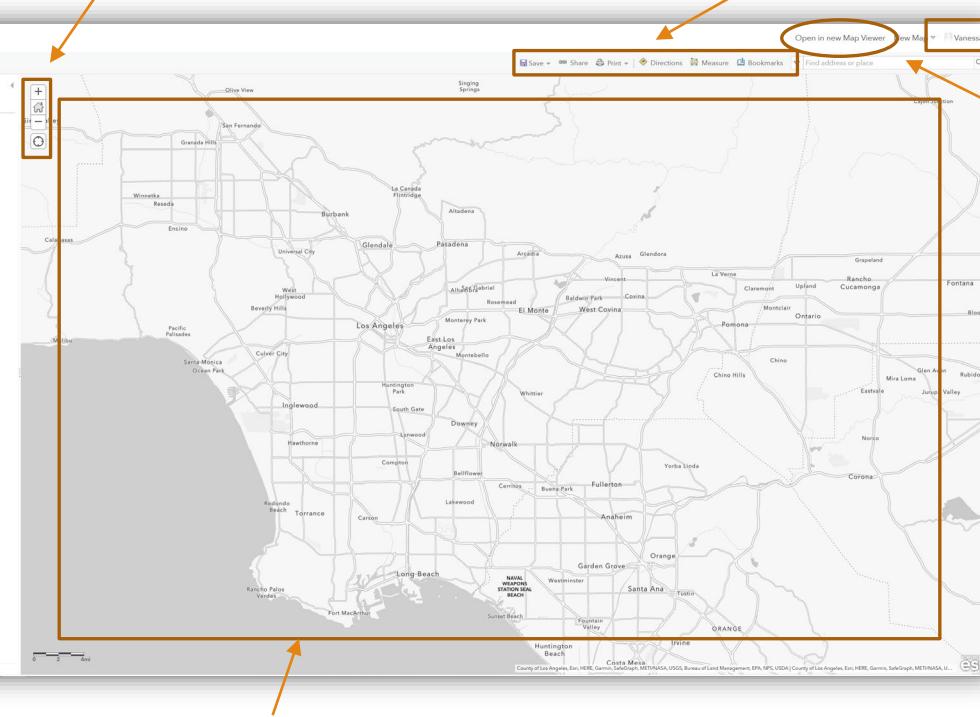
Add is where
you will find new
layers to add to
your map

Base maps are
kept separate
from all the
feature layers

Analysis is where
you will find all your
tools for analysis



Zoom and Home buttons



Save, Sharing and Bookmarks can be
found here*

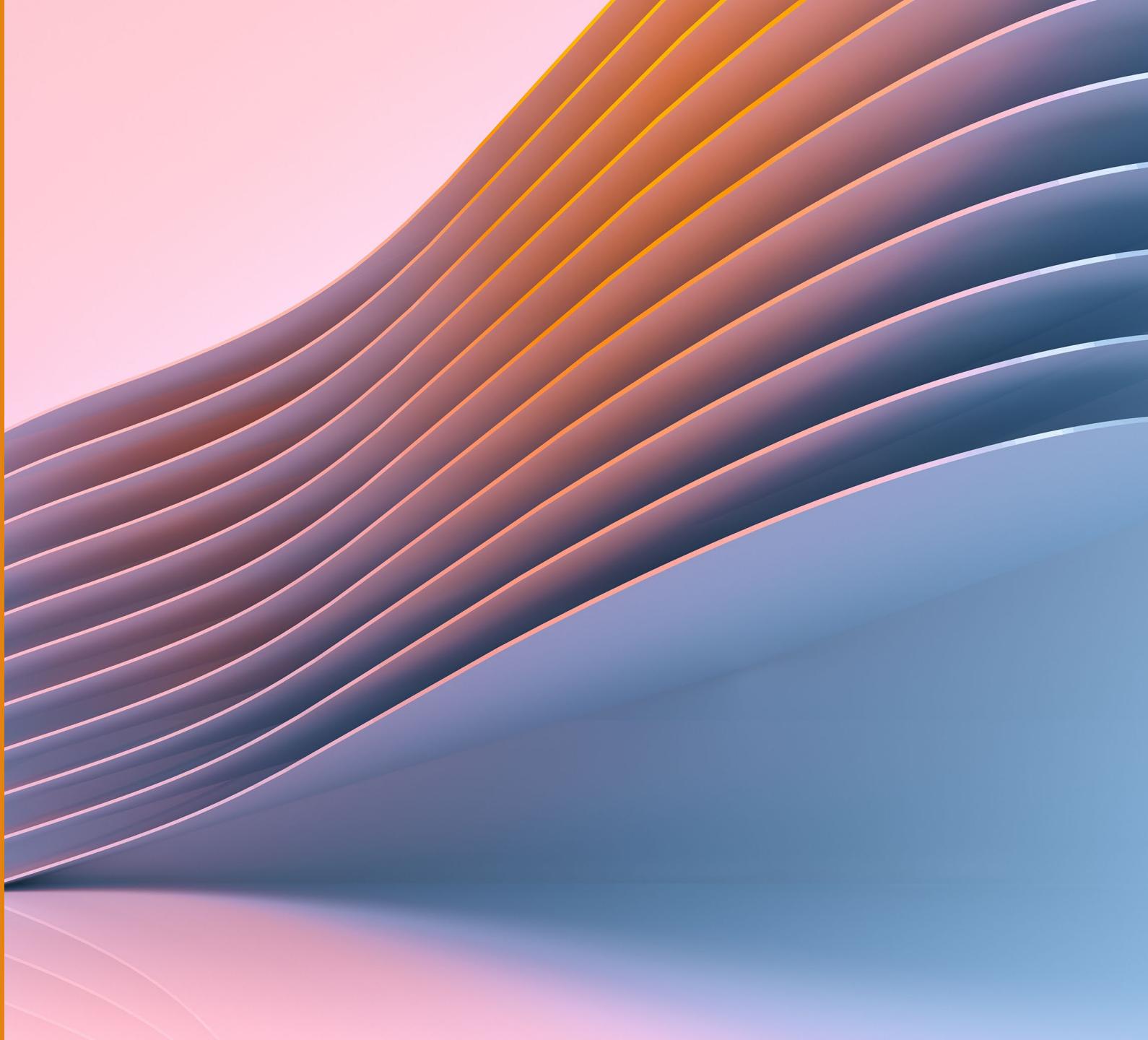
You can switch
back and forth
between
classic and
map viewer

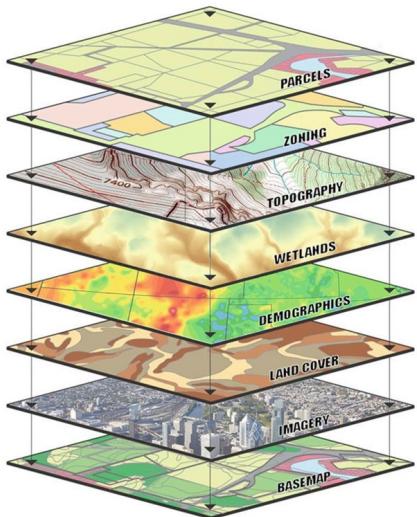
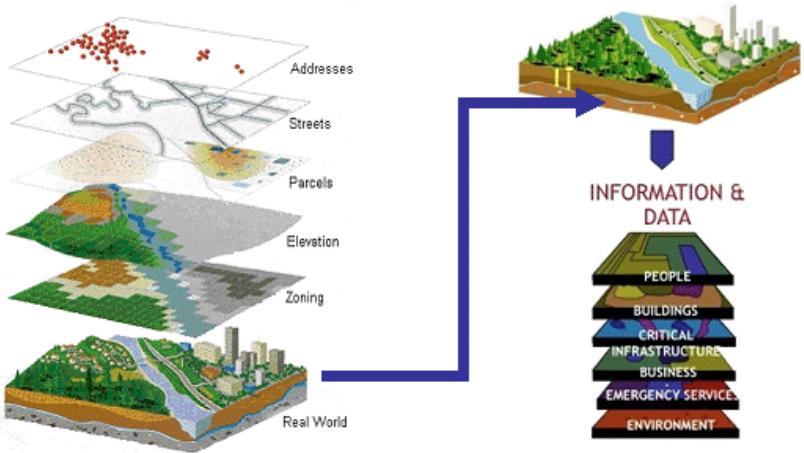
Username
and
account
settings

*print in map viewer not classic

Classic ArcGIS

Data Layers



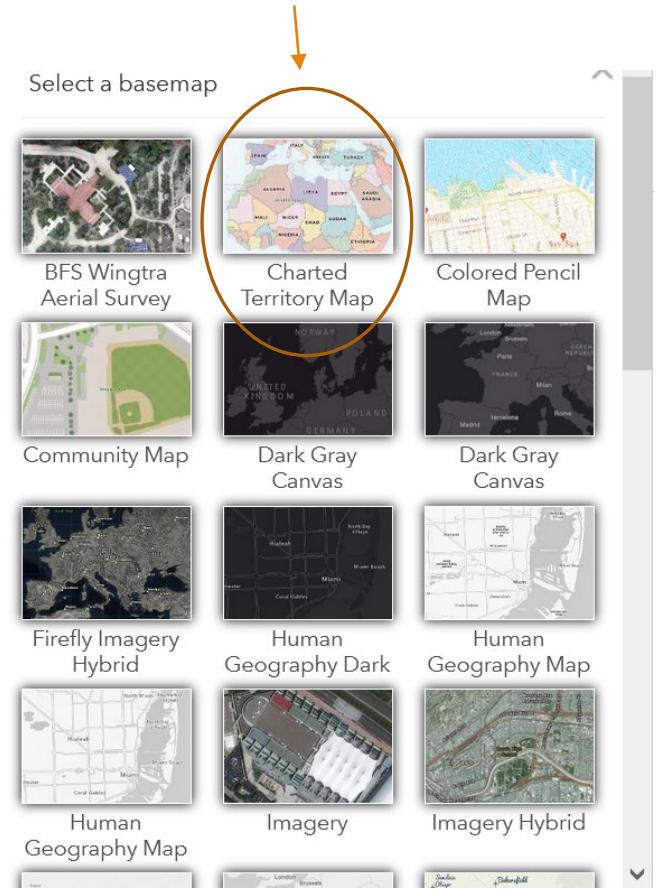
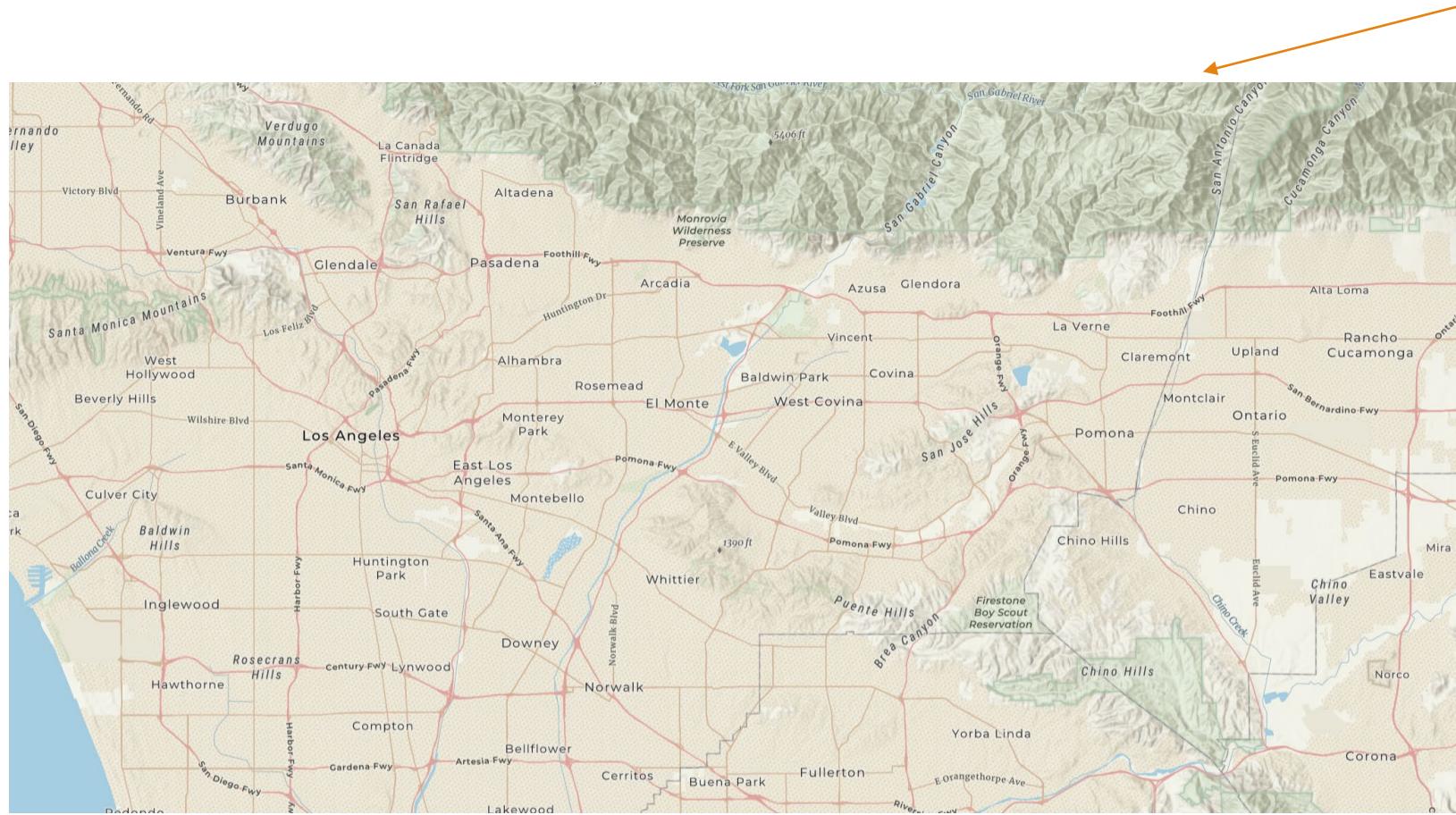


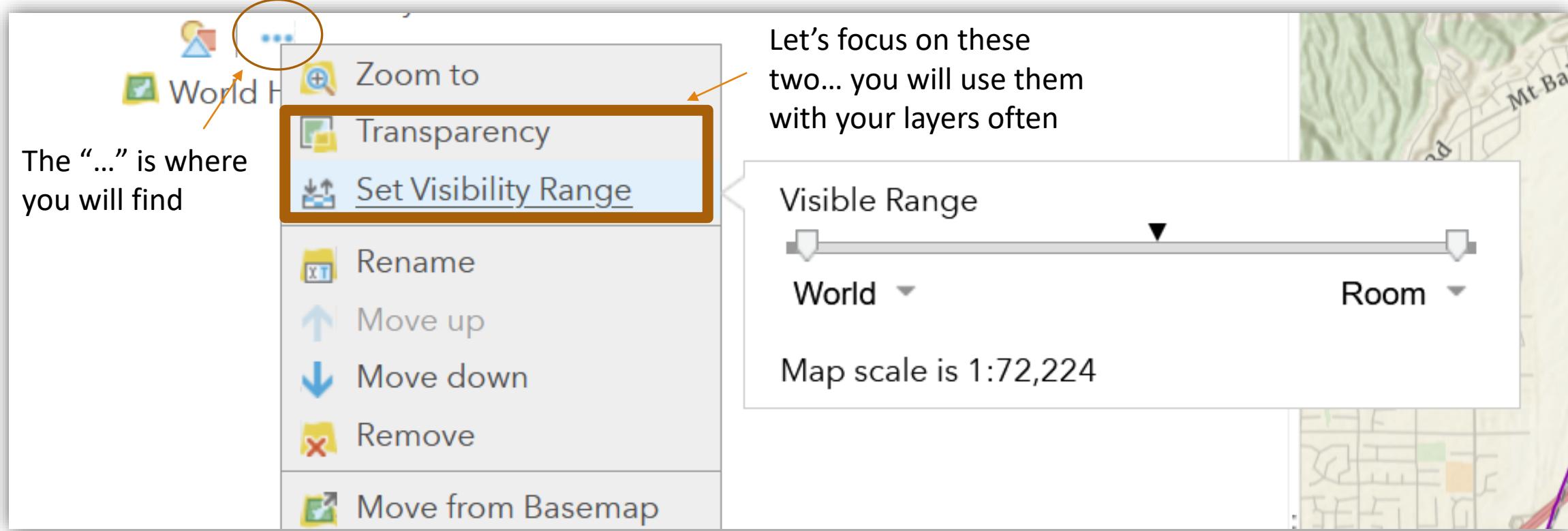
Layers

- Vector data is split into three types: point, line (or arc), and polygon data
- Raster data (also known as grid data) represents the fourth type of feature: surfaces. Raster data is cell-based containing coordinate information and values for each cell.
- Features can be points, lines, or polygons (areas), and may also have tables associated with them. In ArcGIS Online, a feature layer is represented as a single item. However, a feature layer item may contain one or more layers and tables inside it, depending on how it was published.

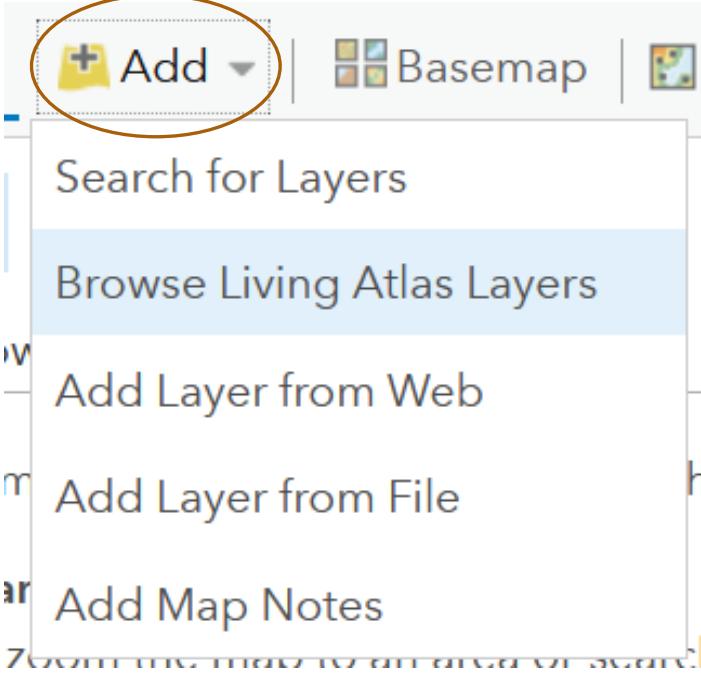
Base Maps

We will be using this Base map

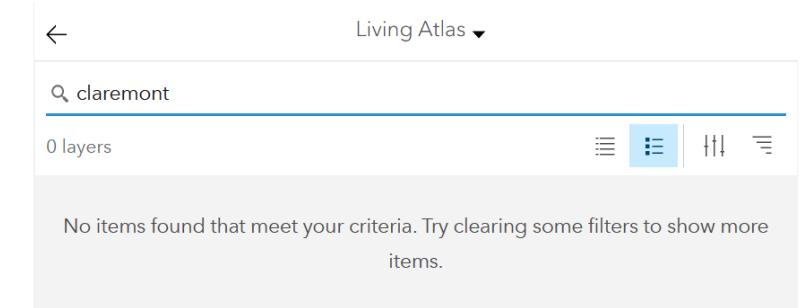
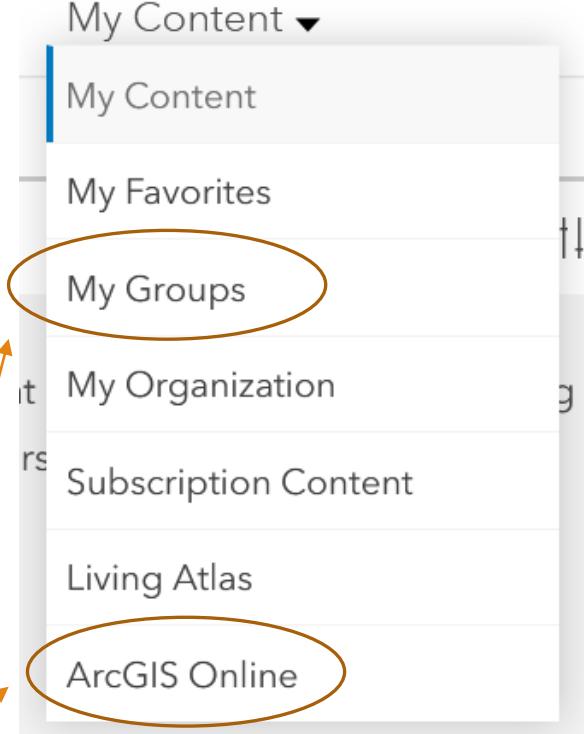




Visibility and Transparency



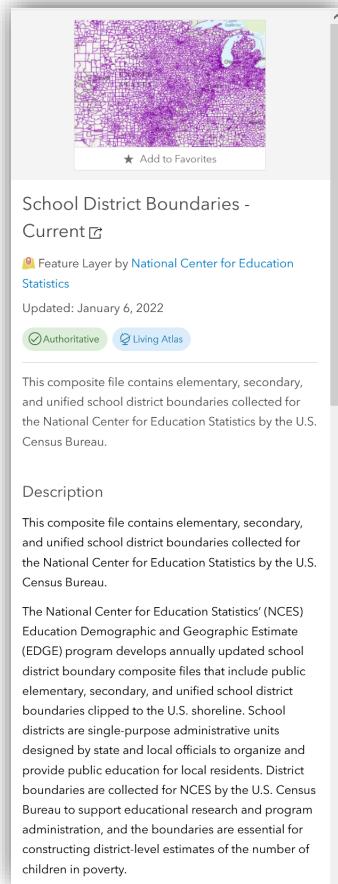
Today's workshop
will be using these
two



Sometimes when you are
searching for key terms you
will come across this. First
look at the library you are
using before you panic that
all your layers are gone.

LAYERS AND LAYERS AND LAYERS

Layer Information – great example



The Census Bureau's School District Boundary Review program (SDRP) (<https://www.census.gov/programs-surveys/sdrp.html>) obtains the boundaries, names, and grade ranges from state officials, and integrates these updates into Census TIGER. Census TIGER boundaries include legal maritime buffers for coastal areas by default, but the NCES composite file removes these buffers to facilitate broader use and cleaner cartographic representation. The NCES EDGE program collaborates with the U.S. Census Bureau's Education Demographic, Geographic, and Economic Statistics (EDGE) Branch to develop the composite school district files. The inputs for this data layer were developed from Census TIGER/Line and represent the most current boundaries available. For more information about NCES school district boundary data, see <https://nces.ed.gov/programs/edge/Geographic/DistrictBoundaries>.

Previous collections are available for the following years:

- SY 2019-20 TL 20
- SY 2018-19 TL 19
- SY 2017-18 TL 18
- SY 2015-16 TL 17
- SY 2015-16 TL 16
- SY 2013-14 TL 15
- SY 2013-14 TL 14

Terms of Use

All information contained in this file is in the public domain. Data users are advised to review NCES program documentation and feature class metadata to understand the limitations and appropriate use of these data.

Credits (Attribution)

NCES EDGE

Owner

National Center for Education Statistics

Managed by:

OpenDataMgr_NCES

View count: 994,240

Created: March 16, 2020

Shared with: Everyone (public)

Title
Updated
Description
Terms of Use
Credits (Attribution)
Owner
Managed by
View Count
Created
Shared with

ArcGIS Online ▾

Items: 183

Search bar: claremont

Thumbnail: Claremont City Boundary by bsims_hplanning (Updated: 10/26/20)

+

Living Atlas ▾

Items: 238

Search bar: schools

Thumbnail: School District Boundaries - Current by National Center for Education Statistics (Updated: 1/6/22)

Libraries

Living Atlas – maintained by Esri

ArcGIS Online – Same layer as Living Atlas plus peer-to-peer layers

All fun and games till you run out of Credits!!!

Credits vs. Free

- Story time! (every GIS specialist has one) The time I blew all my credits on converting all addresses from regular mail to address to geocodes

Addresses vs. Geocodes

- latitude versus longitude



A screenshot of the "Add layer" search results for "schools" in the "Living Atlas". The search bar shows "schools" and there are 238 items listed. The results include:

- School District Boundaries - Current (by National Center for Education Statistics, updated 1/6/22)
- NZ School Enrolment Zones (by Eagle Technology Group Ltd, updated 10/19/21)
- NZ Schools Directory (by Eagle Technology Group Ltd, updated 1/7/22)
- U.S. Public Schools (with Placekey) (by esri_placekey, updated 10/9/20)
- Private School Locations - Current (by National Center for Education Statistics, updated 10/28/21)
- Public School Locations - Current (by National Center for Education Statistics, updated 6/29/21)

Each result item has a green checkmark icon, a blue gear icon, and a blue shield icon to its left.

Credits Talk

Go to setting in
your account
profile and click
on credits.

The screenshot shows the 'My settings' page with a blue header. On the left, there's a sidebar with 'General', 'Licenses', and 'Credits' options, where 'Credits' is selected and highlighted with a blue border. The main content area is titled 'Credits' and displays two values: 'Remaining' (299.50) and 'Assigned' (300.00). Below these values is a descriptive text about credits and a link to 'Learn more about credits'. An orange arrow points from the text on the left towards the 'Credits' tab in the sidebar.

My settings

General

Licenses

Credits

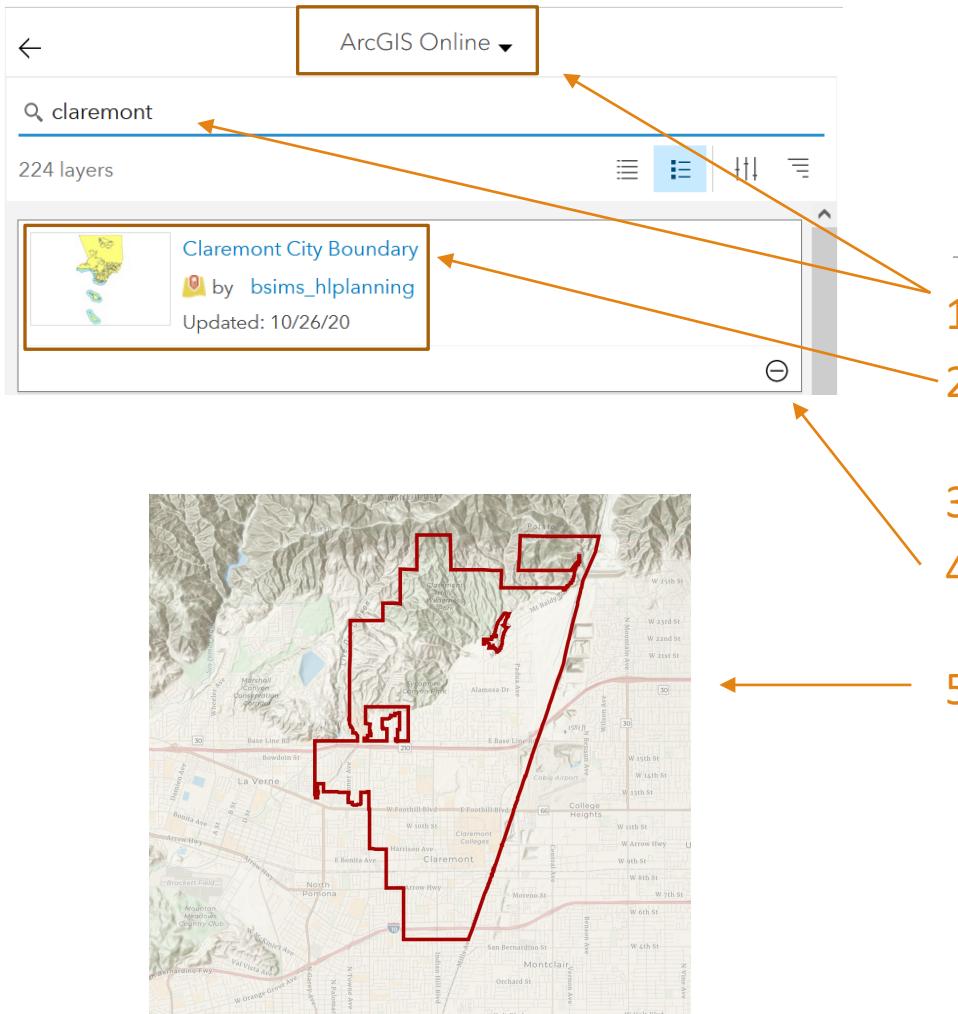
Credits

Remaining **299.50**

Assigned **300.00**

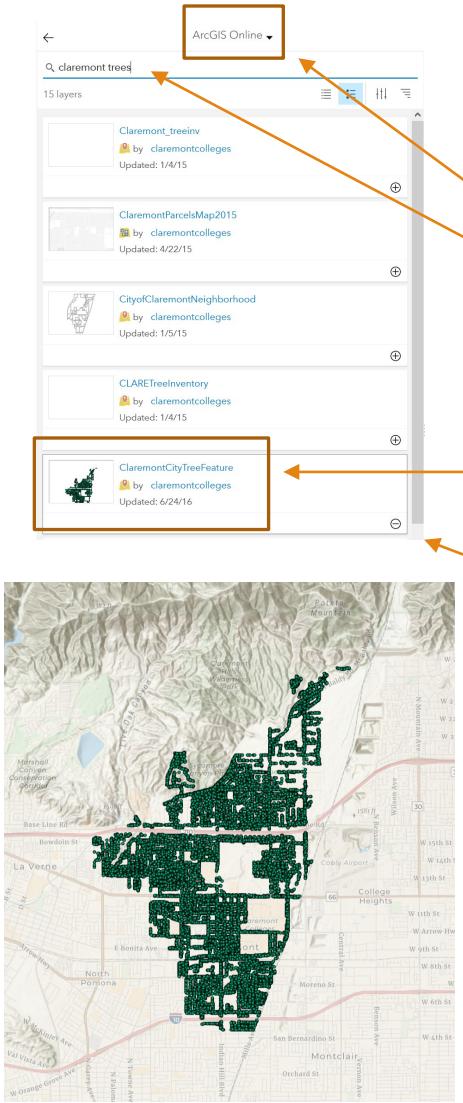
Credits are the currency used across ArcGIS and are consumed for specific transactions and types of storage. Any ArcGIS software that interacts with ArcGIS Online can use credits. Most of what you do in ArcGIS Online does not require credits. In many cases, credit-consuming activities carry a relatively low cost.

[Learn more about credits](#)



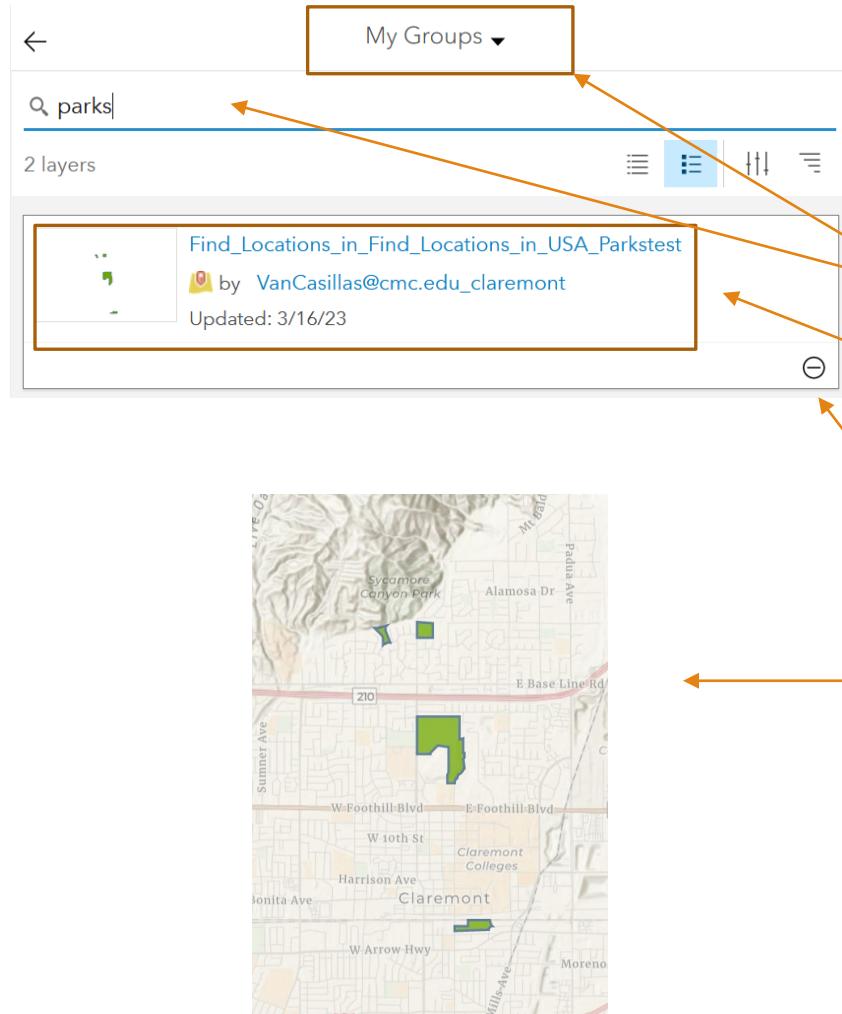
Claremont Boundary Layer

1. Go to ArcGIS Online Library and search for “Claremont”
 2. Click the layer named “Claremont City Boundary” by bsims_hlplanning
 3. Click the plus sign (+) to add it to your map content
 4. You should see a minus sign (-) to indicated that you have added it to your map.
 5. Results of this layer



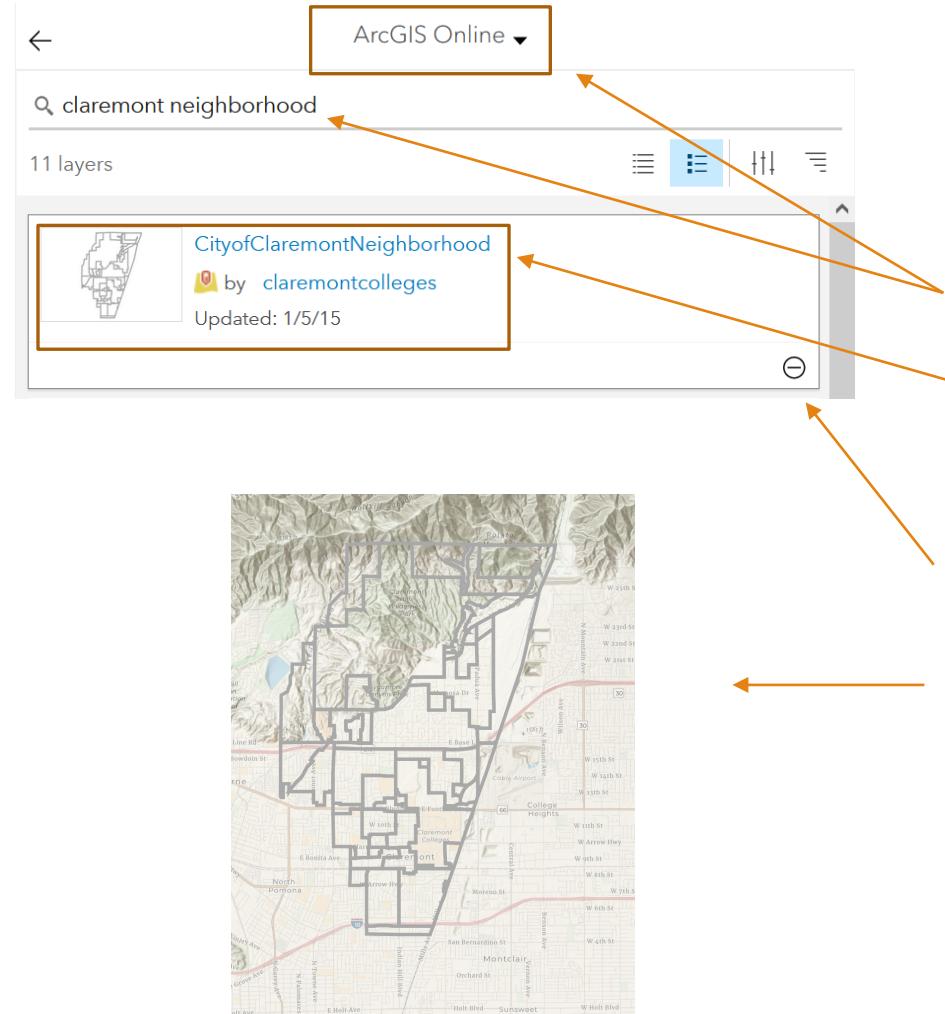
Claremont Trees

1. Go to ArcGIS Online Library and search for “**Claremont trees**”
2. Click the layer named “**ClaremontCityTreeFeature**” by claremontcolleges
3. Click the plus sign (+) to add it to your map content
4. You should see a minus sign (-) to indicated that you have added it to your map.
5. Results of this layer



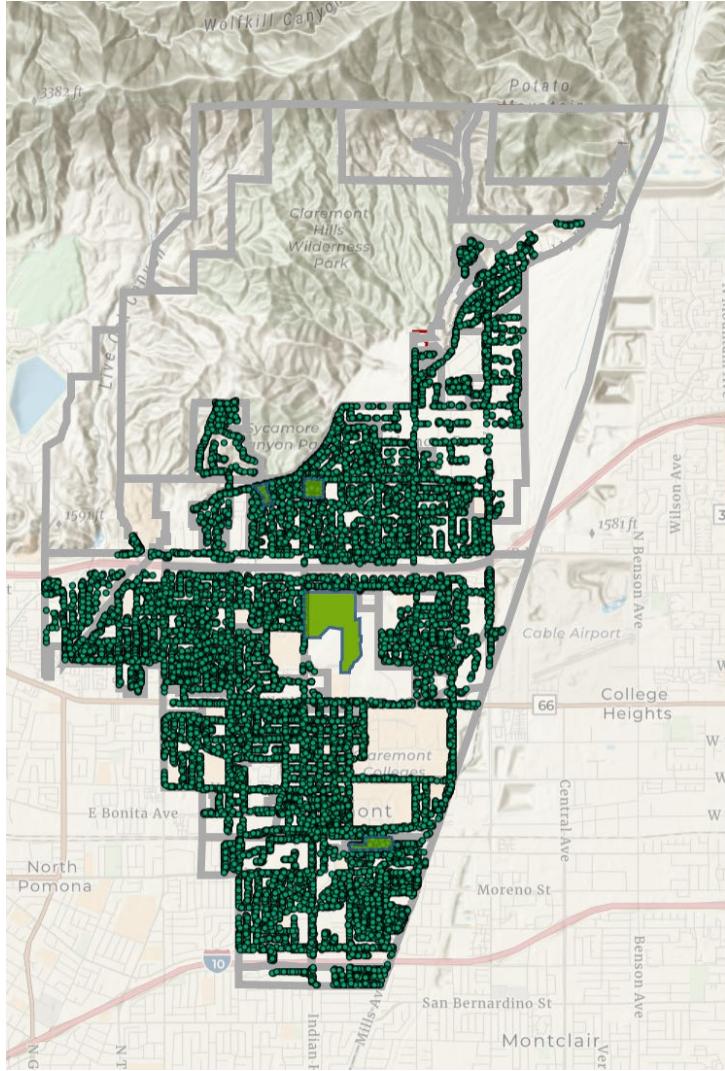
Parks Data Layer

1. Go to ArcGIS Online Library and search for “parks”
2. Click the layer named “Claremont City Boundary” by bsims_hlplanning
3. Click the plus sign (+) to add it to your map content
4. You should see a minus sign (-) to indicated that you have added it to your map.
5. Results of this layer



Claremont Neighborhood Layer

1. Go to ArcGIS Online Library and search for “**Claremont neighborhood**”
2. Click the layer named “**CityofClaremontNeighborhood**” by claremontcolleges
3. Click the plus sign (+) to add it to your map content
4. You should see a minus sign (-) to indicated that you have added it to your map.
5. Results of this layer



So much
information –
it hurts my eyes!

Analysis



Filter

Table

Calocedrus decurrens (Features: 44, Selected: 0)														
Address	BotName	California	ComName	DBH	Latitude	Longitude	OnAddress	OnStreet	Street	Tree_Famil	TreeID	TreeID_1		
2	Calocedrus decurrens	Native	INCENSE CEDAR	12	34.09	-117.71	2	COLLEGE PARK	COLLEGE PARK	Cupressaceae	2,379,249	2,379,249		
100	Calocedrus decurrens	Native	INCENSE CEDAR	12	34.11	-117.72	100	FOOTHILL BL /W	FOOTHILL BL /W	Cupressaceae	5,492,895	5,492,895		
2,309	Calocedrus decurrens	Native	INCENSE CEDAR	12	34.13	-117.72	2,335	NAVARRO DR	FORBES AV	Cupressaceae	5,481,204	5,481,204		
328	Calocedrus decurrens	Native	INCENSE CEDAR	24	34.10	-117.72	328	HARRISON AV /W	HARRISON AV /W	Cupressaceae	6,192,226	6,192,226		
328	Calocedrus decurrens	Native	INCENSE CEDAR	24	34.10	-117.72	328	HARRISON AV /W	HARRISON AV /W	Cupressaceae	6,192,227	6,192,227		
2	Calocedrus decurrens	Native	INCENSE CEDAR	24	34.13	-117.72	2	HIGGINBOTHAM PARK	HIGGINBOTHAM PARK	Cupressaceae	5,479,960	5,479,960		
2	Calocedrus decurrens	Native	INCENSE CEDAR	24	34.13	-117.72	2	HIGGINBOTHAM PARK	HIGGINBOTHAM PARK	Cupressaceae	5,479,962	5,479,962		

Filter: ClaremontCityTreeFeature

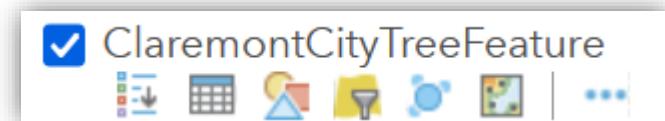
Create

+ Add another expression Add a set

Display features in the layer that match the following expression

BotName is Calocedrus decurrens Value Field Unique Ask for values

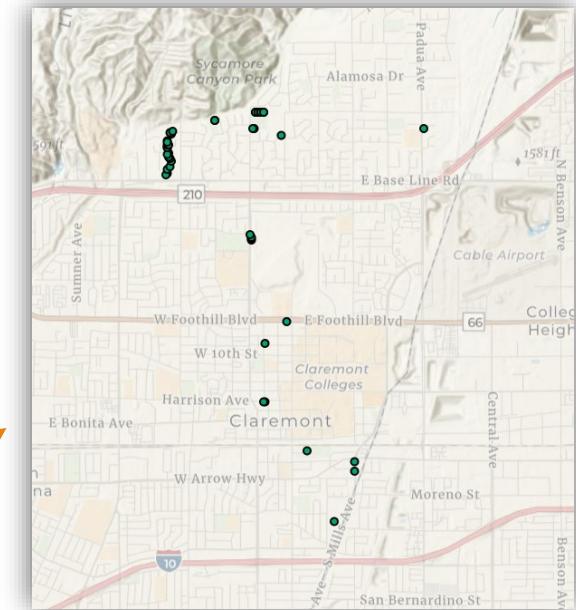
APPLY FILTER **APPLY FILTER AND ZOOM TO** **CLOSE**

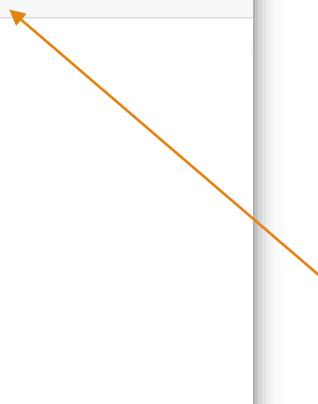
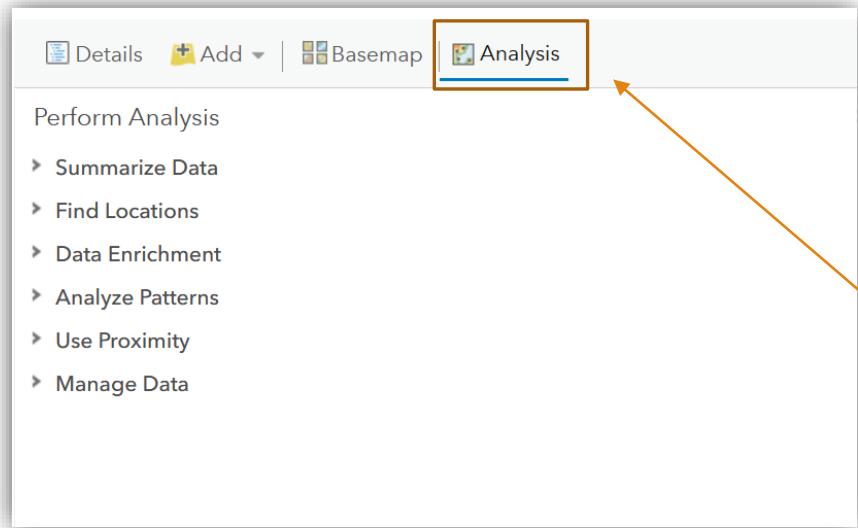


Legend | Table | Style | Filter | ClusterPoints | Analysis | Options

Type in the value you want to filter

When you click [Apply], the results will be.





Analysis – Making our own layers

Click the Analysis tab

A screenshot of the 'Analysis' tab showing the 'Summarize Data' section expanded. The section includes the following tools:

- Aggregate Points
- Join Features
- Summarize Nearby
- Summarize Within
- Summarize Center and Dispersion

Below this section, other analysis tools are listed:

- Find Locations
- Data Enrichment
- Analyze Patterns
- Use Proximity
- Manage Data

These analysis cost credits to use,
we will be using Aggregate Points today,
But I explore each one later by clicking
on the blue “I”

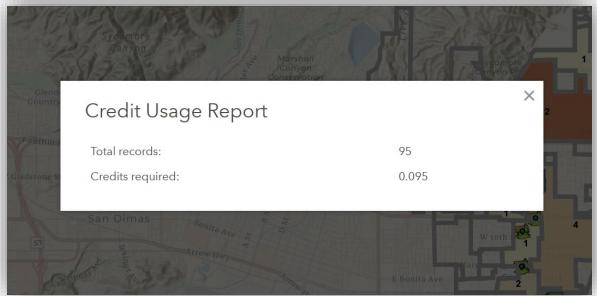
A screenshot of the 'Analysis' tab showing the 'Aggregate Points' tool details. The tool icon shows a layer of points being converted into a layer of areas. The description text is:

Using a layer of point features and a layer of area features, this tool determines which points fall within each area and calculates statistics about all the points within each area. For example:

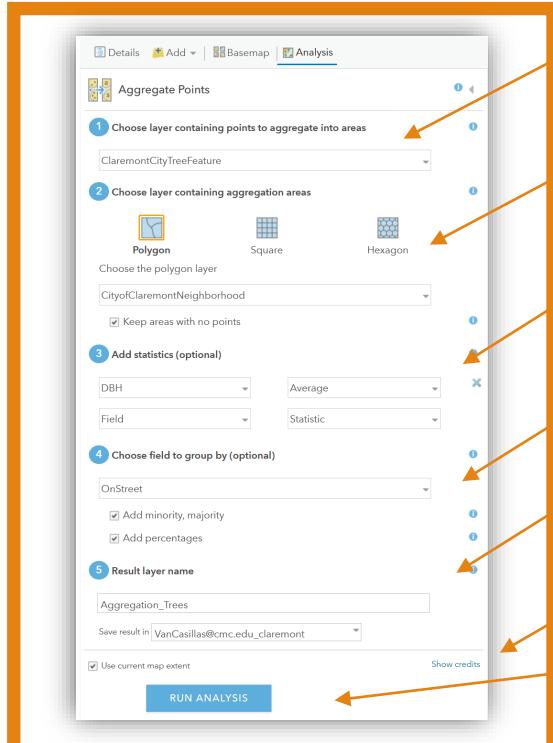
- Given point locations of crime incidents, count the number of crimes per county or other administrative district.
- Find the highest and lowest revenues for franchise locations by state.

Below the description is a map view showing a street network with labels like E Leadore Ave, E Bennett Ave, W Foothill Blvd - Glendora, and E Foothill Blvd.

Be careful of credits!



Aggregate Points

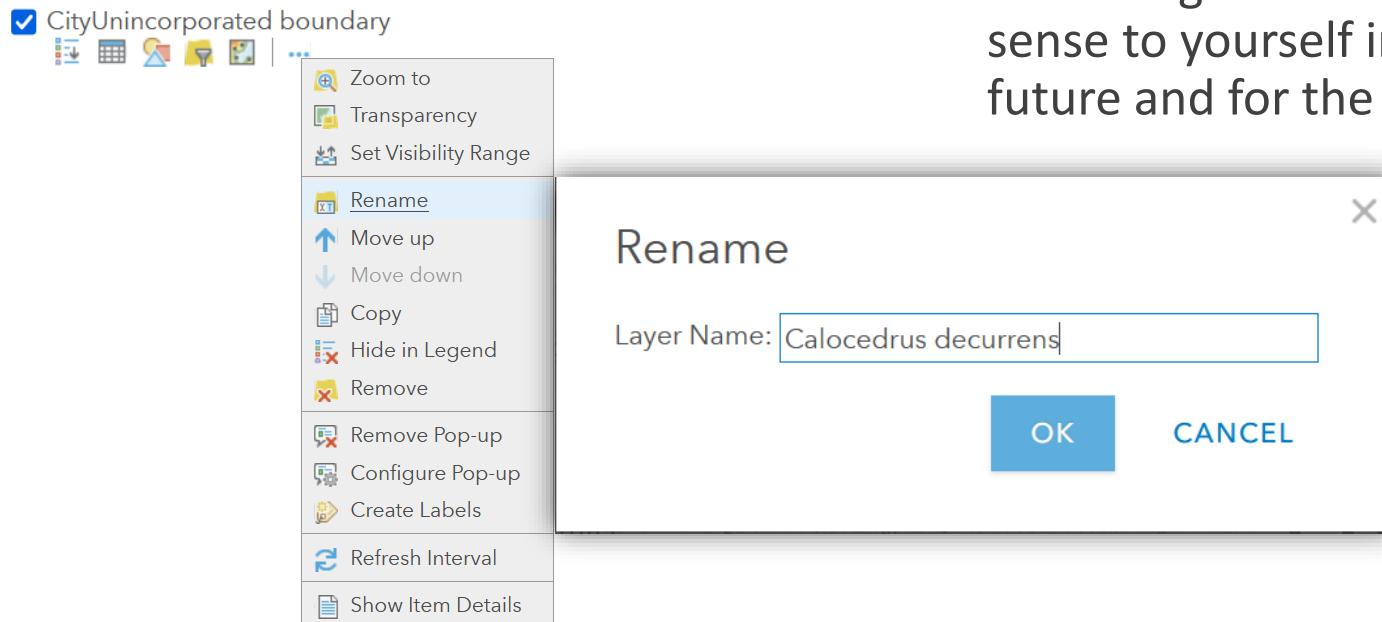


1. Choose the “ClaremontCityTreeFeature” layer
2. Choose Polygon and “CityofClaremontNeighborhood” layer
3. Choose “DBH” and “Average”
4. Choose “OnStreet”, check Add minority, majority and Add percentages
5. Name your Layer whatever you want and save in folder
6. Check your credits by clicking Show credits]
7. Click [Run Analysis]



Style Edits

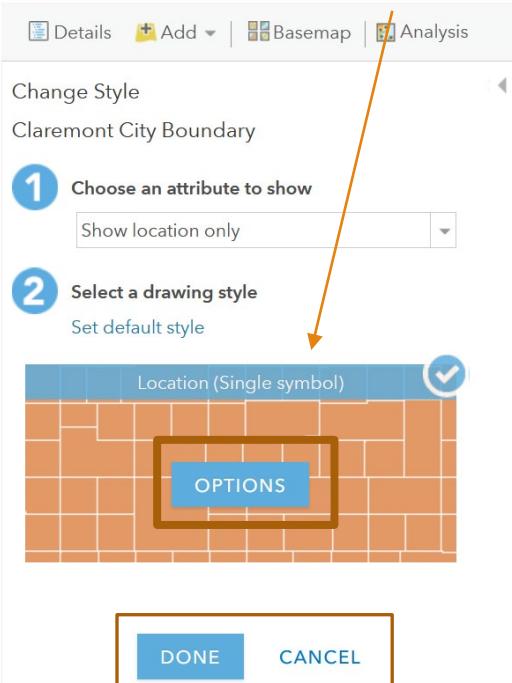
Renaming



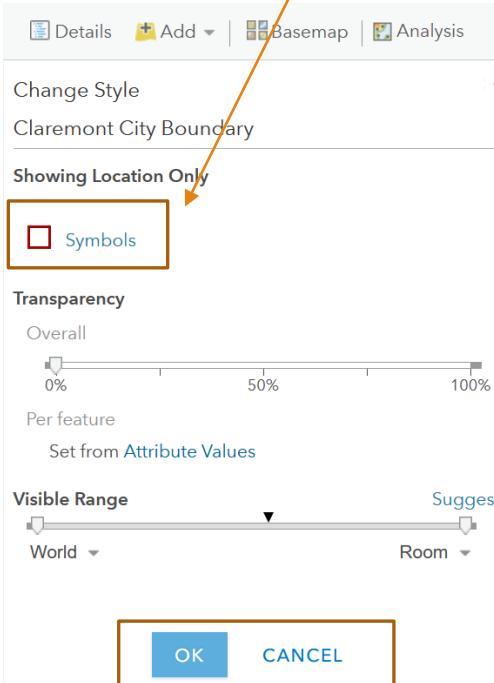
Renaming to make more sense to yourself in the future and for the legend

Claremont Boundary Line Style Edits

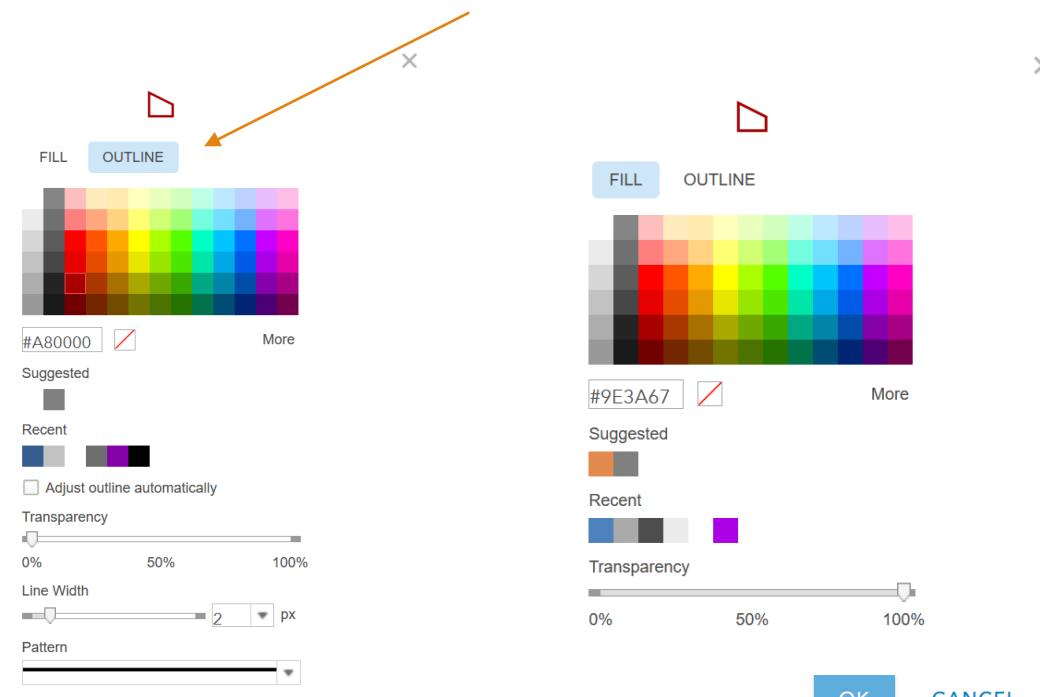
Click the attribute, you would like to display, we will be using “show location only” then click [options]



Click the symbols, You can also change Transparency and visible range for layer here.



Change the line width to “2” under the outline tab, leave fill the same



End step: Click [OK] twice and then [Done]

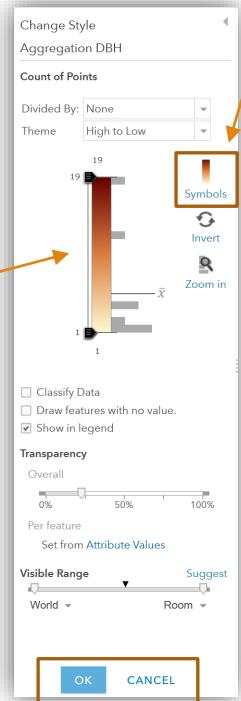
*warning: if you do not click [Done], it will not save to content and map

Aggregation DBH Style Edits

Click the attribute, you would like to display, we will be using “Count of Points” then click [options]

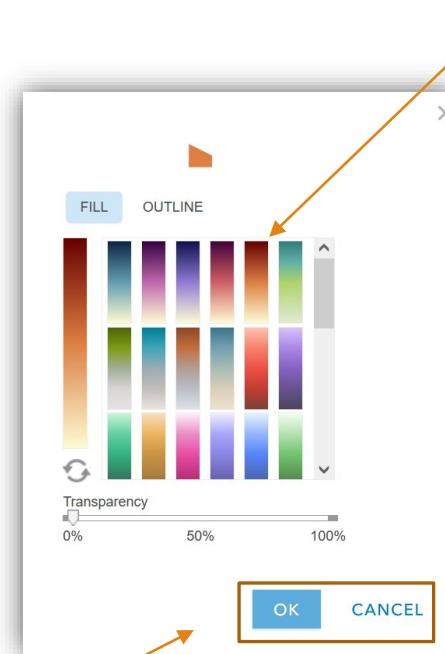


Click the symbols, You can also change Transparency and visible range for layer here.



End step: Click [OK] twice and then [Done]

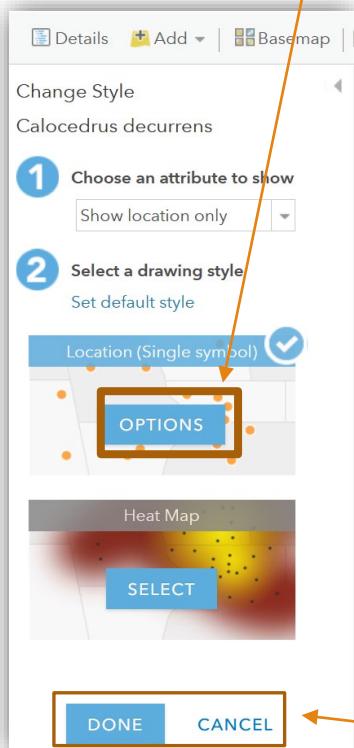
Change the Fill to the 5th one in the Fill tab, leave outline the same



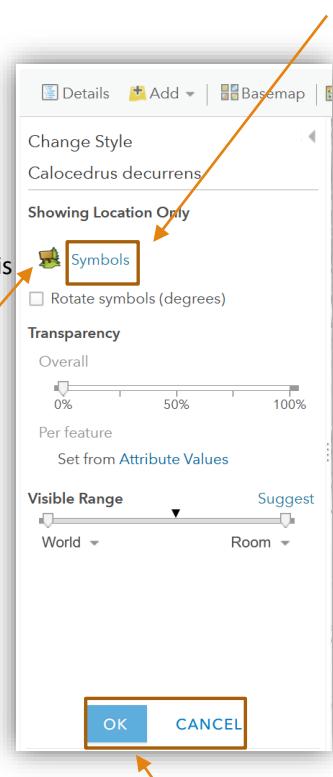
*warning: if you do not click [Done], it will not save to content and map

Aggregation DBH Style Edits

Click the attribute, you would like to display, we will be using “Show Locations only” then click [options]

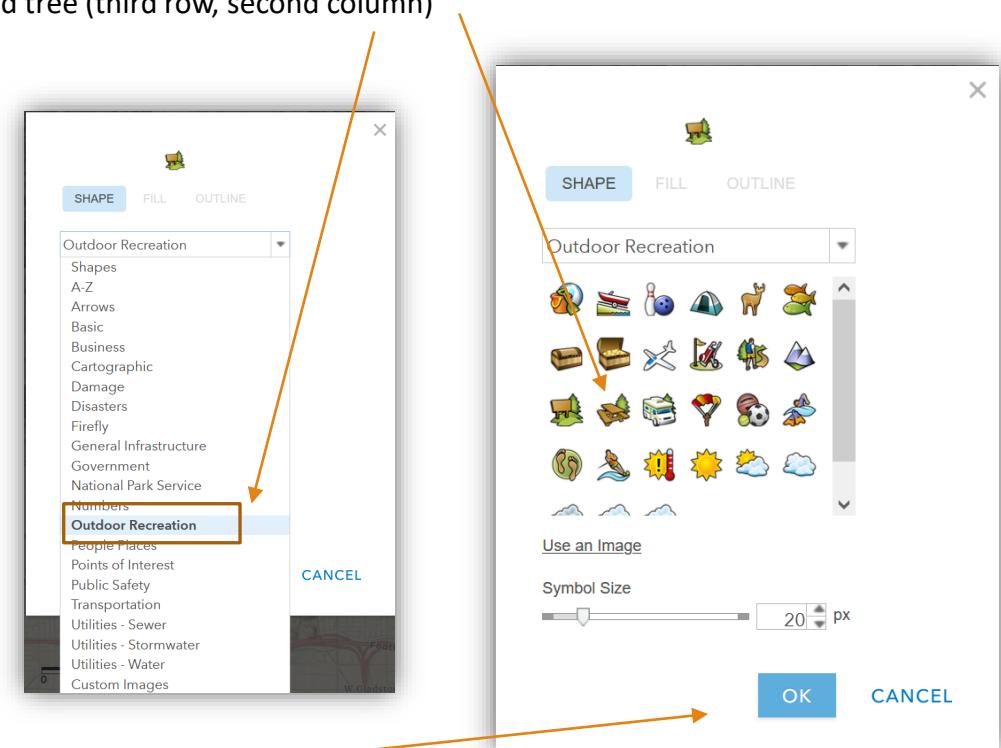


Click the symbols, You can also change Transparency and visible range for layer here.



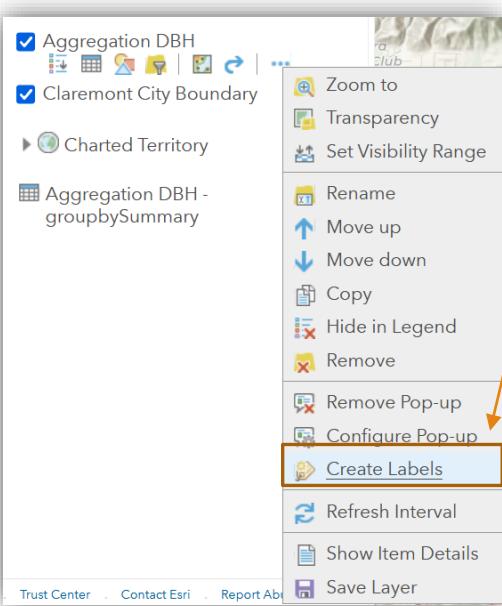
*warning: if you do not click [Done], it will not save to content and map

Click “Outdoor Recreation” and click the icon that has a post and tree (third row, second column)



End step: Click [OK] twice and then [Done]

Labels

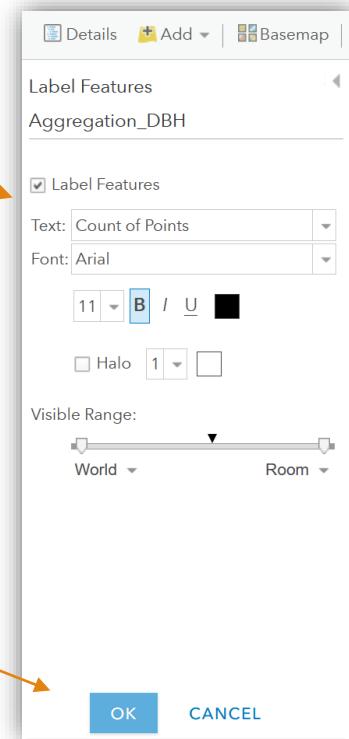


You can add labels from the options icon

Make sure the “Label Features” is enabled

Choose “Count of Points” and 11 size font

Click okay





Legend

Calocedrus decurrens



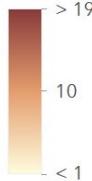
Park Locations



Aggregation_DBH



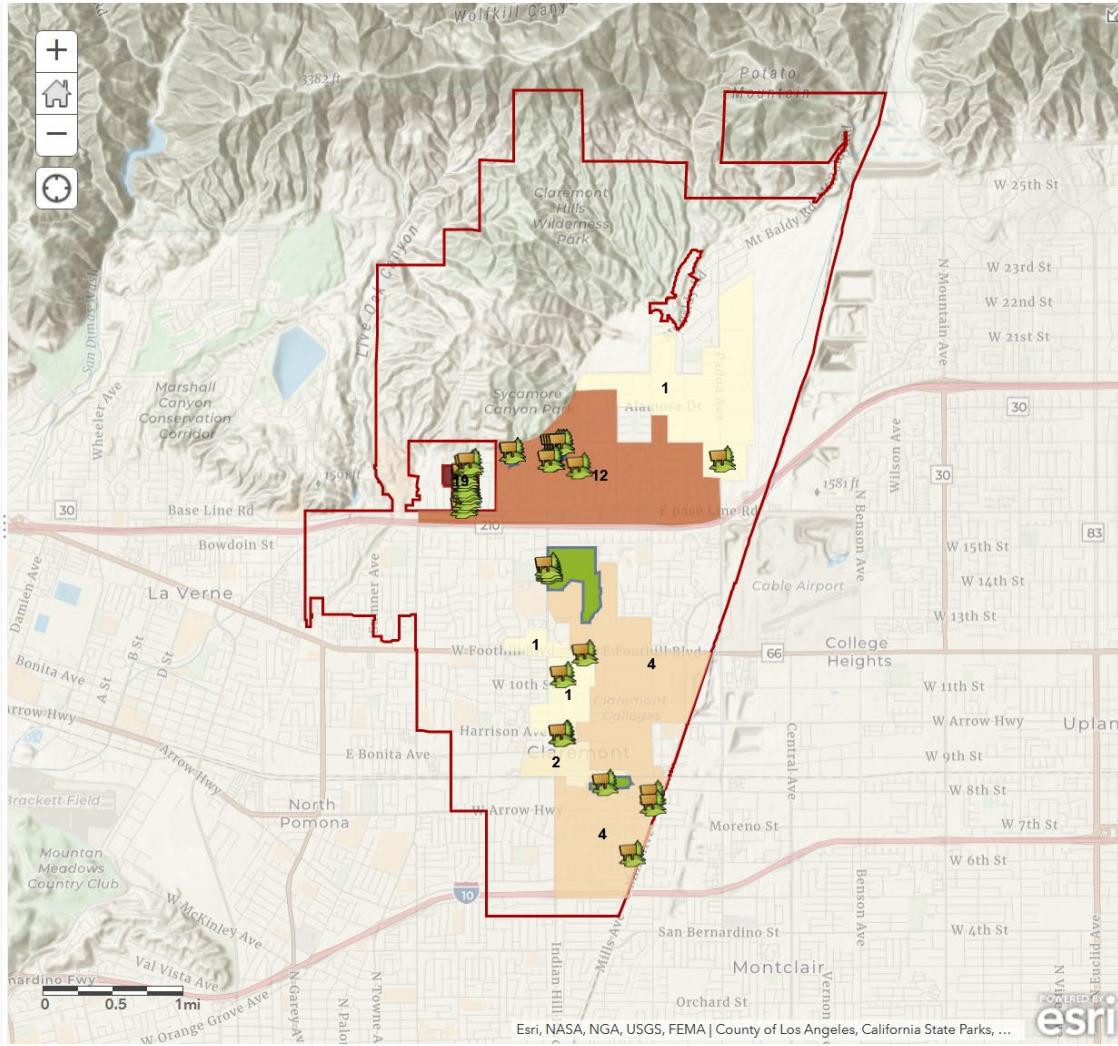
Count of Points



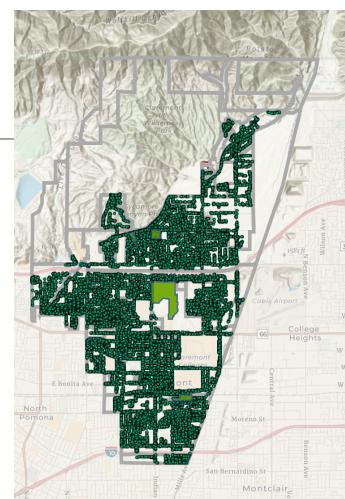
Claremont City Boundary



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A better visual story



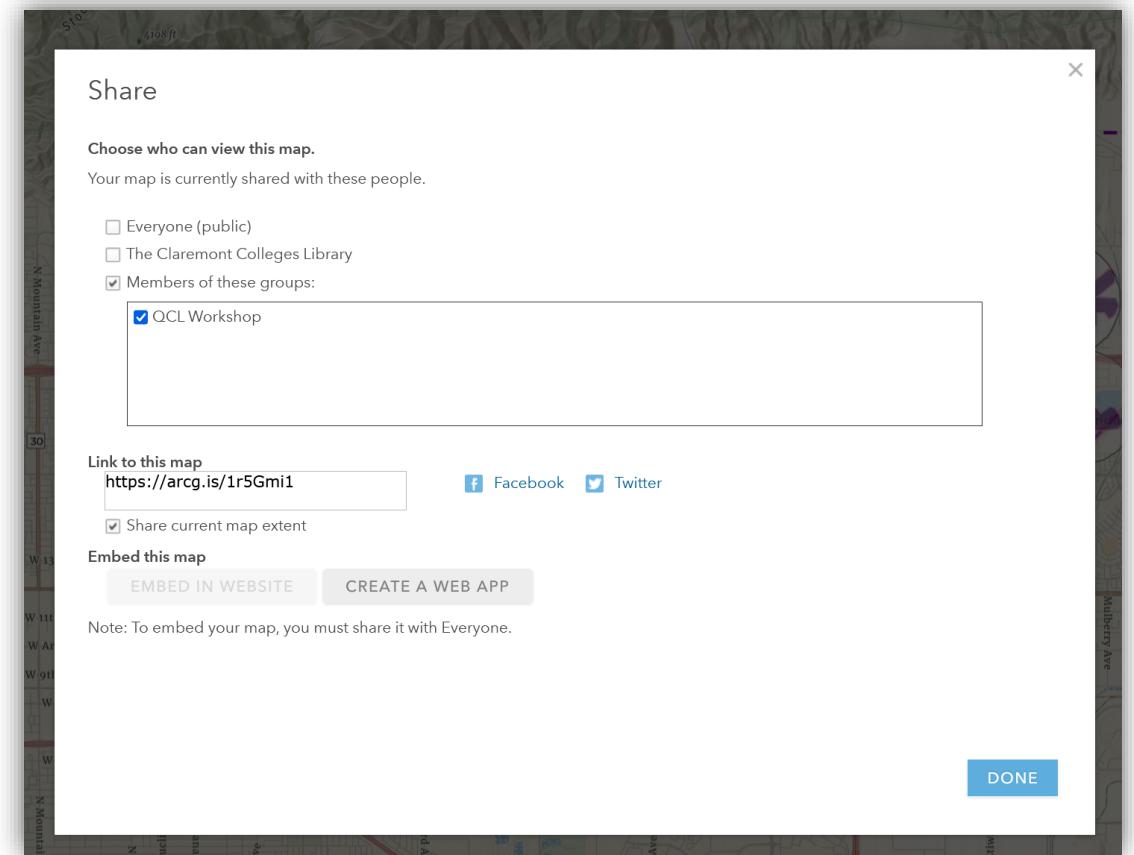
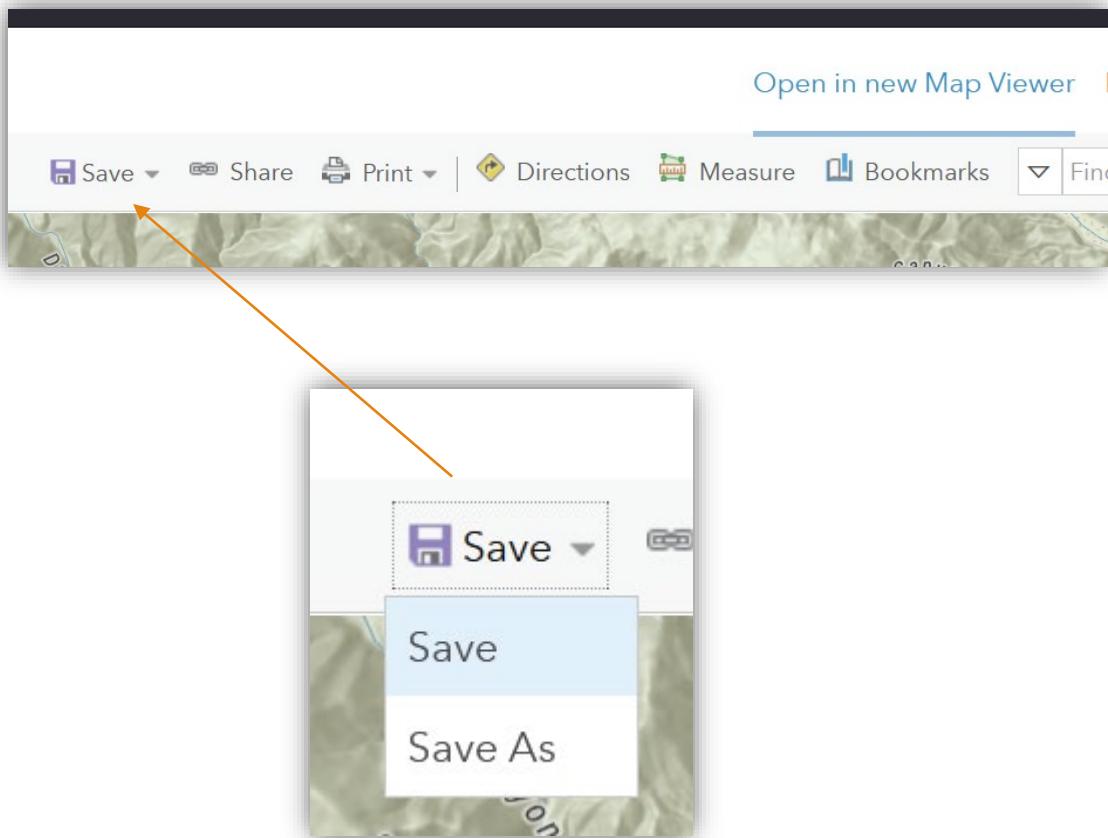
Steps

- 1. Layers
 - Claremont Trees – filter to BotName is *Calocedrus decurrens*
 - Neighborhood
 - Claremont Boundary
 - Park – My group
- 2. Analysis
 - Aggregation – trees in neighborhoods
 - DBH is measured on standing trees outside of the bark. Diameter can be calculated by measuring the circumference of the tree, then divide circumference by π (3.1416)
- 3. Filter out blanks
- 4. Edits
 - Labels
 - Icons
 - Shading

Last Steps



Save and Share



Go to New ArcGIS Online Map

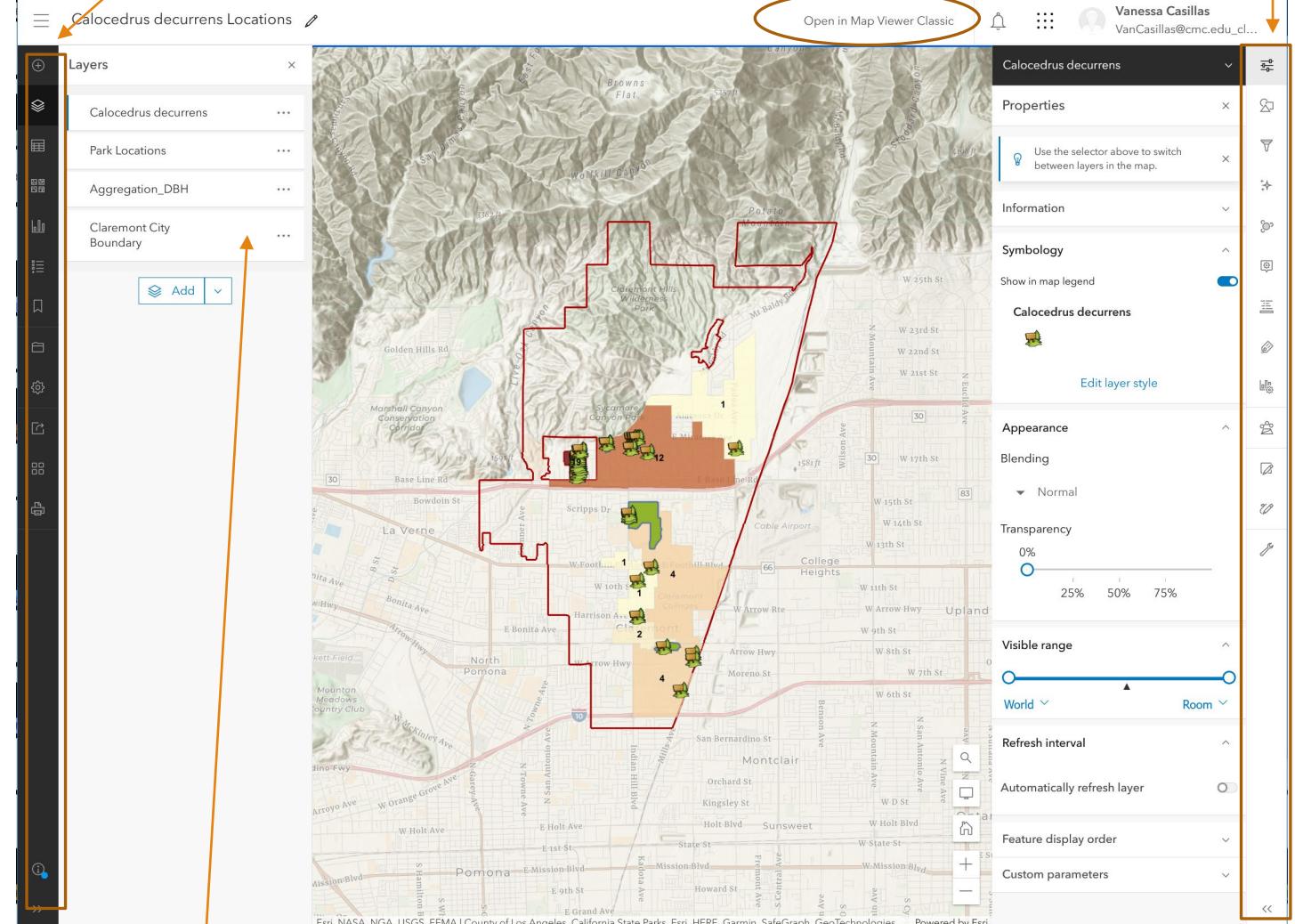
Everything you learned you can do here, it is just a new look

Not all the features are here yet

Layers, Base map, printing, saving, etc.

Switch back and forth as long as you save

Editing, Analysis, labels



To edit you will click on layer you want to edit on left and right will change to that layer's edits

Printing a Map

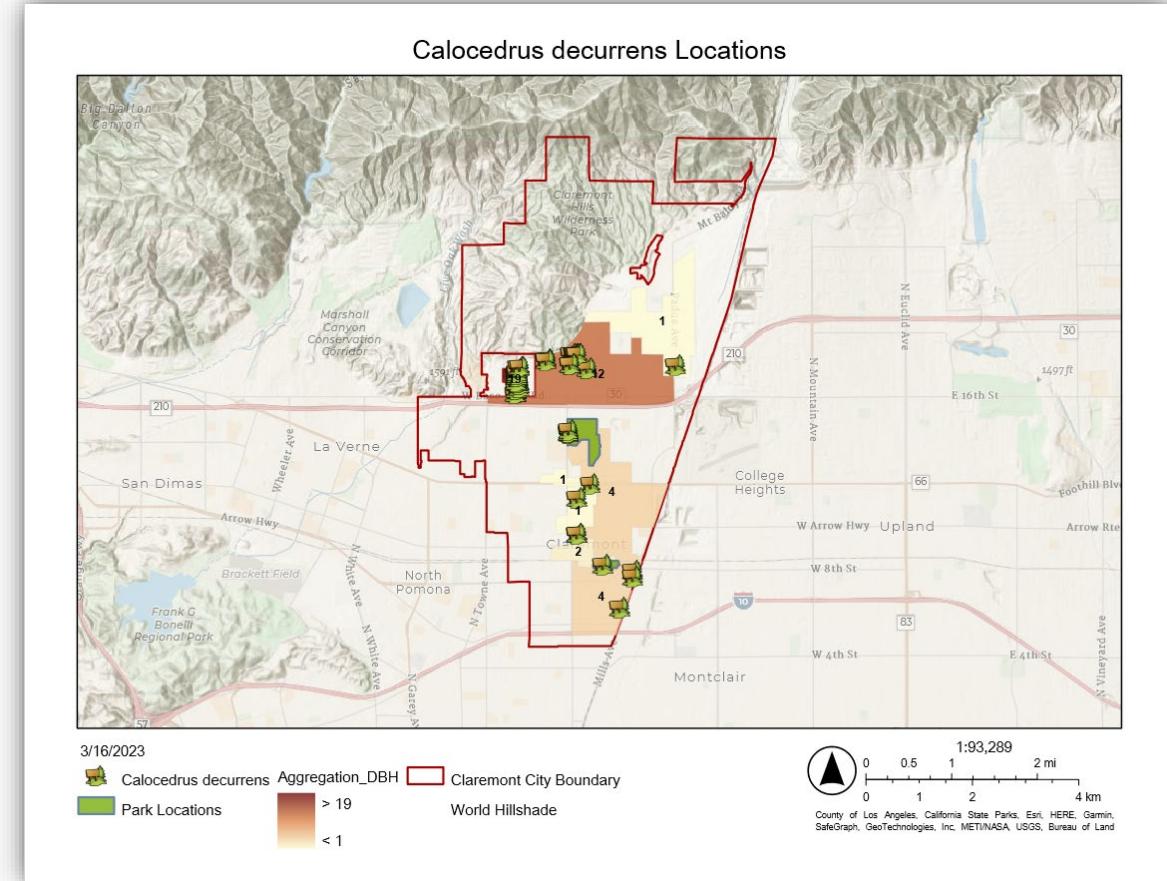
Click on “Advanced options” and check mark “Include legend” and “Include north arrow”

You can change file format and Title here, if you like

When you are ready click Export and it will export a file when you click on the name of the file for you in a new tab

Note: it takes a bit to process

The screenshot shows the 'Print' dialog box in QGIS. On the left is a vertical toolbar with icons for adding layers, managing layout, page setup, file format, advanced options, author, copyright, DPI, and export. The 'Advanced options' section is expanded, showing checkboxes for 'Set scale' (unchecked), 'Author' (empty field), 'Copyright' (empty field), 'DPI' (set to 96), and two checked checkboxes for 'Include legend' and 'Include north arrow'. At the bottom is a large blue 'Export' button. Below the dialog is a list of 'Exported files' containing 'Calocedrus decurrens Locations.pdf'.



The screenshot shows the ArcGIS Content page for the item 'Aggregation_DBH'. The top navigation bar includes Home, Gallery, Map, Scene, Groups, Content, Organization, and a user profile for 'Vanessa Casillas'. Below the navigation is a blue header bar with tabs for Overview, Data, Visualization, Usage, and Settings. The main content area displays the following sections:

- Thumbnail:** A small map showing aggregated points.
- Description:** Feature layer generated from Aggregate Points. Item created: Mar 16, 2023. Item updated: Mar 16, 2023. View count: 9.
- Layers:** Aggregated Polygons (Polygon layer).
- Tables:** groupbySummary (Table).
- Terms of Use:** Add any special restrictions, disclaimers, terms and conditions, or limitations on using the item's content.
- Comments (0):** Leave a comment.

On the right side, there is a context menu with options: Open in Map Viewer, Open in Scene Viewer, Open in ArcGIS Desktop, Publish, Create View Layer, Export Data, Update Data, Share, and Metadata.

Item Information: Shows a progress bar from Low to High, with a note: Top Improvement: Add a longer summary.

Details: Source: Feature Service. Data updated: Mar 16, 2023, 10:58 AM. Schema updated: Mar 16, 2023, 11:04 AM. Size: 129.321 KB. Attachments size: 0 KB. ID: da3f85cea0c6419fbe071f173219ae04.

Share: Buttons for Facebook, Twitter, and LinkedIn.

Owner: Vanessa Casillas (cmc.edu_claremont).

Edit your Layers Information

- Title
- Updated
- Description
- Terms of Use
- Credits (Attribution)
- Owner
- Managed by
- View Count
- Created
- Shared with

Go to content tab to see all our layers and web map

The screenshot shows the ArcGIS Content tab with the following interface elements:

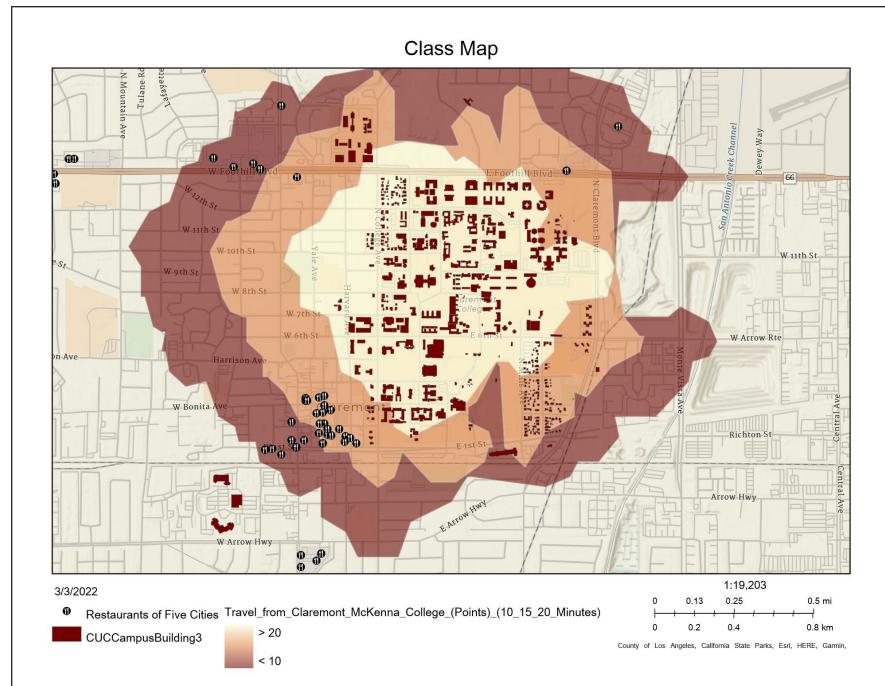
- Content Bar:** Includes New item, Create app, and a search bar for 'Search VanCasillas@cmc.edu_claremont'.
- My Content Tab:** Selected tab.
- Folders:** All my content, VanCasillas@cmc.edu_claremont, BA - Application Data, BA - Project Data, CA - Application Data.
- Table:** A list of items with columns for Title, Modified, and various actions.

Title	Modified
Calocedrus decurrens Locations	Mar 16, 2023
Find_Locations_in_Find_Locations_in_USA_Park	Mar 16, 2023
BA - Application Data	
BA - Project Data	
CA - Application Data	
Aggregation_DBH	Mar 16, 2023
Aggregation_of_trees_in_neighborhoods	Mar 16, 2023

Homework – Be Creative

Make a map using the City of Claremont and the Claremont colleges and change the style to Claremont colleges colors

- You need at least three layers, rename them to whatever you like as long as it makes sense
 - Restaurants
 - Filter restaurants for just the City of Claremont
 - Claremont Boundary
 - We used this one
 - Claremont Colleges
 - Not required Bonus layer: add a time to walk to restaurants from college to restaurant (hint: you do not have to do an analysis, this layer already exist in the ArcGIS Online library)
- Share it to the group receive credit



Resources

ERSI: <https://www.esri.com/en-us/home>

ArcGIS: <https://learn-arcgis-learngis.hub.arcgis.com/>

Library: GIS Mondays <https://library.claremont.edu/>

Contact

QCL: QCL@cmc.edu

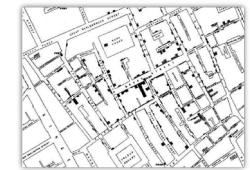
Vanessa: vanessa.casillas@claremontmckenna.edu

LinkedIn: <https://www.linkedin.com/in/vanessaariascasillas/>

References

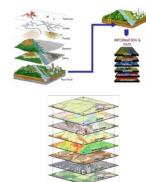
Slide 7:

https://www.researchgate.net/figure/John-Snows-famous-map-of-the-1854-Broad-Street-epidemic-attempted-to-positively_fig1_220144184



Slide 13:

Shukla, Yogita. (2012). Innovative Geospatial Solutions - Key to India's Transport Infrastructure
Kolios, Stavros & Vorobev, Andrei & Vorobeva, Gulnara & Stylios, Chrysostomos. (2017). WebGIS Applications for Weather, Marine, and Atmospheric Environments. 10.1007/978-3-319-53086-4_2.



All Section Pictures: Power point Stock



Hands-on Pictures: Screen shots from ArcGIS Online

