

# GIS 1: a very basic introduction

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BY VANESSA ARIAS CASILLAS (GRADUATE FELLOW)

# Agenda

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What is GIS?

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Classic ArcGIS online overview

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Base and Layers

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Analysis

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Edits

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Save and Send to New ArcGIS Online

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Print and Share

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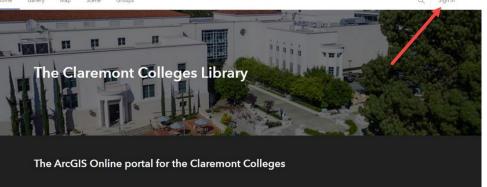
Endnotes

# 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 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. Log in 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

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# 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 bar with the text "Groups" on the left, and "My Groups", "Featured Groups", and "My Organization's Groups" on the right. Below this is a search bar with the placeholder "Search My Groups" and filter buttons for "Title" and "Filter".

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

The main content area displays one group card for "QCL Workshop". The card includes the group name, owner information ("Owner: VanCasillas@cmc.edu\_claremont"), creation date ("Created: Mar 3, 2022"), last update date ("Last updated: Mar 3, 2022"), viewability ("Viewable by: Everyone (public)"), and a category label "Workshop". There is also a "Delete group" button next to the card.

Geography

Remote Sensing

Cartography

Surveying & Photogrammetry

Computer Science

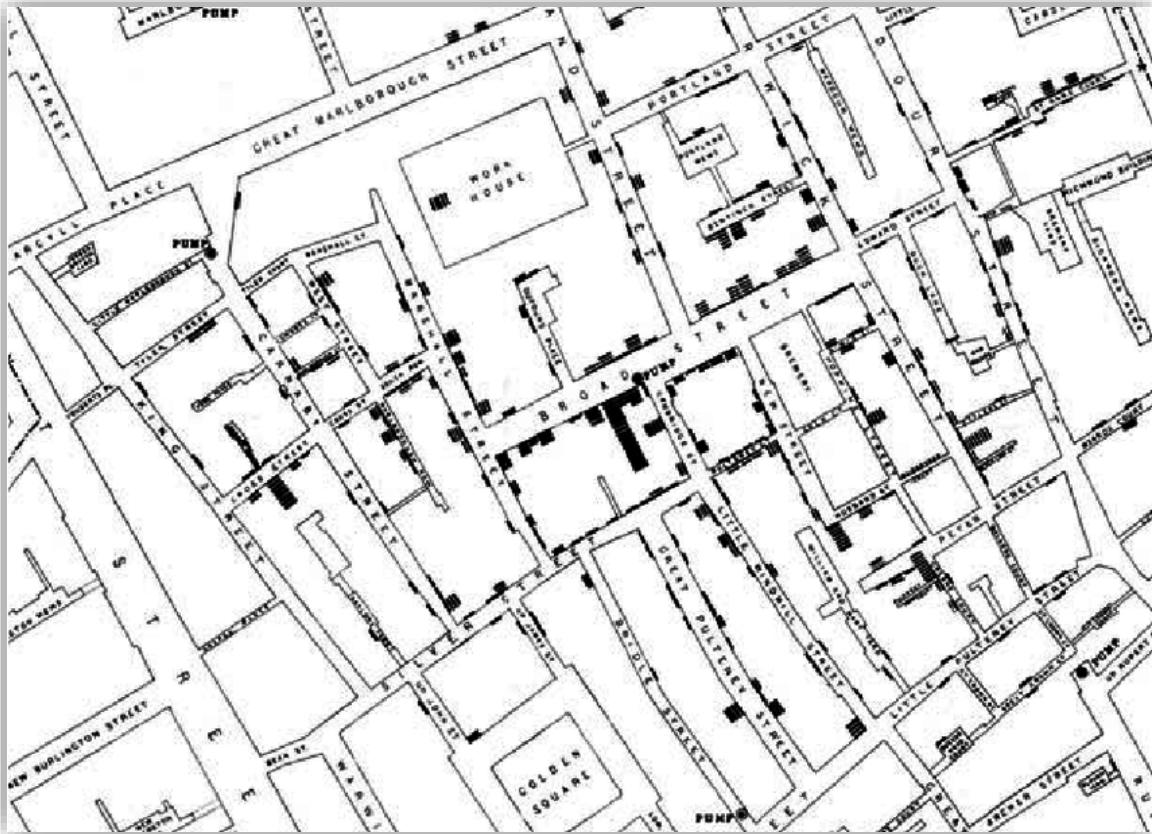
Mathematics & Statistics



# 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

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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

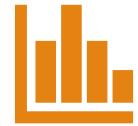
- Mapped cholera deaths
- Determined water pump source

# Goal

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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

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## 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  $\pi$  (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?

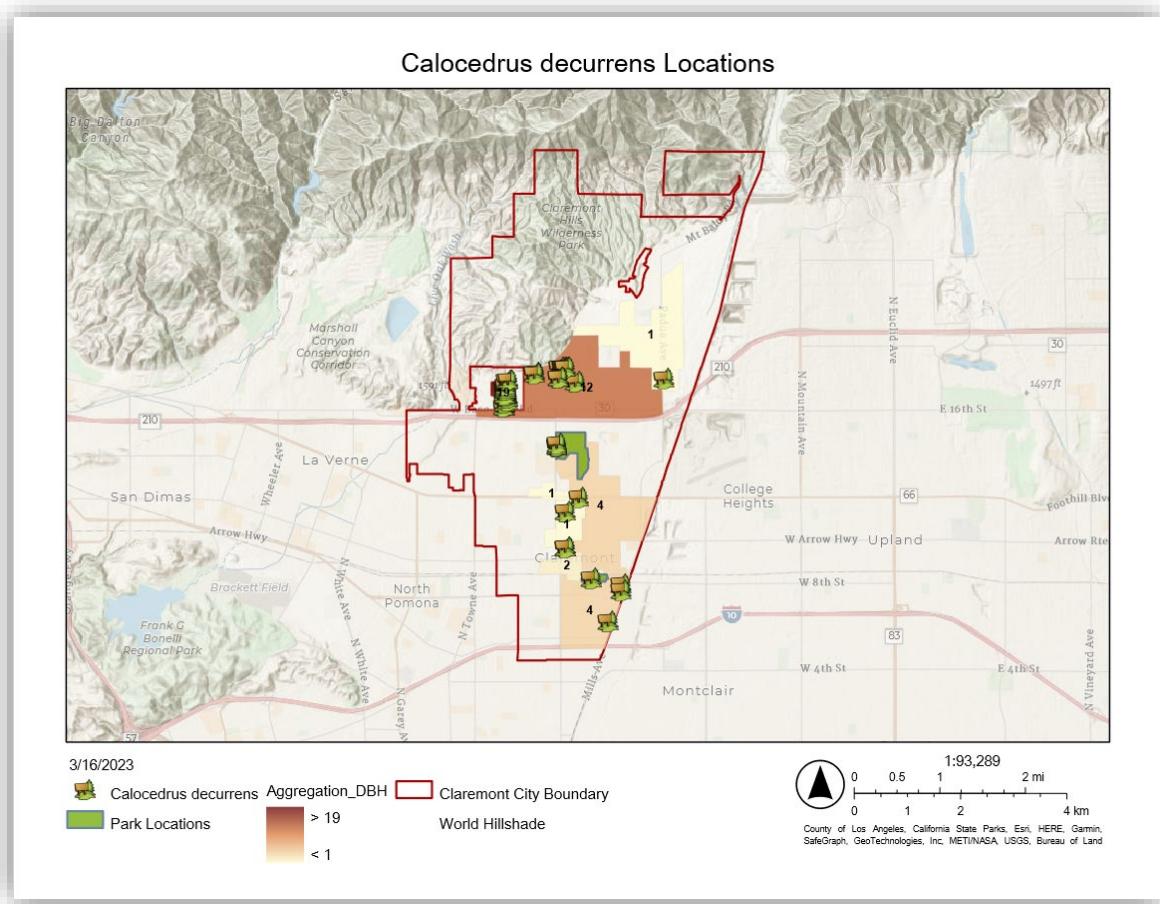
- a. Fieldworks
- b. Public

## 5. Results – does it tell a visual story?

- a. PDF or Share

# End Result

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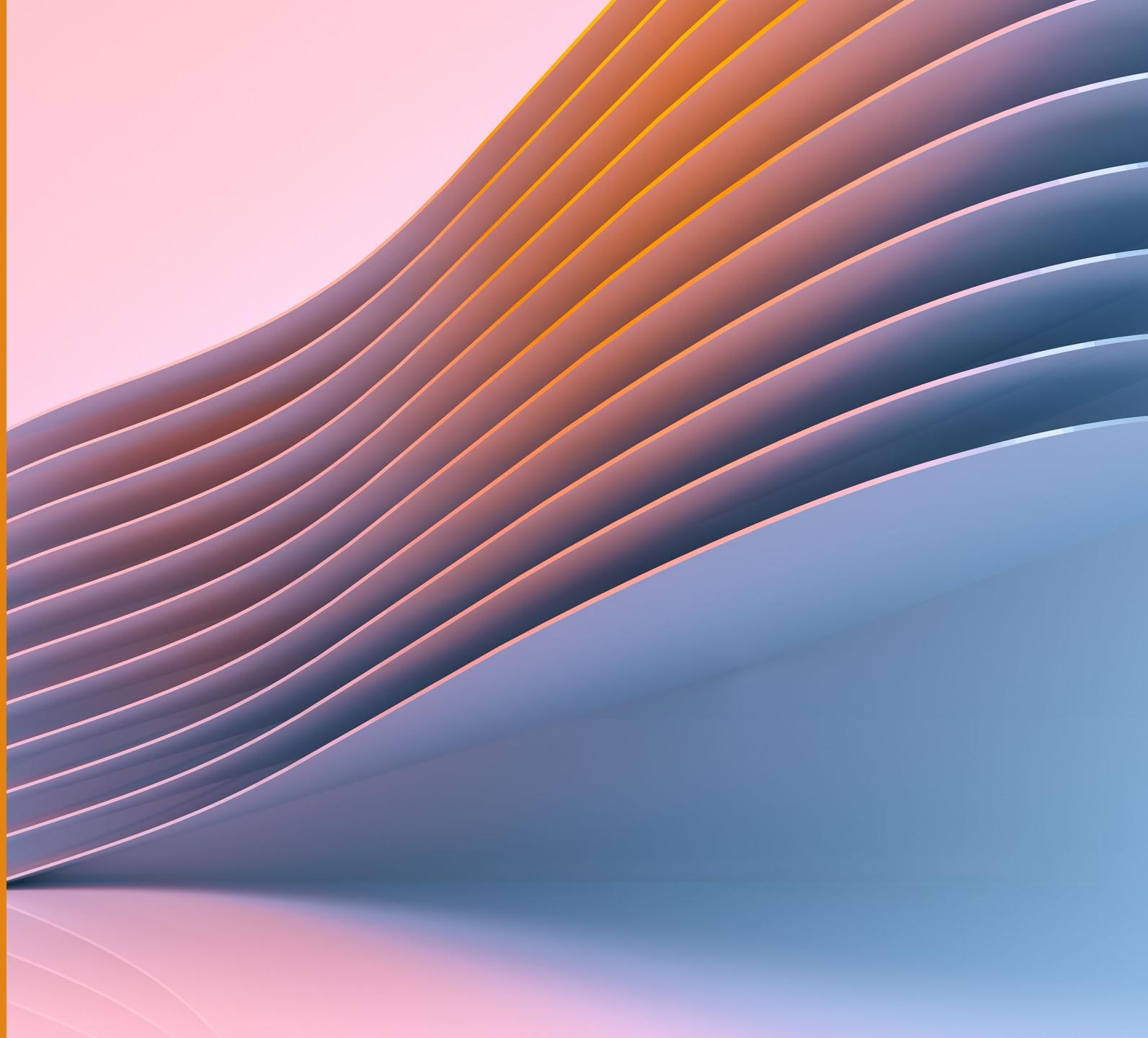
The screenshot displays the ArcGIS Classic interface with several callout annotations:

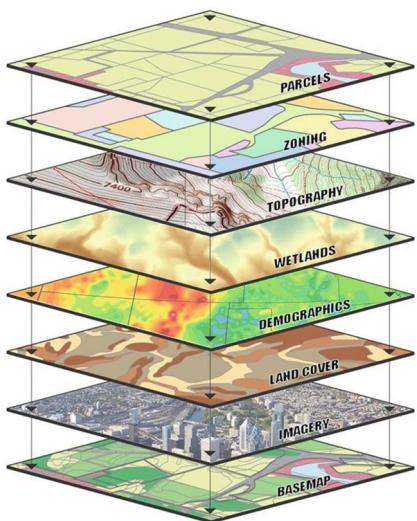
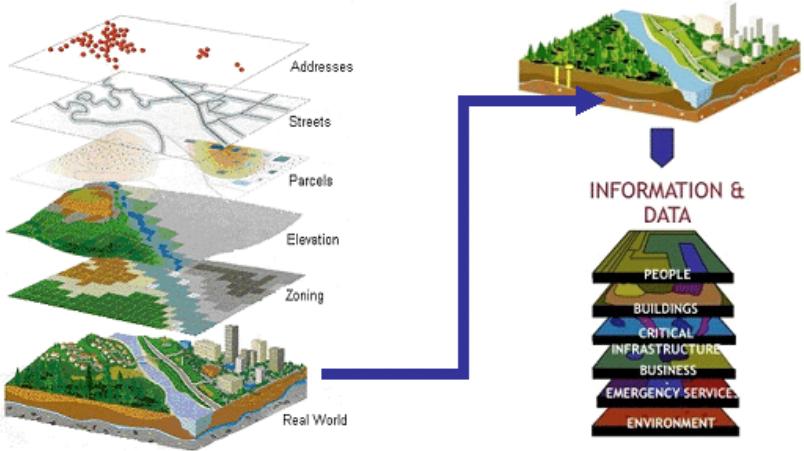
- Details > Content** is where you will find layer on your map and legend. (points to the top left navigation bar)
- Add** is where you will find new layers to add to your map. (points to the top left navigation bar)
- Base maps** are kept separate from all the feature layers. (points to the bottom left navigation bar)
- Analysis** is where you will find all your tools for analysis. (points to the bottom left navigation bar)
- Zoom and Home buttons** are located at the top left of the map area. (points to the zoom controls)
- Save, Sharing and Bookmarks** can be found here\*. (points to the top right navigation bar)
- Username and account settings** are located at the top right of the map area. (points to the user profile icon)
- You can switch back and forth between classic and map viewer**. (points to the "Open in new Map Viewer" button)
- Interactive map, pop ups for tables** (points to the map area showing a pop-up table)

\*print in map viewer not classic

# Classic ArcGIS

# Data Layers





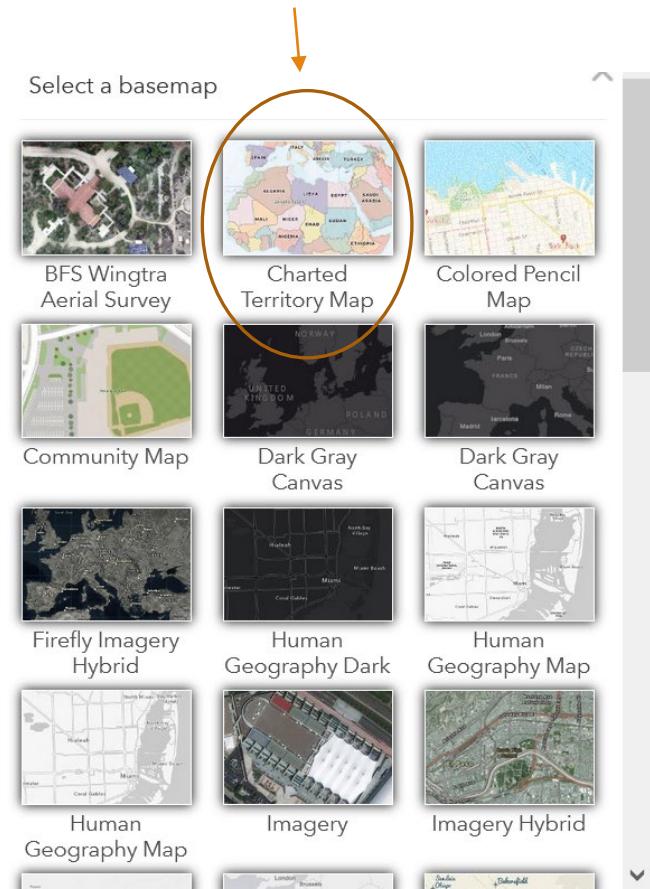
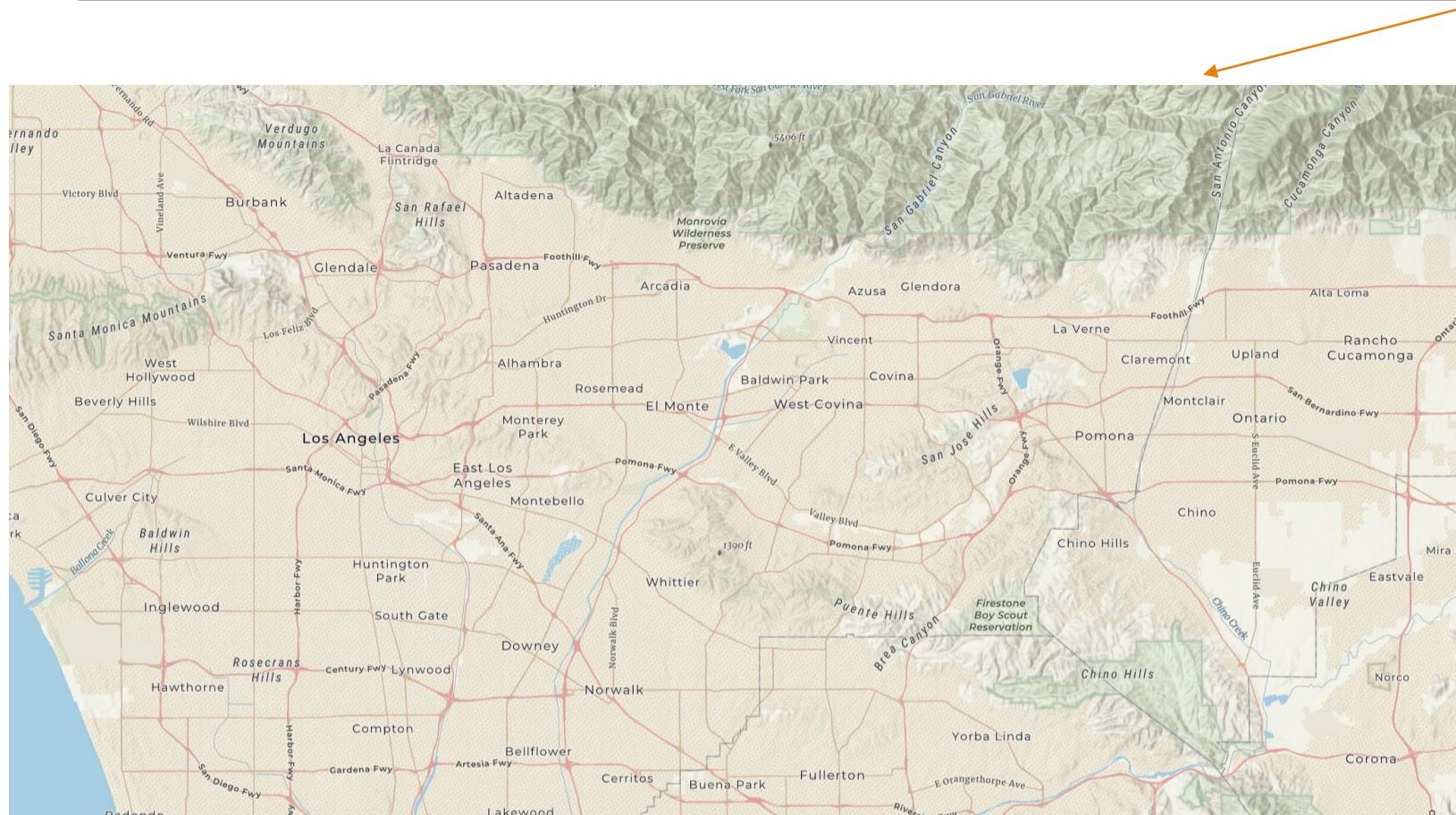
# Layers

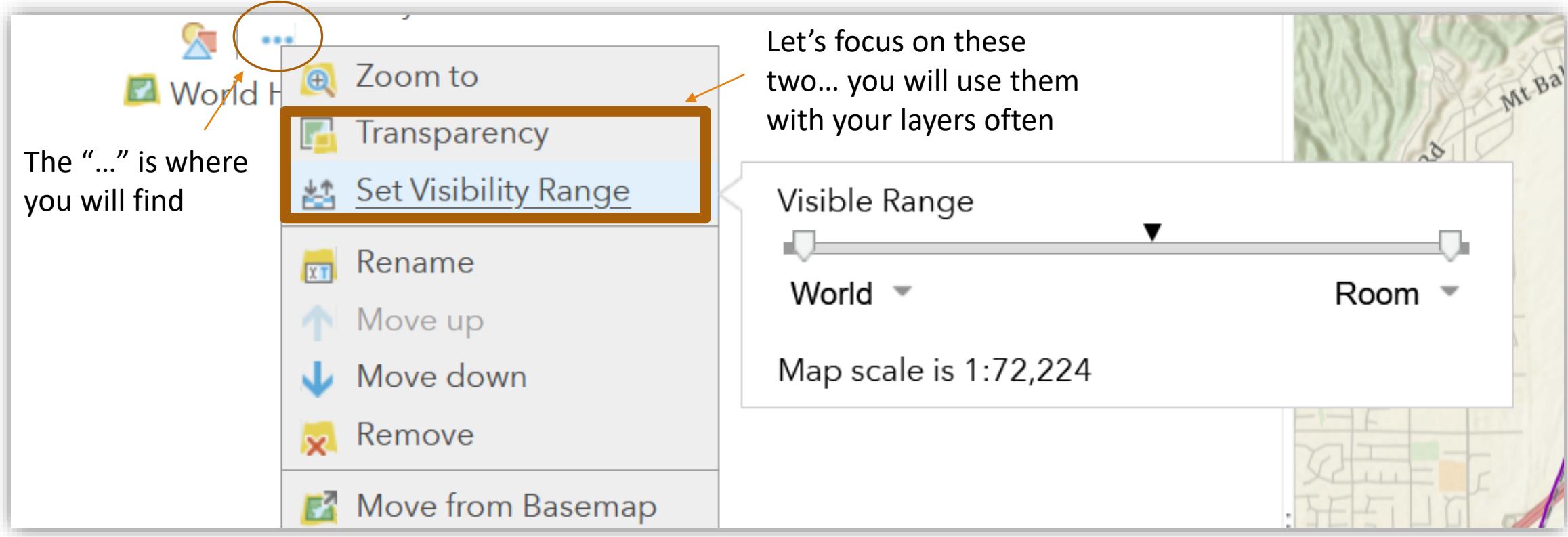
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- Vector data is split into three types: point, line (or arc), and polygon data
- Raster data (also known as grid data) represents the fourth type of feature: surfaces. Raster data is cell-based containing coordinate information and values for each 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

Top left you will click on add option

Add

Basemap

Search for Layers

Browse Living Atlas Layers

Add Layer from Web

Add Layer from File

Add Map Notes

My Content ▾

- My Content
- My Favorites
- My Groups
- My Organization
- Subscription Content
- Living Atlas
- ArcGIS Online

Living Atlas ▾

claremont

0 layers

No items found that meet your criteria. Try clearing some filters to show more items.

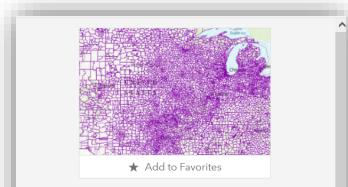
Today's workshop will be using these two

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LAYERS AND LAYERS AND LAYERS

# Layer Information – great example

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School District Boundaries - Current 

Feature Layer by National Center for Education Statistics

Updated: January 6, 2022

 Authoritative 

This composite file contains elementary, secondary, and unified school district boundaries collected for the National Center for Education Statistics by the U.S. Census Bureau.

Description

This composite file contains elementary, secondary, and unified school district boundaries collected for the National Center for Education Statistics by the U.S. Census Bureau.

The National Center for Education Statistics' (NCES) Education Demographic and Geographic Estimate (EDGE) program develops annually updated school district boundary composite files that include public elementary, secondary, and unified school district boundaries clipped to the U.S. shoreline. School districts are single-purpose administrative units designed by state and local officials to organize and provide public education for local residents. District boundaries are collected for NCES by the U.S. Census Bureau to support educational research and program administration, and the boundaries are essential for constructing district-level estimates of the number of children in poverty.

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

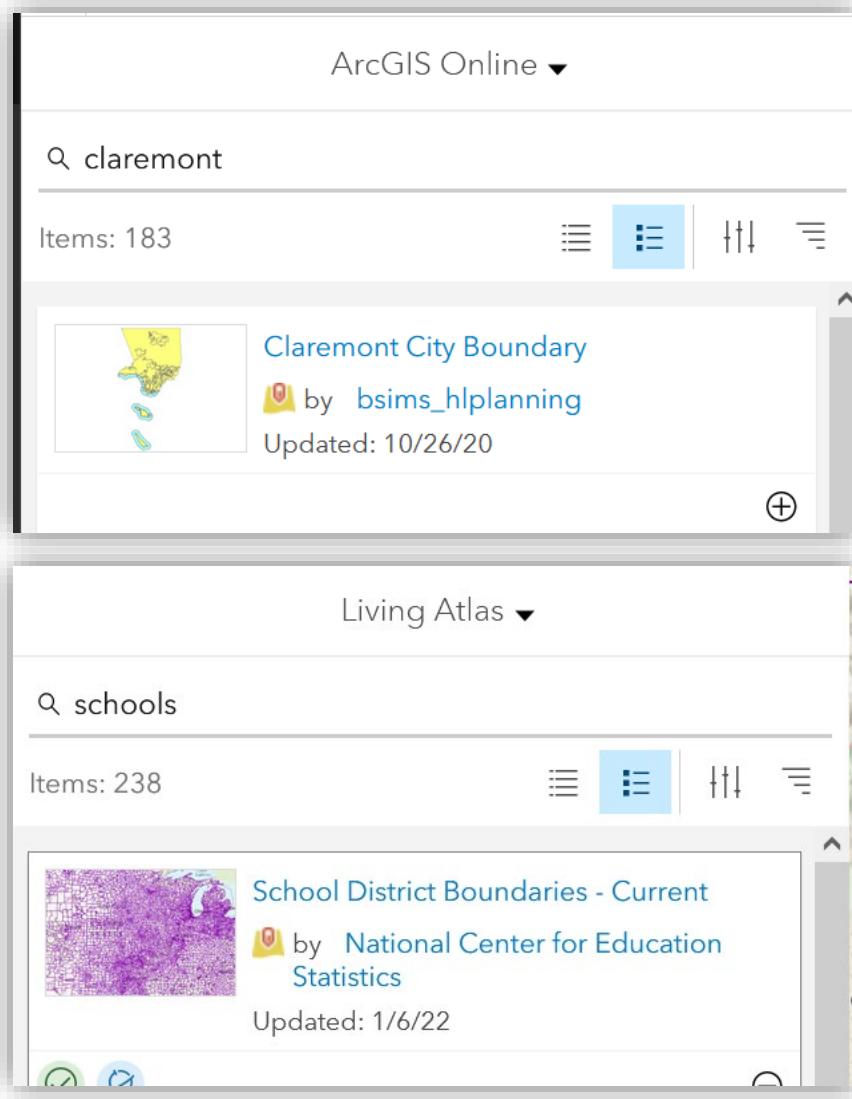
**Owner**

 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**



# Libraries

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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



Add layer

Living Atlas ▾

schools

Items: 238

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

# Credits Talk

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

The screenshot shows the 'My settings' interface with a blue header bar. Below it, there's a sidebar with three options: 'General', 'Licenses', and 'Credits'. An orange arrow points from the text above to the 'Credits' option in the sidebar. The main content area is titled 'Credits' and displays two values: 'Remaining' (299.50) and 'Assigned' (300.00). A horizontal bar indicates the total available credits. Below these values is a descriptive text about credits and a link to 'Learn more about credits'.

My settings

General

Licenses

Credits

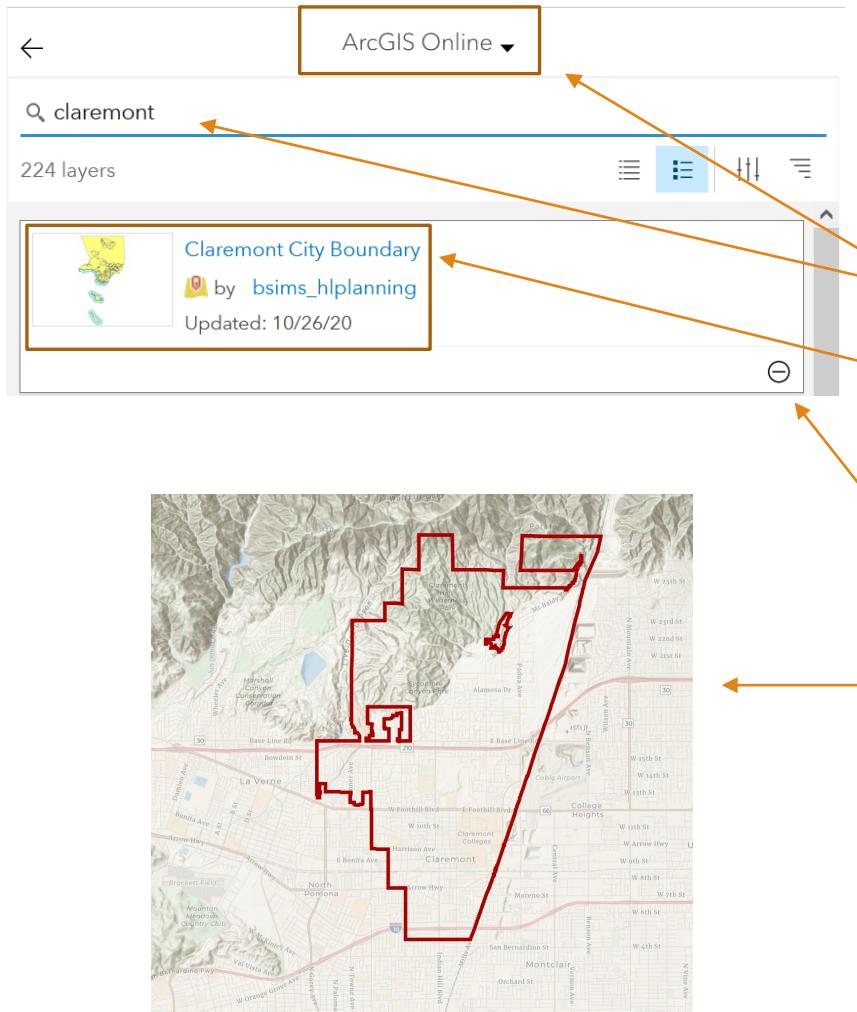
Credits

Remaining **299.50**

Assigned **300.00**

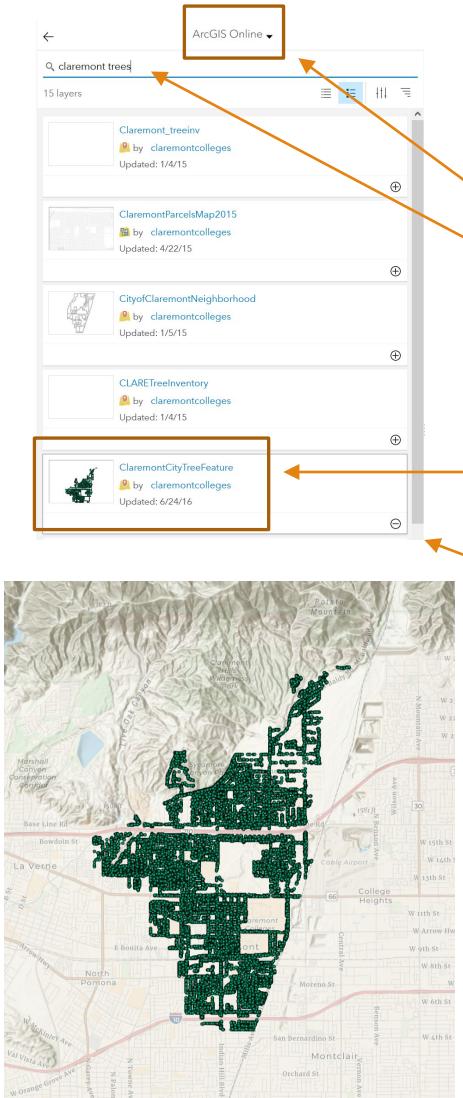
Credits are the currency used across ArcGIS and are consumed for specific transactions and types of storage. Any ArcGIS software that interacts with ArcGIS Online can use credits. Most of what you do in ArcGIS Online does not require credits. In many cases, credit-consuming activities carry a relatively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

[Learn more about credits](#)



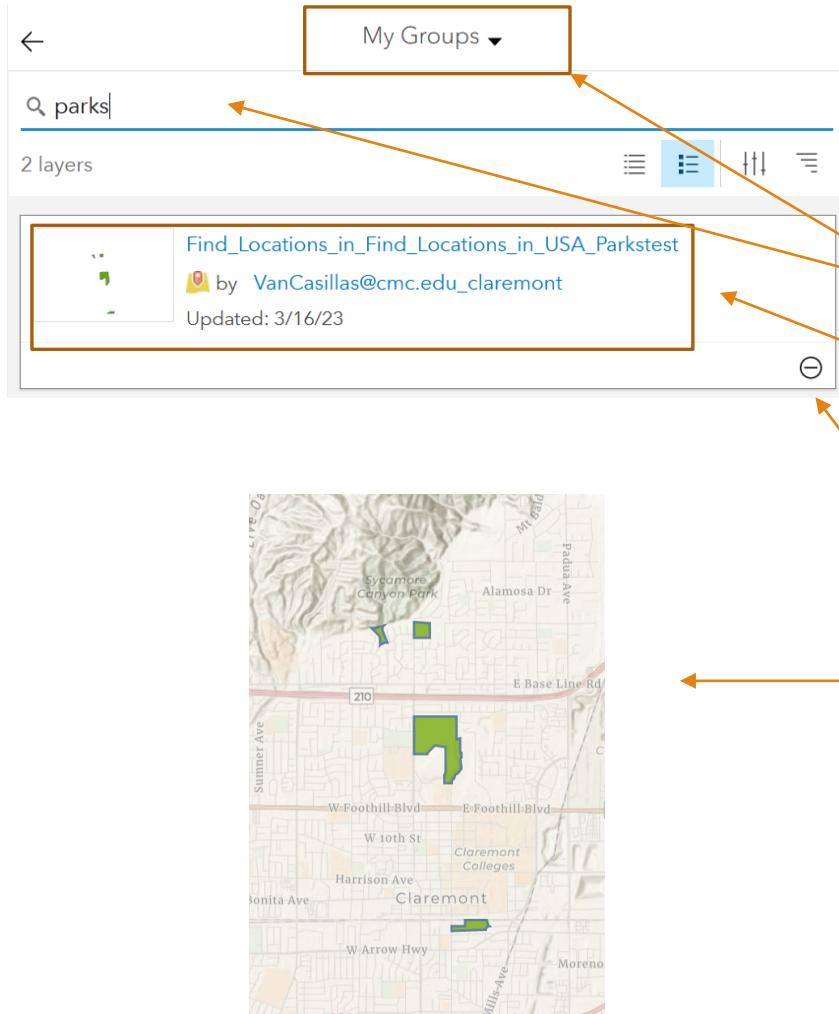
# Claremont Boundary Layer

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



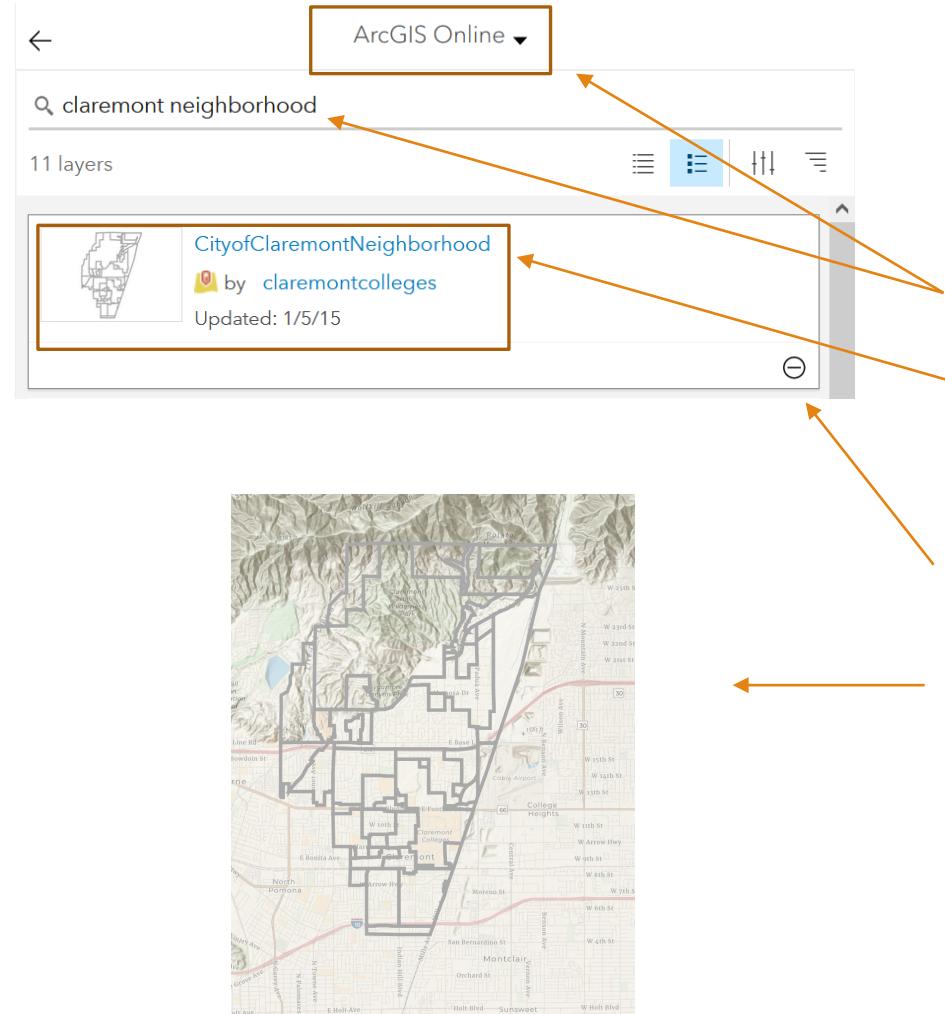
# Claremont Trees

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



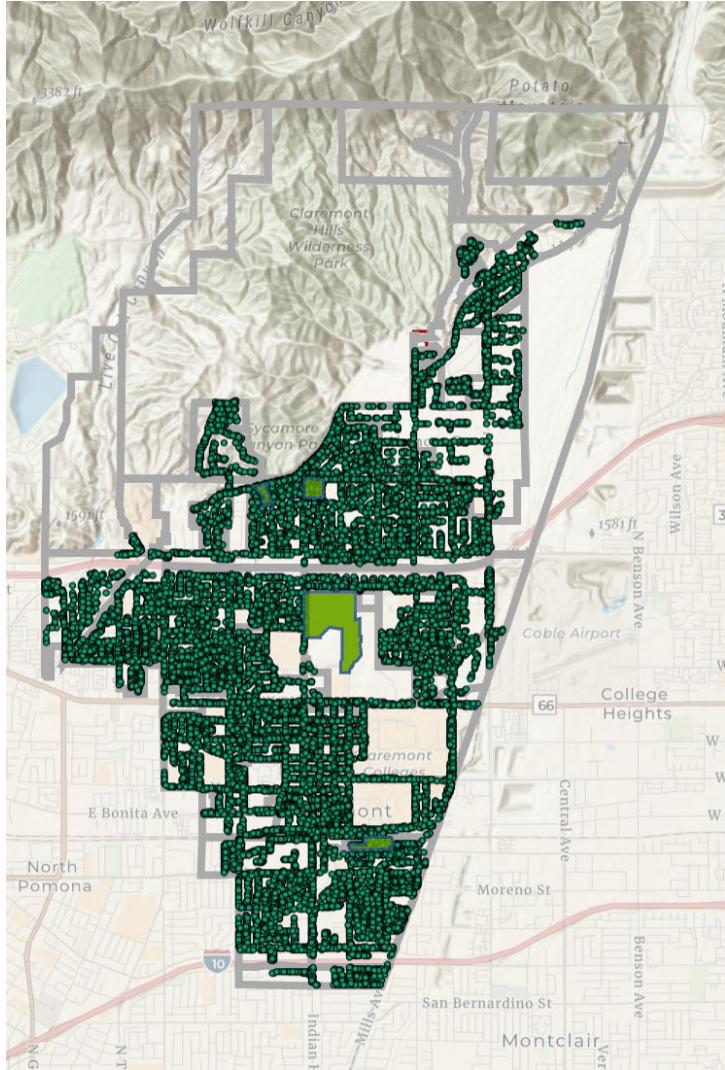
# Parks Data Layer

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!

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# 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

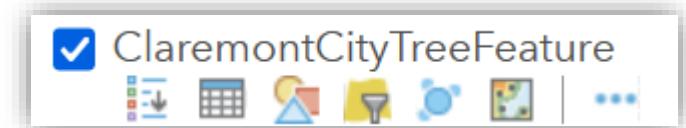
+ Add another expression  Add a set

Display features in the layer that match the following expression

BotName is Calocedrus decurrens  Value  Field  Unique

Ask for values

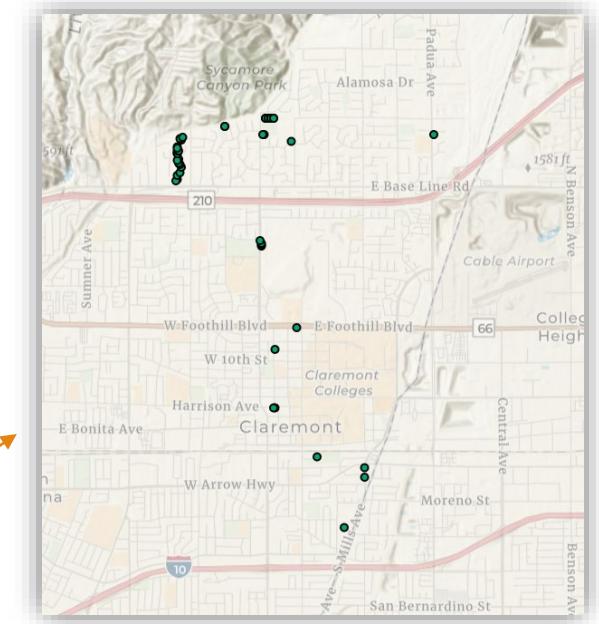
**APPLY FILTER** **APPLY FILTER AND ZOOM TO** **CLOSE**

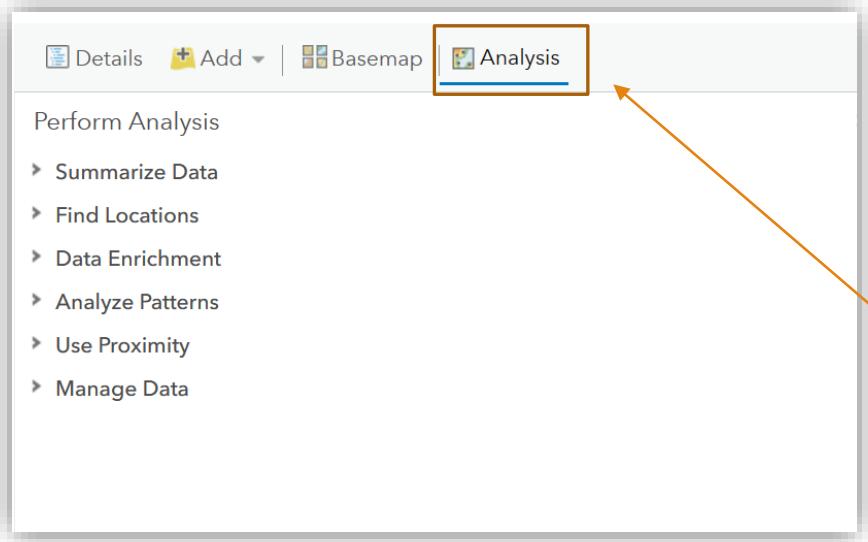


Legend | Table | Style | Filter | ClusterPoints | Analysis | Options

Type in the value you want to filter

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





# Analysis – Making our own layers

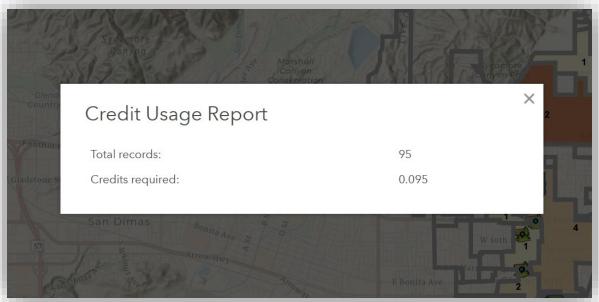
Click the Analysis tab

A screenshot of the 'Analysis' ribbon tab with its contents expanded. The 'Perform Analysis' section is open, showing the 'Summarize Data' group which includes 'Aggregate Points', 'Join Features', 'Summarize Nearby', 'Summarize Within', and 'Summarize Center and Dispersion'. Below this group are other analysis tools: 'Find Locations', 'Data Enrichment', 'Analyze Patterns', 'Use Proximity', and 'Manage Data'. An orange arrow points from the text '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"' to the 'Aggregate Points' icon.

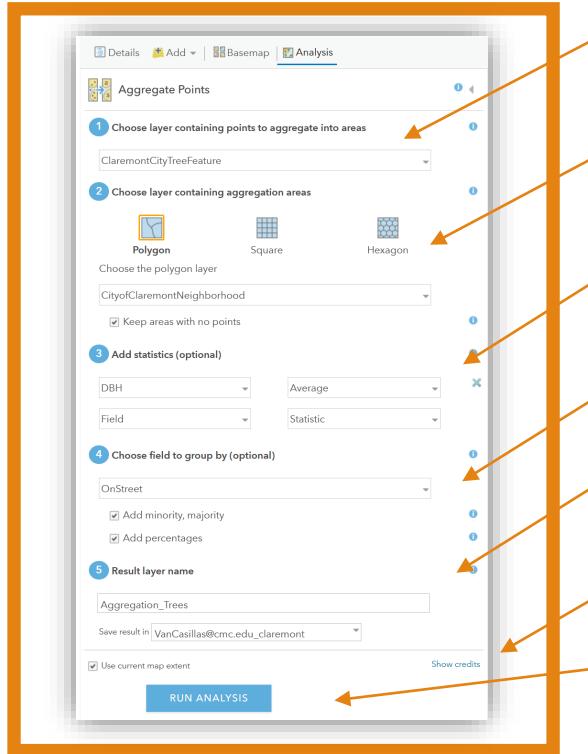
These analysis cost credits to use,  
we will be using Aggregate Points today,  
But I explore each one later by clicking  
on the blue “I”

A screenshot of the 'Aggregate Points' analysis tool details. It shows a diagram illustrating the process: a layer of point features (blue dots) is combined with a layer of area features (purple shapes) to produce a new layer where points are aggregated within areas. A detailed description follows: '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 grid with labels like 'E Leadore Ave', 'E Bennett Ave', 'W Foothill Blvd - Glendora', and 'E Foothill Blvd'.

Be careful of credits!



# Aggregate Points



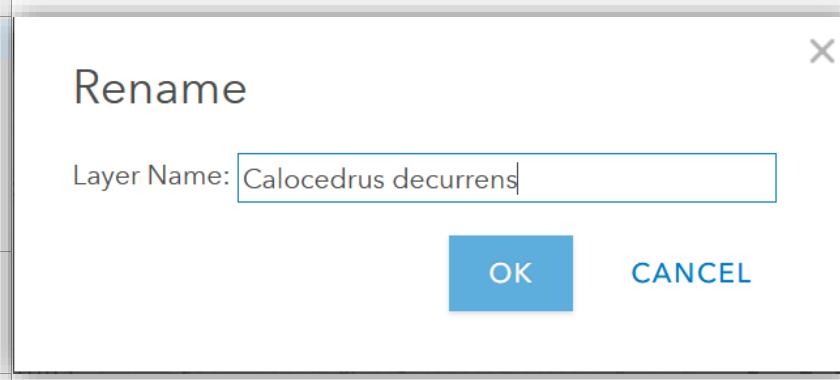
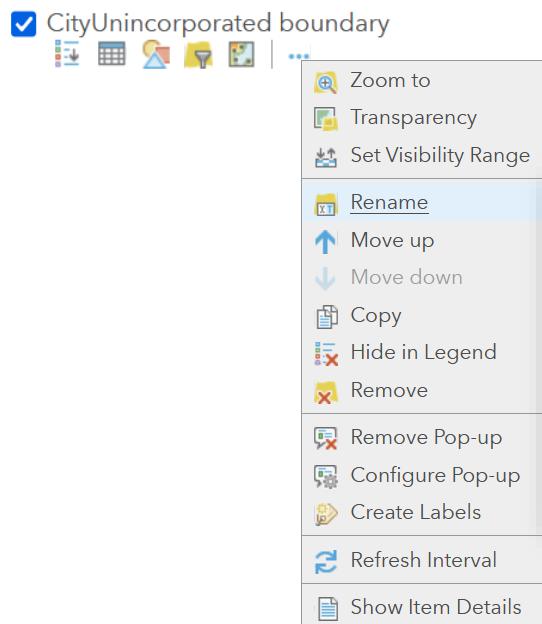
1. Choose the “ClaremontCityTreeFeature” layer
2. Choose Polygon and “CityofClaremontNeighborhood” layer
3. Choose “DBH” and “Average”
4. Choose “OnStreet”, check Add minority, majority and Add percentages
5. Name your Layer whatever you want and save in folder
6. Check your credits by clicking Show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



Style Edits

# Renaming

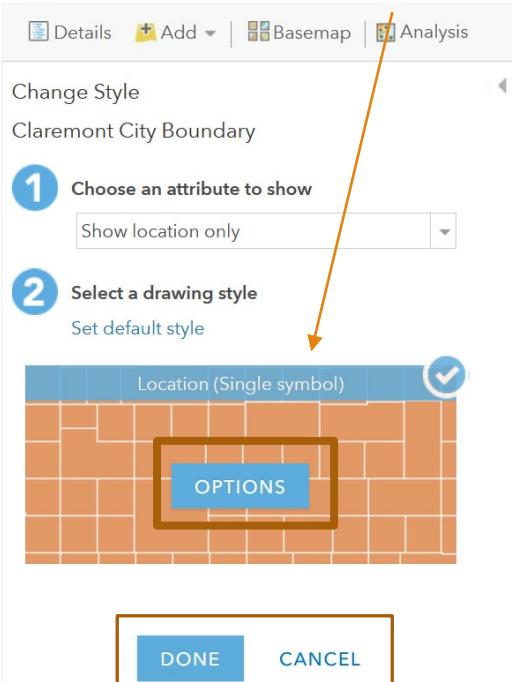
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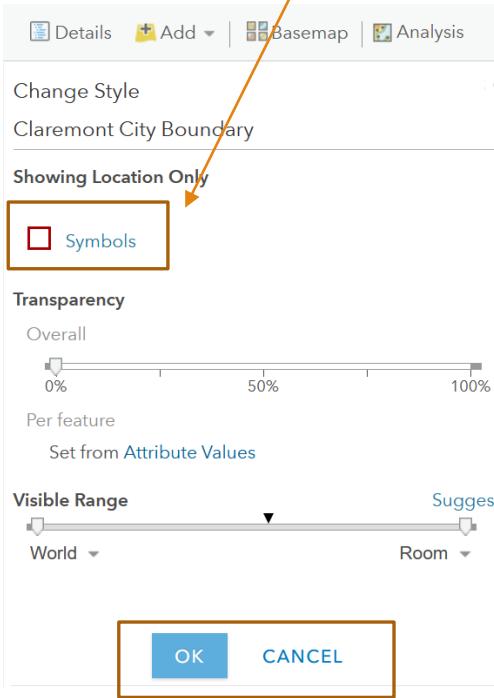
Renaming to make more sense to yourself in the future and for the legend

# Claremont Boundary Line Style Edits

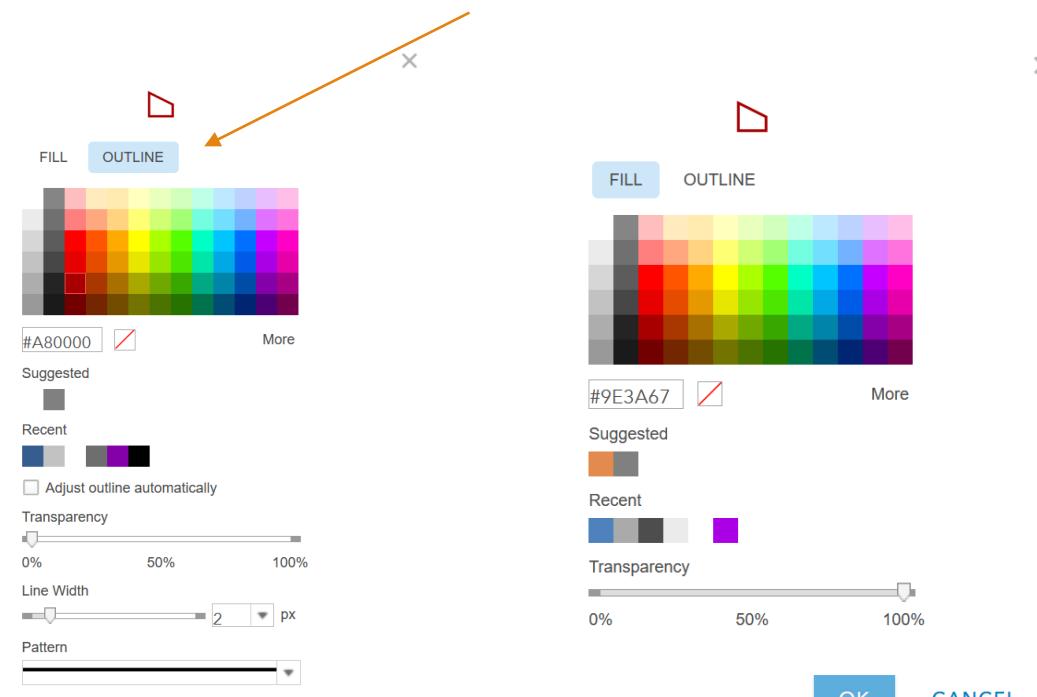
Click the attribute, you would like to display, we will be using “show location only” then click [options]



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

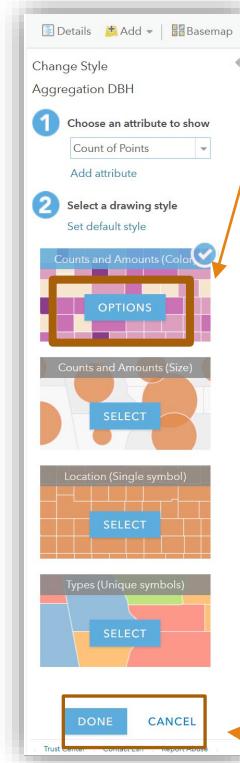


End step: Click [OK] twice and then [Done]

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

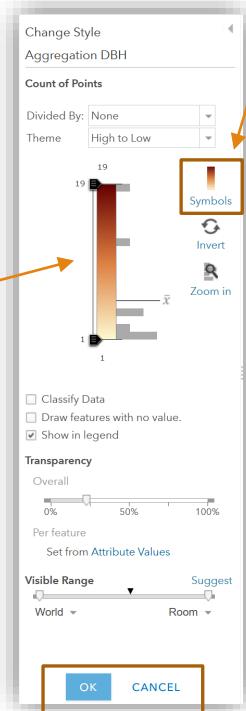
# Aggregation DBH Style Edits

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



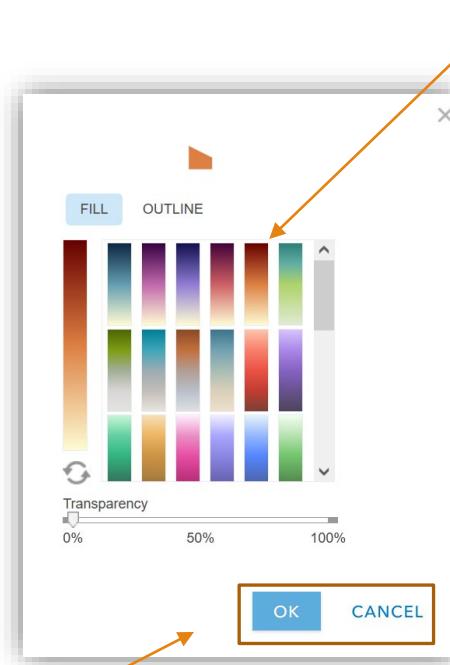
\*Note: this is the result color

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



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

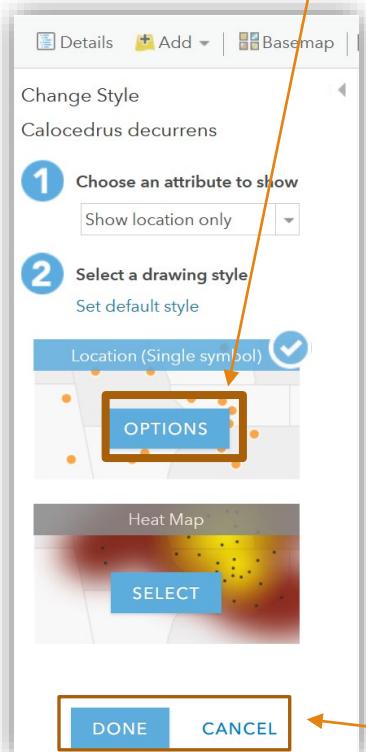
Change the Fill to the 5<sup>th</sup> one in the Fill tab, leave outline the same



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

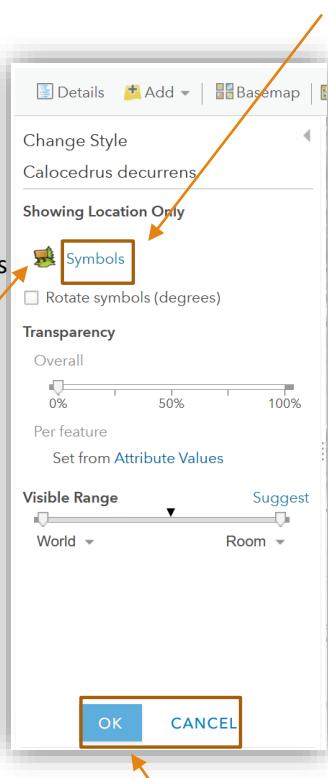
# Aggregation DBH Style Edits

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



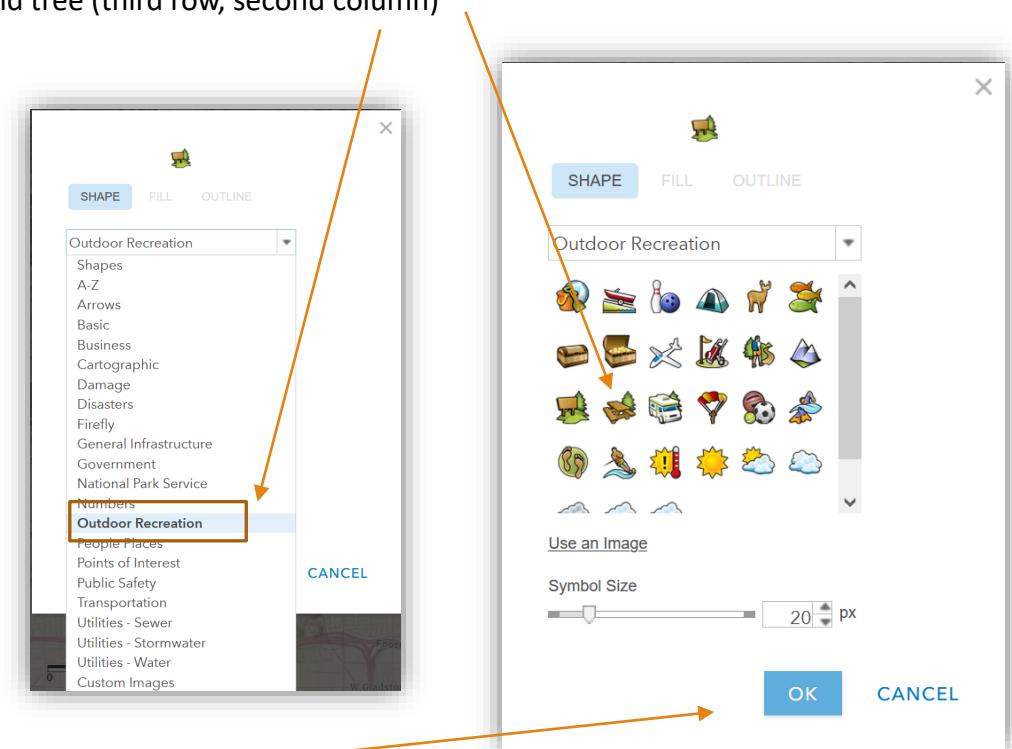
\*warning: if you do not click [Done], it will not save to content and map

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

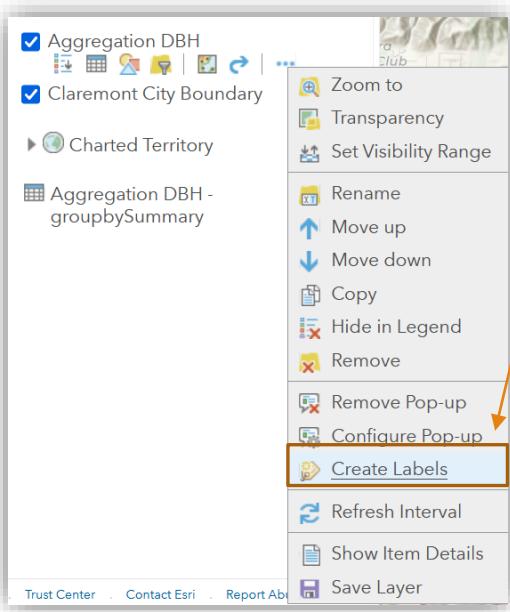


End step: Click [OK] twice and then [Done]

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



# Labels

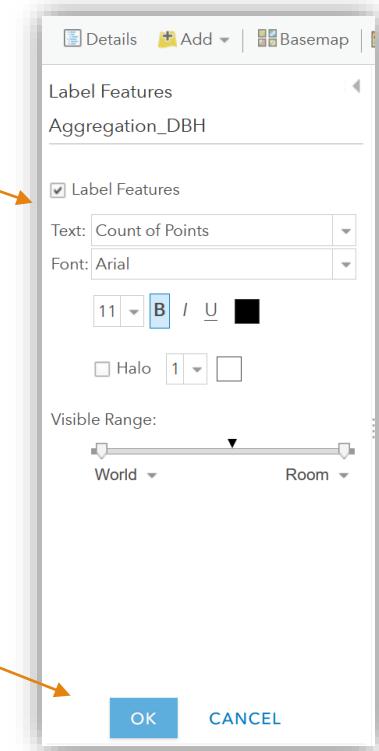


You can add labels from the options icon

Make sure the “Label Features” is enabled

Choose “Count of Points” and 11 size font

Click okay





### Legend

**Calocedrus decurrens**



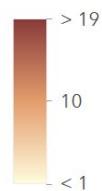
**Park Locations**



**Aggregation\_DBH**



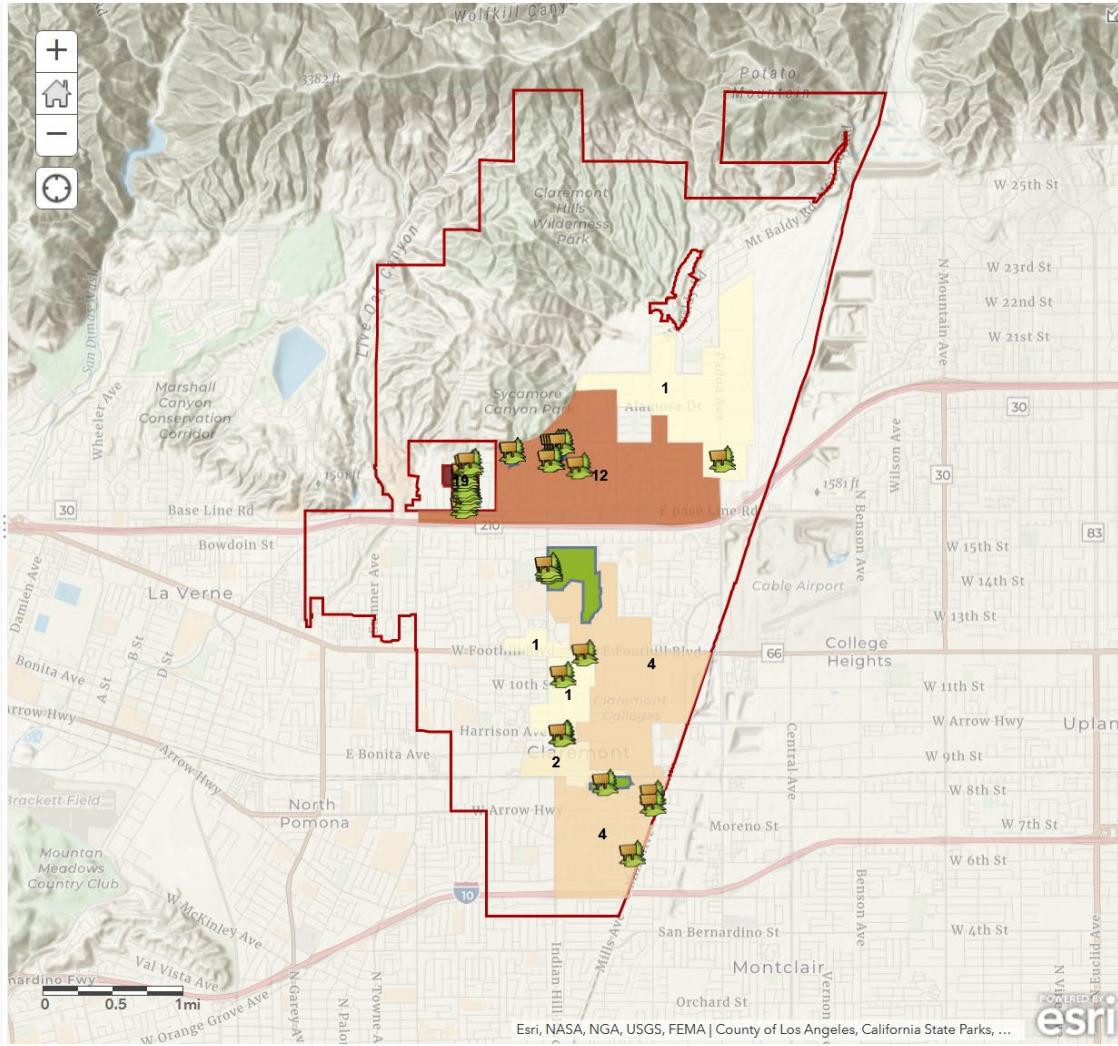
**Count of Points**



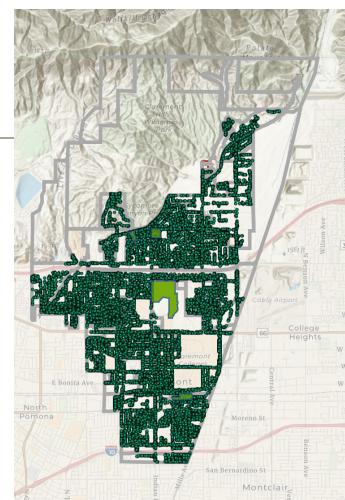
**Claremont City Boundary**



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# A better visual story



# Steps

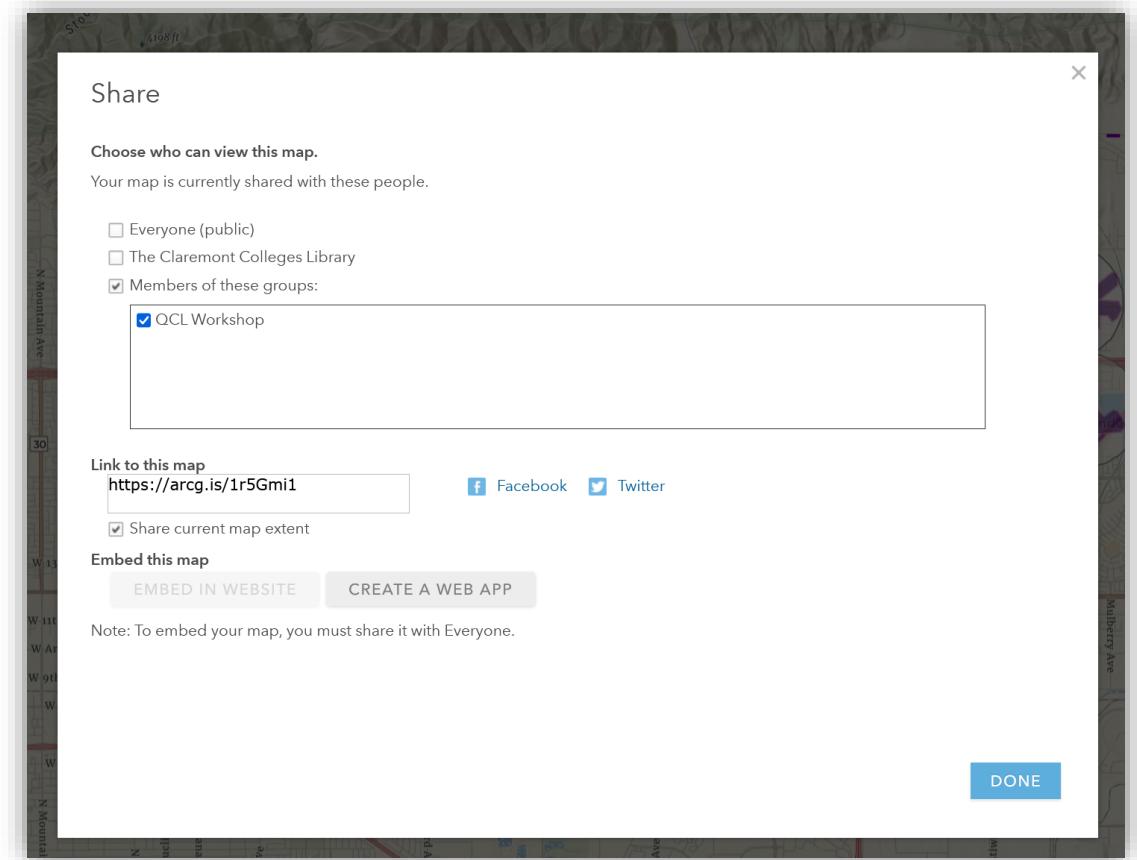
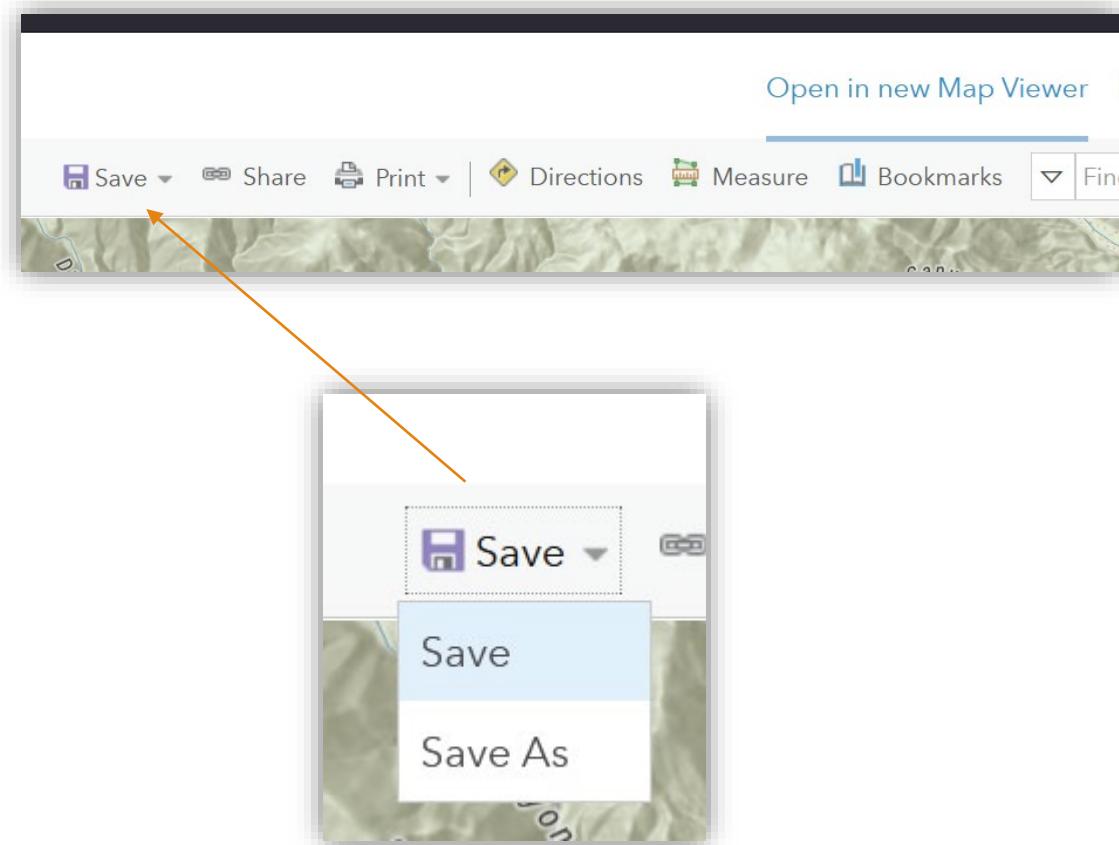
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- 1. Layers
  - Claremont Trees – filter to BotName is *Calocedrus decurrens*
  - Neighborhood
  - Claremont Boundary
  - Park – My group
- 2. Analysis
  - Aggregation – trees in neighborhoods
    - DBH is measured on standing trees outside of the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

# Last Steps



# Save and Share



# Go to New ArcGIS Online Map

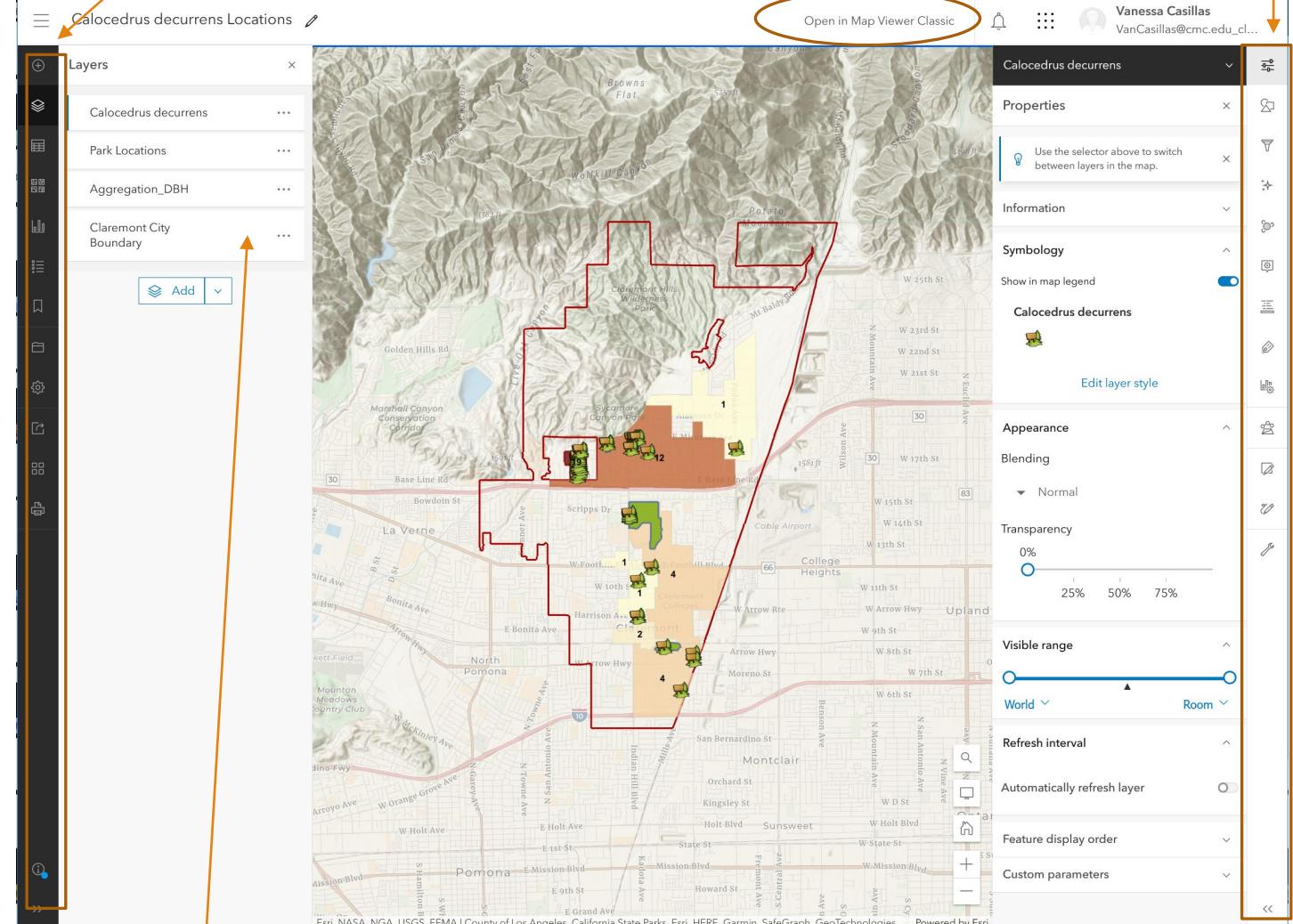
Everything you learned you can do here, it is just a new look

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

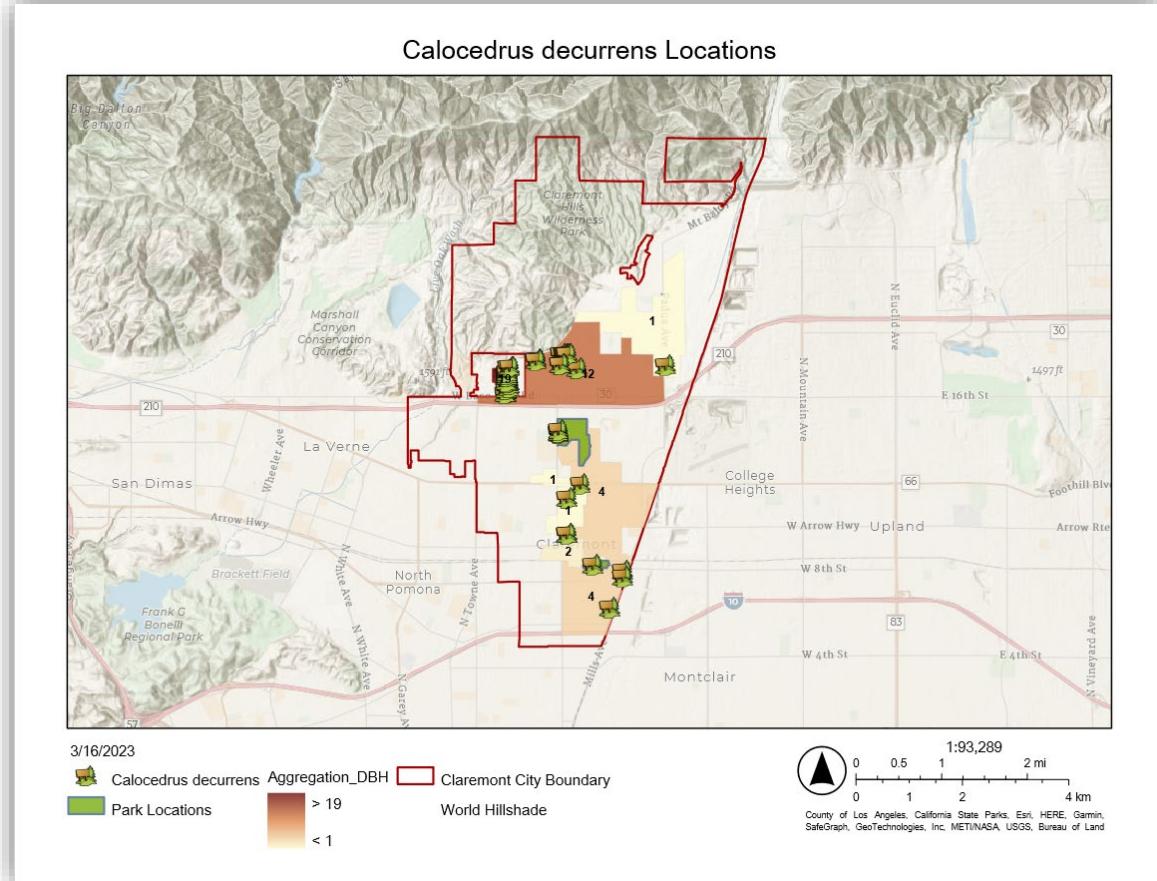
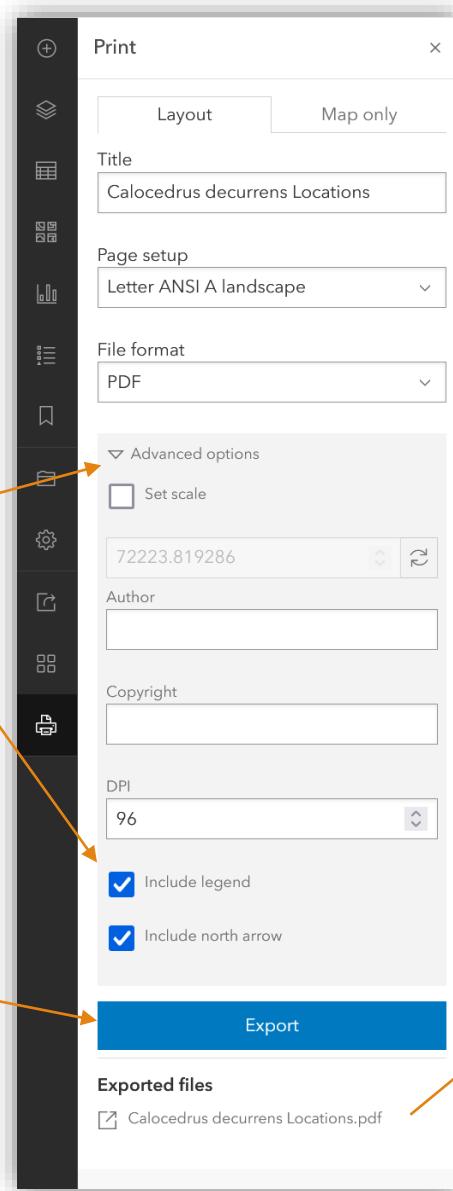
# Printing a Map

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 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'. The main content area has tabs for Overview, Data, Visualization, Usage, and Settings. The 'Overview' tab is selected, showing a thumbnail of a map with purple points, a title 'Feature layer generated from Aggregate Points', and a subtitle 'Feature layer (hosted) by VanCasillas@cmc.edu\_claremont'. It also displays item details: 'Item created: Mar 16, 2023' and 'Item updated: Mar 16, 2023' with a view count of 9. A 'Edit thumbnail' button is available. To the right is a context menu with options like 'Open in Map Viewer', 'Open in Scene Viewer', 'Open in ArcGIS Desktop', 'Publish', 'Create View Layer', 'Export Data', 'Update Data', 'Share', and 'Metadata'. Below the thumbnail is a 'Description' section with a detailed text about the feature layer. The 'Layers' section lists 'Aggregated Polygons' as a 'Polygon layer'. The 'Tables' section lists 'groupbySummary' as a 'Table'. The 'Terms of Use' section contains a note to add special restrictions. The 'Comments (0)' section has a placeholder 'Leave a comment.' and a 'Comment' button. The 'Share' and 'Owner' sections show the item is managed by 'VanCasillas@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 page with a search bar for 'VanCasillas@cmc.edu\_claremont'. The results table lists several items, each with a checkbox, title, type, modification date, and sharing information. The items include:

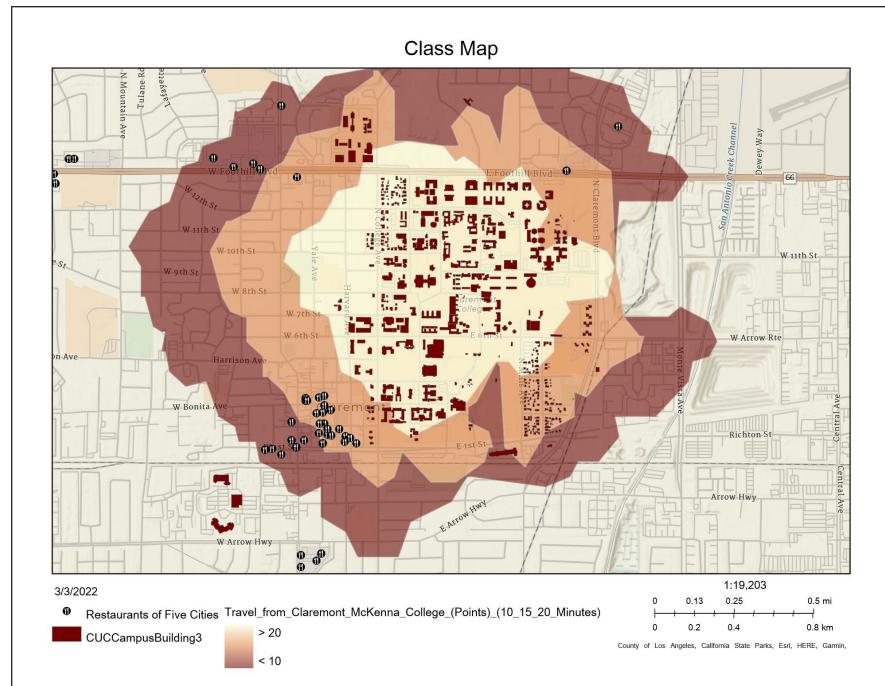
- Calocedrus decurrens Locations (Web Map, Mar 16, 2023)
- Find\_Locations\_in\_Find\_Locations\_in\_USA\_Park (Feature layer (hosted), Mar 16, 2023)
- BA - Application Data
- BA - Project Data
- CA - Application Data
- Aggregation\_DBH (Feature layer (hosted), Mar 16, 2023)
- Aggregation\_of\_trees\_in\_neighborhoods (Feature layer (hosted), Mar 16, 2023)

A red arrow points to the 'Content' tab at the top of the page.

# 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)
- Title it with your name, print a copy and send it to QCL@cmc.edu, and share it to the group receive credit



# Resources

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

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

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

# Contact

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QCL: QCL@cmc.edu

Vanessa: vanessa.casillas@claremontmckenna.edu

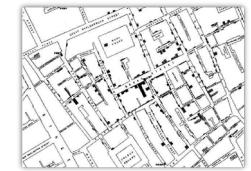
LinkedIn: <https://www.linkedin.com/in/vanessaariascasillas/>

# References

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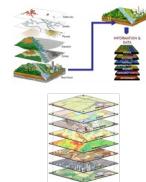
Slide 7:

[https://www.researchgate.net/figure/John-Snows-famous-map-of-the-1854-Broad-Street-epidemic-attempted-to-positively\\_fig1\\_220144184](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

