Implementing Spatial Thinking with Web GIS in the Non-Profit Sector: A Case Study of ArcGIS Online in the Pacific Symphony

by

Michelle Marie Lin

A Thesis Presented to the
Faculty of the USC Graduate School
University of Southern California
In Partial Fulfillment of the
Requirements for the Degree
Master of Science
(Geographic Information Science and Technology)

August 2016

I dedicate this document to my parents, who inspired me to work hard and pursue my goals

Table of Contents

List of Figures

List of Tables

Acknowledgements

I am grateful to my thesis advisor, Dr. Vos, for his guidance and patience throughout this project. I would also like to thank my committee members, Drs. Wilson and Sedano who gave me assistance when I needed it. I thank my parents, sister, and brother for their constant support throughout my entire student career. Also, my friend Tyler for his support and encouragement throughout this process. I would also like to acknowledge, the Pacific Symphony and Alan Brown for the data and insight they provided me for this project.

List of Abbreviations

GIS	Geographic information system
IT	Information technology
NDA	Non-disclosure agreement
NHQ	National Headquarters
USC	University of Southern California

Abstract

With the proliferation of online GIS starting around 2012, costs for running GIS have come down so much that there are now many opportunities to spatially enable organizations like those in the non-profit sector that could not access the technology before. This research demonstrates how to administer a simple GIS system for a non-profit corporation in the performing arts sector, the Pacific Symphony. It illustrates how the symphony developed a basic pattern of spatial thinking and analysis that strategically aligned with their core organizational objectives. This project shows that even though the symphony lack the resources to invest in a professional GIS system, they were still able to utilize spatial technology by implementing a cloud-based GIS system to make their organization more successful. Esri's ArcGIS Online was used for this project because it is a cloud-based, user-friendly GIS software geared to those with little to no GIS experience. By overlaying the symphony's data with ArcGIS Online content, such as demographic data and tapestry segmentation, ArcGIS Online was able to help the symphony choose ideal locations to market and select among alternative performance venues. Additionally, it helped the symphony reduce costs by targeting the appropriate market and customer base. Two key findings coming out of this project are the importance of a GIS champion within the organization to make the GIS implementation successful, and the value of hands-on experience of Web GIS for integrating patterns of spatial thinking in the organization.

Chapter 1 Introduction

Using GIS is a common practice for entities that are looking to integrate patterns of spatial thinking and analysis to align with their core organizational objectives. Generally, companies or government agencies that rely extensively on spatial data will invest in the resources necessary to run an enterprise GIS system that includes hardware, software, and dedicated staff (Schardein 2015). However there are many organizations, such as the Pacific Symphony, for whom spatial data is useful but not key to core organizational objectives. In such organizations the costs of enterprise GIS may outweigh the benefits, but with more economical and user-friendly GIS technologies, there is potential for spatial thinking and GIS to become ingrained in such organizations.

The Pacific Symphony is a non-profit orchestra organization that plays over a hundred concerts a year (The Pacific Symphony 2015). Its budget is $17 million per year, with roughly 50% of revenue coming from ticket sales and 50% from donations. Their tickets are generally sold at prices ranging from $20 - $190 per seat, depending on the event and seating location (Pacific Symphony 2015). Their budget is used to pay their staff, musicians, rent venues, and invest in marketing materials. Funding is heavily constrained, so they are not able to hire staff dedicated to managing a GIS system. Without the budget to hire the GIS staff, the existing Pacific Symphony staff must learn to use the software if the organization is to be spatially-enabled.

Even though the software may not be difficult to use, it does have a learning curve that requires users to invest time to learn how to properly utilize it. Without the proper tutorials or training, even simplified GIS software can be hard to use and may require several weeks or months to learn how to properly use and apply it to their business (Schardein 2015).

Furthermore, GIS software is often only used within a small group of people who are familiar with it or have any educational background in it. If there are others within the organization that would like to utilize GIS, it may require them to learn to use the software, and they may not have the time or resources to do so and can be easily discouraged (Schardein 2015).

Therefore, the goals of this research are to (1) develop basic patterns of spatial thinking and analysis strategically aligned with Pacific Symphony's core organizational goals; (2) enable ArcGIS Online for use by staff in marketing, fundraising, operations, and site location for live performances; and (3) evaluate and report on the effort as a case study of spatially enabling organizations via the cloud. With the data provided, ArcGIS Online will be used to display their customer base to assist in increasing revenue by choosing locations to market and selecting different performance venues.

1.1 The Pacific Symphony Case Study

The Pacific Symphony is a small non-profit organization that holds a series of concerts throughout the year at a variety of performance venues in Orange County, California (see Figure 1). It holds a wide range of concerts throughout the year at a variety of performance venues.

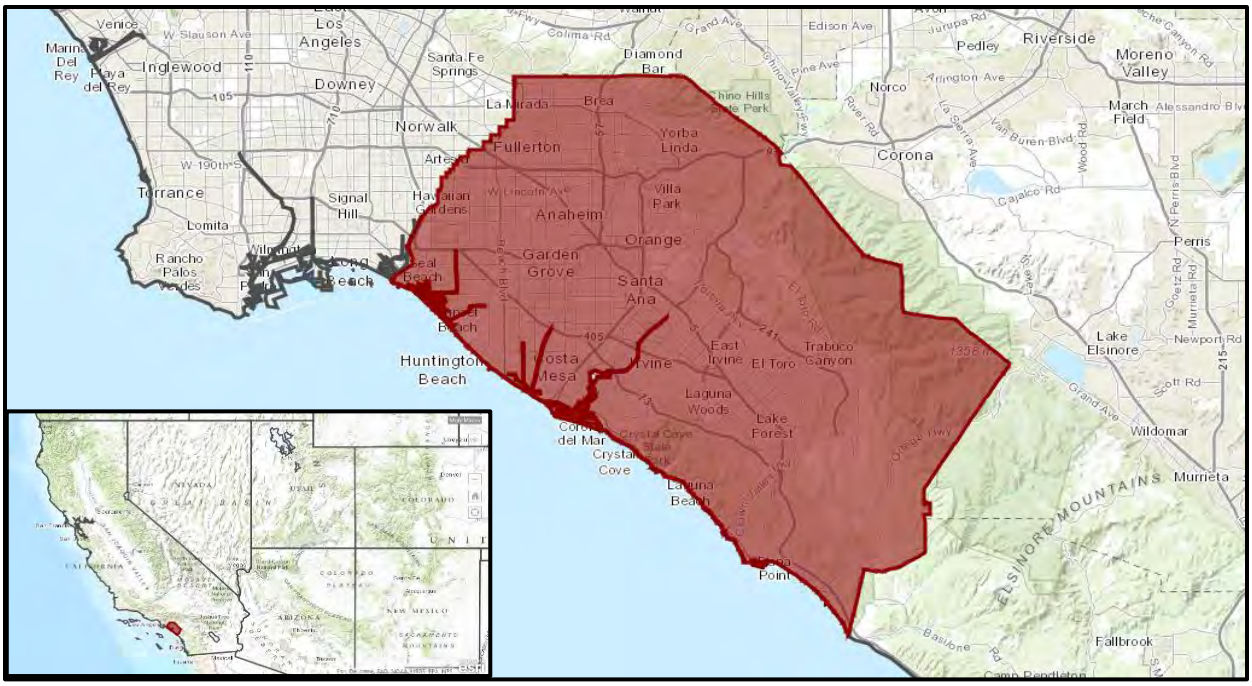


Figure 1 Orange County, California

The orchestra is engaged in a series of projects during the first quarter of 2016 and is hoping to use GIS to help them make better-informed decisions. Therefore, the Pacific Symphony agreed to participate in the research to implement Web GIS into their workflow. They are hoping to add a geographical element to their marketing and fundraising department to support the following projects:

1. Analyze the demographics and tapestry segmentation of their new summer venue, the Pacific Amphitheater, and compare it to their current summer venue, the Irvine Meadows Amphitheatre.
2. Discover four new, smaller performance venues for the winter season by better understanding the location of the current audience and the location of potential audiences in and near Orange County.

3. Attract current and potential donors to Pacific Symphony's events by understanding where they are located in relation to outreach concerts and educational activities.

1.1.1. GIS Knowledge, Spatial Thinking, and Current Mapping and Data Software Use

The Pacific Symphony does not have any prior knowledge of or experience using GIS software. Additionally, they have a small budget and are hoping to easily incorporate GIS software into their workflows without have to spend too much money or time to learn how to use it. Prior to being introduced to GIS and spatial thinking, the Pacific Symphony has been selecting venues by the following criteria: the location is within Orange County, has adequate acoustics, sufficient parking space, and is visually appealing (Brown 2015a). However, with GIS, the Pacific Symphony could change their methods of selecting venues by basing its decision on customer location and geographically selecting areas that have similar demographics and tapestry as its current customers.

For their mapping and data needs, they were utilizing Tessitura and Mosaic. Tessitura is a system of a records software often used in the arts industry that records, tracks, and manages all of their customer and donor data. It also organizes marketing and fundraising requests, handles all ticketing/membership transactions, and provides performance reports (Tessitura 2015). This software is heavily used within the organization, and has one full-time staff member dedicated to working with the software on a daily basis and another full-time staff member dedicated to managing the software (Pacific Symphony 2015). Tessitura also contains a mapping component that allows them to create simple maps as shown in Figure 2. In Figure 2, the maps are based on ZIP codes and not individual addresses. Within the software, there is a "Map-it" tool that allows the user to zoom in and out and pan around the map, there are no additional functionalities included within the map component (Farma 2016).

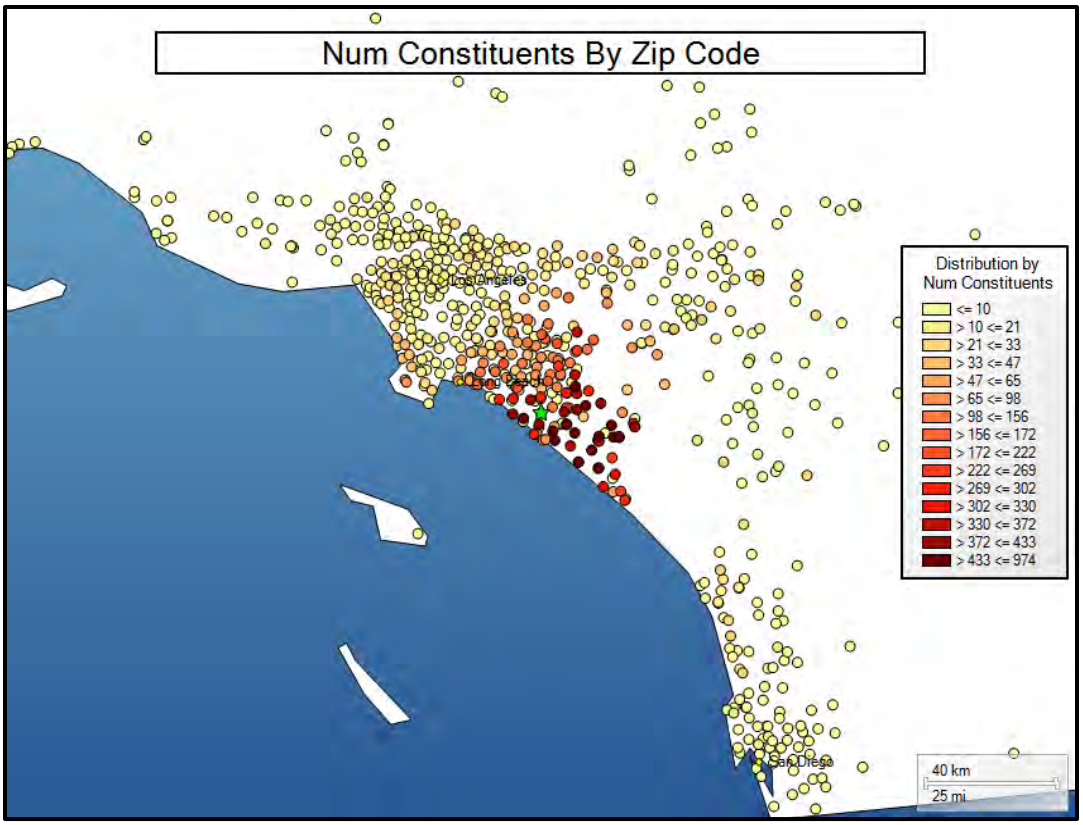


Figure 2 Map of ticket buyers created within Tessitura by ZIP code

Mosaic is a household-based consumer lifestyle segmentation provided by Experian Marketing Services (Experian 2015). The symphony uses it to understand their ticket buyers' and donors' lifestyle. Mosaic has a quasi-spatial aspect to it as in they are able to look up lifestyle data by ZIP codes and addresses; however, users are unable to visualize it on a map or relate it to performance venue locations (Experian 2015).

1.2 Proposed Esri Software

For their projects, they will be utilizing Esri's Web GIS software, ArcGIS Online and Business Analyst Online. ArcGIS Online, a relatively new technology Esri released in July 2012, is a user-friendly, cloud-based GIS software package that allows those not familiar with GIS to effectively instill the geographical element needed to make their entity successful (Esri 2015). It enables users to create web maps they can share with others in their organization. Furthermore, it includes online content and analysis tools that users can use if necessary for their maps. For example, if they have an Excel spreadsheet of their customers' location they can save it as a .csv file and have ArcGIS Online map out their whereabouts. Additionally, there are premium applications that are included within ArcGIS Online, such as Business Analyst Online, that can be used to enrich their own data with up-to-date demographic data and tapestry segmentation (ArcGIS Online 2016). Within Business Analyst Online, the demographic data can identify who their customers are, while the tapestry segmentation can tell them how to reach their customers (Schardein 2015) since it provides information on their lifestyle, occupation, what they like to do on their free time, and where they like to shop (Esri 2016). These types of data sets can help with identifying target audiences and where/who they should market to. For example, if within the tapestry segmentation it states that majority likes to attend movies, then the Pacific Symphony can provide flyers at local movie theaters. Additionally, Business Analyst Online allows users to create smart map layers, which display the Census boundaries (i.e., tracts, counties) that fit a user-defined criteria for up to five user-selected demographic variables (i.e., income, race, gender, tapestry segmentation). Other functionalities include the ability to create story maps or interactive web applications that can be hosted on its webpage or used as marketing material.

Esri claims that ArcGIS Online requires less of an investment in training compared to other GIS software, especially professional-grade software like ArcGIS for Desktop (Pilarcik 2015).

ArcGIS Online's simple user interface enables those who have not used GIS software before to easily utilize GIS. Generally, within a company, there are dedicated groups of people that use GIS and are in charge of the maintaining data, working with the data, and making maps (Pilarcik 2015). Therefore, it only allows a small group of people to benefit from GIS. Enabling an entire organization with GIS and its technology may help their employees use maps to make decisions that can ultimately save them time and money. Organizations will be able to obtain the same results as a world class company without the extensive cost (Brown 2016b).

ArcGIS Online allows users to create maps using up-to-date data, perform analysis, and share the results with everyone within the organization via web browser links (Esri 2015). This cloud-based software allows access to the data through browser-based devices like tablets and smartphones. Therefore, anyone within the organization that has access to these devices and the Internet will be able to pull up the information at anytime, anywhere, and on any device. For example, the Pacific Symphony staff could create a map that shows education program coverage and be able to view or update this information on their smartphone or tablet at any time.

1.3 Geography of Orange County

Unlike other counties like Los Angeles or San Diego County, Orange County does not have one major city, monument, or symbol distinguishing the center of it (Hansen 2015). Instead, it is filled with many different major cities including: Anaheim, Costa Mesa, Huntington Beach, Irvine, Newport Beach, Laguna Beach, and Laguna Hills. This can complicate the strategic situation for organizations in the county because when the geographic center of the county loses its meaning, there may be less sense of place overall (Hansen 2015). For instance, the Los

Angeles Angels of Anaheim baseball organization is known for their drawn-out, contradictory name (Tully and Marroquin 2015). Before 2005, the team name was California Angels and was based in Anaheim. In order to expand their market, Angel officials wanted to broaden it to Los Angeles to create a larger fan base (Tully and Marroquin 2015). Although the counties are connected, they are still two separate places. To have the officials approve the name shows that there is not an identity Orange County can classify with. Furthermore, according to Marc Ganis, president of SportsCorp, at a national level, the Angels are more identified with Los Angeles and that has reduced visibility in Anaheim (Tully and Marroquin 2015).

1.3.1. Current Performance Venues

The Pacific Symphony currently performs mainly at four venues in the central and southern coastal area of Orange County as shown in Figure 3. Though, it also at times perform a large number of smaller concerts for the community at different events, like at parks and schools for example.

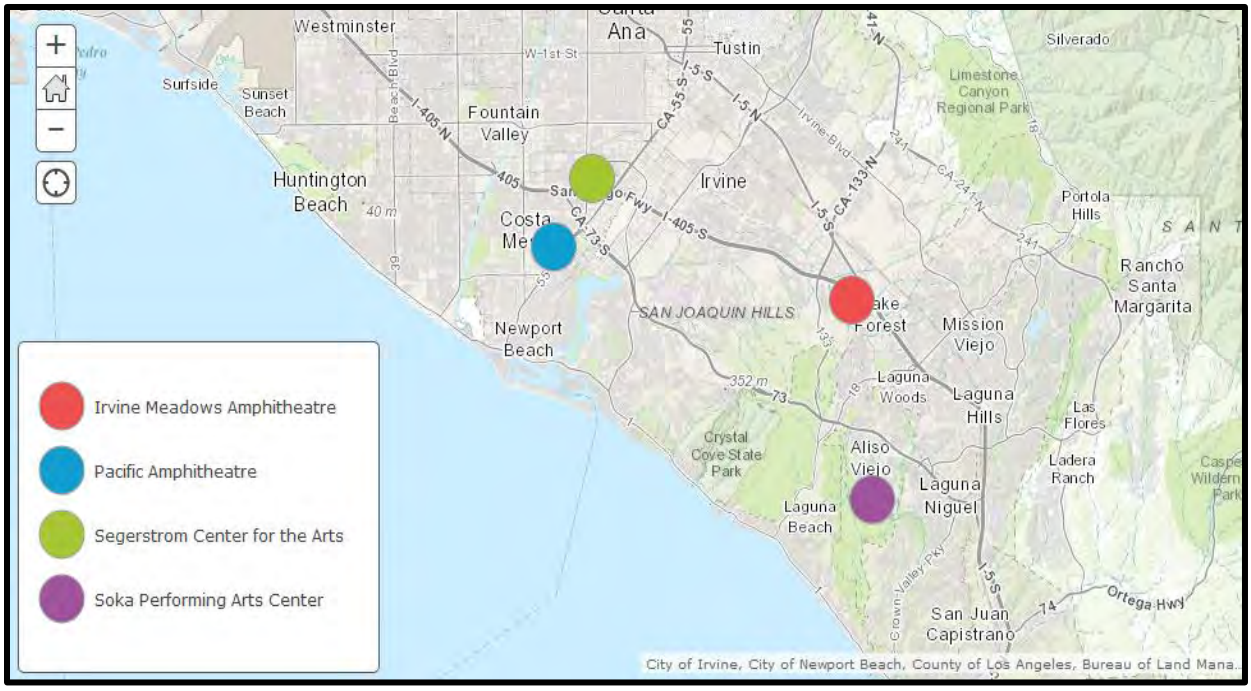


Figure 3 Pacific Symphony's list of venues

1.3.1.1. Renée and Henry Segerstrom Concert Hall and the Samueli Theater

The Samueli Theater, which is within the Renée and Henry Segerstrom Concert Hall, is where the Pacific Symphony holds their Classical, Pops, Family, Sunday Connections, and Specials concerts. The concert hall opened in 2006 in Costa Mesa, California with a seating capacity of 1,704 patrons and 200 orchestra performers (Segerstrom Center for the Arts 2015).

The Samueli Theater itself can seat about 600 patrons for general admission (Segerstrom Center for the Arts 2015).

1.3.1.2. Irvine Meadows Amphitheatre

The Pacific Symphony's summer concerts will be held at the Irvine Meadows Amphitheatre until the end of 2016. The venue was built in 1980 and opened for performances in 1981. It can seat 16,085 patrons.

1.3.1.3. Soka Performing Arts Center

This performing arts center is used for events such as Sundays at Soka and Pacific Symphony Youth Ensembles. It opened in 2011 at the Soka University of America in Aliso Viejo, California. It can seat 1,000 patrons and features acoustics designed by Yasuhisa Toyota, who is famously known for designing world-class performance venues such as Walt Disney Concert Hall in Los Angeles and Suntory Hall in Tokyo (The Pacific Symphony 2015).

1.3.1.4. Pacific Amphitheatre

The Pacific Amphitheatre is currently not a regular venue; however, they believe by the year of 2017 it will become their summer home. It was originally built in 1983, but was not open for community performances until 2003. It is an outdoor venue that includes 8,200 seats located in Costa Mesa, California.

1.3.2. Moving to a new summer performance venue

The Pacific Symphony has performed a summer concert series at the Irvine Meadows Amphitheatre in Irvine, California for over 20 years. It will be displaced in 2017 and is likely moving to the Pacific Amphitheatre in Costa Mesa, California (Sutton 2015). It chose this venue due to the ability to perform numerous concerts and because it is very easy for the symphony to relocate there. Additionally, it had previous concerts that were very successful and brought in a lot of revenue (Sutton 2015). However, the venue does not have as many seats and is not as iconic or eye-pleasing compared to their previous venue. A major concern is whether its customers from the southeast region of Orange County will follow them to a venue much further north and west, as shown in **Error! Reference source not found.** (Sutton 2015).

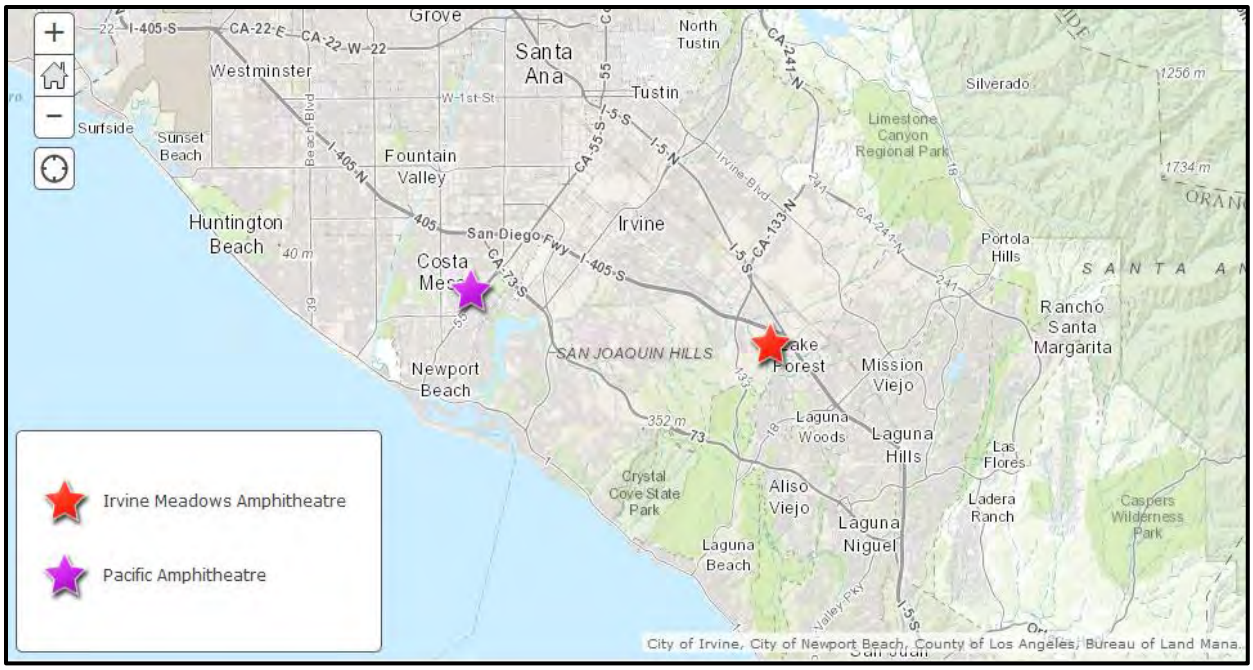


Figure 4 Current vs. future summer home

1.3.3. Selecting performance venues for education and community engagement programming

The Pacific Symphony is looking to explore an increase in the frequency of performing small concerts at numerous venues throughout different Orange County communities. It is hoping to generate a regular audience, bring in more customers, and build a relationship with the communities they perform in. For these concerts, it is hoping to branch out to a different set of customers and make less formal events.

To accomplish this, they are wanting to identify four new venues in Orange County (Brown 2015a). They are hoping GIS can help determine which four venues will be most suitable for their audience. Additionally, they want to avoid cannibalization of their current largest events and performance venues (Brown 2015a).

1.4 Potential benefits of Web GIS in small non-profit organizations

This study demonstrates whether and how a non-profit organization with a modest budget and light spatial needs could still benefit from implementing a GIS system. Even without an extensive GIS knowledge, will the Pacific Symphony still able to instill a geographical element into its business intelligence to help make them successful? Additionally, with ArcGIS Online, can the orchestra's staff learn to create maps, add data layers, and do basic spatial analysis?

Having a location-based platform is significant to an organization like the Pacific Symphony because it provides insight on where it should perform based on customers' locations and where it should market their shows. By implementing spatial analysis in its business processes using simplified, web-based tools, it may be possible for many business processes within the organization to be augmented. Utilizing ArcGIS Online may enable a large cross-section of staff within the organization to discover, use, make, and share maps from any device, anywhere, at any time (Esri 2015).

1.5 Thesis Organization

This thesis is organized into five chapters, each focused on different aspects of the research. Chapter 2 is focused on the importance of this study and the background knowledge needed to develop the project. It argues for the significance of utilizing Web GIS in small/medium nonprofit organizations. Chapter 3 details the process used to develop spatial thinking to meet the Pacific Symphony's core objectives, the goals for spatially enabling the organization, the analytical methods used to meet the goals, and the process for training the staff and evaluating the success of the project. It provides the steps taken and shows how the maps were produced. Chapter 4 reviews the project's implementation, describes the outcomes, and displays the end results of the project. It will include the maps created in ArcGIS Online. Chapter

5 reflects on what I learned from the project, similar implementations in other organizations, and discusses the transition plan and future work for the Pacific Symphony.

Chapter 2: Background

Many large non-profit organizations such as disaster relief and humanitarian aid organizations generally have large spatial needs and use GIS software in their everyday workflow (Lue 2014). However, there are small and medium-sized non-profit organizations with fairly light spatial needs. Such organizations only need GIS for a limited set of projects, tasks, or contracts, not necessarily in their everyday workflow (Swenson 2015). For these smaller organizations, it may be hard to justify the costs of implementing a traditional GIS system or even consulting contracts to obtain the benefits of a GIS.

Today's user-friendly cloud technology may make it possible to spatially-enable such "spatially-light" organizations without having to purchase extensive hardware or hiring GIS specialists. In general, the arts industry could be considered to be a spatially-light business, where GIS is not often used in their day-to-day activities. Some possible uses in arts organizations include marketing, fundraising, and site location. In the symphony orchestra industry in particular, there does not appear to be an organization that heavily relies on GIS, however there are potential benefits, like for audience engagement. Giving a geographical element to this aspect can assist them in determining the best location for events such as meet and greets or parties. Additionally, they can look into arts participation as a whole by mapping the location of current and potential donors or ticket buyers to see who they should attract/market to attend their events to increase business.

Spatially-light industries like the performing arts have a difficult time understanding the benefits (i.e. increased efficiency, productivity, and revenue) of thinking spatially through GIS technology. This can help increase efficiency, productivity, and revenue. Especially now that

GIS companies have created user-friendly cloud technology, organizations can quickly and easily learn how to use it to help their organization.

2.1 How Large Non-Profit Organizations Organize their GIS Department

Large non-profit organizations that have mission-critical spatial needs are heavily reliant on GIS and utilize GIS software every day. These organizations have a core purpose, mission, and business processes that require GIS. They have seen that the benefits outweigh the costs of GIS software and are able to afford the traditional GIS software and expertise. This includes the necessary hardware and software, as well as staff training, specialist hiring, and consulting contracts. Since they are large non-profits, their budget allows them to implement an enterprise GIS system in their workflows. Additionally, in their GIS department, they have a core professional staff that will work on their GIS needs and manage the software, especially those who maintain an in-house GIS system may be better funded for GIS software/hardware (Craig, Harris, and Weiner 2002). However, they are often still heavily reliant on volunteer labor.

The Red Cross is a large disaster relief non-profit organization that has an enterprise license agreement with Esri (Lue 2013). An enterprise license agreement provides users within an organization access to a wide range of licenses including ArcGIS for Desktop and up to hundreds of user names to ArcGIS Online. A study done by Evan Lue (2014) shows how their GIS departments are largely dependent on volunteers. Their National Headquarters (NHQ) has a professional GIS staff and have utilized GIS software to help produce maps for chapters, regions, divisions, or other NHQ departments (Lue 2013). One of the biggest challenges they face is obtaining volunteers with the GIS skillsets needed to complete their project. Therefore, they partner with different universities to have students work as volunteers or hire them through their internship program and involve them with the Disaster Response team (Lue 2013). Red Cross is

able to freely pass out licenses to whomever will be working for them. They are also able to provide hundreds of usernames for their volunteers to work on their web-based maps utilizing ArcGIS Online (Swenson 2015).

Even some governmental organizations are dependent on volunteers and interns for their GIS work. For example, the State of Wisconsin Natural Resources department does not have a dedicated GIS staff. Instead, they have a small group of four people who know how to use the GIS software, but were not hired to specifically do GIS work. They still are largely dependent on volunteers and interns for their GIS work (Swenson 2015). A large portion of their volunteers is retired and passionate about the environment (Swenson 2015). A majority of their interns are students recruited from the Community Environmental Scholars Program through the University of Wisconsin Madison. Students from the university work with the state (without pay or benefits) and were able to take the work that they have done with the state and use it for their final project at the end of the course (Swenson 2015). They had the budget to provide GIS software for all of their volunteers and interns.

There are large non-profit organizations that have successfully integrated GIS as a standard practice throughout their organization like Samaritan's Purse, a large humanitarian non-profit organization (Geo World 2015). Since they specifically work on disaster response, they need to track fast-moving spatial information in order to make strategic decisions. An example of this is when they worked during the post-Haiti earthquake and used GIS to select shelters for victims and their volunteer workers (Geo World 2015). Since they are a large organization, they had the necessary resource and budget to implement a full GIS system and provide GIS software for their volunteers and employees.

2.2 GIS in Small to Medium Non-Profit Organizations

Similar to many of the large non-profit organizations, small to medium non-profit groups also rely heavily on volunteers or even outsource their services to other non-profit organizations that are familiar with GIS (Craig, Harris, and Weiner 2002). Unlike the large non-profit organizations, they do not have an extensive budget and are dependent on grants and donations. Generally, due to budget constraints, they do not have the resources to maintain a technical staff, therefore they tend to share resources with one another including their GIS needs (Craig, Harris, and Weiner 2002) or can look into signing up a GIS intern from a local university (Swenson 2016).

2.2.1. Costs and Benefits of Web GIS

To use a traditional pattern of GIS, it can require extensive hardware and software setup. This can be expensive, especially when a company has to also purchase training for their staff or hire a GIS specialist/team. However, with today's Web GIS and cloud technology, they can keep their current hardware and software setup and access GIS through the Internet, and store their data in the cloud. Additionally, GIS software companies have now provided easy to use GIS software for users inexperienced with GIS. The new pattern of GIS is opening up the world of GIS to everyone through the use of web maps and related applications (GeoSpatial World 2014).

A Web GIS platform is part of the transformational shift of GIS into a services-based platform. There are ready-to-use applications that allow any user to visualize, integrate, and analyze geospatial data (GeoSpatial World 2014). For instance, Arby's, an American fast food restaurant, used four different desktop marketing systems (Grimshaw 2000, 279). Although the cost of purchasing an effective GIS system was the same cost as maintaining their four

marketing desktop software, they were able to remove two of those marketing systems after three years of using GIS, thus reducing their marketing costs overall by 20% (Grimshaw 2000, 279).

2.2.2. Consumerization of IT

Due to mobility and advances in technology (Dutta 2011), the consumerization of IT has had a large impact on companies. Consumerization of IT is the blending of personal and business technology, where employees want to use the same devices they use at home in the workplace. In other words, technology has expanded outside of using the traditional desktop computer to look up information, maps, and data. Employees now want to utilize devices like their smartphones and tablets in the workplace in the same fashion they do at home. It has helped increase efficiency and productivity, and even brought down the cost of hardware (Dutta 2011) because employees can now use the devices they already own. With the consumerization of IT sweeping across organizations, non-profit organizations are no exception and will be following this trend as well.

Due to this phenomenon, Web GIS can make an impact on small/medium sized non-profit organizations who no longer have to purchase extensive hardware to utilize GIS. Now they are able to use all of their everyday devices such as their smartphones, tablets, and the standard office computers.

2.3 Examples of Spatial-Light Organizations and Industries

The real estate industry often uses GIS as part of their everyday workflows (Esri 2015). Ask any real estate agent to list the three most important things a property should have, and the answer is “location, location, location” (DeSimone 2013). Although location is a very large part of the work they do, they are not considered an industry with large spatial needs. This is because finding a location to sell or show a house or a venue is only a small part of what they do. They

may not need any further spatial insight besides demographic data or tapestry segmentation. Instead, a large part of what they do is marketing homes, negotiating prices, and building a relationship with their clients (Brown 2016b).

Typically, the real estate industry uses GIS for site location and demographic studies (Mackenzie 2013). Hence, ArcGIS Online and Business Analyst Online are heavily used in the real estate industry. For example, Mackenzie Commercial Real Estate uses ArcGIS Online to organize retail partner information so they are able to access the necessary information anywhere on any device (Mackenzie 2013). Rather than being locked down to their office computer to view the data or maps, they are now able to view all of their information from their home computer, tablet, and smartphone. Additionally, they are able to update their data and maps in real time. Otherwise, they would have to build their own web application to access the necessary data. With ArcGIS Online, they were able to help their employees better understand and respond to customer behavior and market conditions by being out in the field (i.e., looking at different neighborhoods or homes) and collecting or updating data (Mackenzie 2013).

As a spatially-light industry, realtors were even able to use ArcGIS Online and Business Analyst Online help save time and money by integrating data and maps into easy-to-use software. As a replacement for working with third-party data providers and working with a separate mapping technology, they are now able to easily access all data and mapping needs in one place. Furthermore, this resulted in not having to hire a data specialist/GIS technician and instead have realtors learn to use the software themselves (Brown 2016b). Additionally, it enables them to understand markets, customers, and competitors because it helps them to find schools, stores, etc. to compare data (DeMerrit 2009).

Retail industries have also used GIS for site location, demographic data, and marketing. For instance, Lululemon Athletica is a small company that improved its understanding of its customer base and store locations by using ArcGIS Online and Business Analyst Online (Esri Australia 2014). Lululemon Athletica did not prioritize solely on business, but instead focused more on community building and expanding yoga. They did not have any tools or data that could help increase their business and were concerned about introducing a system that might disrupt their workflow. Their company was not a technologically savvy and did not want complicated and expensive software/technology. They needed something "fast and cheap" (Esri Australia 2014). Their ultimate goal was to learn about their customers, therefore, they looked into using easy to use, cloud-based programs ArcGIS Online and Business Analyst Online. Since they did not want to disrupt their workflow and have their customers fill out extensive surveys to obtain customer data, they asked for their ZIP code after every customer purchase. From that data, Lululemon Athletica was able to input that data into Business Analyst Online and pull up the demographic data to see who is in their customer base.

Before using GIS to understand their customer base, Lululemon Athletica thought their typical customer was a 25-year old single woman (Esri Australia 2014). However after looking into the demographic data based on the collected data, they found out that their general customers were suburban moms (Esri Australia 2014). With this new insight, they made better business decisions to help increase revenue. This included creating bigger stores so that moms were able to push their stroller through, built stores in indoor, suburban malls instead of in downtown malls, and created clothes in bigger sizes (Esri Australia 2014). Before utilizing Business Analyst Online, they would build some of their stores in downtown areas expecting an increase in revenue, but ended up not making any impacts on their sales (Esri Australia 2014).

Booth Babcock, director of store development strategy at Lululemon Athletica wanted software that would be able to help increase their business. Babcock was a formerly a Senior Market Planning Analyst and Senior Project Manager from Starbucks. Starbucks is a very large and successful coffee retailer company, and when Babcock worked there he had a large budget at his disposal. At Starbucks, they had their own dedicated GIS team and software. However, once Babcock left Starbucks and went to Lululemon Athletica, the size of the company and budget was reduced. With that, Babcock looked into obtaining software that is quick, cost effective, and accurate (Esri Australia 2014). Therefore, he implemented ArcGIS Online and Business Analyst Online.

Similar to Lululemon Athletica, the Pacific Symphony is a small non-profit organization that does not have a large budget. Therefore, a good working hypothesis is that utilizing a fast, economical, and precise software such as ArcGIS Online and Business Analyst Online may be able to contribute benefits to the organization that outweigh costs. It should be particularly effective for core organizational goals in marketing, audience engagement, and decisions about concert locations.

2.4 GIS in the Arts Industry

Although little to no GIS has been used within the Arts industry, studies have been done to measure arts participation and art-making in different areas around the United States. For instance, a study was conducted by Jennifer J. Helzer (2014), a professor and director of Geography at California State University Stanislaus, to measure the impact of the arts in different regions and show art organizations how using GIS can help them better understand their communities in the San Joaquin Valley of California. The purpose of this study was to see how the impacts of art participation and art-making impacted San Joaquin Valley and compare those

with areas that have a similar demographics and socio-economic characteristics (Helzer 2014). Within this study, the research team realized there was not a lot of artist location data publicly available for them to use and the majority was collected through museums or events. After the data was collected they were able to compare it to data such as US Census and American Community Survey to map out where the artists are located and see how the multiple maps compare to one another in terms of the number of artist versus factors such as educational attainment or income (Helzer 2014).

With today's Web GIS platform, a lot of the necessary data is already included within the program itself, so users are not required to access content from third party vendors. Organizations instead can collect the data of their consumers/artists locations and bring it into software such as Business Analyst Online and automatically be able to map out variables such as income, race, and educational attainment on one platform. The methods used by Helzer and her team were implemented utilizing ArcGIS for Desktop, which would require more training and someone who is well versed with the software, bringing in data, and manipulating it into a usable file within the software. Web GIS is much more user friendly and will be able to supply the same results in a shorter amount of time.

2.4.1. Scottsdale Cultural Council's Community Cultural Assessment Mapping

GIS has also been used for community cultural assessment in Scottsdale, Arizona. The Scottsdale Cultural Council, who manages the Scottsdale Center of Performing Arts and the Scottsdale Museum of Contemporary Art, partnered with the arts management consulting firm WolfBrown to perform a comprehensive community cultural assessment between January and June 2007 (Brown 2007a). The purpose of this was to help them understand the current and future trends of peoples' experience with arts and culture, the local demographic and lifestyle

trends in arts participation, how current residents and visitors view the Scottsdale Center of Performing Arts and Scottsdale Museum of Contemporary Art, and inform them about where to host events or possibly build a new venue (Brown 2007a). For their maps, they specifically looked at population, educational attainment, and race. These maps helped confirm what they suspected their target audience was and even helped discover new things about them. For instance, Figure 5 displays an example of a map they created using MapInfo's Desktop GIS to display educational attainment in Phoenix, Arizona. From this map, they were able to confirm that art participants generally come from areas where residents have a bachelor's degree or higher and that a large concentration of them are located in Tempe around Arizona State University and Paradise Valley. In this area, at least 45% of residents have a bachelor's degree or higher (Brown 2007a). As they move further away from that area (20 miles out), the concentration of high levels of educational attainment decreases (Brown 2007a). Therefore, based on their findings on the map, they argue that Scottsdale and Paradise Valley are ideal areas for arts facilities (Brown 2007a).

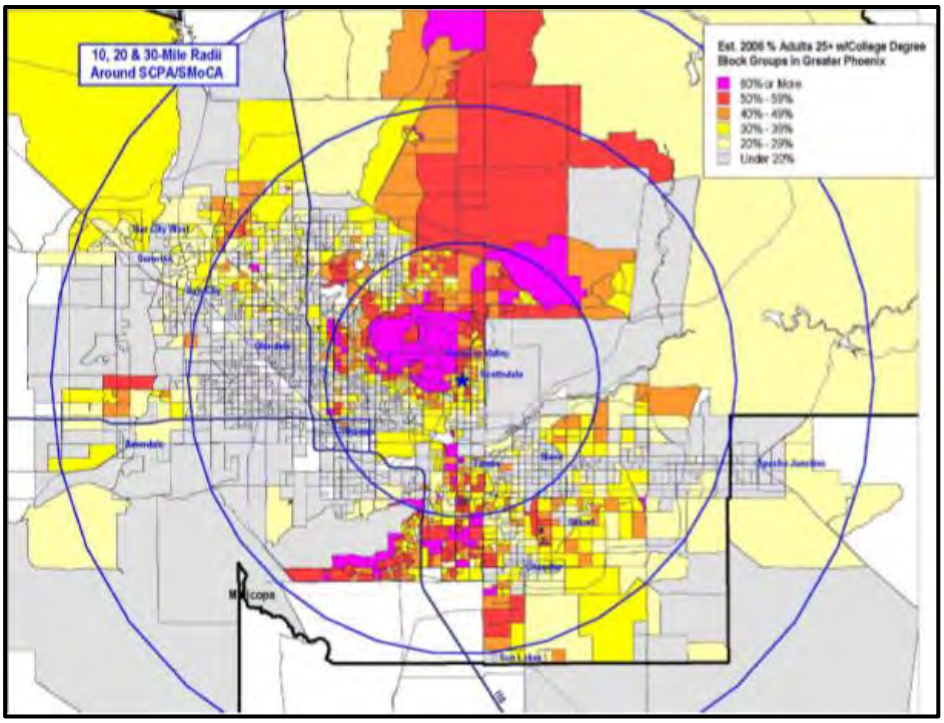


Figure 5 Educational Attainment in greater Phoenix, Arizona

Additionally, based on the maps they have created, they were able to determine that although there have been changes in demographics throughout the years in Scottsdale, it still has the highest concentration of higher-education population and that they participate in a wide range of arts activities (Brown 2007a). However, because other arts programming has opened new facilities, competition has grown in the area, therefore they can better their efforts in promoting their programs to anticipate the rapid changes in the area.

2.4.1.1 MapInfo Pro – Desktop GIS

MapInfo Pro – Desktop GIS is a mapping software created by Pitney Bowes Corporation that enables users to create custom maps and perform spatial analysis (PitneyBowes 2016). MapInfo allows its users to incorporate demographic data from third party vendors such as the Census website, Neilson SiteReports, and Prizm for further analysis (Brown 2007a), such as was done for the Scottsdale Cultural Council (Brown 2007a). The Scottsdale Cultural Council, in

particular, used Census data for their analysis with MapInfo, and overall found the tool effective for simple mapping assignments (Brown 2007a). A comparison between MapInfo Pro – Desktop GIS and ArcGIS Online is provided in Chapter 5.

2.4.2. Newman Center's Arts Audience Mapping Analysis

The Newman Center conducted a study to better understand the marketplace of their performing arts programs in Denver, Colorado, know where the audiences are located, and whether or not their programs overlap with other Denver arts programs. They have included six different organizations to participate in their study and each organization were required to provide ticket buyer location from 2012-2014. They had over 30,000 records and used MapInfo to create their maps and analysis, Nielsen SiteReports for geocoding and socioeconomic data, and PRIZM to enhance the accuracy of the geocoded data. With the data, they overlaid it with educational attainment, population density from the census, and the six organizations that participated in the study.

From this study they were able to better understand their customer base and make better business decisions by choosing ideal venues. They have confirmed that majority of their customers have high levels of educational attainment, over 40% of the patrons come from areas where most of the residents have a bachelor's degree or higher (Brown 2014a). For instance, the Newman Center's patrons are usually within a twenty mile radius of densely populated areas or close to the venue (Brown 2007a). As the radius increases (over 20 miles), the patrons decrease (Brown 2007a). Therefore, when choosing a new venue they will choose within a 20 mile radius of a densely populated area or venue. Figure 6 displays the map they have created to show this.

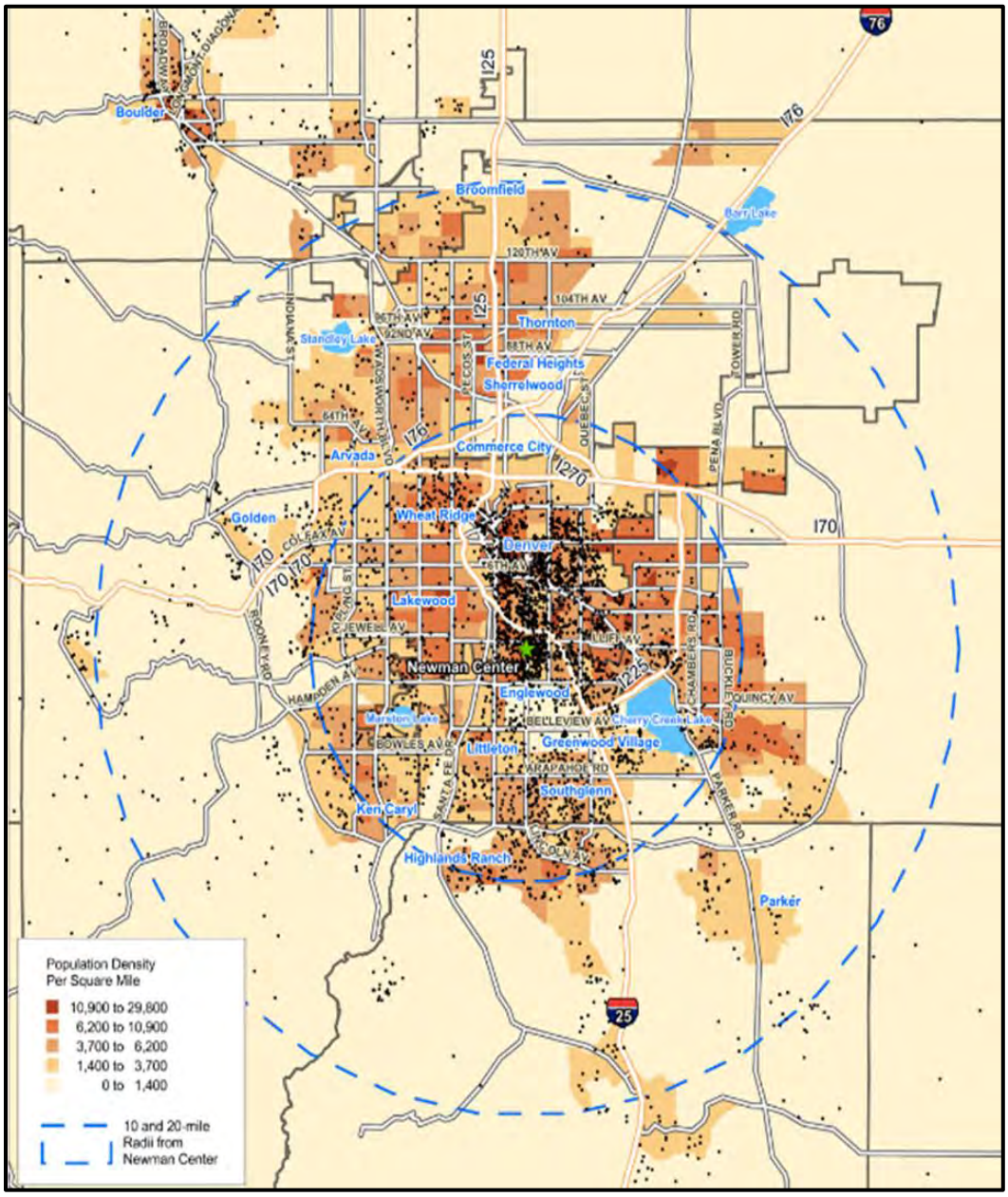


Figure 6 Newman Center's patrons overlaid with population density

4.2.2.1. Neilson SiteReports and PRIZM

Both Neilson SiteReports and PRIZM were used to enhance the data collected by providing better accuracy for their geocoded address and gathering socioeconomic and lifestyle data reports. Additional accuracy for the collected data was achieved by placing geocoded addresses in a ZIP +4 layer so that they had better precision of their customer base. The lifestyle dataset provided by Neilson SiteReports and PRIZM includes 66 segments split into social and lifestyle groups (Nielson 2016). LifeStage groups include younger years, family life, and mature years, and includes detailed segments of those groups (i.e., striving singles, sustaining families, sustaining seniors) (Nielson 2016). Social Groups include urban, suburban, second city, and town and county and are also broken down into additional segments (i.e., Urban Uptown, Inner Subs burbs, City Centers, Middle America) (Nielson 2016). Further analysis of the data compared to Esri's Business Analyst Online will is provided in Chapter 5.

2.5 Using GIS to Strengthen Nonprofit Fundraising and Market Planning Site Selection

I found no published studies on using GIS in the arts industry for marketing, fundraising, and site selection. However there is a lot of potential in this industry. Within the nonprofit sector, fundraising is typically a critical source of revenue. The two key aspects in fundraising include finding the best donor prospects and communicating the appropriate message to them. Using GIS data and maps can help enhance these aspects to improve fundraising methods (Reeser 2014). There are five ways that GIS can be utilized to enhance fundraising techniques: (1) show the location of existing donors to hosted events, (2) map out locations of competitors/partners to understand the market and build partnerships, (3) create maps to show community needs in proposals, (4) generate comparative maps to show how the organization has impacted

community needs, and (5) measure progress on the non-profits strategic goals for evaluation and reporting (Reeser 2014).

The Pacific Symphony, like many other similar music organizations, does not have any permanent locations, instead they to rent out venues for either several years or for a single event or performance (Brown 2015b). Therefore, to pick out suitable places for events such as community outreach programs or fundraising events it is important to select the right location based on their target audience to increase their chances of having a large turnout.

Rodan and Fields Skincare is a multi-level marketing company that sells skin care products and recruits a sales force. Similar to the Pacific Symphony, it does not have any permanent locations and instead have to depend on marketing events. It is important for Rodan and Fields Skincare to host the right event with the right people to increase business. Looking at its main target audience by analyzing their current demographic data and tapestry segmentation, it will choose hotels or community centers that are most optimal (Brown 2016b). Using GIS has helped Rodan and Fields Skincare to generate report tables and data. The findings can be delivered as a map and give the organization the benefit of a very high- level region territory analysis (Brown 2016b).

2.6 Importance and Methods of Spatial Market Delineation

Although GIS software has become more common within different industries, it is still seen as software that is meant for geographers and computer scientists. With this type of reputation, it has become a big concern for managers wanting to implement this type of system into their workflow (Pick 2005, 13). In spite of this, GIS has grown significantly in business and has been successfully utilized in a variety of fields including site location and marketing in different industries (Pick 2005, ix). The use of GIS in business and in marketing is growing and

will only continue to make a larger impact in the future (Pick 2005, 238). This is because it provides a visual platform of the spatial relationships between the customers, suppliers, and competitors (Azaz 2011).

In general, the marketing field has shown an interest in GIS, especially with GIS software companies releasing user-friendly and easy to use systems (Pick 2005, 13). It is now being seen as a critical component of marketing information systems (Pick 2005, 13).

According to Pick (2005), obtaining, organizing, and analyzing data plays a huge role in marketing. Before GIS, people would have to sort through hundreds or thousands of columns and rows of data. This makes it difficult to visualize spatial information and analyze distances between venues or client locations. Now with GIS, this type of data can be easily visualized on a map to quickly and effectively obtain and understand the information needed.

In marketing, it is also important to understand the customer and surrounding competitors because profits are made and lost based on the ability the venue has to draw in customers (Gray 2013). According to Gray, it is significant to understand the physical location of customers as well as the time it takes for each customer to travel. This includes whether or not the main customer base is nearby or within an easy drive of a given company's own facility or venue or those of competitors. Therefore, she used this to understand where competitors are located and what type of customer base surrounds certain areas or chosen venue.

GIS has been used previously to choose among new sports or concert venue locations, typically by collecting data such as demographic, census, and income of the surrounding area. For example, Martinez (2015) conducted a site suitability study for Major League Baseball's Tampa Bay Rays. He utilized data such as socioeconomic factors and drive times to help determine the best location (Martinez 2015). Furthermore, he had to study how far people are

willing to drive for a baseball game. Mapping out customer and competitor location, drive times, and demographics (i.e., tapestry segmentation) can all be done within ArcGIS Online. Since the Pacific Symphony plays in multiple venues and the choice of concert venues is not a one-time decision, it is important to see if the process of using ArcGIS Online to guide these decisions can be integrated into the organization.

2.7 Marketing in the Performing Arts Industry

The performing arts industry flourished and grew in the mid-1960s to the mid-1980s (Kotler and Scheff 1997). However, overtime the performing arts industry is facing serious challenges. In general, for performing arts organizations such as symphonies, the number of attendees has dropped (Vanhoenacker 2014). Between 1982 and 2002, the portion of concert goers under the age of 30 fell from 27% to 9% (Vanhoenacker 2014). Due to these trends, performing arts organizations must learn new ways to attract resources, increase and broaden their audience base, and learn how to better meet the needs of audience segments and contributors (Kotler and Scheff 1997).

2.7.1. Understanding the Performing Arts Market

To fully understand the performing arts market, it is vital to understand consumer behavior (Kotler and Scheff 1997). Not only is it important to understand their behavior, but also their preferences so that they are able to answer questions that include:

1. What encourages a person to purchase a ticket?
2. What motivates someone to purchase a single ticket or a subscription package?
3. What stimulates loyalty to a performing arts organization?

(Kotler and Scheff 1997, 75).

Other dynamics that they need to take in to consideration are cultural factors (nationality, sub culture, and social class), social factors (social roles and family), psychological factors (personality, beliefs and attitudes, and motivation), and personal factors (lifestyle, economic circumstances, and occupation) because these greatly affect consumer behavior (Kotler and Scheff 1997). Furthermore, these elements can affect a customer's attendance beyond what is being offered at live performances, and really taps into their lifestyle into answering questions such as how much they spend or how much time they spend doing leisure activities (Kotler and Scheff 1997).

2.7.2. Audience Engagement

According to Alan Brown, the marketing director for the Pacific Symphony, performing arts organizations need to work beyond traditional marketing into a mode of audience engagement because it provides a deeper and more meaningful experience for patrons. Although each audience member sees the same performance, each has a unique experience. Audience engagement is a foundational principle of artistic programming because this shows that the institution is thinking about the audience members as central to the event (Brown 2015b).

In response to the trend of focusing on audience engagement, some arts organizations have even established dedicated groups whose sole purpose is to plan and implement engagement programs and activities (Brown 2015a). Better understanding and more careful choice of concert locations can be a key part of the focus on audience engagement. On the one hand, bringing concerts closer to loyal customers can help increase ticket buying. On the other hand, the symphony might choose new places to play for purposes of audience diversification or education.

A good example of the importance of location for audience engagement is the Brave Theatre in San Francisco, California. Brave Theatre hosts parties after a play reading, also known as The Kitchen Series, where audience members are invited to meet their dancers at a local bar/restaurant by using Twitter to tweet their location immediately following their performances. With these types of meet and greets, participants cover their own expense for food. Also, because it is in a casual setting, it gives both the performers and audience a chance to engage and socialize. By having them tweet their location, it encourages social media followers to re-post, help gain new followers, and most importantly help create a closer relationship and stronger connection with the organization, which can ultimately encourage repeat attendance.

2.8 Finding the Target Audience

Finding the target audience is key to increasing revenue for the art industry's performances (Harlow 2015). The organization must address questions that include:

1. Is the audience likely to be receptive?
2. Do leaders agree the audience is important to the organization?

It is important to find a receptive audience so that the organization performs and holds events at locations surrounded by a demographic that would most likely attend. However, the spatial dimensions of target audiences are not well understood in the performing arts industry. Typically, the organizations rely on media segmentation to find target audiences. For example, an Opera group in Minnesota noticed that a large group of their current audiences listened to the local classical music radio station. They decided to offer free tickets to their concerts for whomever listened in. On the night of their performance, they ended up with a full house and gained many new loyal fans to attend their monthly performances.

Since finding the target audience is fundamental in this industry, adding a geographical element can assist in analysis for marketing, fundraising, and site selection. The performing arts organization can take a list of their customer locations and display it on a map to create a heat map to show where the largest density of their customers is located. Knowing where most of their customers are located will show where they should advertise their performances or hold their events or performances. Furthermore, they can pull up data such as demographics and tapestry segmentation to show what type of customers they are attracting and find areas with similar demographics to perform to possibly receive a larger profit than in areas with a dissimilar demographic.

2.8.1. Identifying Market Segments and Target Markets

One task that a strategic marketer for the performing arts industry does is aggregate consumers into similar groupings (Kotler and Scheff 1997). Consumers can be grouped geographically, demographically, or "psychographically" (i.e. lifestyle, activities, and interests) (Kotler and Scheff 1997). Even though each consumer may be unique, it is important for them to identify broad groups or categories to market to in order to receive the best possible turn out.

The most common segmentation used in the arts industry is demographics (Kotler and Scheff 1997). It plays a significant role in identifying current and potential audiences (Kotler and Scheff 1997). Lifestyle data has also played an important role because it shows the organization which consumer segmentation to market to and how to reach them.

Before GIS software was available, marketers could print up reports and data tables and compare and contrast the results. GIS gives them a clear visual of a map that shows where these consumers groups are located. With the software, they can either have one or more variables to display where their current and potential audiences are located. For example, they can create a

map with demographic variables such as male, white, college educated, and has an income of $75,000, and add in a lifestyle variable such as “Boomburbs” and the results will be displayed on a map to show where these types of demographics are located in a region. The more variables the organization adds and looks into, the more enriched their data will be.

2.9 Understanding what Organizations are Looking to Accomplish with GIS

In order to successfully implement a GIS system into an organization, it is paramount to understand what the organization is looking to use GIS to accomplish and have a plan on how to implement it. Over 50% of GIS is not understood within an organization (Douglas 2008, 33), which can lead to either the GIS software never being used or fully implemented or limiting the benefits to just one department. It is significant to know what they are trying to achieve and how to measure it, so that they are able to communicate that to the rest of the organization. To avoid this issue, it is important to have a plan and clear understanding of the company’s needs. This includes: identifying project requirements, setting up clear and feasible objectives and deliverables, putting together a realistic time frame to complete the project, and providing enough resources for the staff to successfully complete it (Croswell 2009, 185). Although this is a traditional list of tasks to follow, it fits well in the context of this project with the Pacific Symphony because its users are new to GIS, it gave clear expectations, and defined what could be completed on time.

2.10 Importance of Having a GIS Champion

Having a GIS champion within the organization can make or break a project’s success (Francica 2014). Anyone can be a GIS champion, and it does not have to be someone that is a GIS technician (Sensors and Systems 2011). However, this person should put in the time and effort to gain hands-on experience and learn to use the software properly (Schardein 2015). This

is so that he/she could understand how the technology is used and know the language and terminology so that the project can be steered in the right direction and run smoothly (Sensors and Systems 2011). Additionally, he or she needs to be able to drive the project forward and make sure the team and project stay on the right path (Sensors and Systems 2011).

Many GIS projects can head in different directions, therefore it is also important for the GIS champion to ensure that everyone is on the same path and that the project is completed successfully (Sensors and Systems 2011). For example, both Time Warner Cable and Ordnance Survey Ireland each had a huge GIS project to complete, but did not know the best method to implement it (Francica 2014). Time Warner Cable has 32 separate design sites and their project manager, Lucius Brooker, became their GIS champion and took charge of their project by constraining their budget and centralizing their GIS software and storage (Francica 2014). With his assistance, they were able to complete this project successfully (Francica 2014). Similar to Time Warner Cable, Ordnance Survey Ireland has been utilizing GIS for over forty years, but needed to reevaluate how to manage their spatial data (Francica 2014). Like Time Warner Cable, their Senior Operations Manager, Andy McGill, took charge as the GIS champion and began converting all of their spatial data into a single geospatial system making the information usable in their new system (Francica 2014). In both cases, the GIS champions became someone who drove the project forward, had hands-on GIS experience, and made GIS key to a successful project (Francica 2014).

2.11 Project Planning and Execution

A well thought out project is formed in different stages that consist of initiating, planning, controlling, executing, closing, and ongoing cross project improvement (Croswell 2009, 190). The initiating stage establishes the overall objectives. The planning stage discusses the

assumptions, constraints, resources needed, and deliverables of the project. Controlling requires project monitoring, reporting, and change/risk management. Executing occurs when the project is completed and resources are managed. The closing stage includes evaluations and results of the project. Lastly, the ongoing cross project improvement consists of any enhancements that need to be made to make the project more successful (Croswell 2009, 190).

Chapter 3: Project Structure and Process

I worked directly with the Pacific Symphony to identify needs for spatial intelligence in their business and implement a Web GIS system into their organization. The project relied specifically on Esri's ArcGIS Online and Business Analyst Online. During this process, I worked closely with their Executive Vice President and Chief Operating Officer, Sean Sutton, Marketing Consultant, Alan Brown, and a selected group of staff members to incorporate the software into their projects. The selected group of staff members (project team) included staff from the marketing, fundraising, and sales departments.

As a first step, there was a wide-ranging discussion of how spatial thinking and tools might support the business strategy of the symphony. Goals in marketing (ticket sales) and fundraising were identified as paramount. From this discussion, the following tasks were identified to enable symphony staff to accomplish their goals: (1) Check the demographic composition and Esri tapestry segmentation of potential audiences within 10-15 minute drive time of the service area around a concert venue; (2) Take this newly collected demographic and tapestry data and compare it to ticket buyers at existing venues from 2010 to 2015; (3) Identify current/potential donors within 10-15 minute drive time of education or community outreach concerts in Orange County. These three goals were carefully aligned with the GIS skills that the symphony needed the most so it can be repeated again and again to support decisions and operations at the Pacific Symphony.

To complete these tasks and implement Web GIS, I developed a process to train the project team to use ArcGIS Online and Business Analyst Online. This process included multiple conference calls, in-person meetings at their facility, slide-decks, step-by-step guides tailored to their specific use case, and software demonstrations using remotely shared screens. This was

designed to ensure that the appropriate data was pulled from their databases and that they took the appropriate steps to obtain the information necessary to achieve their objectives.

3.1 Identifying Organizational Goals and Spatial Needs

Prior to this project's initiation of work with the Pacific Symphony staff, the orchestra's board, staff, and musicians were engaged in a long term strategic planning process. That process evolved into discussions regarding the need for a new summer home, how to select the best venues to serve the entire Orange County community with educational programming and concerts, and how to attract current and potential donors to the orchestra. Coincidentally, USC's Spatial Sciences professor, Dr. Bob Vos was involved in this discussion and suggested adopting more sophisticated patterns of spatial thinking and the use of GIS technology. Dr. Vos passed along information about these initial strategic planning discussions to me to continue working with the orchestra as a case study.

I worked directly with the Pacific Symphony to implement ArcGIS Online and Business Analyst Online into their organization. First, I asked Sean Sutton and Alan Brown a series of questions to see how familiar they are with GIS and their ultimate goals for their organization. The questions asked were the following:

1. What are your core organizational objectives?
2. For your marketing needs, are you utilizing any maps? If so, how?
3. How are you currently marketing your performances?
4. How are you looking to use maps to fit into your goals and objectives?
5. What type of demographics are you targeting?
6. You are targeting different venues; does this mean you are targeting different audiences?

A lot of what the symphony was looking to do involved finding new venues and discovering where their target audiences and donors are located. At the start of this project, symphony staff were not using any maps and instead focused on addressing customer behavior using spreadsheets with data based on ZIP codes through Mosaic and Tessitura. However, one goal was to visualize their data and see on a map where they should be marketing or holding their performances. Furthermore, they are hoping to look at demographic data and tapestry segmentation based on hot spots of their current customer location. The majority of the symphony's customer base includes those that have a higher income ($75,000 and up), education (Bachelor's degree or higher), and are within a 15-minute drive time of the venue (Brown 2015a). With the data, the symphony's staff is also looking to target the Chinese community and hoping the data can provide that type of information as well.

Knowing that all three of their main goals and objectives were based on the symphony's current customer data, a lot of the steps and tools necessary to complete the project were similar to one another. There is a particular interest in enabling the team that will be finalizing the summer home and finding 3-4 more new performance venues. These tasks can use the same workflow pieces listed above.

3.1.1. Kick-Off Meeting

After a couple of meetings with Alan Brown and Sean Sutton, I thought it would be best to set up a kick-off meeting with the Pacific Symphony staff to confirm their goals and objectives, introduce Web GIS, give an overall overview of the capabilities of Esri's ArcGIS Online and Business Analyst Online, relate their situation to the Lululemon Athletica's case study, and provide a short demonstration of the products.

I set up an in-person meeting on Wednesday, December 16, 2015 at 4:00 p.m. at their facility in Santa Ana, California. Table 1 shows which staff members participated in the meeting. Christopher Adriance and Kay Dalton specifically work with patron and donor information, where they were also in charge of inviting patrons and donors to their events. Jean Oelrich and Frank Terraglio were specifically involved with the summer home venues. Susan Farma was in charge of their Tessitura software and managed the data for it. Lorraine Caulkin was focused on marketing campaigns and was also involved with finding 3-4 new venues for their outreach concerts.

Table 1: Project team with associated job title

Name	Position
Christopher Adriance	Patron Advancement Manager
Lorraine Caulkin	Director of Sales
Kay Dalton	Associate Vice President of Development
Susan Farma	Interim Tessitura Projects Manager
Jean Oelrich	Director of Marketing and Loyalty Program
Sean Sutton	Chief Operating Officer
Frank Terraglio	Vice President of Marketing and Public Relations

In preparation for the meeting, I put together a presentation that included a series of PowerPoint slides to describe the project and a software demonstrate to show the intended results the project. During the software demonstration, I logged in, geocoded a set of addresses, generated drive time buffers based on those addresses, created heat maps that highlighted the clustering of those addresses, and pulled up demographic data and the tapestry segmentation within the area I was focusing on. This introduced them to some of the basic functionalities and data they can obtain and use. They were trained in greater detail later in these processes later in the project.

3.1.1.1. Applied Spatial Thinking

The Pacific Symphony had 2011-2016 ticket buyer location data, but did not have the appropriate tools to help display their data on a map and pull up additional data. Adding a geographical element to the data assembled from ArcGIS Online and ticket sales helped the symphony's staff visualize where their customer base is located. ArcGIS Online includes data such as demographic, census, and tapestry that clearly showed what type of audience they are attracting. It told where they should market their performances and perform live music to receive the largest turn out.

Before using GIS, the Pacific Symphony selected venues by the following criteria: the location is within Orange County, has adequate acoustics, sufficient parking space, and is visually appealing (Brown 2015a). However, with GIS, the Pacific Symphony has changed its methods of selecting venues by basing its decision on customer locations and geographically selecting areas that have similar demographics and tapestry as its current customers.

3.1.2. Assigned Tasks

After the presentation, I discussed expectations at the end of the project. I was looking for a team of two to three people, two from Marketing and one from Fundraising. By the end of the meeting, everyone wanted to take part in the study and have access to the software. Following the meeting, we reached a consensus to assign the following members of the project team to different goals. Table 2 shows the assigned tasks.

Table 2: Assigned teams and tasks

Team	Task
Jean Oelrich and Frank Terraglio	Discover 4 smaller new potential venues in Orange County by analyzing data collected from current customer locations and at the following potential venues: Soka University of America, California State University Fullerton, Chapman University, and parks at Newport Beach, Mission Viejo, and Irvine for outreach concerts and education/community engagement programming
Lorraine Caulkin and Susan Farma	Analyze existing ticket buyer data by looking into the demographic, tapestry, and historic traffic data. Analyze the demographic, tapestry, and historic traffic data of the possible summer venues: Pacific Amphitheater, Great Park, and Mission Viejo
Christopher Adriance and Kay Dalton	Attract current and potential donors to community outreach and education events/concerts by looking at their demographic data and tapestry segmentation

This will help answer the following questions:

1. Out of the three performance venues, the Pacific Amphitheatre, Great Park, and Mission Viejo, which would be the most optimal venue for the symphony?
2. Out of the following venues: Soka University of America, Cal State Fullerton (Meng Hall), Chapman University (Musco Hall), and the community parks at Newport Beach, Mission Viejo, and Irvine, which four venues would be the most optimal for free outreach concerts for education/community engagement programming?
3. Which current or potential donors are within the area of an event that the symphony can send invitations to?

Additionally, we discussed the necessary training to accomplish these tasks. They asked for step-by-step guides and to set up training dates in the future via web cast or in person. I

suggested that once I received the login credentials based on USC's ArcGIS Online license that I distribute the information along with step-by-step guides. The purpose was to encourage them to try to get a feel for the software and attempt the project themselves before setting up a training schedule.

3.2 Integrating ArcGIS Online and Business Analyst Online

After identifying the Pacific Symphony's needs, we were able to move forward to implementing the software into the organization. The first step was for the project team to gain access to ArcGIS Online and Business Analyst Online. I had to work with USC's IT administrator to set them up with usernames and passwords. Each member had his or her own username set up by the IT administrator and then set up their own password. A group was created so that no one else, including USC's IT administrator, could access or view the data and maps.

The next step was to assign service credits, which are the currency within ArcGIS Online. Credits are charged when any tools are used or data stored within ArcGIS Online. In the Pacific Symphony's case, a lot of the service credits were allocated for geocoding; for every 1,000 geocodes it cost 40 service credits (Esri 2016).

Within USC's ArcGIS Online subscription, service credits are assigned per username and not put into a pool where everyone can share the service credits. Besides the team member that was geocoding, each user was assigned 400 service credits. The member who geocoded all of the data into ArcGIS Online was given 3,000 service credits.

3.3 Data

The data necessary for this project included the location of customers' based on the ticket sales from 2010-2015, the current and potential performance venue sites, the whereabouts of existing donors, demographic and income data, and tapestry segmentation. Utilizing Web GIS, the Pacific Symphony aims to integrate these datasets to achieve the project objectives.

Since they had such a large dataset, it was suggested that we do a random sampling of 13,028 addresses and still receive 99% accuracy with ± 1% confidence interval of the data (Creative Research Systems 2016). However, due to the nature of the project that included attracting current and potential donors, they have decided not to do a random sampling and instead use their entire dataset. It is necessary to have complete data to identify donors to invite to outreach concerts.

In previous discussions, we talked about USC creating a secured FTP site so that the data can be in a secure location instead of sending it through email or using other types of cloud storage (e.g., Drop Box). Nevertheless, instead of creating the FTP site, I had the Pacific Symphony upload its own ticket buyer data directly to ArcGIS Online so that the data will never have to leave their hands. This partly ameliorated concerns over data security.

3.2.1. Integrating Organization Data with ArcGIS Online

The Pacific Symphony organizes its customer data within Tessitura. Generally, the data is organized by year and it includes customer name, location, subscription type, donation amount, and concert series purchased. Pacific Symphony's Tessitura Projects Manager, Susan Farma, selected the data necessary for this project, extracted them, and organized them manually on an Excel spreadsheet.

3.2.2. Data Security Issues

I worked with Susan Farma and Sean Sutton to pull the necessary data from their database to upload it into ArcGIS Online. However, they were not comfortable with uploading their ticket buyer location and donation information in the cloud. They were concerned specifically about a possible data breach and client data confidentiality. Due to their concern, I sent information on the security of Esri's cloud system: http://doc.arcgis.com/en/trust/, and ensured them that Esri has experience in hosting sensitive data (Esri 2016).

After several phone calls, the Pacific Symphony required me, my faculty thesis advisor, and USC to sign a non-disclosure agreement (NDA). The NDA was drafted by the Pacific Symphony and sent through the general counsel at USC. After about a week, the NDA was approved and signed and we were able to move forward with the project.

It was stated in the agreement that no one outside of the staff of the Pacific Symphony, excluding me, would be able to view the data and that the data would only be used for academic purposes. To protect client confidentiality, we agreed to withdraw names of donors and ticket buyers from the dataset on ArcGIS Online, as they are not necessary for the project. Additionally, the Pacific Symphony has final approval of any maps used in any project publications.

3.3.3. Data Needed from ArcGIS Online and Business Analyst Online

The data necessary for their project includes demographic data and tapestry segmentation focusing in areas within ten to twenty-five minute drive times of a performance venue, specifically focusing on demographics with higher income and education.

3.4 Training

Within ArcGIS Online and Business Analyst Online, the symphony staff used the following tools to complete the project: geocoding, changing symbols, creating map notes, creating smart map layers, and creating drive times.

First, I completed the assigned tasks on my own using sample analysis within ArcGIS Online and Business Analyst Online. Afterwards, I trained the symphony staff to use them. The training resources used to complete this project included step-by-step guides and webcasts through join.me. Each team was assigned different training days to best accommodate everyone's schedule. Each team was assigned a leader so that in case we were unable to schedule everyone on a certain day, at least one person was trained up on the software and be able to move forward with the project. The leaders of this project were determined in consultation with Sean Sutton and they were Jean Oelrich, Lorraine Caulkin, and Christopher Adriance.

Customized training sessions were held on different days with different teams within a week utilizing join.me. Each session took about an hour and team members were guided step-by-step through each exercise. To ensure they were comfortable with the software, before the training session was over, I had the team lead do the exercise by him/herself. They also took away the step-by-step guides on the exercises we just did together. I also provided my direct contact information in case they needed any additional assistance or if they had any questions. After week one of training, I followed up with them every week to check on their progress and made sure they were taking the proper steps to complete their project and most importantly, receiving the correct information or data.

3.4.1. Creating Step-by-step Guides

In order to create effective step-by-step guides, I created guides based on their project and objectives for each team. This not only included steps, but also screen shots, and a video of how to geocode addresses and upload them as a feature service. The guides included the following tutorials for both ArcGIS Online and Business Analyst Online. Table 3 shows an overview of the steps at a high level.

Table 3: An overview of steps and tools needed to be used in the project based on assigned tasks

Objective	Process
Comparing current and potential summer homes	• Import geocoded layer • Create map notes around the most concentrated area • Bring layer into Business Analyst Online • Pull up demographic data and tapestry segmentation • Create a 5-, 10-, 15-minute drive time radius around the potential summer venues • Pull up demographic and tapestry segmentation • Create smart map layer • Bring layer back into ArcGIS online for further analysis
Discovering 3-4 new venues for community and education outreach concerts	• Take existing data pulled from current ticket buyers • Geocode potential new venues • Create map notes around the most concentrated area • Bring layer into Business Analyst Online • Pull up demographic data and tapestry segmentation • Create a 5-, 10-, 15-minute drive time radius around the potential summer venues • Pull up demographic and tapestry segmentation

	• Create smart map layer • Bring layer back into ArcGIS online for further analysis
Attract potential donors to community outreach and education events/concerts	• Import geocoded layer • Create map notes around the most concentrated area • Bring layer into Business Analyst Online • Pull up demographic data and tapestry segmentation • Create a 5-, 10-, 15 minute drive time radius around the potential summer venues • Pull up demographic and tapestry segmentation • Create smart map layer • Bring layer back into ArcGIS online for further analysis
Attract current donors to community outreach and education events/concerts	• Import geocoded layer • Geocode community outreach and education event/concerts • Create desired drive time buffers to see which donor falls within that buffer

3.4.2. Geocoding

Before I began working with the project team on data analysis, we first had to upload and geocode the data into ArcGIS Online. The project team geocoded 58,000 records from 2010-2015. We set up a webcast to show the initial steps of how to geocode a sample of 100 addresses. Once geocoded, they felt confident enough to geocode the remainder of the data on their own. However, there were errors in the data where some of the donors' data in the Excel spreadsheet did not upload into ArcGIS Online. After a couple of days of a lot of trial and error, I was able to figure out that the root of the problem was from the Excel spreadsheet. The donor data, for example, labeled starting with a number, "2016_Donation", while all of the other fields were labeled starting with a letter, "Address_". For that reason, for all of the donation data we added

the letter "A" in front of the label, “A2016_Donation”, and all of the data from the donation fields were successfully uploaded into ArcGIS Online. During this time, we used up about 1,000 service credits and had to add service credits to their user names so we could continue geocoding.

3.4.3. Sharing Data

After all of the data was geocoded within ArcGIS Online, I sent a step-by-step guide to teach them how to share layers and maps within the group. They were able to easily share data within minutes.

3.4.4. Identifying their Main Customer Base

In order to discover Pacific Symphony’s main customer base, the project used Business Analyst Online. The symphony’s staff took their ticket buyer location data and created a heat map to see where their customers are mostly concentrated. From there, they drew polygons, using the Map Notes tools, around the areas where it had the highest density and moved the layer to Business Analyst Online and pulled up demographic data and tapestry segmentation.

3.4.4.1. How Heat Maps are Calculated within ArcGIS Online

The heat maps created in ArcGIS Online show the highest density based on location (Dempsey 2012). ArcGIS Online, by default, does not take into account the value of other attribute fields in the data, such as ticket sales (Esri 2016) and operates very similarly to the Kernel Density tool found in the Spatial Analyst extension in Esri’s ArcGIS for Desktop (Pilarcik 2016). Kernel Density is a popular approach for estimating probability distribution (i.e., ticket buyer distribution) and has been widely used for spatial analysis (Stewart 2009). The tool generalizes the address points in an area, provides a density estimate at any location (Levine

2013), and displays it as a smooth surface (Stewart 2009). To do this, it first calculates the search radius, the distance between each address point (Esri 2016), and the standard distance, the measurement of the degree of features that are concentrated or disbursed around a geometric mean center (Esri 2016). Then, it generates a series of buffers based on the standard distances, overlays them on one another, and converts the data into a raster format, giving each cell a value based on how many buffers are overlaid at its particular location. Once the raster is symbolized based on the value of the cells, a heat map is created (Esri 2016).

3.4.5. Locating a New Summer Home

Even though the orchestra plans to have annual summer concerts at the Pacific Amphitheater in the immediate future, they are also looking at other possible venues to see if would be a better fit in the long term. Other potential venues include the Great Park in Irvine or to build their own venue at Saddleback College in Mission Viejo. The information received from this project and the skills they learn may influence decisions on future summer venues.

3.4.5.1. Summer Home's Procedure and Analysis

In an Excel spreadsheet, the assigned project team listed the physical address of all three locations. Once the spreadsheet was saved, they went into Business Analyst Online and geocoded the data. Then, they went to each point and created 5-, 10-, and 15-minute drive times and generated demographic data and tapestry segmentation reports. The 5-, 10-, and 15-minute drive times were set by Alan Brown and are the times the Pacific Symphony would like to continue to use throughout the project.

After data was pulled, they compared the results to the data they received from the main customer base study and determined which potential summer venue had the greatest overlap with the location of the current customer base.

3.4.6. Venues for Education/Community Engagement Programming Outreach Concerts

The project team listed the physical addresses of all of the buildings in an Excel spreadsheet and geocoded the data into Business Analyst Online. However for the parks, they added the points individually by doing a geosearch within Business Analyst Online. After all of points were added, they created 5-, 10-, and 15-minute drive times around each potential venue and pulled up the demographic data and tapestry segmentation reports.

After data was pulled, they compared the results to the data they received from the main customer base study to determine the four venues with the greatest overlap with the demographic characteristics of the current customer base.

3.4.7. Attracting Current and Potential Donors

The project team first created a new map and added the ticket buyer data and changed the symbols to display who were donors and the amount the client donated within ArcGIS Online. Then they imported known outreach concerts and events throughout the year and created 5-, 10-, and 15-minute drive times to see which donors fell within the buffer. From there they were able to clearly see whom they should invite to their concerts/events. The identified records were then extracted from ArcGIS Online where the donors could be identified and invited using the symphony's main database and its tools.

Using Business Analyst Online, they took the donors' location data from ArcGIS Online and imported it into the application. Once imported, they created 5-, 10-, and 15-minute drive times and pulled up demographic data and tapestry segmentation. Using the same process, they geocoded known event locations and created another set of 5-, 10-, and 15-minute drive times and generated demographic data and tapestry segmentation. Taking the reports created, they

compared the results to see which areas would be a good fit for marketing their performances and events to potential donors.

3.5 Rubric to Evaluate Success

After all of the maps and data were created and pulled, surveys were passed out to gain a general idea of how the project team felt about using the software and how useful they think it is. The questions asked are listed below:

1. Did you find this software user friendly? Please explain why it was or was not.
2. How long did it take you to learn how to use the software? What in particular was hard to do or understand?
3. During the training, which method of training was the most useful to you: step-by-step guides, web cast training, or working with the other project team members? Was there a particular person on the team that understood it better than the others?
4. On a scale of one to ten, ten being the most useful and one being the least useful, how would you rate the usefulness of the software in terms of decision making in the task that was assigned to you?
5. What were your findings based on your assigned tasks?
6. What did you discover about your customer base that you didn't know before?
7. Did any of the data you collected from the software help shape decisions for the objectives you were assigned to?
8. From the data you pulled, was there anything in particular you learned about the county? Could this benefit or change the way you choose venues for performances?
9. With the maps you have created (ex: heat maps), did the 5-, 10-, 15 minute drive time hold true (claim of where most of your customers are located)? Would it have been more

beneficial to your organization to extend it to 20-25 or more minutes? Did you notice there was there a drop off after a certain minute of drive time?

10. Do you think there would be any value in using this software in other aspects/goals within your organization? Why or why not?
11. Is this something you would like to use in the future moving forward? Please explain why or why not.

Although Susan Farma and Chris Adriance were the only ones really working with the software, the entire group still sat with each other to talk about what kind of data they needed and what kind of maps they were looking for. Therefore, it was still important to gain everyone's perspective of the software. Though, due to their workload, not everyone was able to provide feedback. Three out of the group of six were able to fill out the surveys.

3.6 Final Wrap-up Meeting with Project Team, Sean Sutton, and Alan Brown

After the completion of the project, I had a final meeting with the project team, Sean Sutton, and Alan Brown to gather feedback. This included feedback on the value of the results they received from using ArcGIS Online and the ease of use of the software itself. We also discussed the commercial cost of the software and whether or not the benefits would outweigh the costs and if Sean Sutton feels that his team is now able to use the tools effectively without my continued support.

Chapter 4 Project Implementations and Outcomes

In order to work with a team that has not used or even heard of GIS before, I had to help the project team see the value of using Web GIS and how it can help increase their business. Additionally, I had to modify some of the workflows and training sessions so that they were able to properly and successfully use the software. This included in-person meetings, software demonstrations, and phone calls. After two months, the Pacific Symphony's project team was able to create several maps and pull up data that assisted in comparing the two summer homes, finding new venues for their community and education concerts, selecting venues to attract more donors, and understanding their ticket buyers/donors better. Most importantly, they had become spatially aware of their audiences, venues, and the way the organization engages with donors and potential audiences in Orange County.

When the project team was utilizing ArcGIS Online and Business Analyst Online, they ran into complications that created significant barriers in using the software for several team members, especially given the project's time constraint. Needless to say, there was a big learning curve for the project team and it took those who were successful roughly 16 hours each to be able to produce maps and receive the data they needed.

However, even with some of the issues they ran into using the software, they found the software useful and beneficial for their organization. This project illustrates the power of using Web GIS and identifying the problems within the business strategy that it address so they are able to know who and where to reach out for assistance (Brown 2016a). They were able to visualize and discover many new things about their customers and venues, and using ArcGIS Online in a hands-on fashion even helped spur new questions (Caulkin 2016). As reported at the project's closing meeting, for the Pacific Symphony, the experience of using the software

spurred spatial thinking about their strategic plan. According to staff, this was more important than gaining the actual technical skills to operate it. The technical aspect of learning how to use the software would actually be more time consuming due to the required training necessary to accomplish certain tasks. Even though they ran into several difficulties, it was more understandable to do this work hands on as a first project, and someone might be hired later to assist with detailed technical work (Farma 2016).

4.1 Working with the Project Team

During this development, it was important to work closely with the project team to ensure that they understood how GIS can help them increase audiences and raise money. This included several in-person meetings, phone calls, and web casts.

4.1.1. Benefit of the Kick-Off Meeting

The kick-off meeting made a large impact on the symphony in understanding the role of Web GIS in their core strategies. Additionally, it was a great way for me to confirm and understand their goals and objectives. Before the initial kick-off meeting, there were several phone calls to confirm an agenda and their objectives. However, it still changed slightly by the time we had the kick-off meeting. Some of the changes included only looking at existing and potential venues within the Orange County borders. Also, instead of looking at just one summer venue, the Pacific Amphitheatre, they also wanted to look at two other potential venues for the future

During the meeting, it seemed as though they were most receptive when I did a quick ten-minute software demonstration of some of the workflows they would later attempt on their own. It really helped put in perspective what the software is capable of and most importantly how is can assist them within their organization. Although I had a slide deck of information, the

software demonstration helped ease their minds on how user friendly the software can be. Immediately after the software demonstration, the project team got excited about the capabilities of the software and started a conversation about how they can use the software for their current and future projects.

4.1.2. Staying in Touch with the Project Team

When implementing a product into the organization, it was vital to keep in touch with the project team and Sean Sutton. There were times when they did not move forward with their work due to complications they ran into with the software and did not have the time to reach out to me for additional support or help. First, the initial guides that I provided the team were not helpful to them, and because of that they did not know how to work with the data. Once I was aware that the guides were not as helpful, I was able to modify the training methods to include one-on-one webcasts and more detailed guides. The one-on-one training was the most crucial thing that helped them move forward with the project and the guides were useful being used as references (Adriance 2016).

Second, when geocoding their ticket buyer and donors address data into ArcGIS Online, they ran into the 1,000 feature limit. Knowing that they had this problem, I taught them a work around by uploading the data as a feature service and explained that the error pop up is just notifying them that there is a browser limitation of 1,000 features, but all points are still on the map even if it is not displayed. Lastly, a few weeks after the kick-off meeting, I realized that they were uncomfortable putting their data into the cloud without a Non-Disclosure Agreement (NDA) drafted and signed by all parties. Eventually, we were able to put together an NDA and push it through the appropriate channels at both USC and Pacific Symphony very quickly. This required close coordination on language and consideration of data security issues.

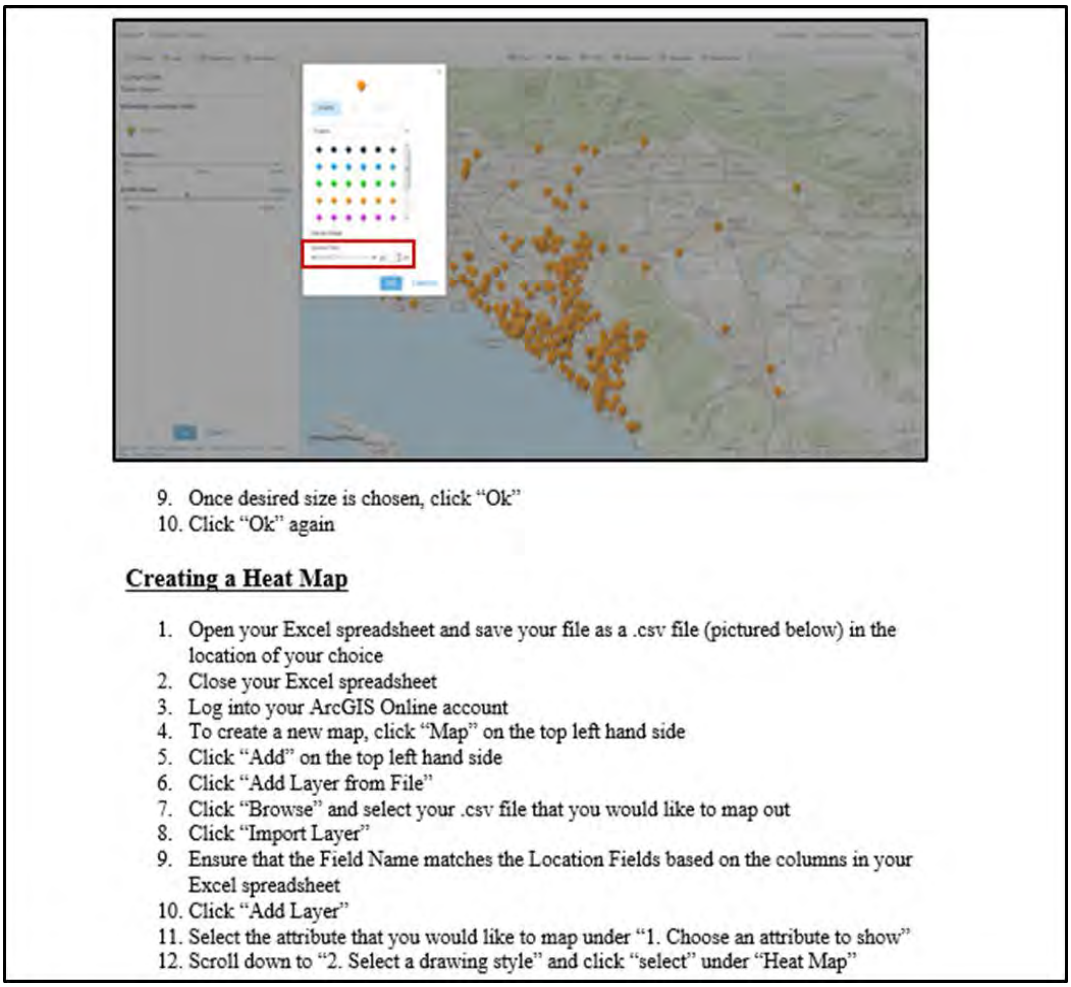
4.2 Training

In the beginning, basic training guides were provided for ArcGIS Online and Business Analyst Online. As Table 4 illustrates, the guides were fairly general, showing the main functionality they will be using in their assigned tasks. Instead of showing exact steps they would need to take, I provided a general idea of what they needed to do to complete the task with data from 2013-2014. For example, rather than telling them when to create a heat map, I just provided steps on how to create a heat map. In the end, they were unsure when to actually generate it.

Table 4 Skill sets needed to complete task and shown by product in step-by-step guides

Product	Tutorial Included
ArcGIS Online	Logging in/out, creating/saving map, changing a basemap, view/edit previously created maps/data, geocoding, changing symbols/colors, and creating a heat map
Business Analyst Online	Logging in/out, viewing reports, pulling up layers previously created, pulling up imported data, searching for a business or a facility, creating a PDF map, clearing data off of the map, creating drives times, defining areas by drive time/state/polygon/file for reports, creating color coded map, and creating smart map layers

As shown in Table 1, I provided tutorials on how to use basic functionalities within ArcGIS Online and Business Analyst Online. An example of the guide is shown in Figure 7. Within this guide, it does not indicate when it is appropriate or best to create a heat map or when to create a smart map layer. Therefore, it caused a lot of confusion for the project team because they have never been exposed to GIS software before, it was difficult for them to understand when to use certain tools or which type visualization was best for different types of data or analysis.



9. Once desired size is chosen, click "Ok"
10. Click "Ok" again

Creating a Heat Map

1. Open your Excel spreadsheet and save your file as a .csv file (pictured below) in the location of your choice
2. Close your Excel spreadsheet
3. Log into your ArcGIS Online account
4. To create a new map, click "Map" on the top left hand side
5. Click "Add" on the top left hand side
6. Click "Add Layer from File"
7. Click "Browse" and select your .csv file that you would like to map out
8. Click "Import Layer"
9. Ensure that the Field Name matches the Location Fields based on the columns in your Excel spreadsheet
10. Click "Add Layer"
11. Select the attribute that you would like to map under "1. Choose an attribute to show"
12. Scroll down to "2. Select a drawing style" and click "select" under "Heat Map"

Figure 7 An example of the first step-by-step guide created

One of the first steps to begin the project was to geocode all of the data. For the geocoding portion, I had asked them to follow the instructions on the guides. However, they requested to do it together through a screen share via join.me because they felt that the guides were not user intuitive and too general for them to understand how to use properly use it. Additionally, this was a task that was added on top of their existing role, and so they felt overwhelmed, especially on a quick timeline. They felt more comfortable utilizing the software with someone to walk them through step-by-step using a screen share.

4.2.1. One-Hour Training Sessions

Each group was to do a one-hour training session to help them get started on using the software and pulling up the necessary data. Of the three groups, only two were able to set up a time. The third group, tasked with the summer home analysis, was unavailable at the time, so I sent a new detailed step-by-step guide and they said it should be sufficient enough to get started.

4.2.1.1. Donors Group's One Hour Training Session

During this training session, only Christopher Adriance (team lead) was able to attend. We worked with the data available and went through the exact steps he needed to take to complete his objective/task. Though, at the time of this training session, we had to use hypothetical data and were unable to show what the results should have looked like. He stated that those additional step-by-step guides would be helpful and felt that he had a good grasp of the software after the training session.

4.2.2.1 Education/Community Programing Group's One Hour Training Session

For this session, Lorraine Caulkin and Susan Farma were able to participate. Unlike the donors group, at the time of the training we had all of the appropriate data loaded up and ready to work with. Therefore, we were able to go through the exact steps to show what their maps should look like based on the criteria they chose. Again, I also created step-by-step guides on the steps that we had gone through so that they are able to reference back to it when needed.

4.2.3. Newly Created Step-by-step Guides

The second set of step-by-step guides were created to show the exact steps of what they needed to do and were done through the one-hour training sessions. The guides were intuitive

and detailed enough for the groups to follow through with the project, and we did not need to set up any additional training sessions.

4.2.4. Learning Curve

Although ArcGIS Online and Business Analyst Online claim to be user-friendly, there is still a learning curve that requires users to take the time to understand how to utilize it. However, the interface of ArcGIS Online and Business Analyst Online is much simpler than more-complex GIS software like ArcGIS for Desktop and require much less time to learn how to use it.

Especially when working with a team that has no experience using GIS, the process to learn how to use it required much detailed instruction, walking them through the process step-to-step. With the original guides that were given to them, the project team did not utilize or even touch the software. Though once I did the one-hour training sessions and created new detailed guides, they were able to quickly move forward with the project without any additional assistance from me. Overall, the group and individual training sessions with me took about six hours. It took them another 14 hours to create the maps and pull up the data on their own.

The original plan for this thesis was to have everyone in the project team work on the maps and data for each assigned objective. However, because the majority of the team members were having trouble utilizing the software and were unable to add it on top of their current workload, only two people were really able to use the software. Instead of having each team member work on a specific topic, Susan Farma and Chris Adriance were the main people creating maps and pulling up data. They all worked together as a group to pull up the necessary information needed to complete their objective, but Susan was the only one that created the maps and Chris helped alongside her. The other team members felt that the software itself was not user-friendly enough to add on top of their existing workflow.

4.3 Feedback on Software

In general, the project team did not find the software to be as user friendly as hoped. The biggest issue with it was the time allotted for them to work with the software and the inability to add it on top of their current workload. Susan Farma, who worked with the software the most, found that the software took too much time and steps to add data to the maps and the geocoding portion of the project was too confusing, especially when some of the data would not import. There were many limitations they ran into when it came to cropping, resizing, and changing the style of the maps.

Even though they ran into trouble utilizing the software, everyone agreed that the software is powerful and useful, but wished it could be easier to use and more intuitive. Furthermore, they feel that it has good potential for improving marketing and fundraising based on regions and data.

4.4 Benefits of Having a GIS Champion

From this process, it is clear that it is still beneficial to have someone working with the software that is familiar with GIS or at least someone willing to take the time to become their main point of contact for their GIS needs. Furthermore, this person ensures that the GIS portion of this project stays on track and keeps it moving forward. For the Pacific Symphony, Susan Farma took charge of working with the software and was able to help everyone create maps based on their needs. Additionally, she ensured that everyone came together by setting up meetings to come to a consensus on what type of maps and data everyone was looking for based on the assigned tasks. Once she took the lead, many maps were being produced daily. Altogether, during the project, Susan Farma produced eleven maps. Although it may have taken hours to learn how to use the software, the project team had no experience with GIS and in the

end was still able to produce maps and weigh venue locations by choices based on customer location rather than physical attributes such as size of parking structures or number of seats. From the surveys, all members agreed that having Susan as a point of contact made the process of utilizing the software much easier especially with their current workload.

4.5 Key Initial Strategic Findings from the Project Team

From the maps they created, the project team created some initial findings that either confirmed their conceptions of their audience or discovered something new within their ticket buyers or donors. Table 5 displays some of the findings that they were able to confirm and discovered.

Table 5 Confirmed and discovered facts based on the maps created by the project team

	Confirmed	Discovered
Audience Location	Most of their customers are located within Orange County	There were more summer audiences coming from the city of North Tustin and Orange than they had originally thought (see Figure 8 below)
Audience Segmentation	Most of the customers within Orange County are predominantly along the coast	Income is not the only factor they should highly consider when marketing their performances. For example, one of their major hot spots was a retirement home neighborhood where it was at a much lower income where the ages range from 60 and up
Fundraising	Donors are largely based in Orange County	Donors fell off after the 30 minute drive time mark and an even more significant drop off at 60 minutes

Overall, a couple of the maps were created correctly and others were completed differently than what was done through the web casts and shown on the study guides. For instance, they felt that the 5-, 10-, 15-minute drive time was too small and expanded their drive time to up to 60 minutes. In addition, they did not create the heat maps properly or create any smart map layers.

4.5.1. Summer Home Findings

For this task, they geocoded the potential and current summer venues and overlaid it with the summer audiences from 2014 and 2015. However, they included different summer venues than what we had previously discussed. They incorporated Irvine Meadows Theater, Pacific Amphitheatre, Great Park Irvine, Back Bay Amphitheater in Newport Beach, and Historic Mission San Juan Capistrano in San Juan Capistrano. Also, instead of using a heat map, they created a map using circles where the size determines how many tickets were bought from a particular address. Figure 8 displays this map, which turned out to be a jumble of overlapping points that are very hard to discern.

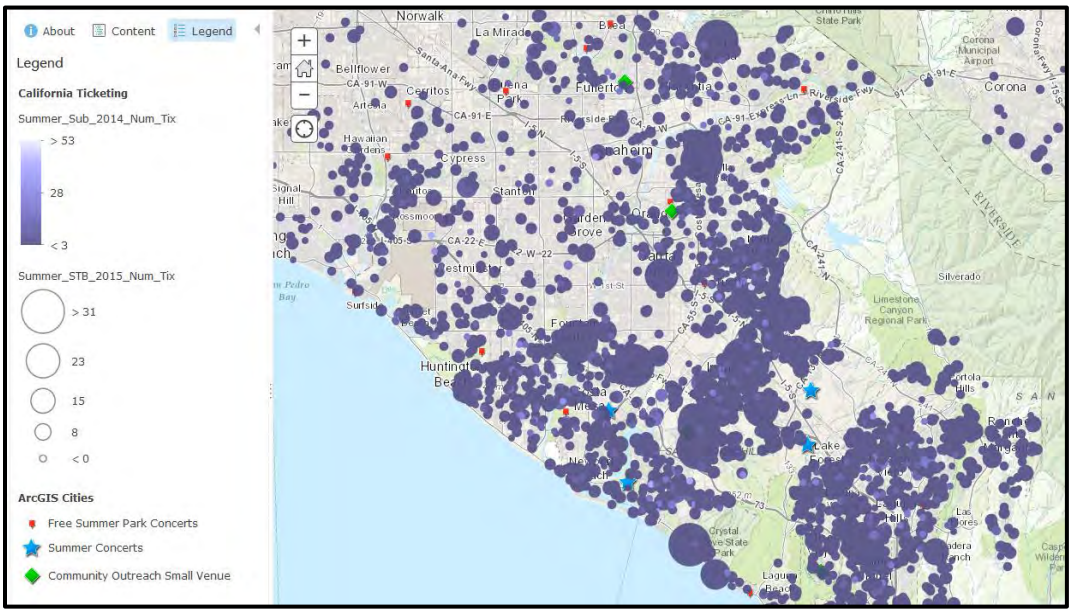


Figure 8 Summer Venues map created by the Project Team

In their findings, based on the map they have created in Figure 8, they noticed that the summer audiences for both single ticket buyers and subscribers skewed slightly towards the south of the county (e.g., Irvine, Mission Viejo, etc.), but that there were also more summer subscribers from the cities of North Tustin and Orange than they have expected.

4.5.1.1. Complications with the Summer Home Maps

Due to their current workload, they were unable to determine if moving the summer venue would affect them in any way. I believe it largely had to do with the map they have created as it was hard to read and very unclear, therefore risking the chance of gathering the wrong information from the map.

Since they are looking to see the new summer venue in comparison to their current customer base, there was a clearer way to depict the map. Instead of using graduated symbols on individual address points, they could have filtered out the data they wanted to see using the "Filter" tool to create a heat map. Figure 9 shows the map that I created using the original instructions.

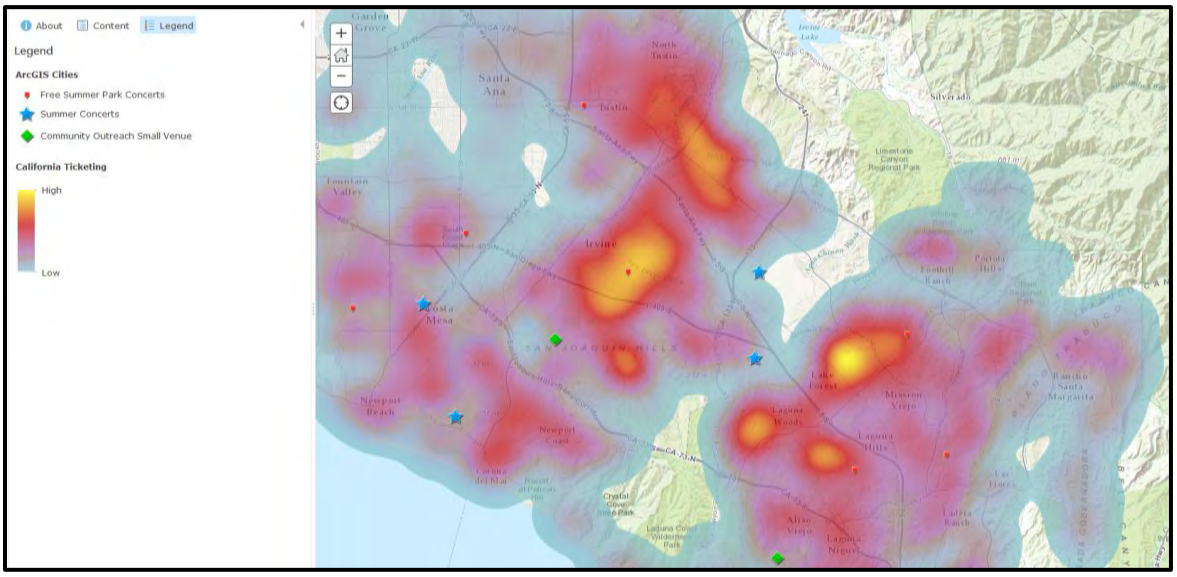


Figure 9 Heat Map of Summer Ticket buyers

From there, they could have created a 30- and 60-minute drive time to see if their main customer base would still be within the hot spot of existing customers. Ultimately, the answer here depends on the length of the drive time that is believed to be necessary to attract audiences. If one assumes a 30-minute drive time, based on my own findings, moving the summer venue

over to the Pacific Amphitheatre should not have a major effect because hot spots of current summer single ticket buyers and subscribers still fits very well within the 30-minute drive time. However, per Alan Brown, majority of the performing arts customers are generally within 15 minutes of the venue, and this is also the case for the concentration of existing summer audience hot spots around the current summer venue. Figure 10 displays the map I have created, where the Irvine Meadows 15-minute drive time covers the major hot spots of their current summer ticket buyers.

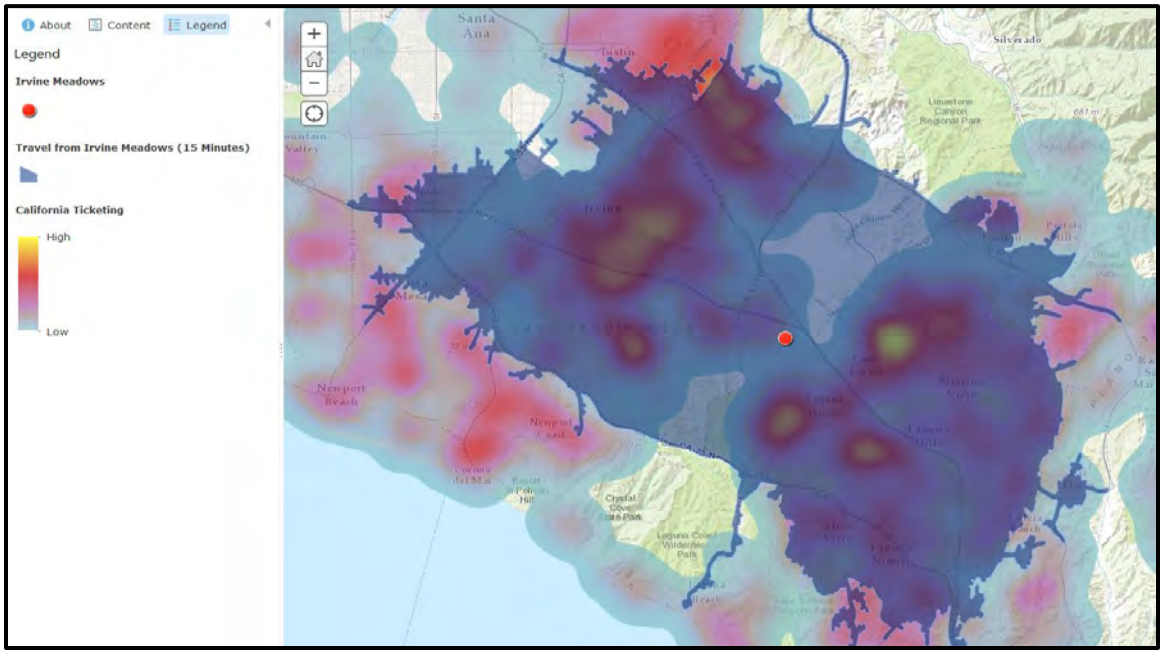


Figure 10 15-minute drive time created from Irvine Meadows Theatre overlaid with 2015 summer ticket buyers

If they were to move to the Pacific Amphitheatre, the 15-minute drive time only covers a small portion of their major hot spots. Figure 11 shows the 15-minute drive time from the Pacific Amphitheatre only covers half of the hot spot in Irvine and excludes the other portions of Irvine, Laguna Woods, and Mission Viejo. It shows that they risk losing a large portion of their current summer ticket buyers without a larger marketing effort in the areas missed. Also, it indicates that

they may have to expand marketing efforts to attract new audiences to the north (e.g., Huntington Beach, Fountain Valley, etc.) in areas that are within the 15-minute drive time of the Pacific Amphitheater.

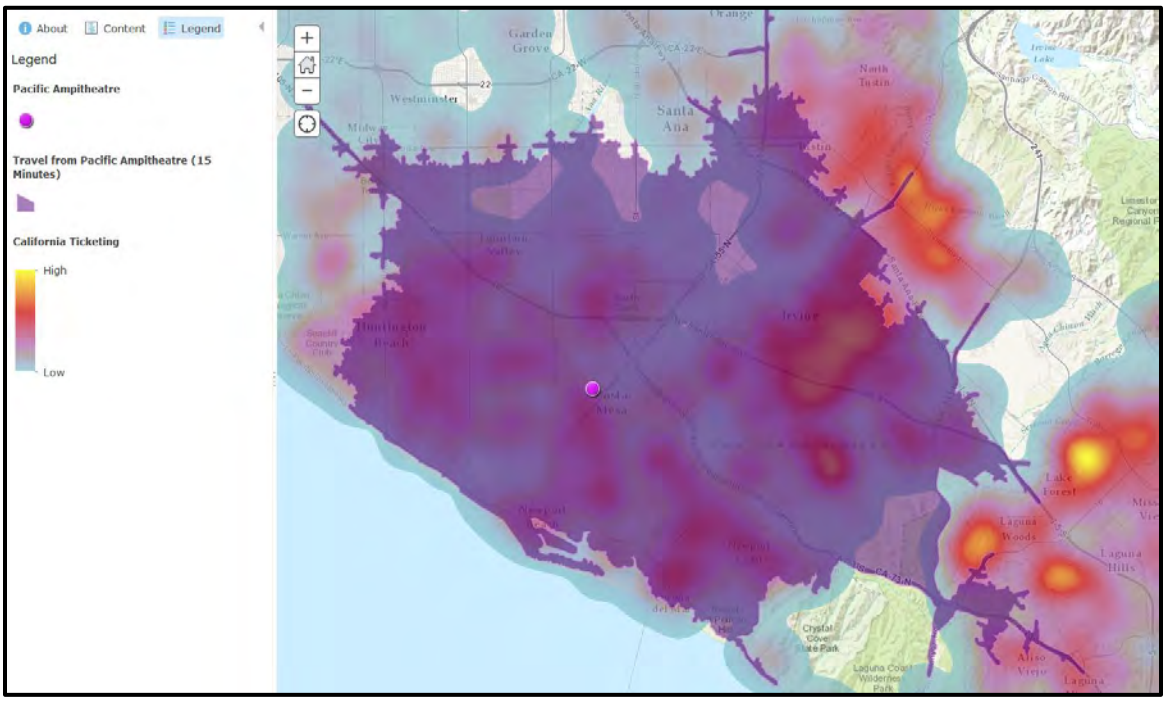


Figure 11 15-minute drive time created from the Pacific Amphitheatre overlaid with the summer audience

4.5.1.2 Tapestry and Demographics for the new Summer Home

During the project, the Pacific Symphony team was unable to pull up the appropriate tapestry segmentation and demographic data to compare and contrast their current summer home, Irvine Meadows Theatre, and their new summer home, Pacific Amphitheatre. Based on my original instructions, I found that the dominant tapestry segmentation for the neighborhoods that the summer audiences came from was the Boomburbs. Figure displays a map where I created a 15-minute drive time around the Irvine Meadows Amphitheatre and found it covered a small portion of this particular tapestry segmentation within the 15-minute drive time. Figure

show that the 15-minute drive time area for the Pacific Amphitheatre covers an even smaller portion of this tapestry segmentation.

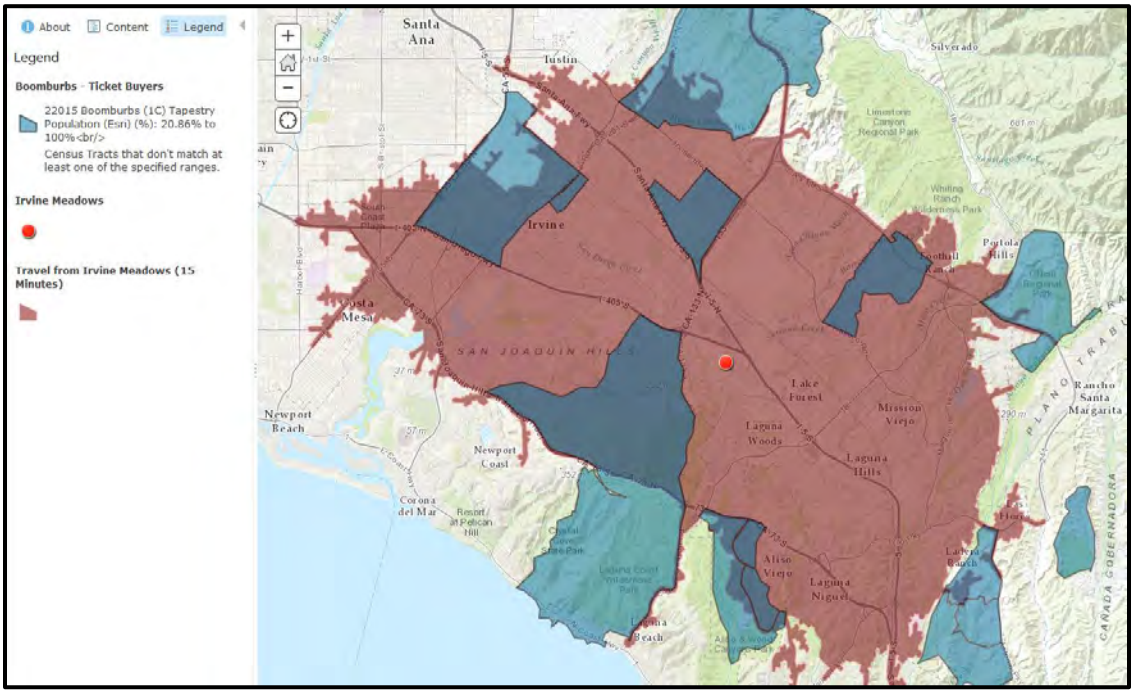


Figure 12 15-minute drive time from Irvine Meadows Amphitheatre overlaid with Boomburbs tapestry segmentation

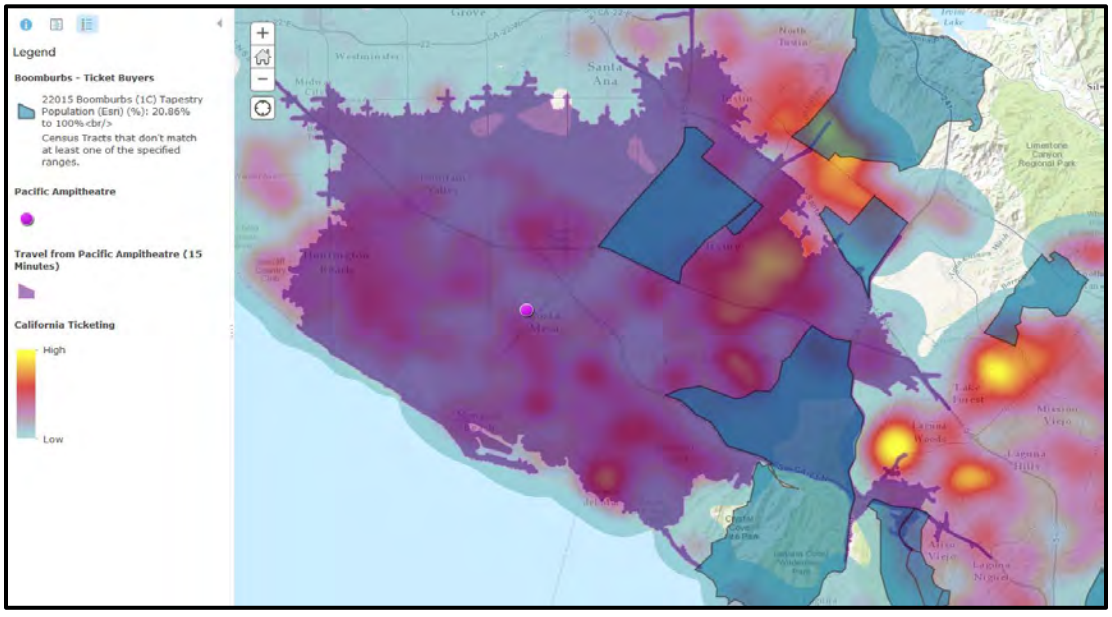


Figure 13 15-minute drive time from the Pacific Amphitheatre overlaid with Boomburbs tapestry segmentation

When I pulled up the demographic data of the ticket buyer's neighborhoods, I discovered trends that aligned with Alan Brown's statement that majority of the audience members have higher income and higher education. The data that I mapped showed 64.8% of their summer ticket buyers (including both subscribers and single ticket buyers) came from census tracts with a median household income of $75,000 and above and 43.3% of their residents having at least a bachelor's degree. To depict this on a map for comparison of the summer venues, I created a smart map layer to highlight the Census tracts with these criteria and brought it into ArcGIS Online for further analysis. Figure shows the smart map layer created for education and income overlaid with a 15-minute drive time from Irvine Meadows Amphitheatre. **Error! Reference ource not found.** illustrates a 15-minute drive time from the Pacific Amphitheatre. As shown by comparing these two maps, the current summer venue covers more census tracts with people with high incomes and high levels of educational attainment than the proposed Pacific Amphitheatre Venue.

This presents challenges for the Pacific Symphony and poses a significant bind for it since the largest turnout is for the summer concerts. Moving from the Irvine Meadows Theatre to the Pacific Amphitheatre would take the symphony further away from their major hotspots in Irvine, Orange, and Tustin and closer towards Huntington Beach, Newport Beach, Fountain Valley, and Costa Mesa where there is not as large of a presence of ticket buyers as cities within a 15-minute drive time from Irvine Meadows Amphitheatre.

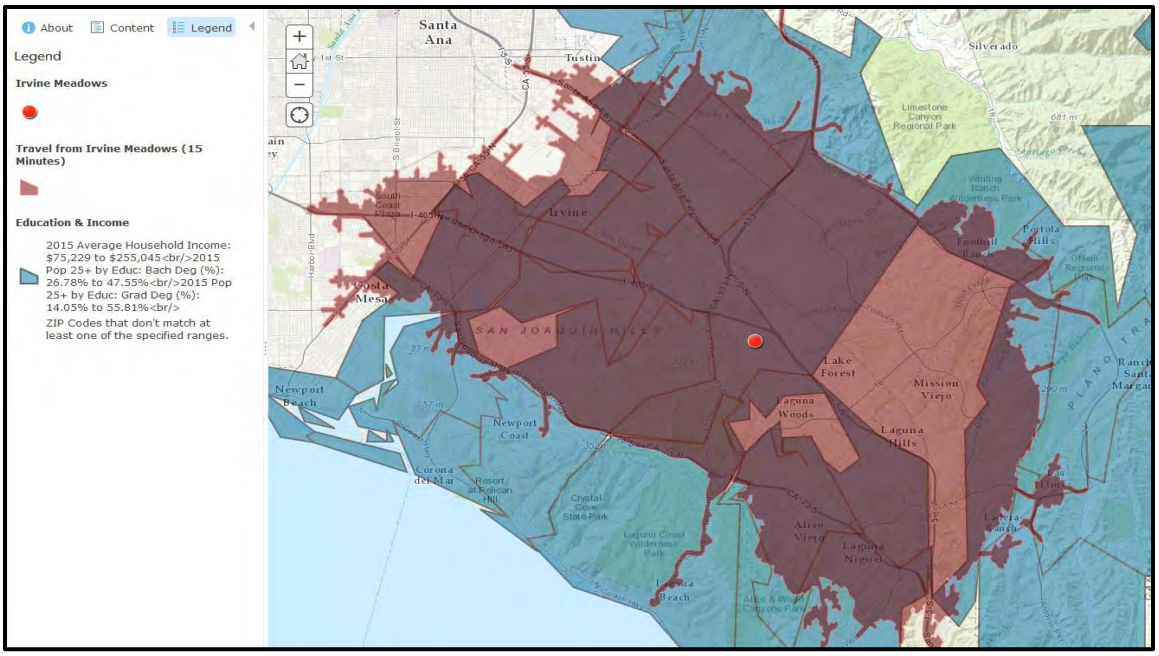


Figure 14 15-minute drive time from Irvine Meadows Amphitheatre overlaid with education and income smart map layer

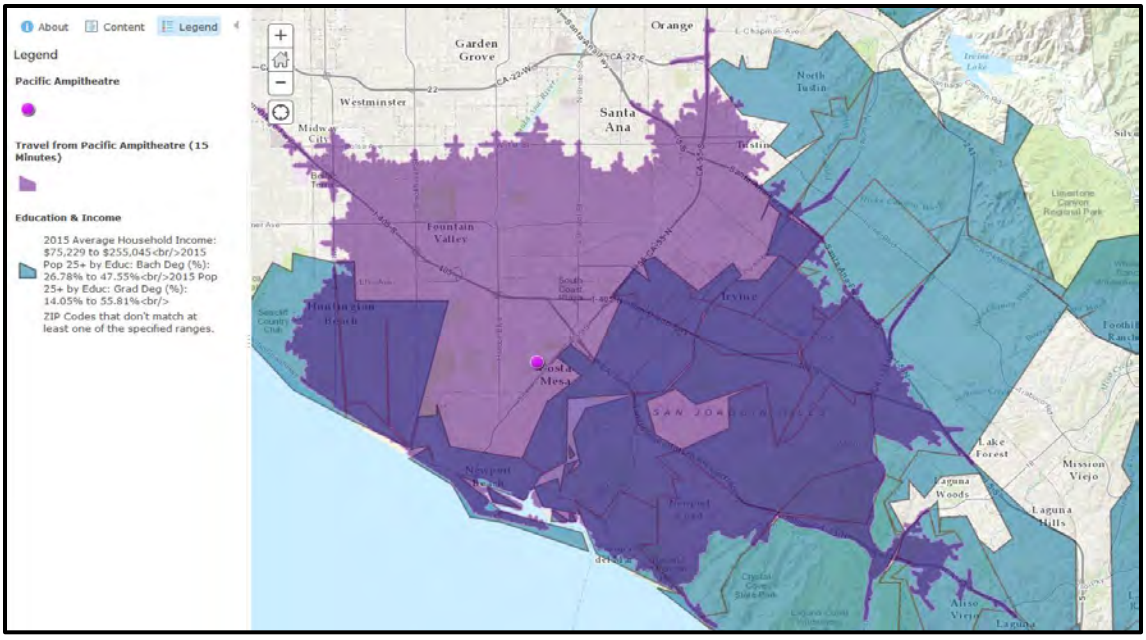


Figure 15 15-minute drive time from Pacific Amphitheatre overlaid with education and income smart map layer

4.5.2. Community and Education Programming Findings

When looking for four new venues, the project team only focused on the summer audiences rather than potential locations of additional concerts in the winter season. To complete this task, they looked up Orange County's cities and parks that held free summer concerts, geocoded these parks in ArcGIS Online, and overlaid it with summer ticket buyers from the years 2014 and 2015. Similar to their summer venue map, they symbolized their summer ticket buyers using different sized circles. Due to their workload, they were unable to identify the best four venues for their community and education programming. Again, similar to their summer venue issue, I believe the map made it difficult to visualize their findings and could have discouraged them to move forward. Figure 16 displays the map they created.

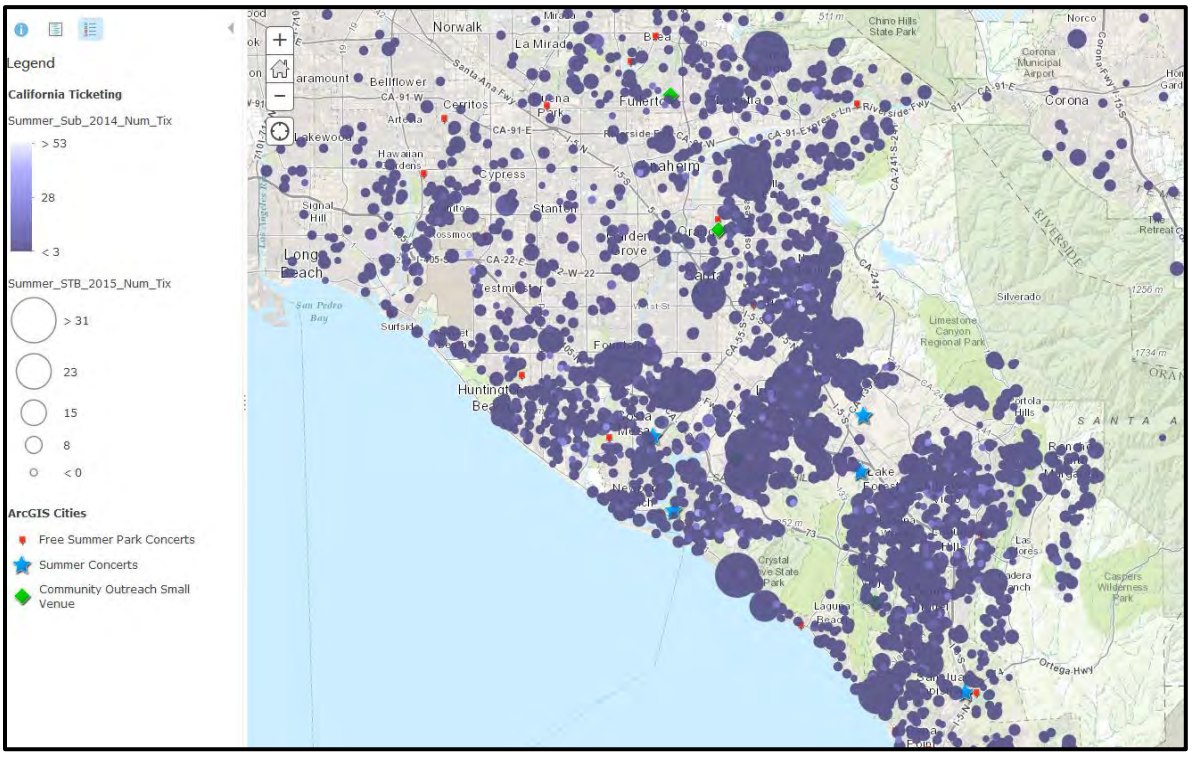


Figure 16 Community and education programming venues created by the project team

With very similar steps to the summer venue task, because they are looking to see which venues to choose based on their current customer base, they could have created a heat map instead. They could have filtered out the data they wanted to see using the Filter tool and created a heat map. From there, they could have created a 30- and 60-minute drive time to see if their main customer base would still be within the hot spot of customers. Figure 17 displays an example, Woodbridge Community Park, being a clear choice because it lies right in the middle of a major hot spot of their current ticket buyers and Eastgate Park in Cerritos would not be a good choice because it was located further out from their current summer ticket buyers.

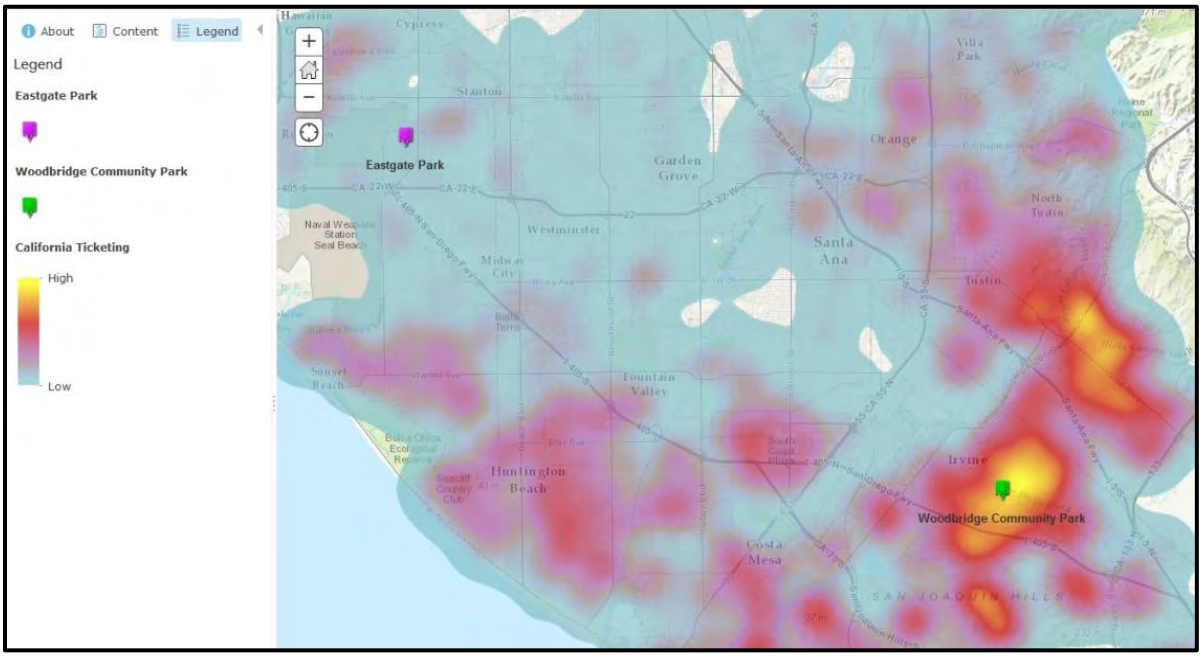


Figure 17 Woodbridge Community Park vs. Eastgate Park overlaid on a heat map of ticket buyers

4.5.3. Donors Findings

The project team was able to create maps depicting the location and number of typical annual fund donors relative to their Class Act performance events, evening concerts for parents and children related to the Pacific Symphony's elementary school educational programs. They

were able to geocode the schools in their Class Act educational program and created a 15-minute drive time to see which donors fell within the drive time buffer to clearly depict who they can invite. Figure 18 displays the map the project team created displaying typical annual fund donors, excluding major funders.

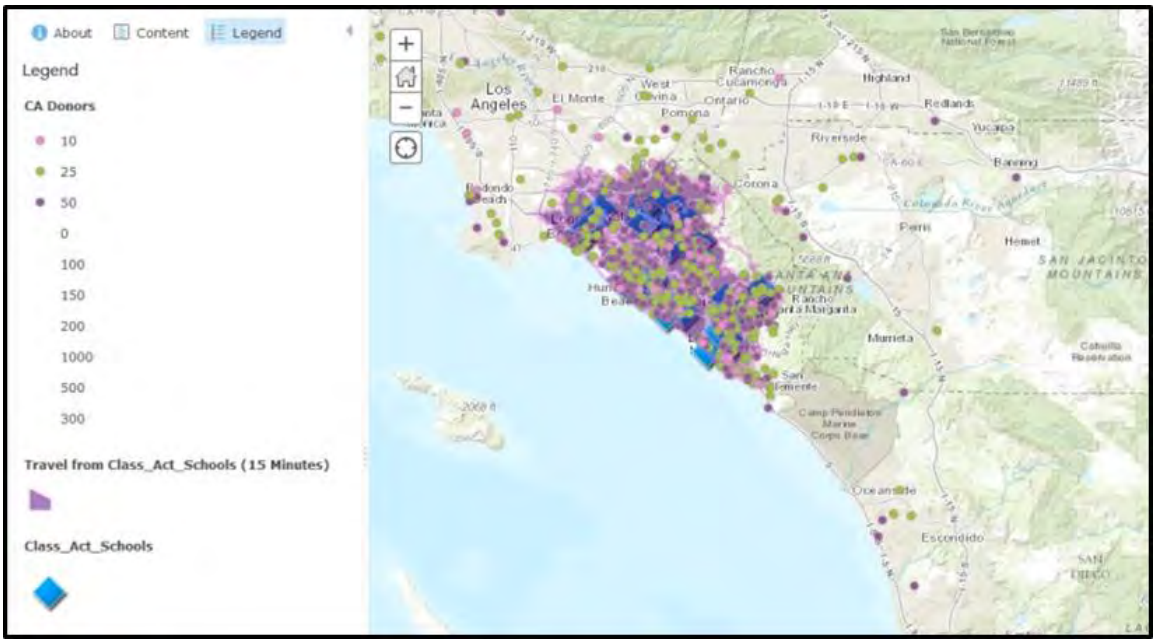


Figure 18 Donor map created by project team

From here, they were able to do some additional analysis and discovered that there was a drop off of donors at the 30-minute drive and a huge drop of at the 60-minute drive time. One factor they discovered was that a large portion of their donors are located in the retirement community in Laguna Woods. They found that income in this area is not as high as the area where most of their other typical annual fund donors live. This helped them determine that income is not the only factor that should be looked at when it comes to donations or for classical music preferences, but that age should also be considered.

However, to make the map much clearer they could have omitted the donors that donated $0 in 2015 by using the Filter tool. Additionally, they could have filtered out each Class Act

school location individually to clearly depict how many donors they are able to attract and prioritize it by the amount of donors or donation amount. Furthermore, I selected the lightest color to show the smallest amount and used a darker variation of that color as the donation amount got higher since people usually associate lower numbers with lighter colors and are typically associate darker colors with higher numbers (Brown 2016a). Figure 19 shows the map I created for one such school, excluding any major donors.

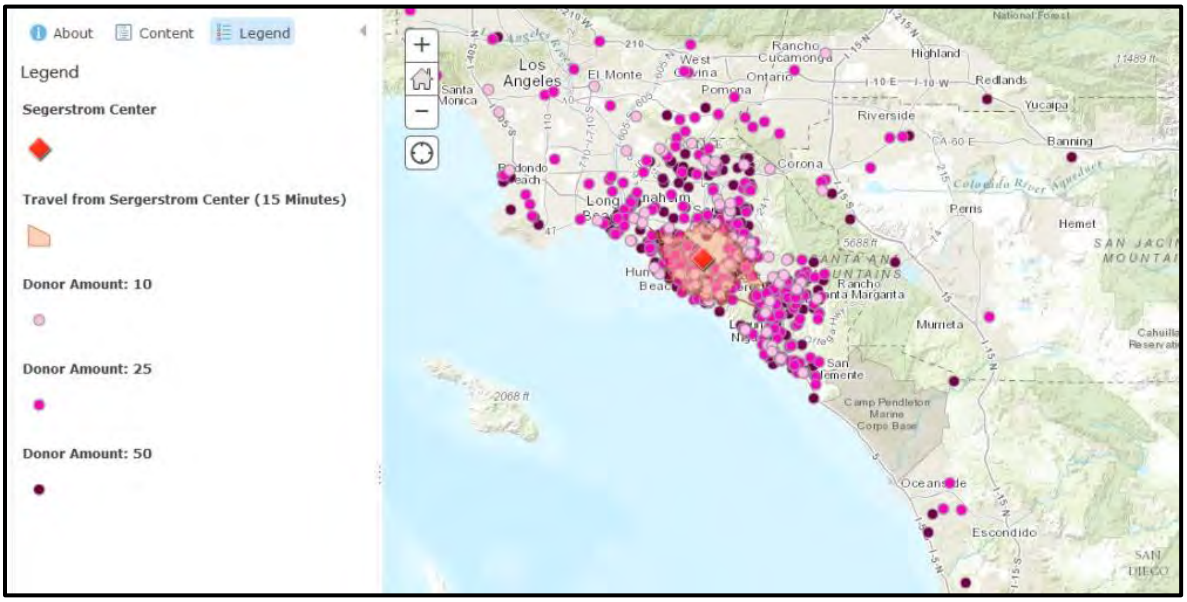


Figure 19 Donors within a 15-minute drive time from Paulariono School

Figure 20 displays an example of if they were just looking to see where most of their donors were located, regardless of the amount of the donation. In this case, they could have just created a heat map and created drive times for each school and filter out as necessary.

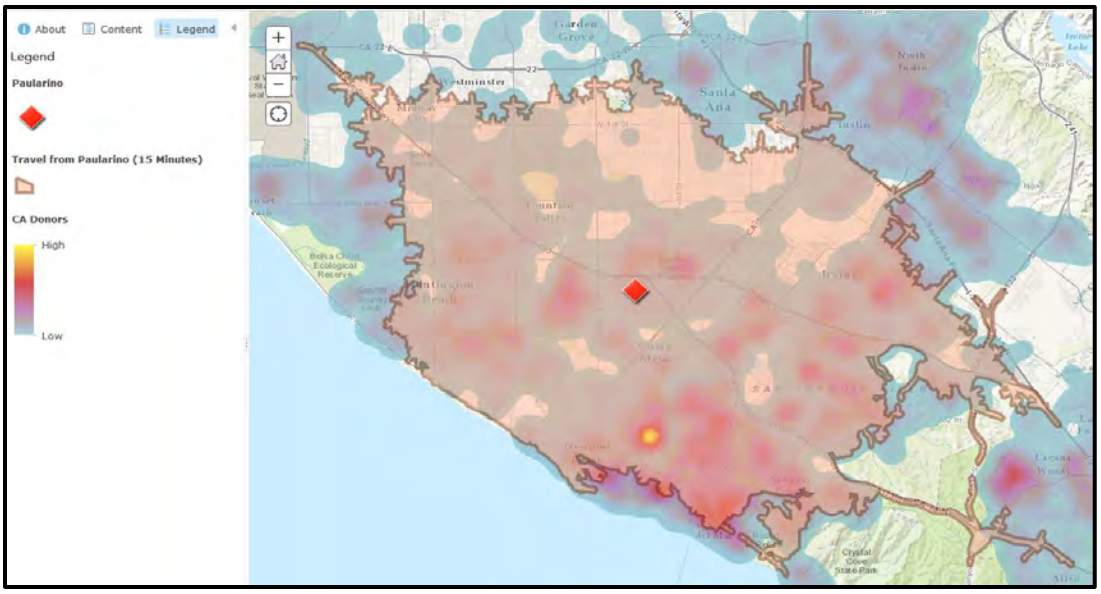


Figure 20 15-minute drive time from Paularino overlaid on a heat map

4.5.3.1. Donors' Tapestry Segmentation

To look at the tapestry segmentation of the donors, the project team created a map that showed the tapestry segmentation for the state of California, added their ticket buyer information, placed a point for the Segerstrom Center, and created drive times of 15, 30, and 60 minutes from the Segerstrom Center. The purpose of this map was to find the dominant tapestry segmentation of their donors based on the neighborhoods they came from. Although study guides were provided and a web cast was conducted to show them how to accomplish this task, the project team ran into complications and was unable to complete it successfully. Figure 21

illustrates the map they have created.

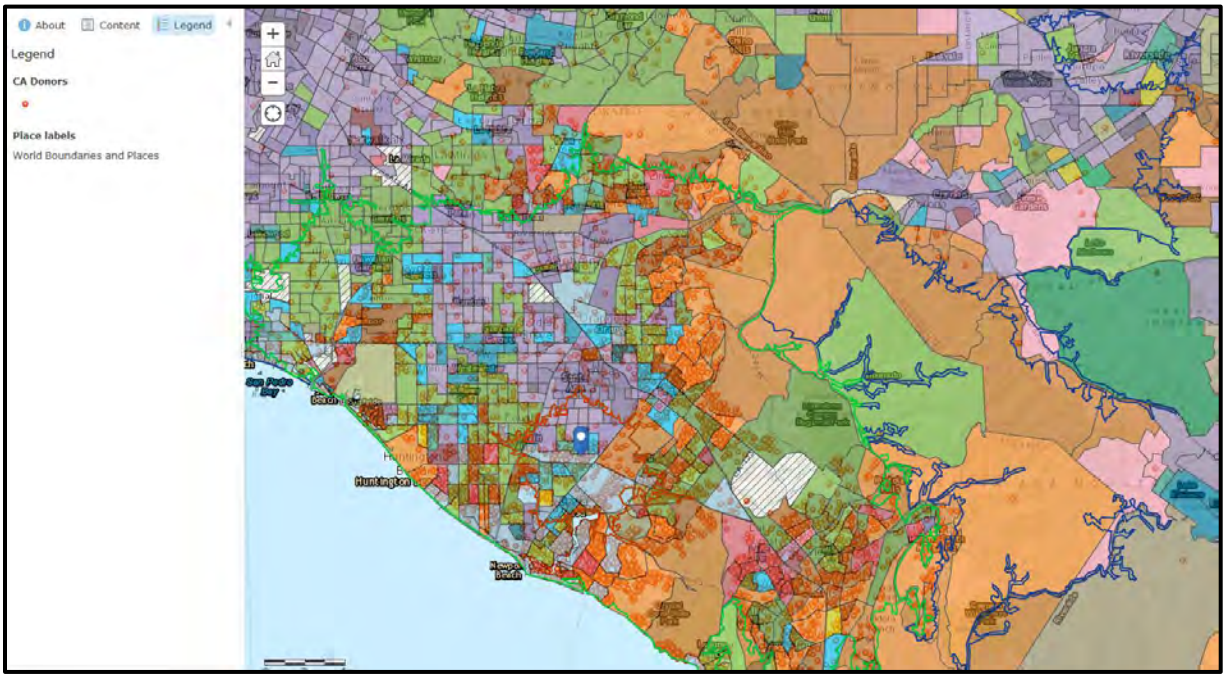


Figure 21 Tapestry map created by project team

Instead, they should have created a heat map within ArcGIS Online and used the Map Note tool to draw a polygon around the hot spots. From there, they will be able to bring the map note layer into Business Analyst Online and combine all of the polygons to pull up the tapestry segmentation data. Once pulled, they will be able to clearly see which tapestry segmentation is dominant within the neighborhoods that their ticket buyers are from. In this case, it was the Enterprising Professionals segmentation. From there, they would have been able to create a "Smart Map" that allows you to add variables to show where these variables are located on a map. Thus, they can add the Enterprising Professionals segmentation and clearly depict where they segmentations are located on a map. Then, they would have been able to add a point for the Segerstrom Center and create 15-, 30-, and 60-minute drive times to see how much of their target audience they can reach. Figure is an example of the map they should have made, shown with

15- and 30-minute drive times.

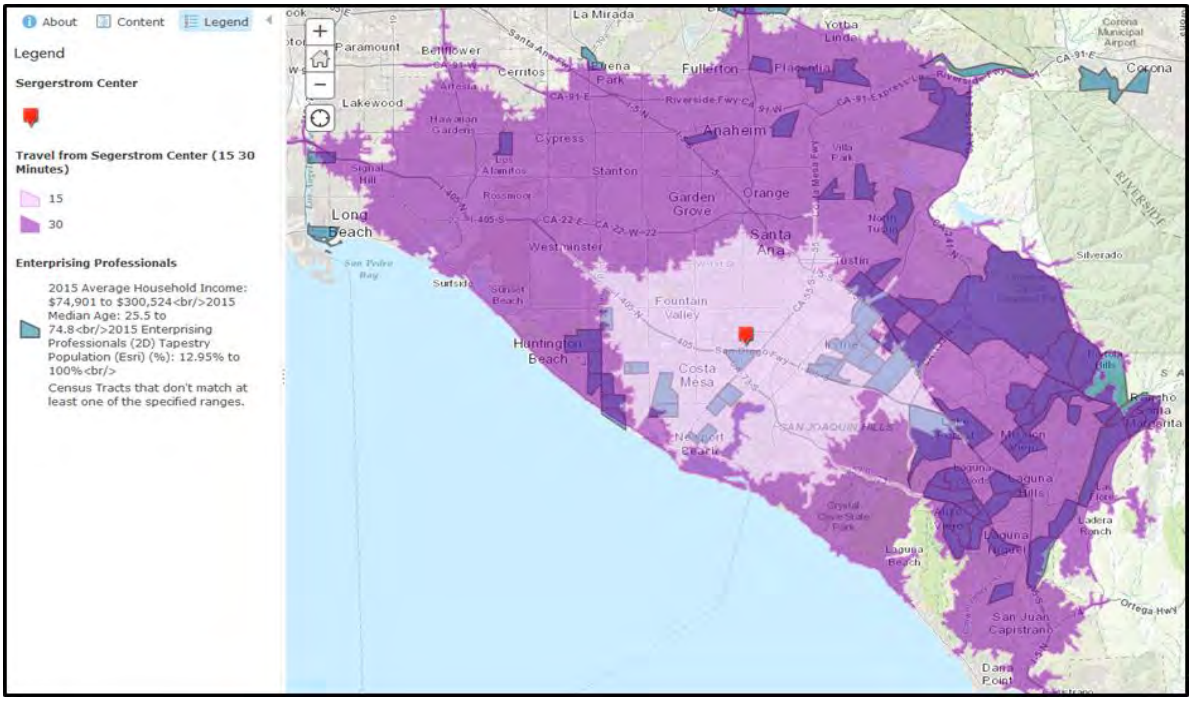


Figure 22 15- and 30-minute drive time from the Sergerstrom Center overlaid with the Enterprising Professionals smart layer

4.6 Project Costs

ArcGIS Online's service credits played a large role in terms of cost for their project. Within Esri's licensing, subscriptions to ArcGIS Online will include a certain number of credits that expire after twelve months (Esri 2015). Any additional service credits purchased expire after 24 months (Esri 2015). Service credits are sold in blocks of 1,000 and cost $100 for every block (Esri 2015).

During the time of the project, the project team used a total of 5,675.94 service credits. Table 6 shows the breakdown of service credits by user and tools.

Table 6 Tools and total amount of credits used by each user

User	Tools	Credits Used
Susan Farma	Geocoding, drive times, report generating, and storage	5,639.86
Christopher Adriance	Report generating and storage	36.08
		Total: 5,675.94

Roughly 4,000 service credits, $400 worth, were used in error while geocoding the data into ArcGIS Online. Before geocoding such a large amount of data, I had suggested that they geocode in subsections of ten, however due to miscommunication the data was uploaded all at once multiple times. Errors included, they would have had to purchase at least $600 worth of service credits on top of an initial subscription.

In Chapter 5, below, discusses the benefits that the Pacific Symphony could expect to receive from using Web GIS relative to these costs.

4.7 Summary of Project Implementation and Outcomes

Utilizing Web GIS within the non-profit sector is not only possible, but also brings in value and a different perspective of their data that they may not have been aware of before. Web GIS is an easier way for non-profit organizations to add a geographical element to their research because they do not have to worry about purchasing extensive hardware or software and most importantly, not having extensive GIS knowledge. Although it may still require training, as shown through the Pacific Symphony case study, putting together maps and being able to perform analysis were possible even though the staff had never even heard of GIS. It not only provided new insight for them, but also spurred new questions that encouraged them to add additional data for further spatial analysis.

Chapter 5: Reflections on the Project

During this project, the Pacific Symphony was able to become spatially aware and partially enabled utilizing Web GIS. Although the symphony's staff may have never used the software and ran into some difficulties, they were able to still produce maps and visualize their data. Even in spatially-light organizations, such as the performing arts industry, GIS can be of importance and provide valuable insight to help make better business decisions. However, in spite of user friendly web-based software, it was clear that for the project to succeed expert assistance was required in setting up the program and consultant support would be needed for continued work on this project. From the maps they created, they were both able to confirm what they already knew and discover new patterns of their audiences. This final chapter will discuss the Pacific Symphony's experience with Web GIS, possible future work, and transition plan.

5.1 Value of Utilizing Web GIS in the Pacific Symphony

This project was able to illustrate the power of using Web GIS and identifying the problems that it can and does solve so they are able to know who and where to reach out to (Brown 2016a). The symphony's staff was able to visualize and discover many new things about their customers and venues and this hands-on work even helped spur new questions (Caulkin 2016). For the Pacific Symphony, the experience of using the software is the value of this project rather than the actual technical skills to operate it. The technical aspect of learning how to use the software would actually be more time consuming due to the required training necessary to accomplish certain tasks. Even though the staff ran into several difficulties, it was more understandable to do it hands on rather than hire someone to do the work for them (Farma 2016).

5.1.1. Technical Capacity of Non-Profits

Although many non-profit organizations use volunteers to assist them with GIS work, it is most beneficial for the organization to learn how to implement and use GIS software themselves. Even though larger non-profit organizations rely on volunteers, they still have a dedicated staff running their GIS program. With Web GIS, it will make it much easier for smaller non-profit organizations to run their own GIS program without having extensive GIS knowledge and without having to put in the budget for additional staff and hardware. In general, smaller non-profits may rely on volunteers, but often times they have a lot of turnover so it is difficult for them to build the institutional capacity for handling software (Brown 2016a). This can result in a large need for professional development and covering job transitions. Even the Pacific Symphony would need to establish monthly workflows and standard-operating practices to ensure that the software is learned, used, and integrated efficiently. Therefore, instead of relying on volunteers to come through and having to take the time to train them, it would be much more beneficial to learn and use the software themselves. Like the Pacific Symphony, having a single person be the GIS champion would be highly beneficial to a smaller organization. Their skillsets and job description does not have to be dedicated to just GIS, but it should be part of their regular workflow. This could include creating the necessary maps and maintaining data.

5.1.1. MapInfo, Neilson SiteReports, and PRIZM vs. ArcGIS Online

After interacting with MapInfo Pro – Desktop GIS's free trial, I noticed a similar interface to Esri's ArcGIS for Desktop that may not be geared towards GIS novices. In order to create the maps that Pacific Symphony's project team has accomplished, it would require other third party data vendors, such as Census and Neilson SiteReports, to import the necessary data

into the software. Unlike MapInfo Pro – Desktop GIS, ArcGIS Online has all of its data centralized in one area where users can find whatever demographic information that is required. However, with PRIZM, users are able to easily obtain and utilize the ZIP+4 layer that is currently not available within ArcGIS Online. Nevertheless, a ZIP+4 layer can be obtained from United State Postal Service and imported into ArcGIS Online for an annual subscription fee (USPS 2016).

Although similar to Business Analyst Online's Tapestry segmentation data, the datasets provided by Nielsen's Site Reports and PRIZM are broken into different categories, provides visuals such as pie charts, and includes occupation categories in demographic data.

5.2 Challenges and Limitations

When utilizing the software, the Pacific Symphony ran into some complications that ultimately made them feel that the software was not user friendly. Although they found the software to be powerful and useful to its needs, with the staff's overall workload during the project, they were unable to set aside the time to use the software and create the maps and pull up the data that they were hoping for.

5.2.1. Interface between ArcGIS Online and Applications Feedback

The project team felt that the interface between ArcGIS Online and Business Analyst Online was clunky and having to switch back and forth between the software was tedious and difficult. Even with the step-by-step guides, they found the icons hard to understand and wished it could be more obvious (Ardriance 2016). Furthermore, they did not use the heat maps extensively because it seemed inconsistent in the way it produced maps at different scales (Farma 2016). Instead they used different sized circles and color scales that made it difficult to really understand their data.

5.2.2. Bugs within ArcGIS Online and Business Analyst Online

With the software, there were two particular bugs that the project team ran into. One was limits with map notes. When they had to draw a map note over the heat map, it would automatically default back to its original display, black dots. This made it extremely difficult for the project team to draw the map notes. Instead, they had to memorize the locations, making it tedious and time consuming for them. Second, they had to combine all of the different map notes together. However, when combining all of the map notes it could take several times or even having to restart the software before even being able to move forward.

5.2.3 Precision in Demographic Data

The demographic data and tapestry segmentation used for this project was not collected from individual surveys taken by ticket buyers, but instead was a generalization of the neighborhoods the ticket buyers came from. Therefore, the data collected from Business Analyst Online could result in an ecological fallacy, which occurs if relationships or characteristics observed in groups are incorrectly held to be the same for individuals within those groups (Freedman 1999). For example, if we determined that the symphony has a majority its audience members coming from neighborhoods with a bachelor's degree, it still might not be the case that a majority of individuals who attend the symphony must have a bachelor's degree. In this case, determining individual behaviors based on aggregated data can yield incorrect conclusions (Freedman 1999). For more accurate studies in the future, although very difficult, it is best to collect individual surveys of each audience member and map those instead, rather than guessing which demographic and tapestry segmentation they are a part of based on their neighborhood.

5.2.4. Potential Inaccuracies Due to Variations in Population Density

The maps made for this study display hot spots of ticket buyers, but there may be potential inaccuracies due to variations in population density in Orange County. Because the ticket-buyer data was not normalized for underlying population density, the hot spots of ticket buyers might in reality just represent particularly dense neighborhoods. This would be a greater concern if the analysis was performed for study areas with notable variations in population density, such as the metropolitan regions of Los Angeles or New York (Brasuell 2012). However, the Orange County landscape is different because it is filled with more single homes and families and further away from commercial areas. Unlike places like Los Angeles and New York, commercial areas are grouped in one area and residential neighborhoods are grouped in other areas with relatively low variation in population density within the residential areas. Therefore, the hot spots in this study are based kernel density with non-weighted points. Though, this could be an issue in the future as population increases in Orange County. If the population does increase and concentrations of residential density emerge, a different hot spot analysis may need to take place and would likely need to be done within ArcGIS for Desktop.

5.3 Training Feedback

Both Christopher Adriance and Susan Farma were the ones utilizing the software and felt that the web casts were the most helpful, but they also used the written guides as reference and they found these particularly useful for reviewing concepts from the web tutorials. The software they are currently using to manage subscriber and donor database, Tessitura, has a "recipe book" of how to pull data for its analysis function called "T-Stats." They felt that if Esri's ArcGIS Online has something similar to that for the performing arts industry, using ArcGIS Online would be very helpful (Adriance 2016).

5.4 Errors in Maps and Data Collection by Project Team

Whether due to the project team's workload or the project's ambitious goals for GIS novices, there were many errors made on the maps that resulted in some incorrect data collection and analysis. For instance, they stated that there was nothing shown that they already knew for the summer venues except that they had more customers in the north than they previously thought. However, when I created the maps with a 15-minute drive time, the Irvine Meadows Amphitheatre covered all the major hot spots while the Pacific Amphitheatre only covered a small portion of it as shown in Figure . This also aligned with the tapestry segmentation and demographic data (income and education) as shown in Figure .

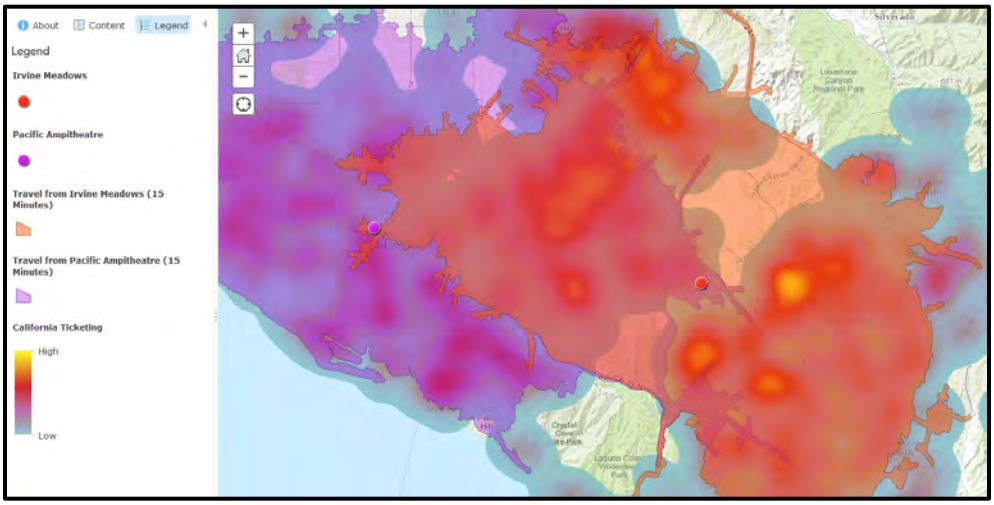


Figure 23 15-minute drive time and Pacific Symphony Amphitheatre with 15-minute drive time overlaid ticket buyers heat map

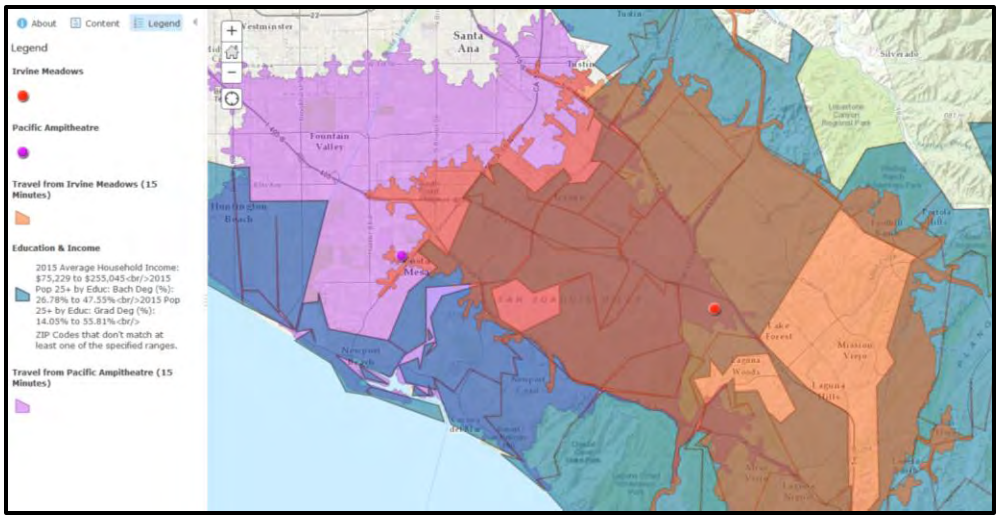


Figure 24 Irvine Meadows with 15-minute drive time and Pacific Symphony Amphitheatre with 15-minute drive time overlaid with education and income smart map layer

5.5 Value of Targeted Marketing Strategy

The Pacific Symphony spends about $1.5 million per year on marketing and being able to target those dollars more effectively would be a very wise investment (Sutton 2016). The benefits fairly outweigh the costs in terms of the licensing costs of the software because although there are some costs in staff time and training, these are fixed costs anyway because the staff is on salary. Also, there is more precise geographic targeting possible with Internet advertising than with newspapers, and so new advertising technologies offer greater opportunities for geographical targeting. Currently, the Pacific Symphony also sends out a lot of large, colorful postcards to promote concerts, therefore with more precise geographic targeting, it would extremely beneficial in targeting such direct mail. To accomplish this, it would need to be able to get a layer to import into ArcGIS Online of ZIP code +4 boundaries, point of different venues, audience hotspots, and tapestry segmentation. An example is shown in Figure where the summer ticket buyers hot spots are overlaid on top of ZIP codes in comparison to the Pacific Amphitheatre 15-minute drive time. From this map, because it is missing a major hotspot, it

shows that the Pacific Symphony will have to improve their marketing efforts in Irvine and can possibly send flyers for their performances in that ZIP code area. Once it is ready to pull up the addresses within the boundary, it will have to zoom in to that particular spot and extract the data into a .csv file using the "Extract Data" tool. To use a more precise ZIP +4 layer, the Pacific Symphony would have to create its own layer and upload it into ArcGIS Online or see if another user created and shared the layer within ArcGIS Online.

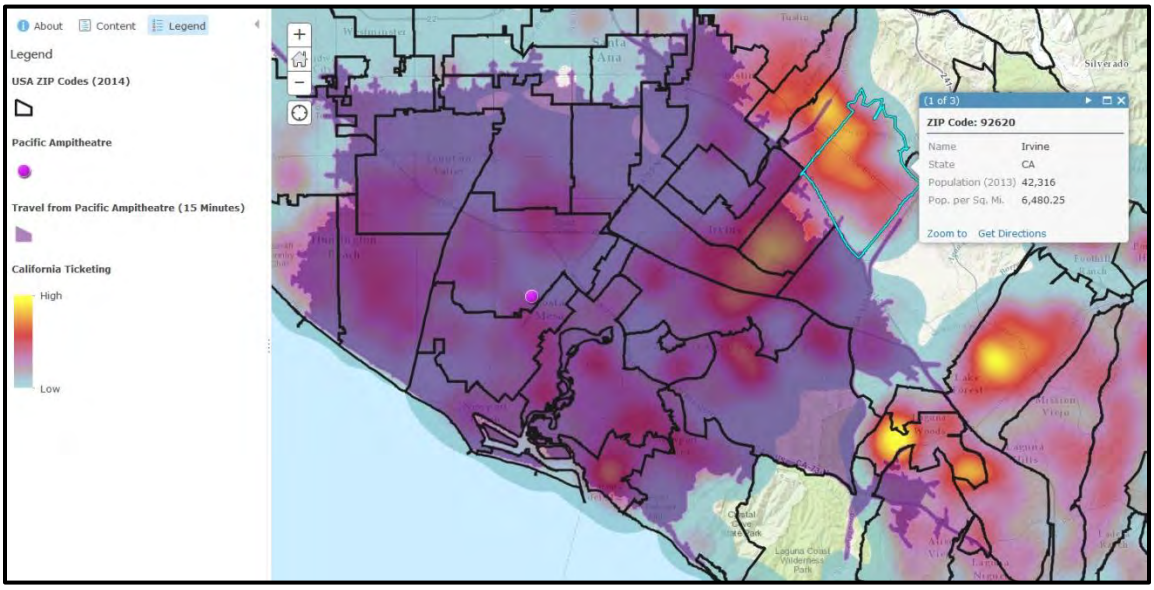


Figure 25 Summer ticket buyers overlaid with drive time and ZIP code boundaries

5.6 Possible Future Work at the Pacific Symphony

Since the Pacific Symphony has decided to move forward with utilizing Web GIS within their organization, it would need to not only sign up for Esri's non-profit program, but also need to establish a robust set of criteria for their analysis on specific candidate venues (Brown 2016a). The staff is looking to utilize Web GIS for site suitability analysis in a light sort of way, as Sean Sutton calls it, "A strategy of 'regionality." The idea behind this strategy is to expand audiences by broadening the Pacific Symphony's footprint around Orange County. The role of GIS would

be mostly based on spatially delineating prospects for audience and donors, but a comprehensive site suitability analysis could also include features of the venues, such as acoustics, parking, rental costs, etc.

One project in particular included attracting the Asian population to their concerts. Using ArcGIS Online and Business Analyst Online, they will be able to easily create this map. An example of a map containing the Asian population that they can create and add layers to is shown in Figure 12.

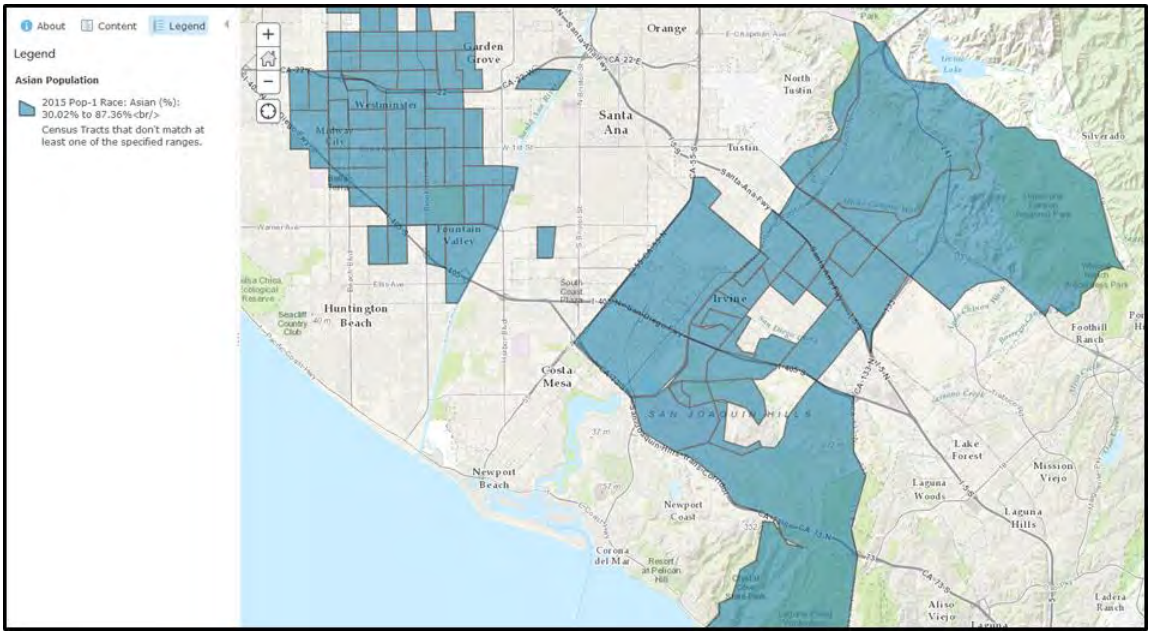


Figure 12 Asian population in parts of Orange County

5.7 Transition Plan

Since this project has concluded, the Pacific Symphony no longer has access to USC's academic ArcGIS Online account. Therefore, if the staff wishes to continue utilizing the Esri's ArcGIS Online and Business Analyst Online, they will need to purchase their own subscription and service credits for commercial use.

Due to Esri's software licensing, they have a couple of different options to choose from depending on their non-profit status. Since the organization is a 501(c) 3 non-profit, they may be able to qualify for Esri's non-profit program. However, if they do not qualify, they will need to purchase the license at standard commercial price.

5.7.1. ArcGIS Online and Business Analyst Online Licensing

The licensing for ArcGIS Online and Business Analyst Online are to be used within the organization only. For example, organizations are unable to print out reports and sell them to other entities. In order to use Business Analyst Online, they must have a subscription to ArcGIS Online. When purchasing Business Analyst Online user names, it co-exists with the current usernames to ArcGIS Online. For example, if they have a 5 user names subscription to ArcGIS Online they are unable to have a 10 user name subscription to Business Analyst Online. They would only be able to have a 5 user name subscription to ArcGIS Online and Business Analyst Online (Esri 2016). Additionally, each user must have their own username and password and are not allowed to share usernames (Esri 2015).

5.7.2. Esri's Non-Profit Program

Esri currently has a non-profit program in place for non-profit organizations that are a 501(c)3 humanitarian/conservation entity. Although the non-profit program may expand in the near future, currently only environmental conservation establishments can qualify for the program (Esri 2015). Esri's non-profit program may soon accept art, culture, and humanities organizations (Swenson 2016).

In order to become part of Esri's non-profit program, they must apply online at http://www.esri.com/nonprofit and it may take up to 2-3 weeks to find out their eligibility. If qualified, they will be able to obtain Esri licenses at no cost and only have to pay the

administrative fee (Esri 2015). Although depending on the license, the administrative fee will vary (Swenson 2015). Esri does not have a published price list for the non-profit licenses and the only way to receive pricing is to apply for the program. If they qualify, they will receive an email with pricing information for some of the licenses and if they had any further questions, they can contact their local Esri non-profit representative.

To apply for the program, they must provide the following information: tax exemption status, employer identification number, and their Internal Revenue Service 501(c)3 category, and national taxonomy of exempt entities code (Esri 2016).

5.7.2.1. Esri's Non-Profit Program Training Pricing

If the organization is qualified for the non-profit program, they will be able to purchase training courses offered through Esri at a significant discount shown in Table 7.

Table 7 Training displayed with non-profit discount

Type of Training	Discount
Virtual Campus	40%
Instructor Led	40%
Client site and private classes	30%

Table 8 shows an example of the cost of majority of virtual campus and instructor led training courses with the non-profit discount. Client site and private classes are not published publicly.

Table 8 Pricing of majority of the training courses with non-profit discount

Type of Training	Standard Commercial Cost	Non-Profit Cost
Virtual Campus	$32 or $224	$19.20 or $134.40
Instructor-Led	$1,070 or $1,605	$642 or $963

5.7.3. Esri's Standard Commercial Licensing

If the Pacific Symphony does not qualify for Esri's non-profit program, it will have to purchase the software at standard commercial price. For both ArcGIS Online and Business Analyst Online, it is an annual subscription fee. Table 9 displays the costs of the licenses if it were to purchase the license the way they used it in the project.

Table 9 Cost of project

Product	Standard Commercial Cost
ArcGIS Online Level 1: 5 user names and 2,500 service credits	$2,500/year
Additional 5 user names	$2,500/year
Business Analyst Online: 5 user names	$500/year
Additional Business Analyst Online's 5 user names	$500/year
(6) Block of Service Credits	$600
	Total: $6,600/year

5.7.4. Hiring Consulting Work

If the Pacific Symphony staff decides to hire a consultant to do the Web GIS work for them, due to Esri's licensing, they will still need to purchase their own subscription. The consultant is unable to purchase an ArcGIS Online and Business Analyst Online subscription and publish maps out for different organizations. If they decide to purchase their own subscription, they will be able to dedicate one of their logins to their consultant to create the maps for them. Table 10 shows the general idea of cost is listed in the table below:

Table 10 Pricing of the project including GIS consulting services

Product/Services	Cost
ArcGIS Online Level 1: 5 user names and 2,500 service credits	$2,500/year
Additional 5 user names	$2,500/year
Business Analyst Online: 5 user names	$500/year
Additional Business Analyst Online's 5 user names	$500/year
(6) Block of Service Credits	$600
Average rate for a GIS Consultant (80 hours)	$5,000-6,000
	Total: $11,600 - $12,600

The costs to further develop the program would be higher in the first and second years of the program. Once the work in ArcGIS Online is embedded in the standard-operating procedures of particular staff members, the costs would be limited to maintaining software licenses.

5.8 Conclusions

Although not all organizations are heavy users of GIS, there are many spatial-light organizations and industries that can highly benefit from GIS. Spatial-light organizations now have an opportunity to use a cloud-based, user-friendly software to support business decisions. Industries such as the performing arts may not be heavy users, but as shown with the Pacific Symphony case study, the staff was able to develop spatial information that can help better target marketing efforts, select sites for performances, and choose fundraiser locations. While the software was not as user-friendly as anticipated by the symphony, it brought in valuable data that their current mapping platform was unable to do. Furthermore, it stirred up additional questions that may be able to improve their business. From using Web GIS, they are able to see how they need to increase marketing efforts for their summer home audience, see which Class Act schools are near particular donors, and better understand who their target audiences are and best ways to reach them. It has also assisted them in being able to market to a target audience. The benefits

very likely outweigh the costs because after the first year with consultant work, there will be less of need for consultant support since the Web GIS could be integrated within their standard work procedure.

References

Adriance, Christopher. 2016. Interview by author. Santa Ana. April 5.

Borgatti, Steve. 2016. "Normalizing Variables". Gatton College of Business and Economics University of Kentucky. Accessed May 18, 2016. http://www.analytictech.com/ba762/handouts/normalization.htm.

Brown, Alan. 2014. "Newman Center Presents Programming Study: Arts Audience Mapping Analysis", Lecture, Denver, May 21.

Brown, Alan. 2007. *Community Cultural Assessment.* Scottsdale, AZ: WolfBrown.

Brown, Alan. 2015. Interview by author. Santa Ana. October 19.

Brown, Alan. 2016 Interview by author. Santa Ana. April 5.

Brown, Josh. 2016. Interview by author. Redlands. March 3.

Brasuell, James. 2011. Los Angeles is the Most Densely Populated Urban Area in the US. Curbed Los Angeles. Accessed May 20, 2016. http://la.curbed.com/2012/3/26/10385086/los-angeles-is-the-most-densely-populated-urban-area-in-the-us.

Creative Research Systems. 2016. The Survey System Sample Size Calculator. Accessed January 23, 2016. http://www.surveysystem.com/sscalc.htm.

Dempsey, Caitlin. 2012. Heat Maps in GIS. GIS Lounge. Accessed April 19, 2016. https://www.gislounge.com/heat-maps-in-gis/

Douglas, Bruce. 2008. *Achieving Business Success with GIS*. Hoboken, NJ: John Wiley & Sons Inc.

Croswell, Peter L. 2009. *The GIS Management Handbook*. Frankfort, KY.

Caulkin, Lorraine. 2016. Interviewed by author. Santa Ana. April 5.

GeoSpatial World. 2014. "I want GIS to be as easy as iPhone". http://geospatialworld.net/Magazine/MArticleView.aspx?aid=31054.

DeMeritt, Matthew. 2009. "ESRI Business Analyst Online Includes Tools for Easier Market Research: Geographic Analysis Capabilities Help Businesses Understand Where to Invest." PR Newswire. Accessed October 1, 2015. http://www.prnewswire.com/news-releases/esri-business-analyst-online-includes-tools-for-easier-market-research-79821637.html.

DeSimmone, Brendon. 2013. *"Why Location Matters in Real Estate."* Fox News. Accessed January 11, 2016. http://www.foxbusiness.com/features/2013/10/22/why-location-matters-in-real-estate.html.

Dutta, Pupul. 2011. "*The Consumerization of IT*." Express Computer (September). Accessed October 1, 2015. http://search.proquest.com.libproxy1.usc.edu/docview/894860415?pq-origsite=summon&accountid=14749.

Esri Australia. "Esri Business Summit - Lululemon Athletica" (video). YouTube. Posted on April 22, 2015. Accessed October 9, 2015. https://www.youtube.com/watch?v=F3_fPtGiN78.

Esri. 2015. ArcGIS Applying Geography Everywhere. Accessed October 1, 2015. http://www.esri.com/software/arcgis.

Esri. 2015. ArcGIS Online. Accessed October 1, 2015. http://www.esri.com/software/arcgis/extensions/businessanalyst/key-features.

Esri. 2015. ArcGIS Online Service Credit Program. Accessed February 10, 2016. http://esri.com/software/arcgis/arcgisonline/credits.

Esri. 2012. "Esri; MacKenzie Adopts ArcGIS Online and Opens Up New Lines of Business." Real Estate Weekly News. Accessed October 1, 2015. http://libproxy.usc.edu/login?url=http://search.proquest.com.libproxy2.usc.edu/docview/1095700092?accountid=14749.

Esri. 2016. How Kernel Density Works. Accessed April 16, 2016. http://pro.arcgis.com/en/pro-app/tool-reference/spatial-analyst/how-kernel-density-works.htm.

Esri. 2016. Nonprofit Organization Program. Accessed February 10, 2016. http://esri.com/nonprofit

Esri. 2015. Real Estate. Accessed December 5, 2015. http://www.esri.com/industries/real-estate.

Esri. 2016. Standard Distance. Accessed May 2, 2016. http://pro.arcgis.com/en/pro-app/tool-reference/spatial-statistics/standard-distance.htm.

Esri. 2016. Trust ArcGIS. Accessed January 15, 2016.

Farma, Susan. 2016. Interview by author. Santa Ana. April 5.

Fotheringham, Stewart A. 2009. The SAGE handbook of spatial analysis. Thousand Oaks: SAGE Publications Ltd. Accessed May 5, 2016. http://sk.sagepub.com.libproxy2.usc.edu/reference/hdbk_spatialanalysis.

Francica, Joe. 2014. GIS Champions Still Make or Break Project Success: Case studies from Time Warner Cable and Ordnance Survey Ireland. Accessed May 17, 2016.

http://www.directionsmag.com/entry/gis-champions-still-make-or-break-project-success-case-studies-from-ti/424039.

Freedman, David A. 1999. *Ecological Inference and the Ecological Fallacy*. Berkley, CA: Prepared for the International Encyclopedia of the Social & Behavioral Sciences Technical Report No. 549. Accessed April 28, 2016. http://web.stanford.edu/class/ed260/freedman549.pdf.

Geo World. 2015. "From disaster response to relief and development: an integrated GIS approach for nonprofit organizations." Gale Business Insight Essentials, October 2011, accessed December 9, 2015, http://bi.galegroup.com.libproxy2.usc.edu/essentials/article/GALE|A273788204?u=usocal_main&sid=summon&userGroup=usocal_main.

Gray, Amanda. 2014. "Spatial Delineation of Market Areas: A Proposed Approach". Master's thesis, University of Southern California, 2014. http://spatial.usc.edu/wp-content/uploads/2014/04/GrayAmanda.pdf.

Grimshaw, David, 2nd ed. 2000. *Bringing Geographical Information Systems into Business*. Canada. John Wiley & Sons Inc.

Harlow, Bob. 2014. "The Road to Results: Effective Practices for Building Art Audiences." New York, New York: Bob Harlow Research and Consulting.

Helzer, Jennifer H. 2014. "MapGIS - Measuring Art Participation with GIS." Accessed March 2, 2016. https://www.arts.gov/sites/default/files/Research-Art-Works-CSUStanislaus.pdf.

Kotler, James, and Joanne Scheff Bernstein. 1997. *Standing Room Only: Strategies for Marketing the Performing Arts* (United States of America: Presidents and Fellows of Harvard College, 1997).

Levine, Ned. 2013. *Crime Stat IV: Part IV: Spatial Modeling I.* Washington DC: National Institute of Justice. Accessed April 28, 2016. http://nij.gov/topics/technology/maps/documents/crimestat-files/CrimeStat%20IV%20Chapter%2010.pdf.

Lue, Evan. 2013. "*Volunteers with GIS Skills Support American Red Cross*." Esri News for Health and Human Services. Accessed October 1, 2015. http://www.esri.com/library/reprints/pdfs/health-and-human-american-red-cross.pdf.

Lue, Evan. 2014. "Defining the geospatial needs of a ubiquitous disaster relief organization." USC. PhD diss., University of Southern California. Accessed October 1, 2015. http://digitallibrary.usc.edu/cdm/ref/collection/p15799coll3/id/469845.

Martinez, Carlos. 2015. "Relocation Bay: Identifying a Suitable Site for the Tampa Bay Rays". Master's thesis, University of Southern California, 2015. http://spatial.usc.edu/wp-content/uploads/2015/03/Martinez_Carlos.pdf.

Nielson. 2016. Nielsen PRIZM. Accessed April 30, 2016. https://segmentationsolutions.nielsen.com/mybestsegments/Default.jsp?ID=70.

Nielson. 2016. Nielsen PRIZM Lifestage Groups. Accessed April 30, 2016. https://segmentationsolutions.nielsen.com/mybestsegments/Default.jsp?ID=7010&menuOption=learnmore&pageName=PRIZM%2BLifestage%2BGroups&segSystem=CLA.PNE.

Nielsen. 2016. 2016 Nielsen PRIZM Social Groups. Accessed April 30, 2016. https://segmentationsolutions.nielsen.com/mybestsegments/Default.jsp?ID=7020&menuOption=learnmore&pageName=PRIZM%2BSocial%2BGroups&segSystem=CLA.PNE.

Pick, James. 2005. *"Geographic Information Systems in Business."* Hershey, PA. Idea Publishing Group.

Pilarcik, Tyler. 2015. Interview by author. Redlands. November 16.

Pilarcik, Tyler. 2016. Interview by author. Redlands. April 18.

PitneyBowes. 2016. MiPro v15.0/15.2 (32-bit/64-bit) Standard Edition (English). Accessed April 30, 2016. http://store.pbinsight.com/store/pitneybo/en_US/pd/ThemeID.28499800/productID.320026200/categoryID.43348500/parentCategoryID.43227400.

Poolet, Michelle A. 1999. "SQL by Design: Why You Need Database Normalization." SQL Server Pro. Accessed May 18, 2016. http://sqlmag.com/database-performance-tuning/sql-design-why-you-need-database-normalization.

Reeser, Devon. 2014. "Five Ways to Use GIS to Strengthen Your Nonprofit Fundraising." GIS Lounge. Accessed February 10, 2016). https://www.gislounge.com/five-ways-use-gis-strengthen-nonprofit-fundraising/.

Schardein, Rod. 2015. Interview by author. Redlands. November 17.

Sensors and Systems. 2014. What Does it Mean to be a GIS 'Champion'?. Accessed May 17, 2016. http://sensorsandsystems.com/what-does-it-mean-to-be-a-gis-champion/.

Sutton, Sean. 2015. Interview by author. Santa Ana. October 19.

Sutton, Sean. 2016. Interview by author. Santa Ana. April 5.

Swenson, Emily. 2015. Interview by author. Redlands. November 9.

Swenson, Emily. 2016. Interview by author. Redlands. February 10.

United States Postal Service. 2016. RIBBS Address Management Project. Accessed April 30, 2016. https://ribbs.usps.gov/index.cfm?page=address_manage_products.

Vanhoenacker, Mark. 2014. “Classical music in America is dead,” Requiem, 2014, accessed February 10, 2016. http://www.slate.com/articles/arts/culturebox/2014/01/classical_music_sales_decline_is_classical_on_death_s_door.html.

William J. Craig, Trevor M. Harris, and Daniel Weiner. 2002. *Community Participation and Geographical Information Systems* (New York, NY: Taylor & Francis Inc, 2002), 27 – 163.

Appendix A: ArcGIS Online Step-by-step Guide – Finding Demographics/Tapestry Data based off of Current Customer Data

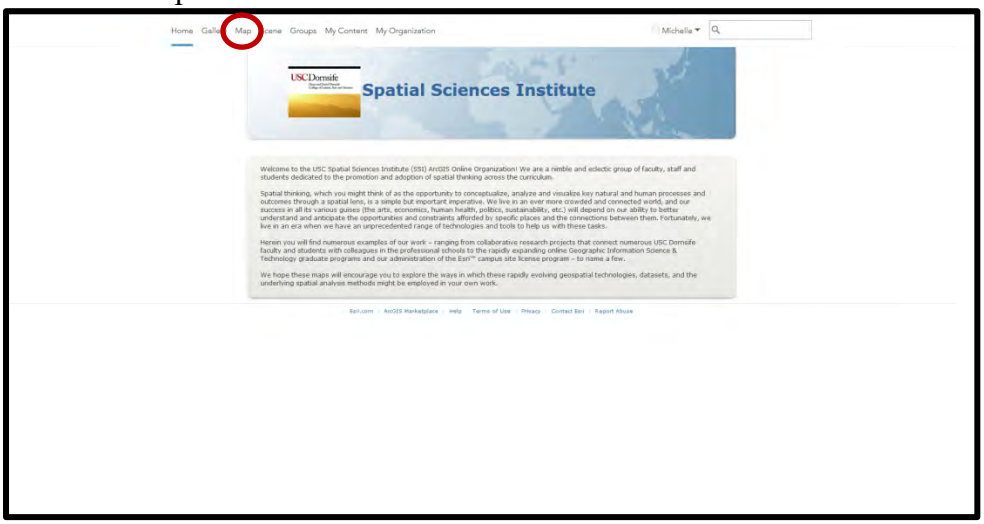
This appendix contains complete copies of the step-by-step guides given to the project team that show the appropriate steps needed to complete the maps that the project teams were assigned. Once completed, these maps should be able to display the necessary information needed to do the visual analysis described in this manuscript. The text on the images from the screen shots below are hard to discern because of the paper and margin limits for a thesis manuscript. However, the text listed in the guides themselves shows the exact steps necessary to generate the maps. Also, since the images give a general idea of the menus and display in ArcGIS Online at each step, this information is provided here in case it is of use to the reader in developing step-by-step guides for similar projects.

Log into ArcGIS Online

1. Go to www.arcgis.com
2. Click "Log in" on the top right hand corner
3. Log in with your credentials

Bringing in Donor layer

1. Click on "Map"

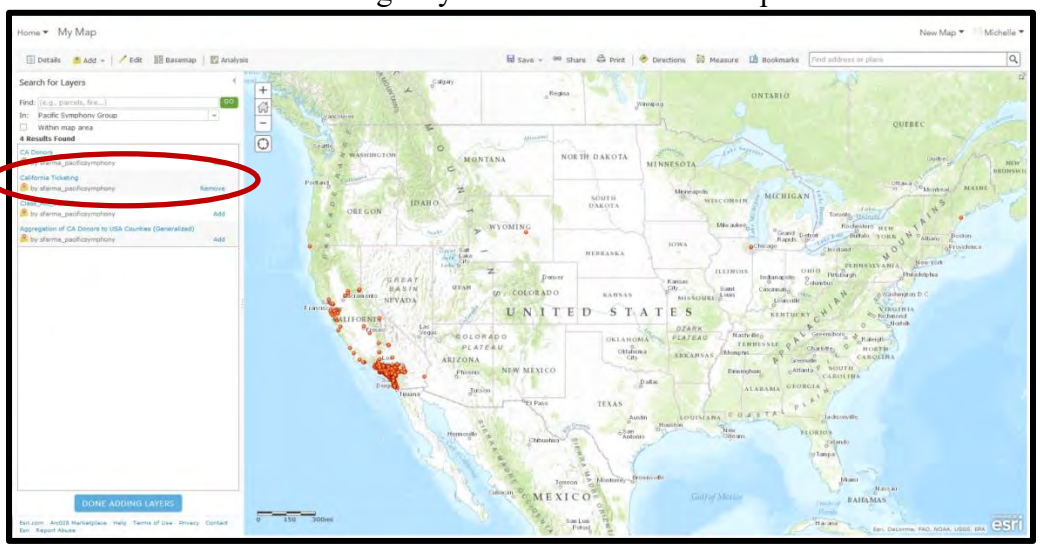


2. Click on “Add”

3. Click “Search for Layers”

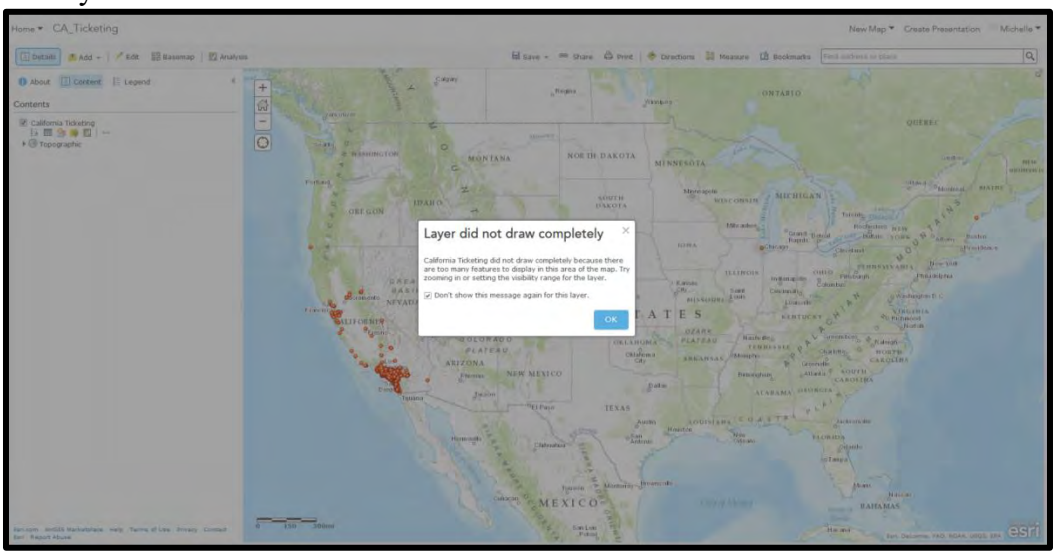
4. Uncheck “Within map area”
5. Under “In” click the drop down menu and select “Pacific Symphony Group”

6. Find the “California Ticketing” layer and click “Add to map”

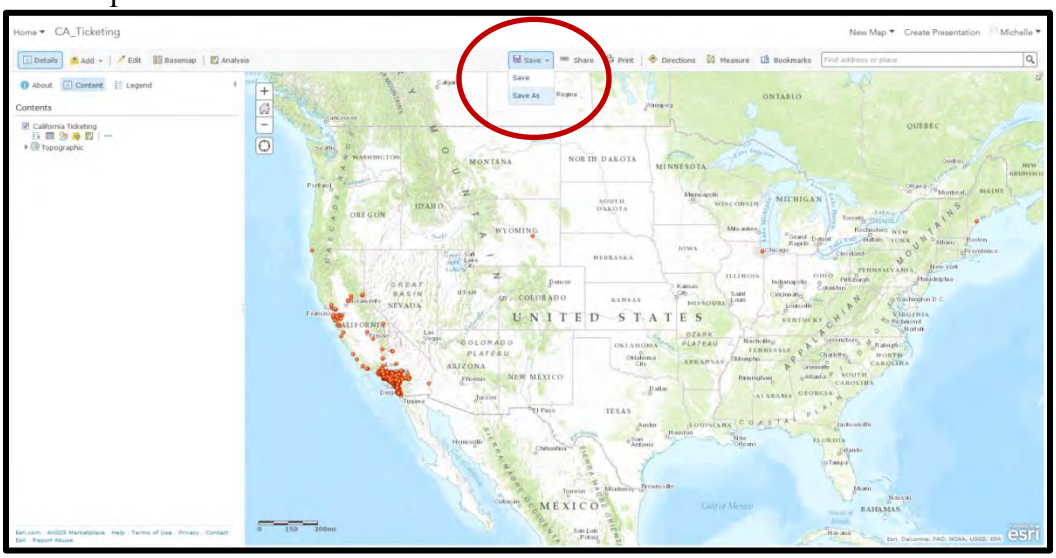


7. Click “Done Adding Layers”

8. When you see this pop up (pictured below), select “Don’t show this message again for this layer” and click OK



9. Save map



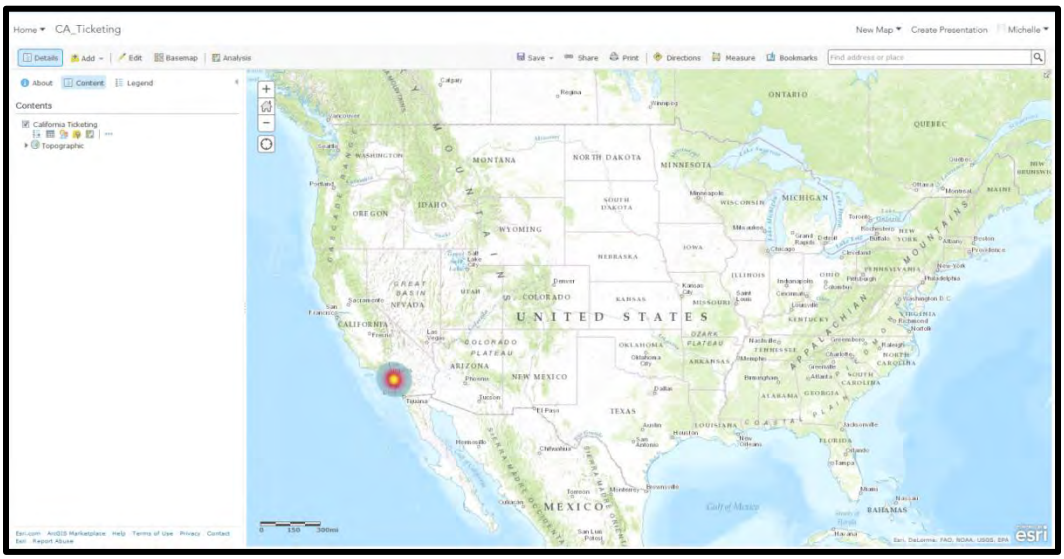
Creating a Heat Map

1. Under your "California Ticketing" layer click (Change Style) (pictured below)

2. Under "1 Choose an attribute to show" select "Show location only"

3. Under “2 Select a drawing style” click “Select” under Heat Map

4. Click “Done”

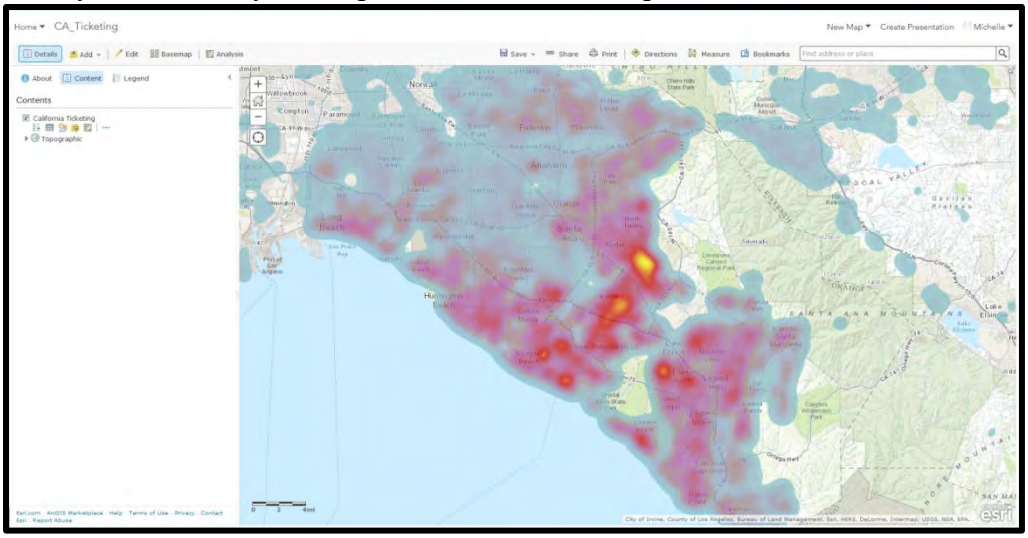


5. Save map

Drawing Map Notes

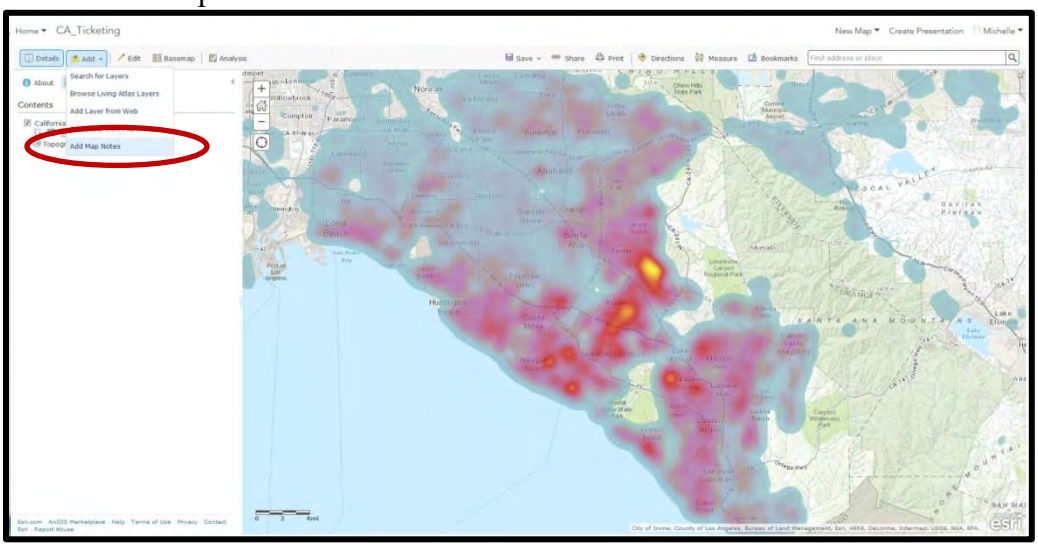
1. Zoom into Orange County by holding the “Shift” key on your keyboard and taking your mouse and drawing a box around the yellow spot.

2. After you zoom in, your map should look like the picture below

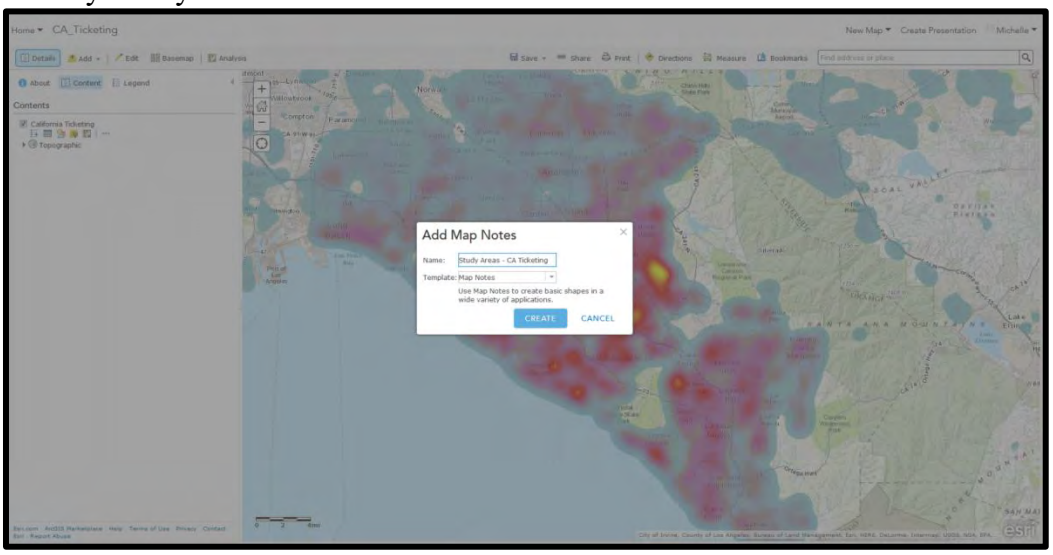


3. Click “Add”

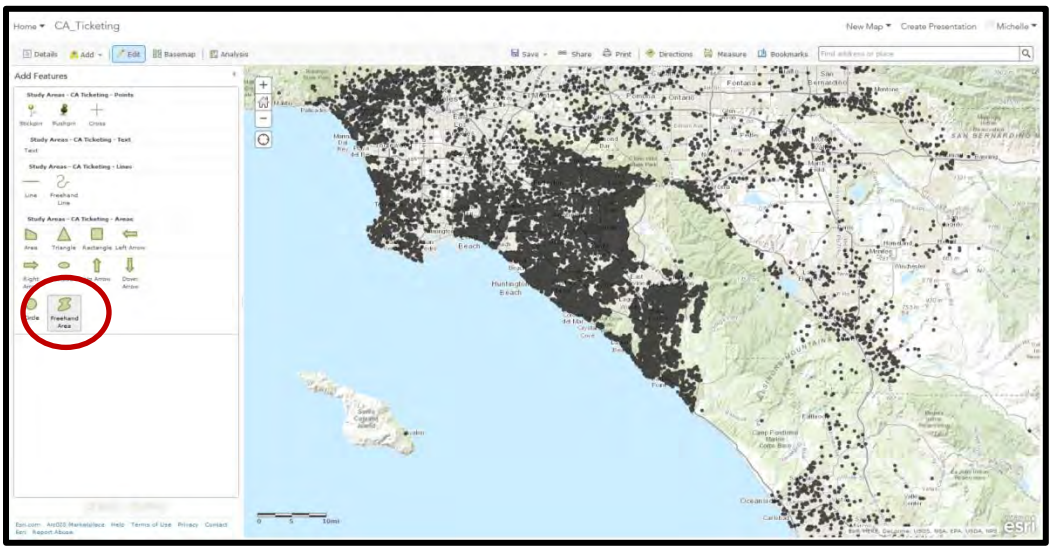
4. Click “Add Map Notes”



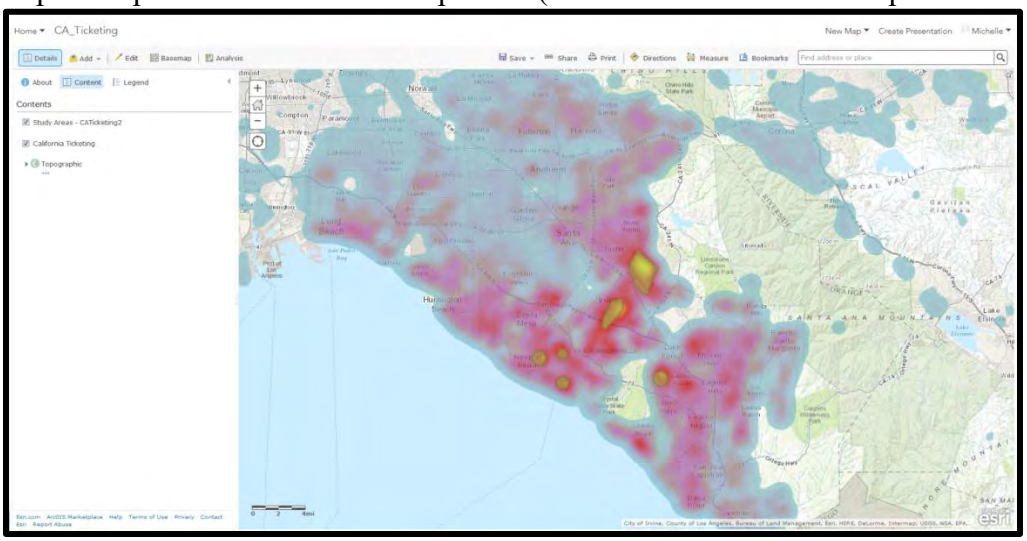
5. Name your layer and click “Create”



6. Click “Freehand Area”



7. When you click map notes, it will automatically default back to its original symbol (black dots). Therefore, you will have to remember where your hot spots are and draw accordingly
    a. If you are having difficulty with this, I already created the map notes and you can load in the layer saved as “Ticketing”
8. Press down and trace around the hot spots
9. Click “Close” when the pop up comes up
10. Click anywhere within the map to finish the drawn map note
11. Repeat steps 4-7 to draw more map notes (Should look similar to the picture below)

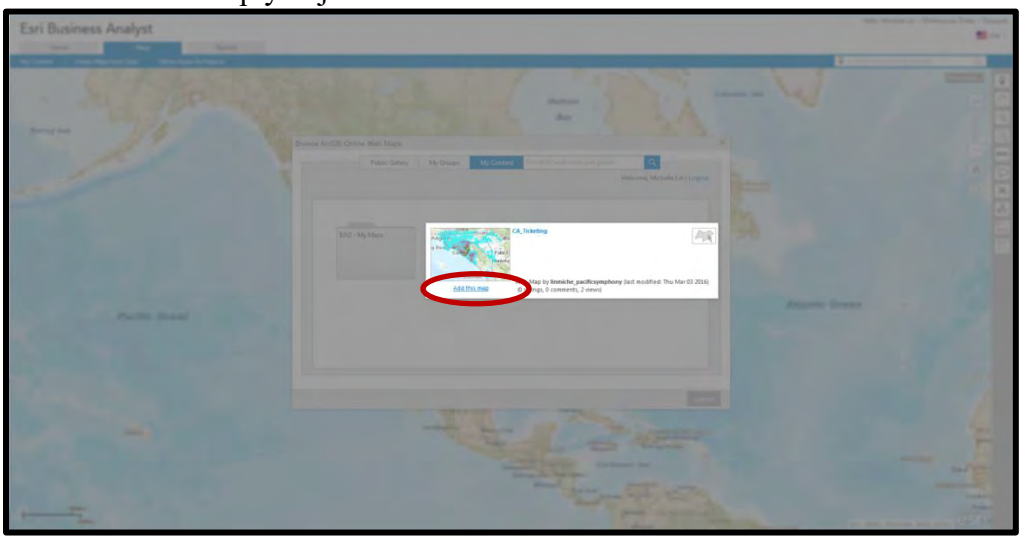


12. Once all of your map notes are drawn, click “Edit”
13. Save map

Transitioning Map Notes into Business Analyst Online

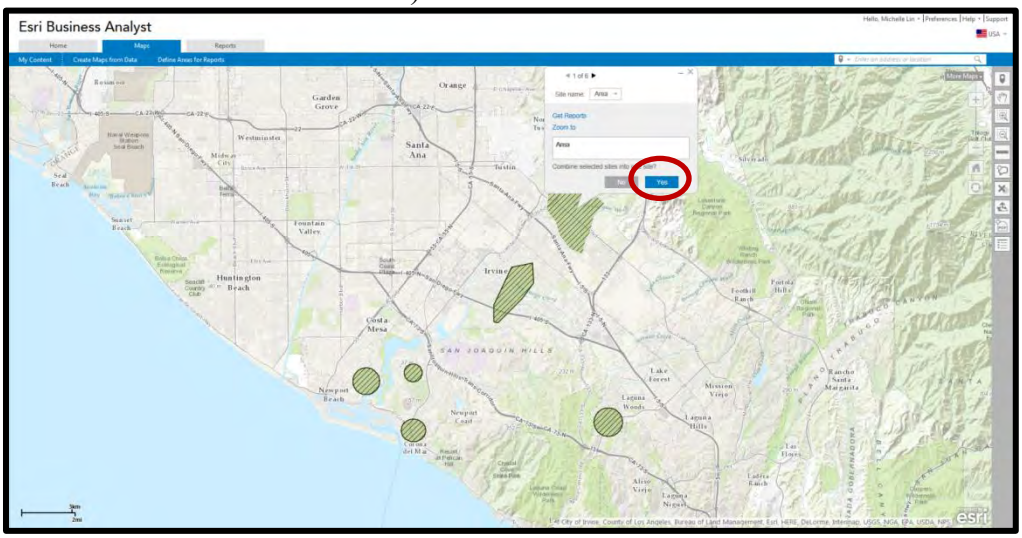
1. Log into Business Analyst Online: https://bao.arcgis.com/esriBAO/login/
2. Click “Map” tab
3. Click “Create Maps from Data”
4. Click “Web Maps”

5. Hover over the map you just created within ArcGIS Online and click “Add this to map”



6. Hold the “Shift” key on your keyboard and select all the map notes

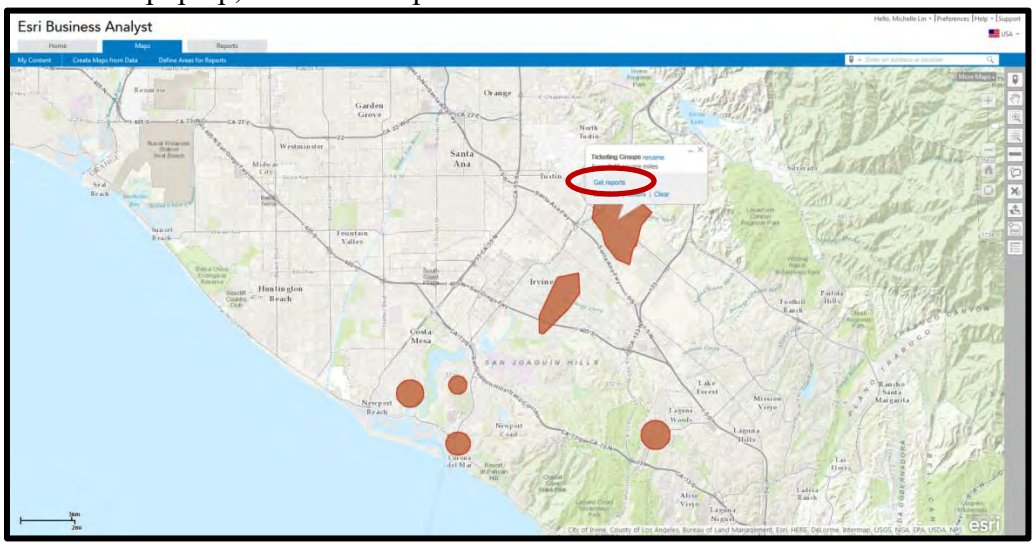
7. A popup should display asking “Combine selected sites into one site?” Click Yes (Should look like the screen shots below)



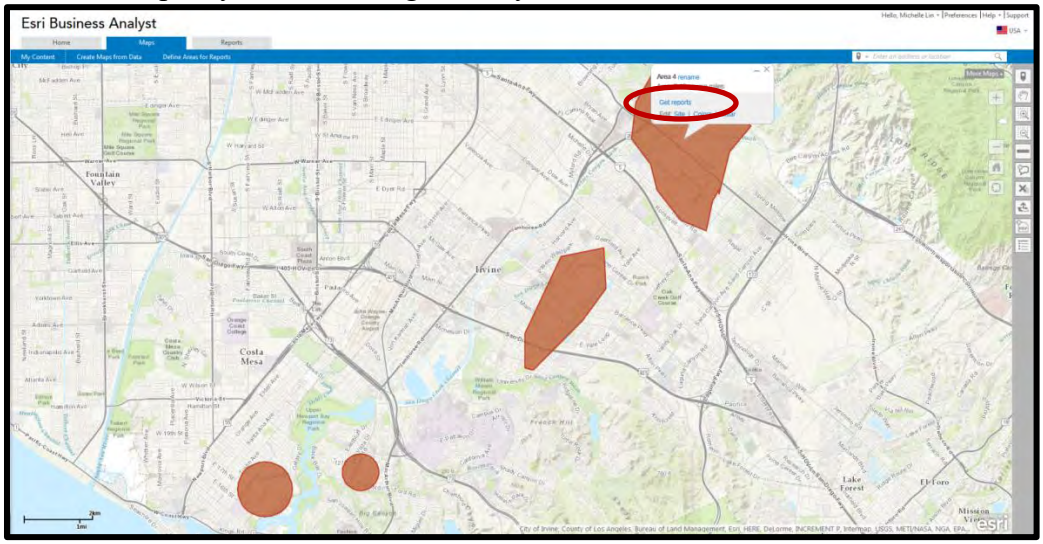
   a. There is a bug within the software where it may not ask you this right away. Please repeat this step until you see it (may take several times)
8. To rename the title, click “rename”

Printing out Data Reports

1. Within the pop up, click “Get reports”

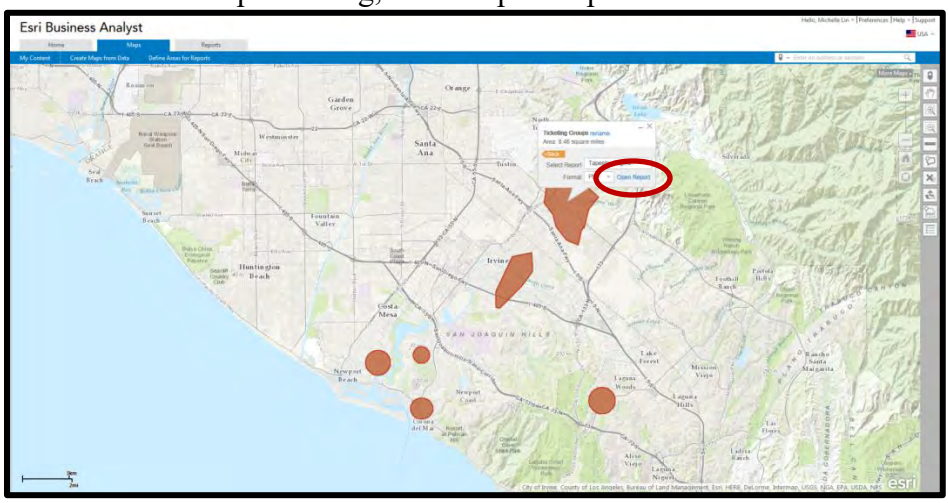


2. Select the report you are looking to analyze

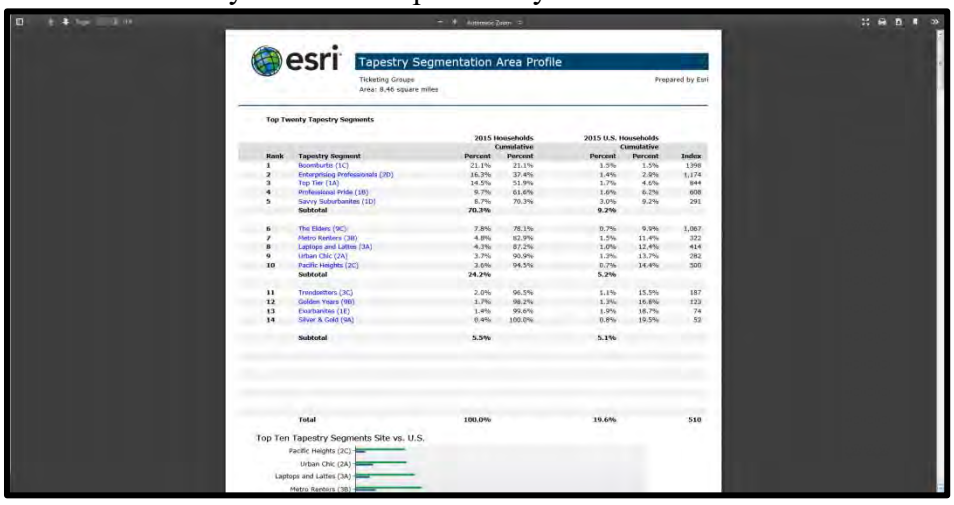


3. Click “Run Report”

4. Once it's finished processing, click "Open Report"



5. Save PDF within your own computer for your records

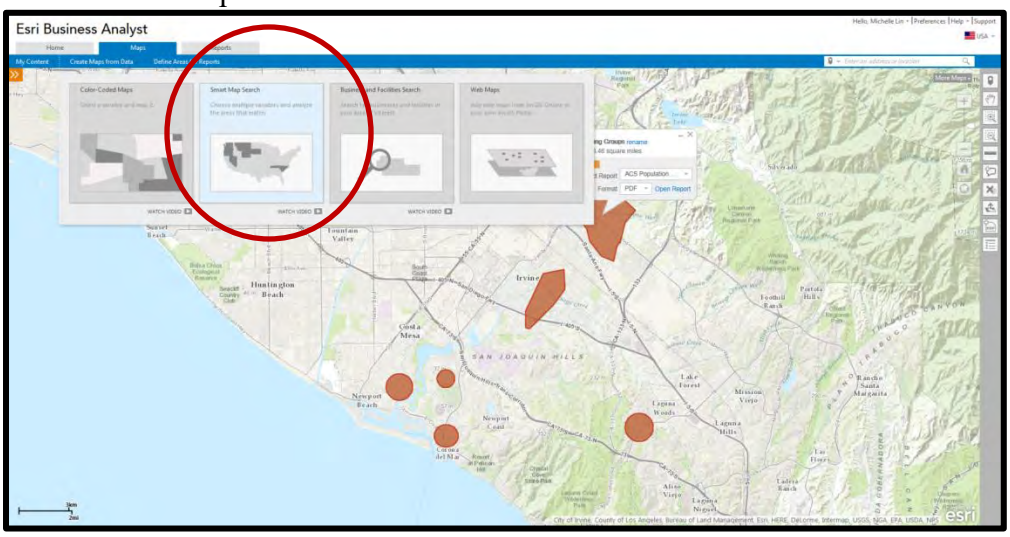


6. To print out additional reports, repeat steps 1-5

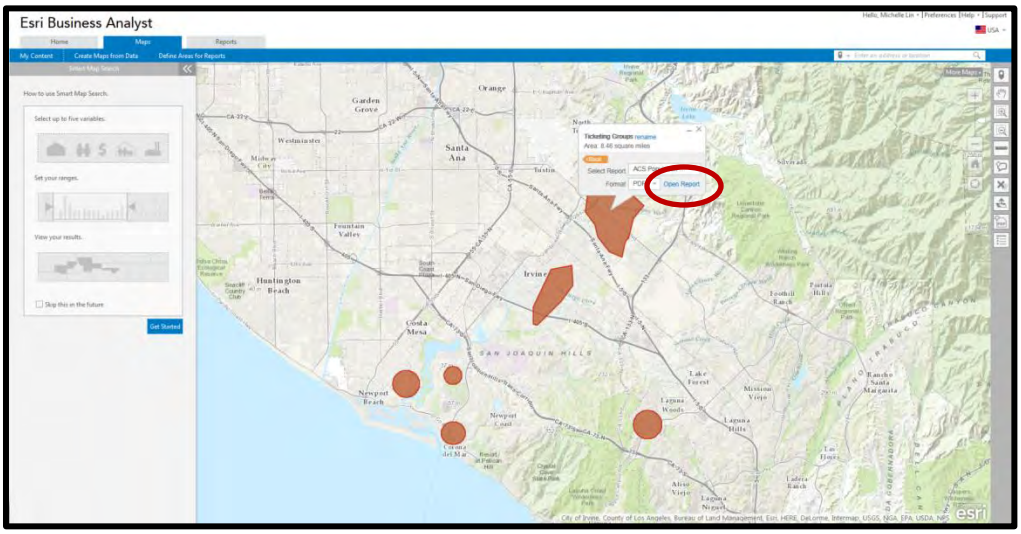
Creating a Smart Map

1. After analyzing your data, you will know what variables you would like to add and view on your map
    a. The variables I have chosen are: education (Bachelor's: 37.6%), Tapestry (Boomburbs: 21.1%), and income ($75,000 - $200,000+)
2. Click "Maps"
3. Click "Create Maps from Data"

4. Click “Smart Map Search”

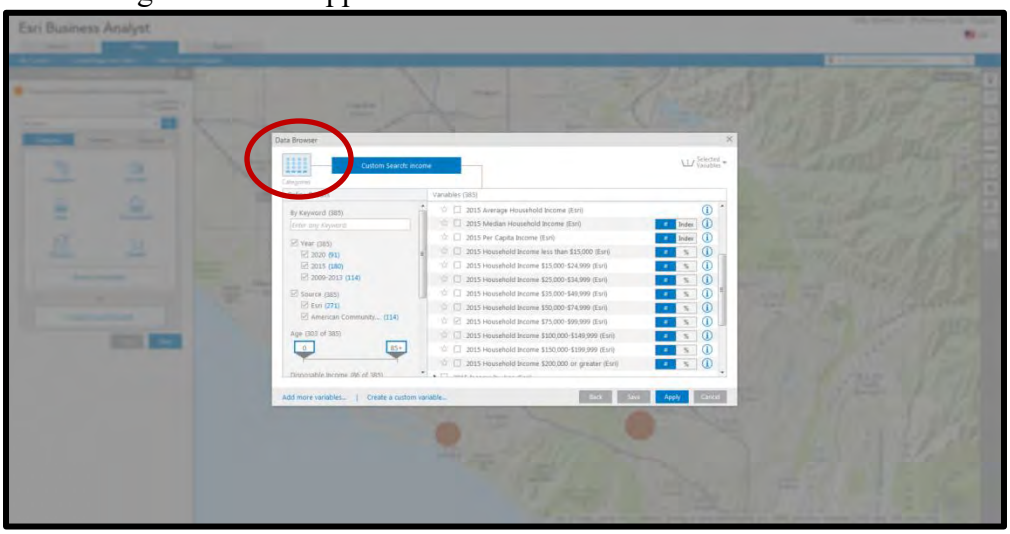


5. Click “Get Started”

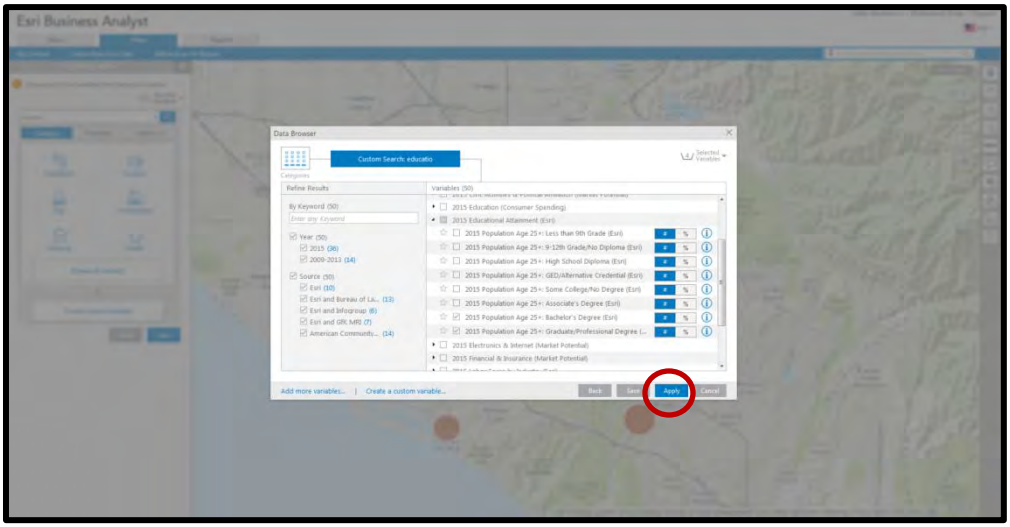


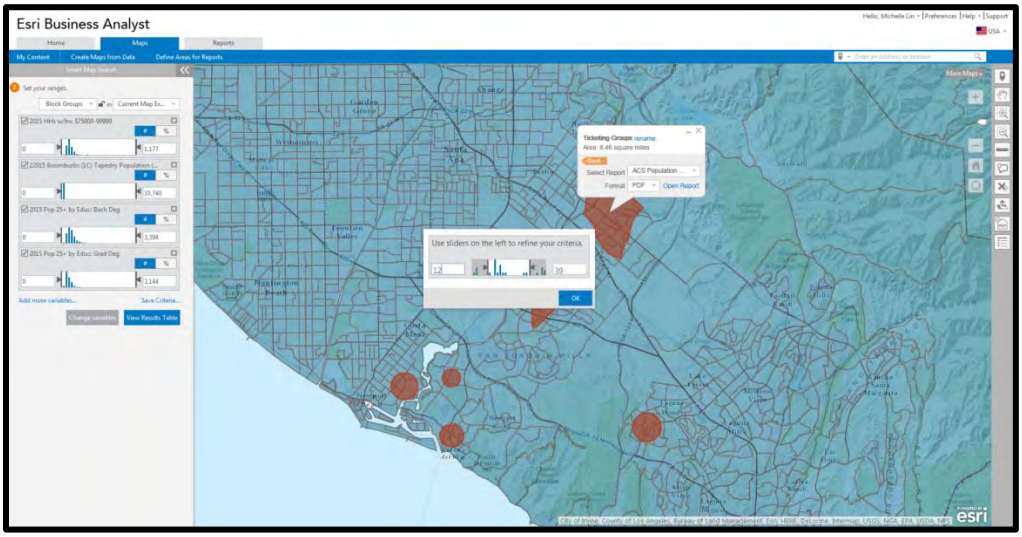
6. Type in the variable you are looking to add to your map
    a. I did: income, tapestry, and education
7. Click the magnifying glass
8. Select your desired variables

9. Click Categories on the upper left hand corner to search for additional variables

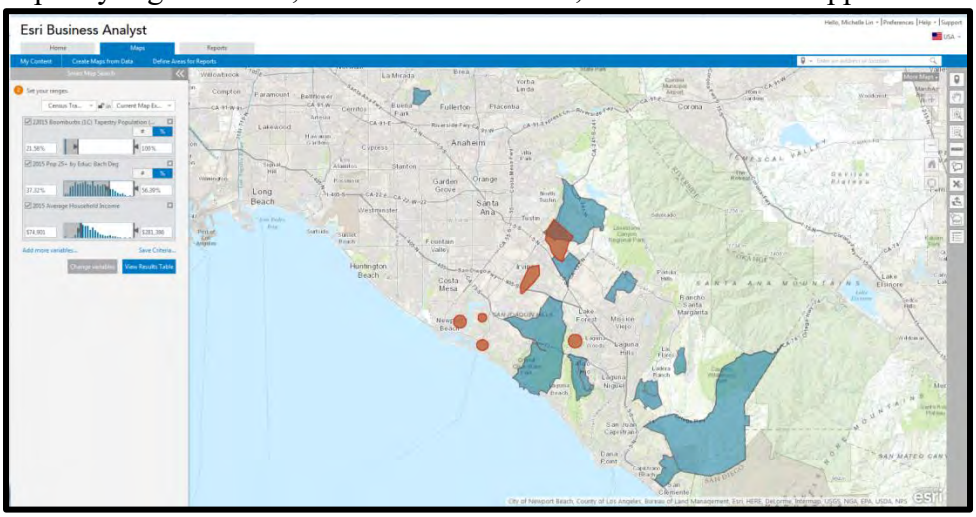


10. Click “Apply”



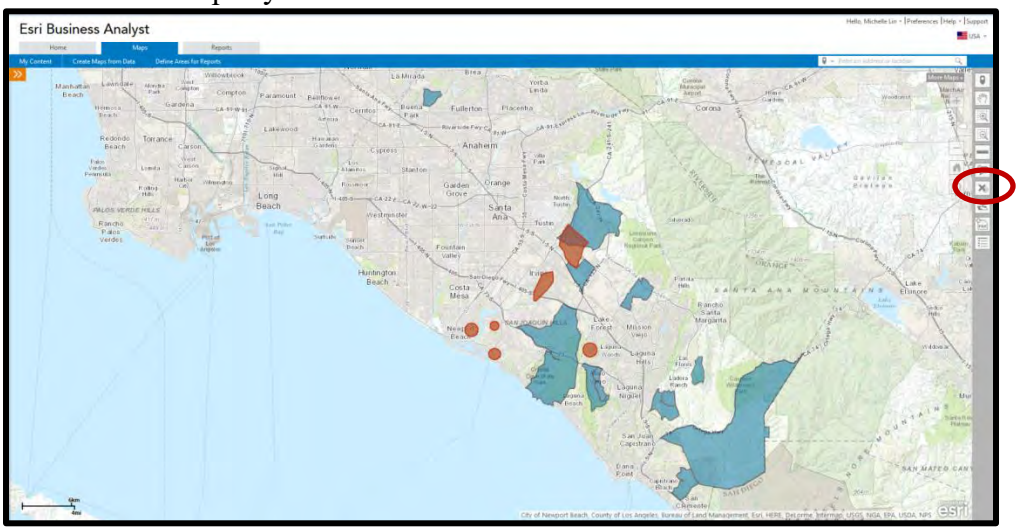


11. Input your ranges (your map should look similar to the one pictured below)
    a. Drag the sliders – there is a bug in the software that will not let you type in the desired numbers Income is best left as #
    b. Tapestry segmentation, education attainment, and race are best applied as %



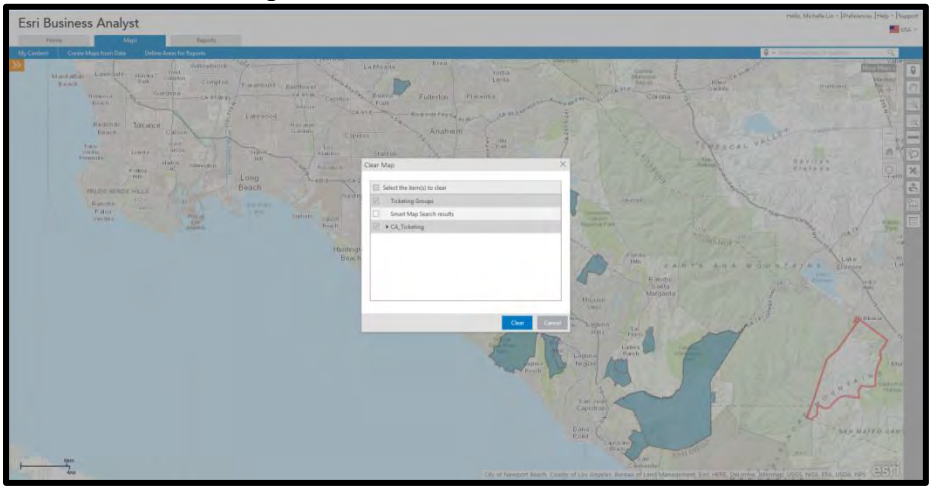
Move Smart Map Layer Over to ArcGIS Online

1. Click "Clear Map" symbol

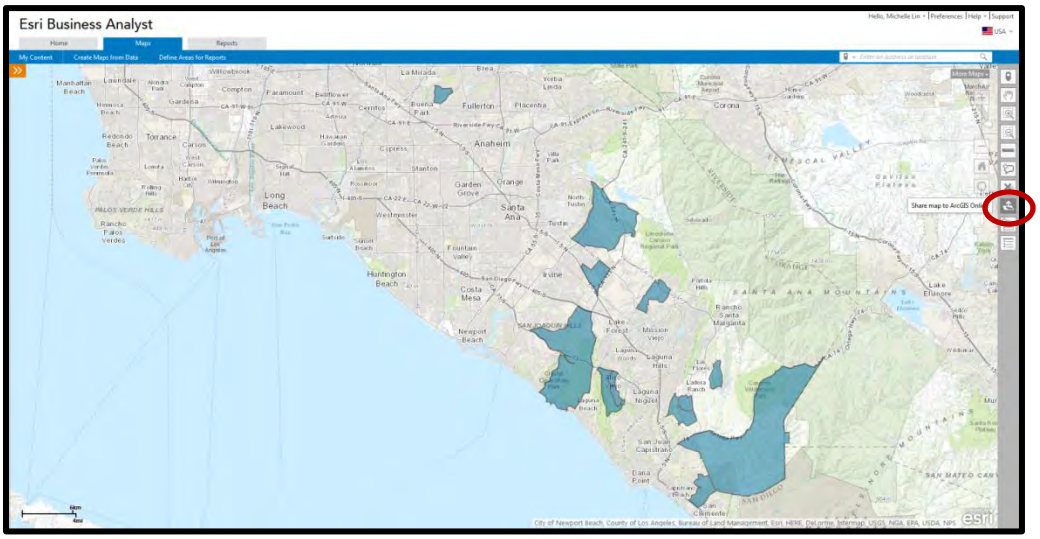


2. Clear everything **EXCEPT** the Smart Map Search result
    a. To clear other layers, select the layer(s) and click Clear

b. Should look like the picture below

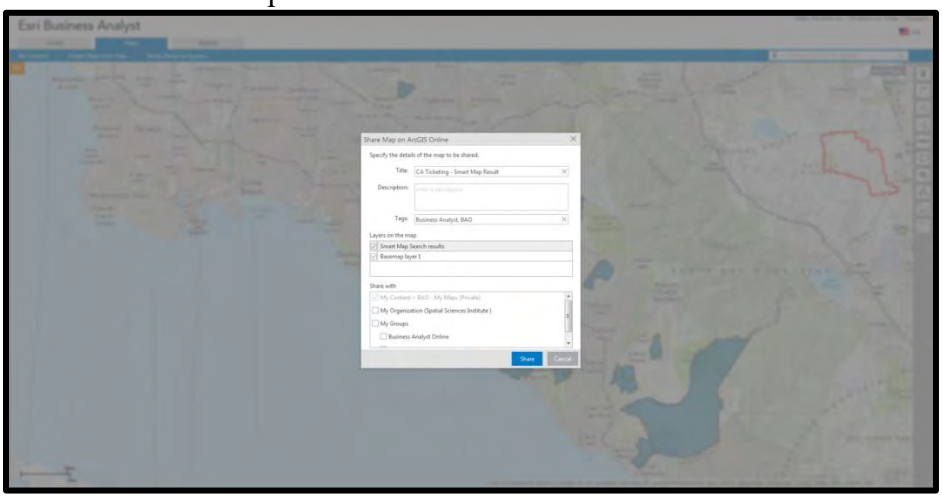


3. Click “Share map to ArcGIS Online”

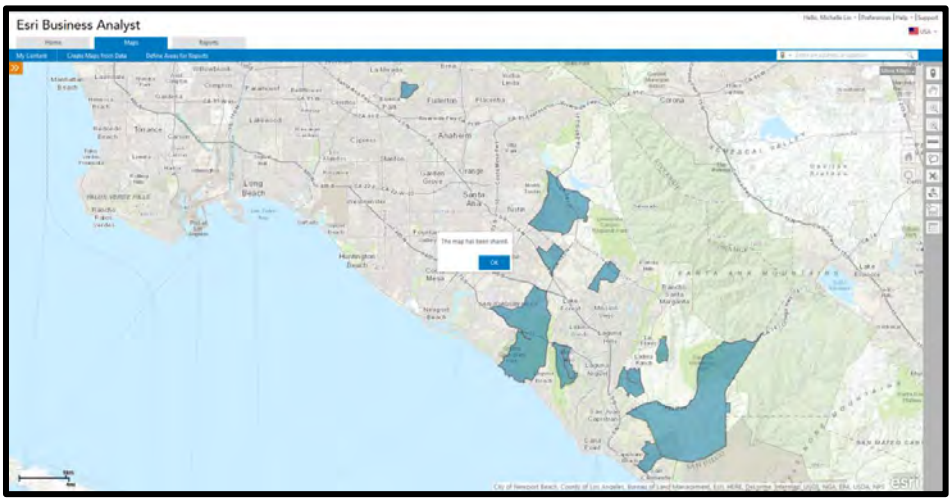


4. Under “Layers on the map”, make sure **ONLY** the “Smart Map Search result” and “Basemap layer 1” is selected – Clear everything else
5. Type in desired title

a. Should look like the picture below

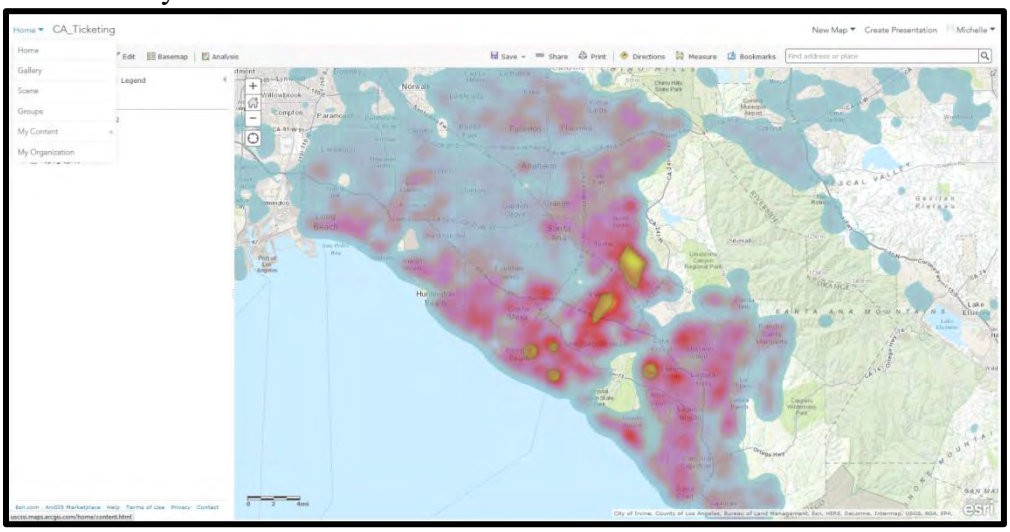


6. Click “Share”
7. A popup will appear stating that your map has been shared to ArcGIS Online

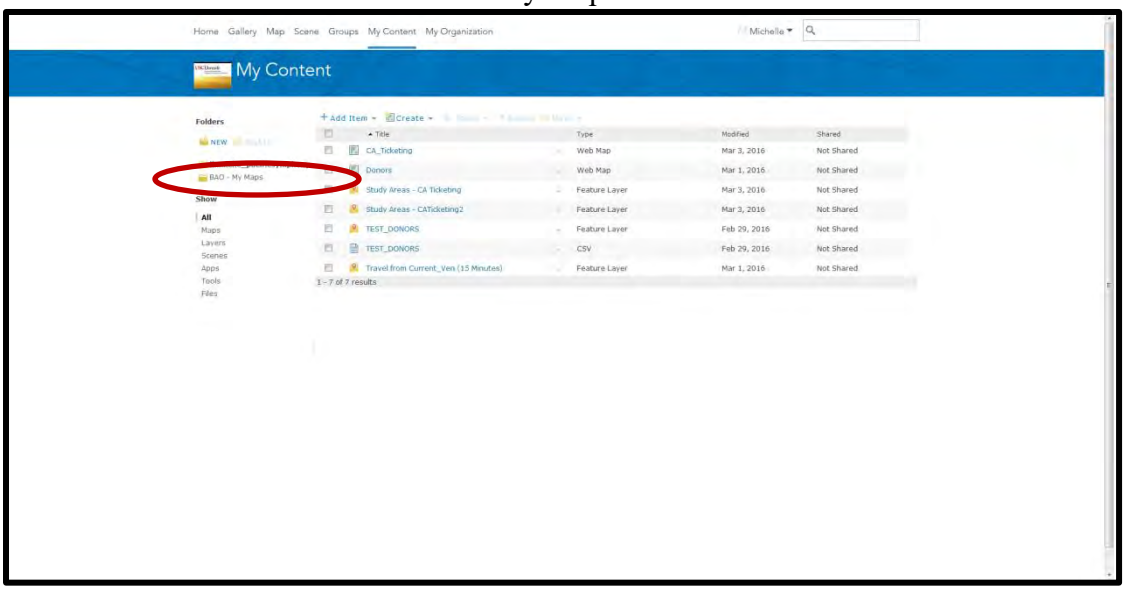


Transitioning Back to ArcGIS Online

1. Go back to your previous tab where you had ArcGIS Online or log back in
2. Click on “My Content”

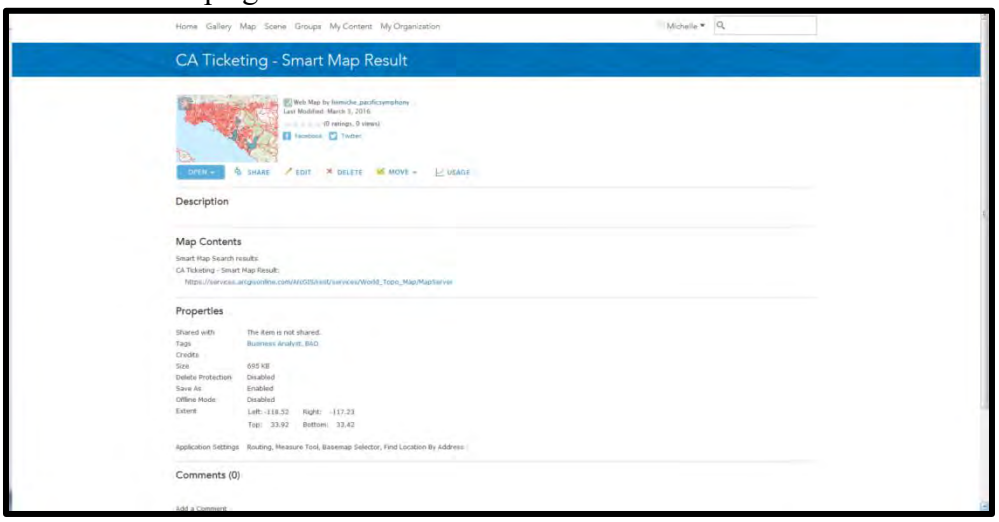


3. Click on the folder to the left “BAO – My Maps”

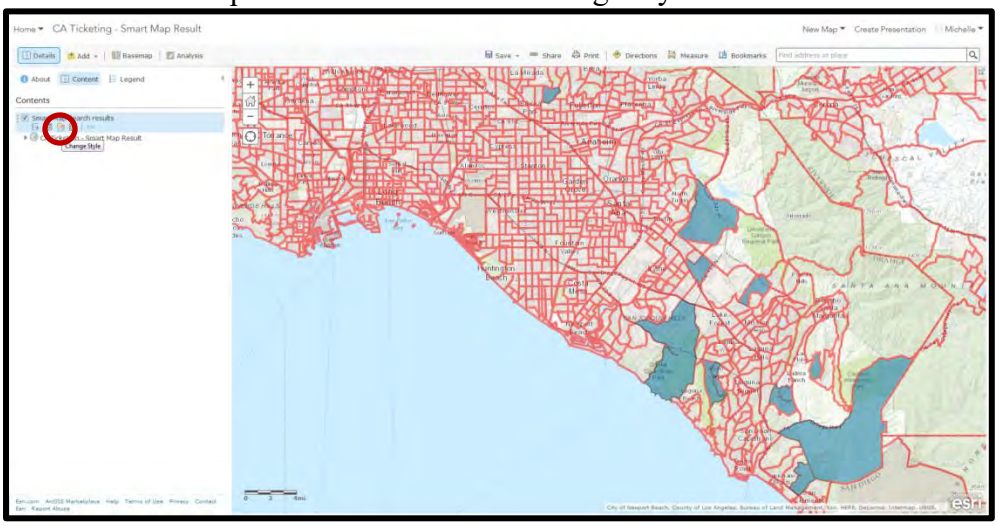


4. Click on the map

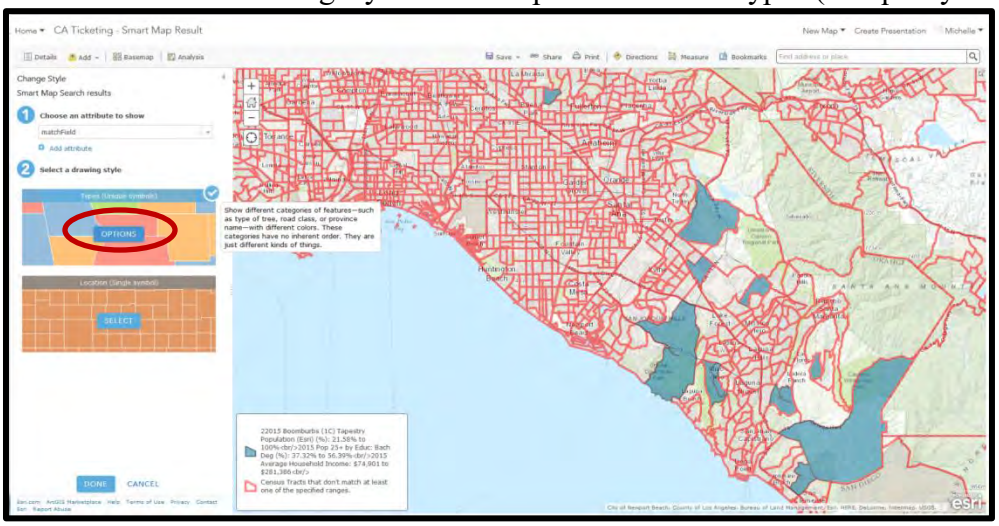
5. Click on the map again



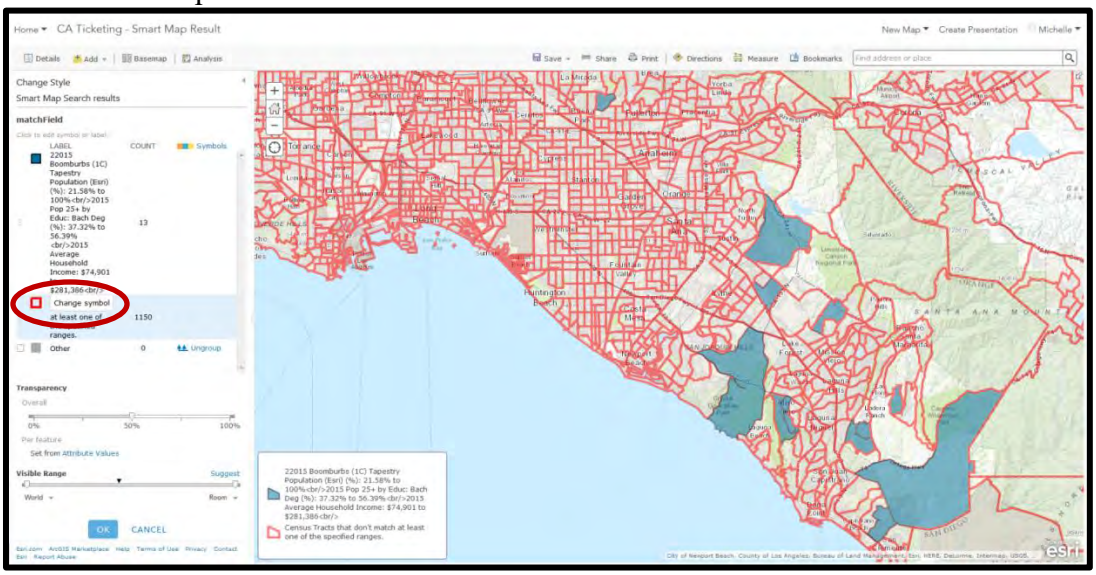
6. Under “Smart Map Search results” click Change Style



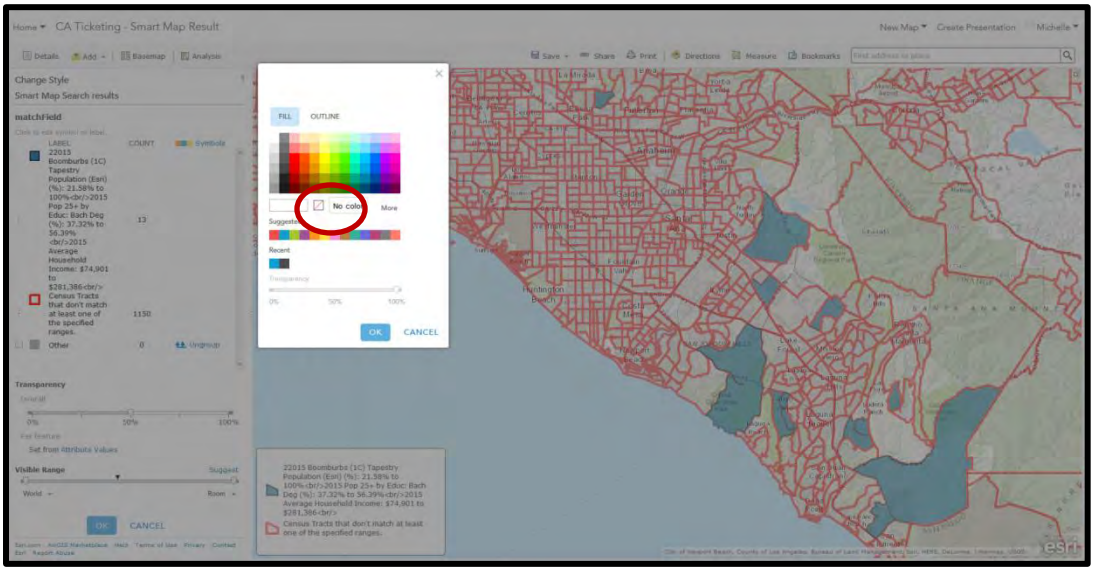
7. Under “2 select a drawing style” click “Options” under “Types (Unique symbols)



8. Click the red square

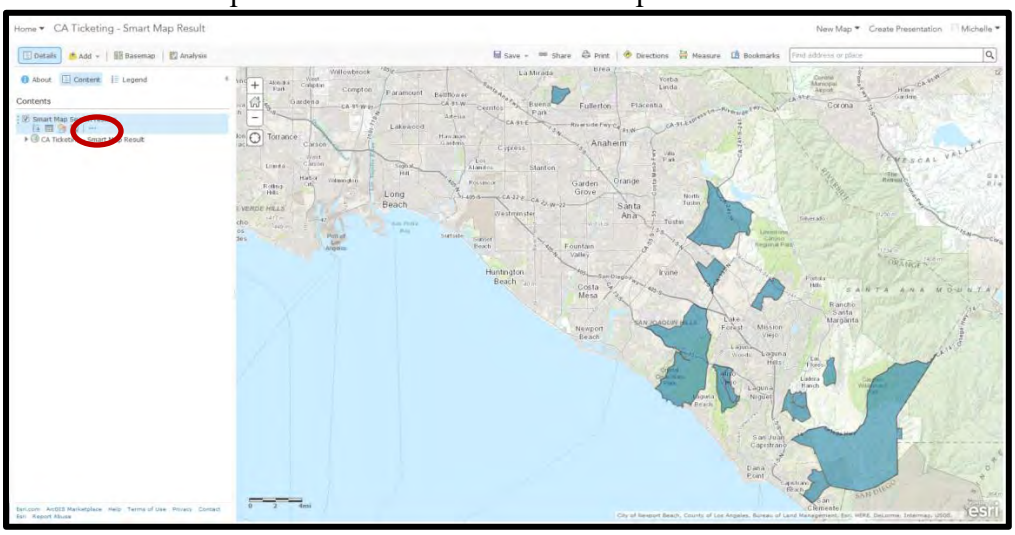


9. Under “Fill” and “Outline” select “No color”

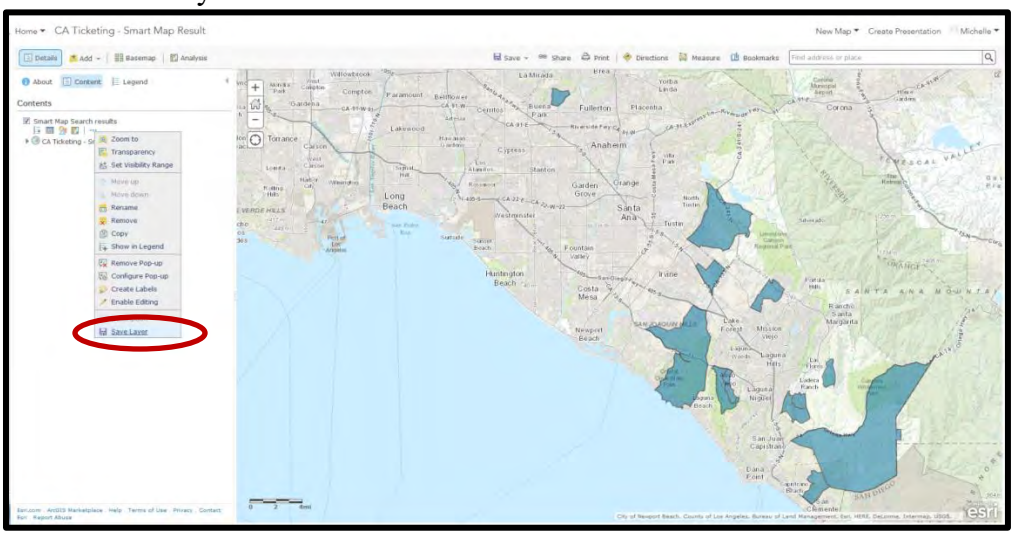


10. Click OK
11. Click Ok
12. Click Done

13. Under “Smart Map Search results” select More Options

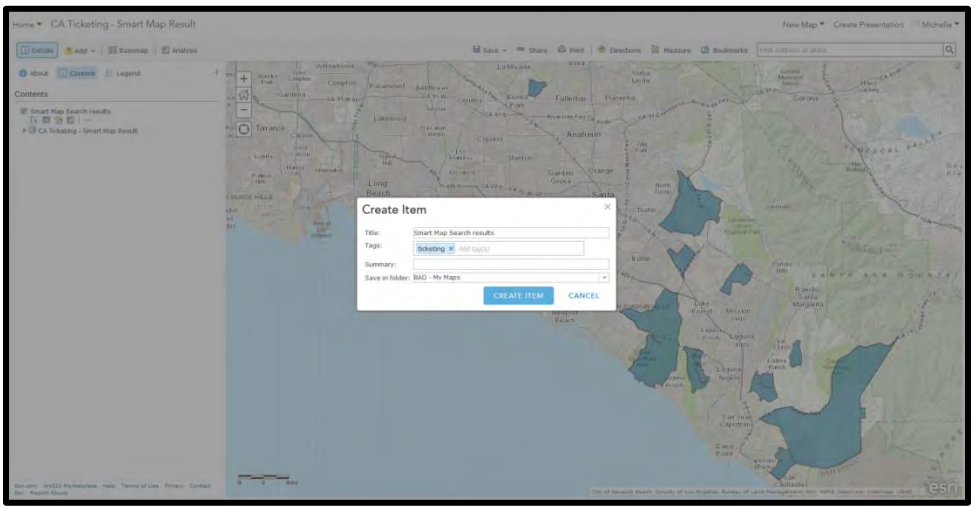


14. Click “Save Layer”

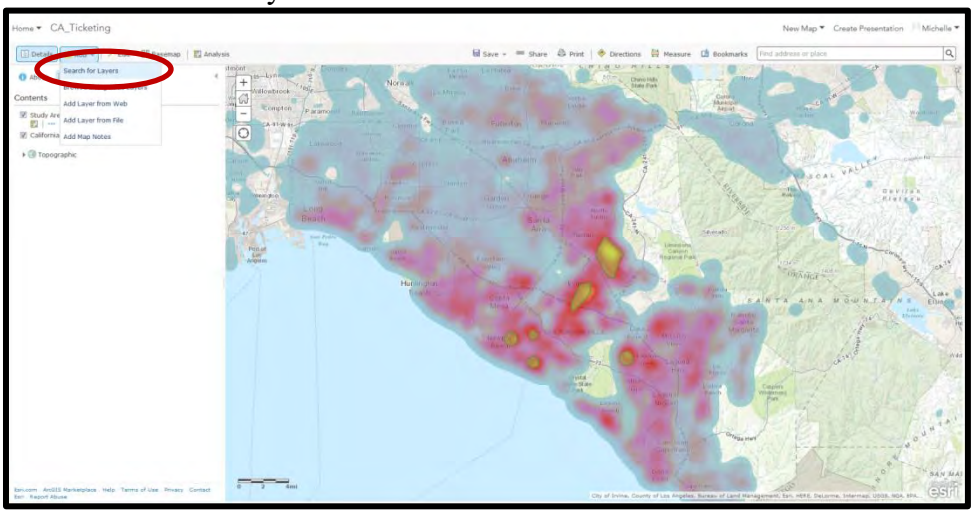


15. Add Title and tags

16. Click “Create Item”

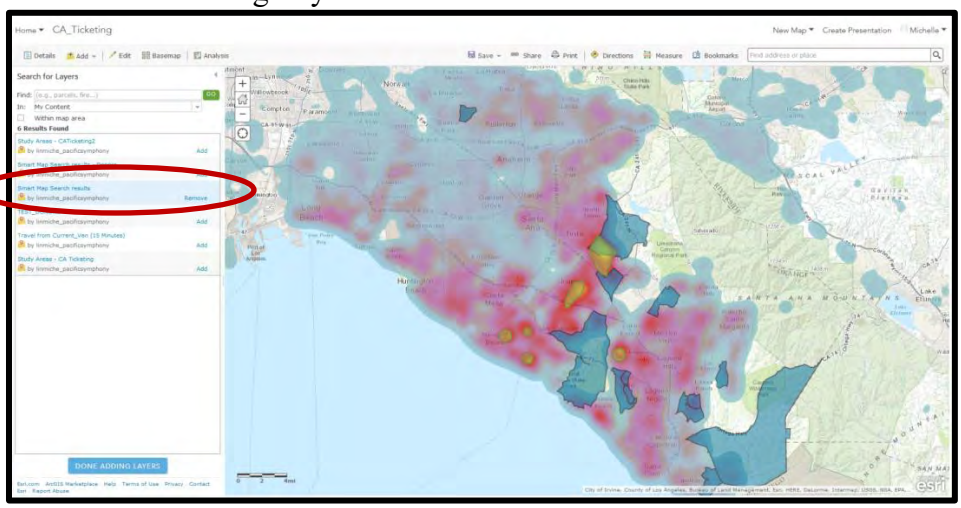


17. Save map
18. Click “Home” and click “My Content”
19. Go back to your original map (ex: CA Ticketing) under your folder
20. Click “Add”
21. Click “Search for Layers”

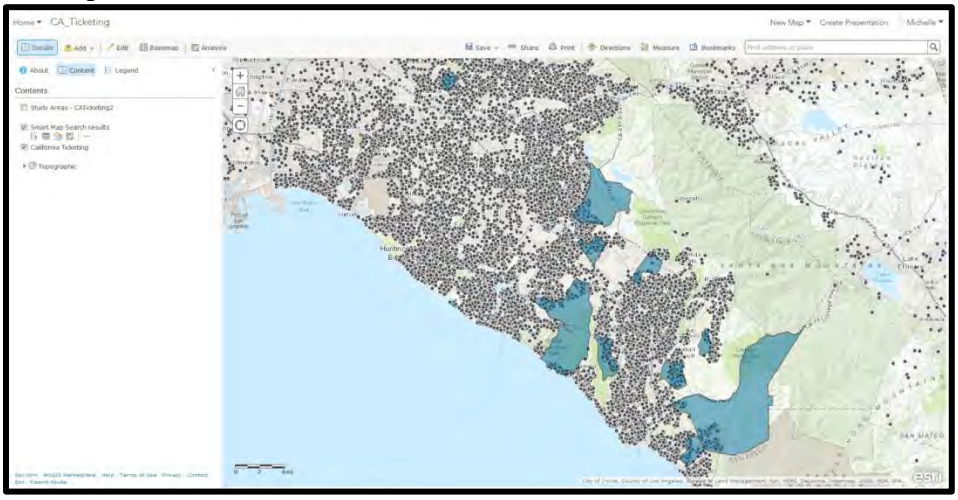


22. Uncheck “Within map area”
23. Go to “My Content”
24. Go to “Smart Map Search result” and click “Add”

25. Click “Done Adding Layers”



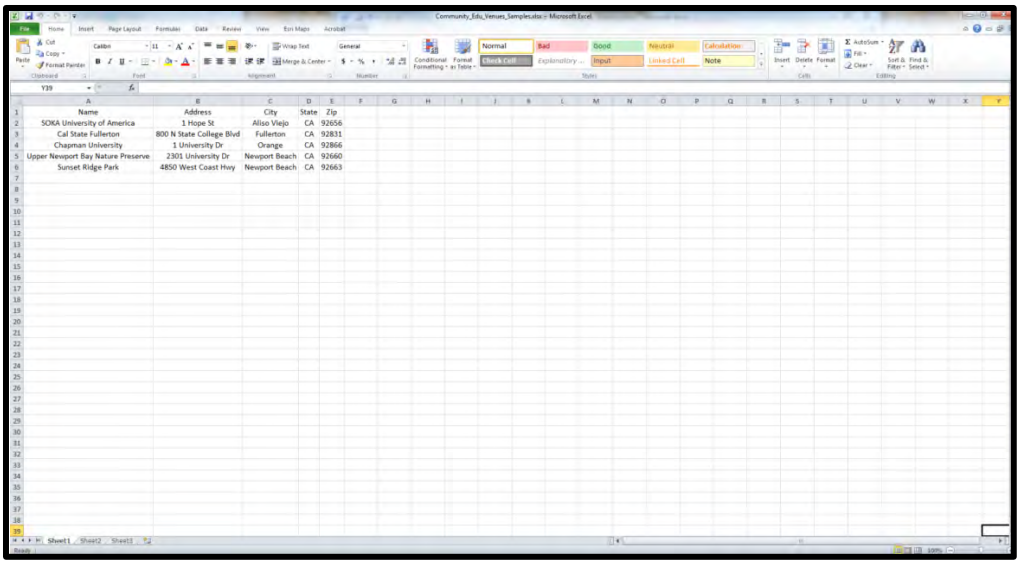
26. Uncheck your map notes layer
27. If you would like, you can change your heat map back to regular dots on a map to make the map more clear



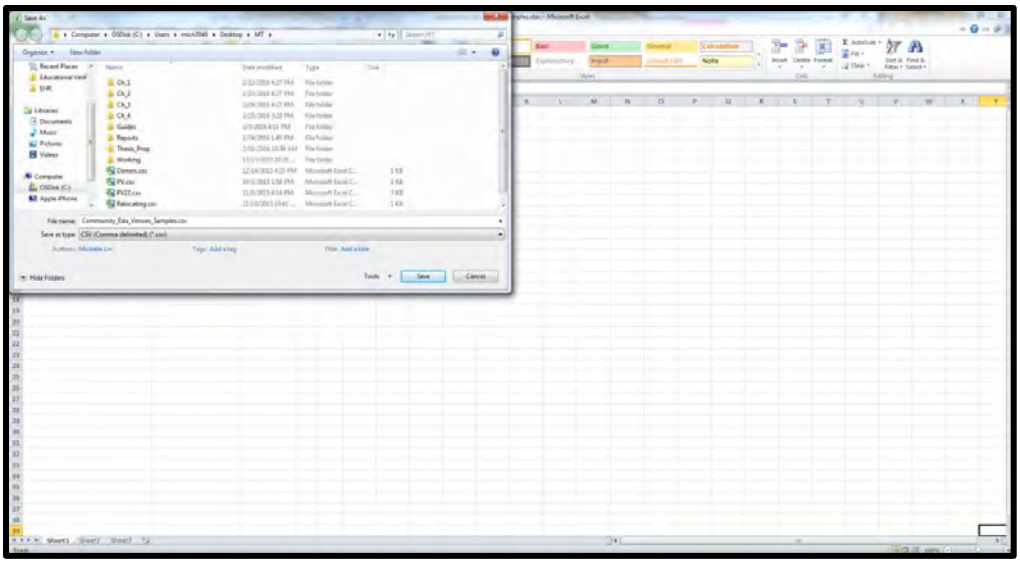
    a. Under Donors, click Change Symbols
    b. Under “2 Select a drawing style” click Select
    c. Click “Done”
28. Save map
29. Analyze map to see areas that you can potentially target that you may not have targeted before

Creating an Excel Spreadsheet of Potential Venues

1. Create an Excel spreadsheet that includes: name of venue, address, city, state, and ZIP code
2. Save the file as a .csv

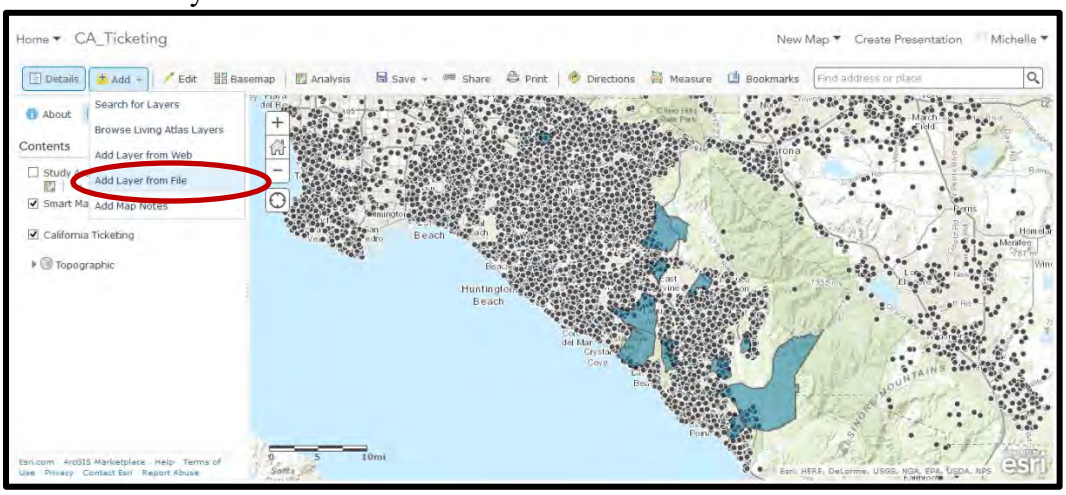


Name	Address	City	State	Zip
SOKA University of America	1 Hope St	Aliso Viejo	CA	92656
Cal State Fullerton	800 N State College Blvd	Fullerton	CA	92831
Chapman University	1 University Dr	Orange	CA	92866
Upper Newport Bay Nature Preserve	2301 University Dr	Newport Beach	CA	92660
Sunset Ridge Park	4850 West Coast Hwy	Newport Beach	CA	92663

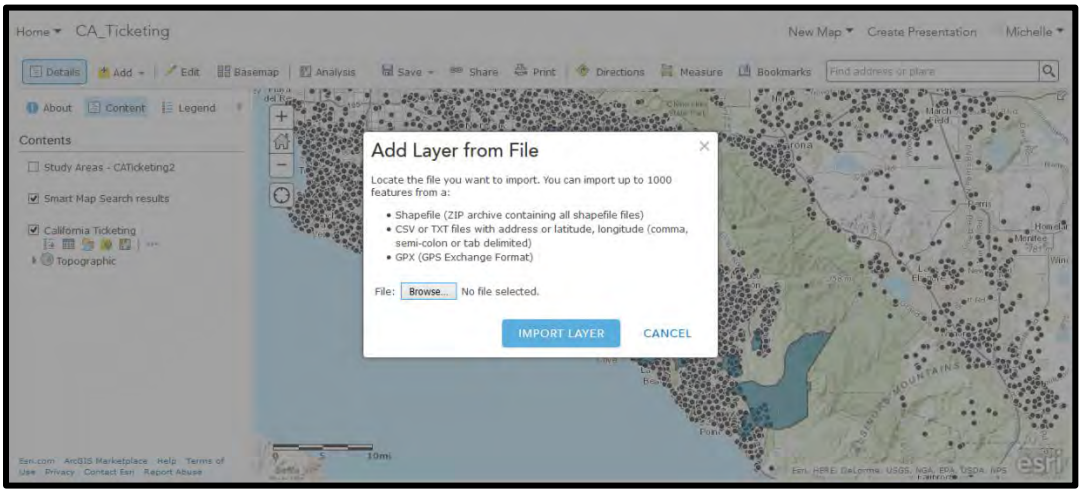


3. Go back to ArcGIS Online and into the map you created earlier
4. Click “Add”

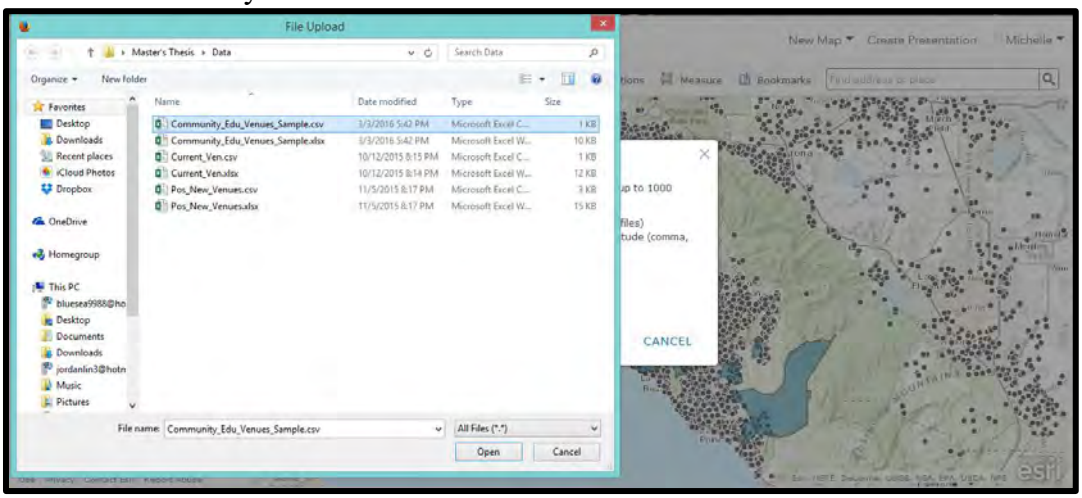
5. Click “Add Layer to File”



6. Click “Browse”

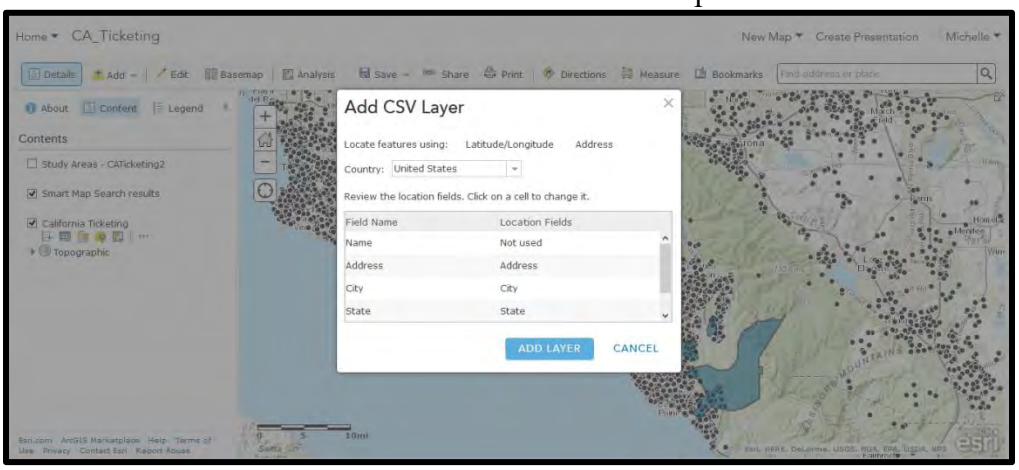


7. Select the .csv file you saved earlier

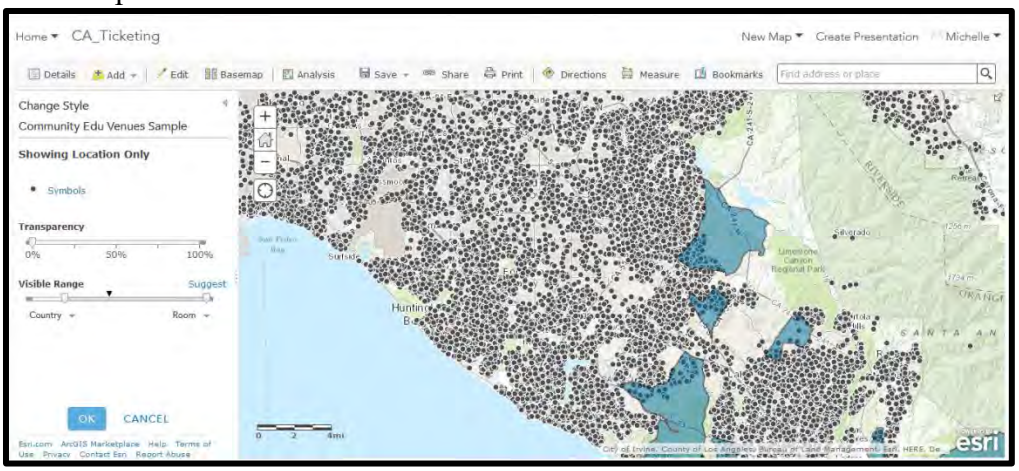


8. Click “Import Layer”

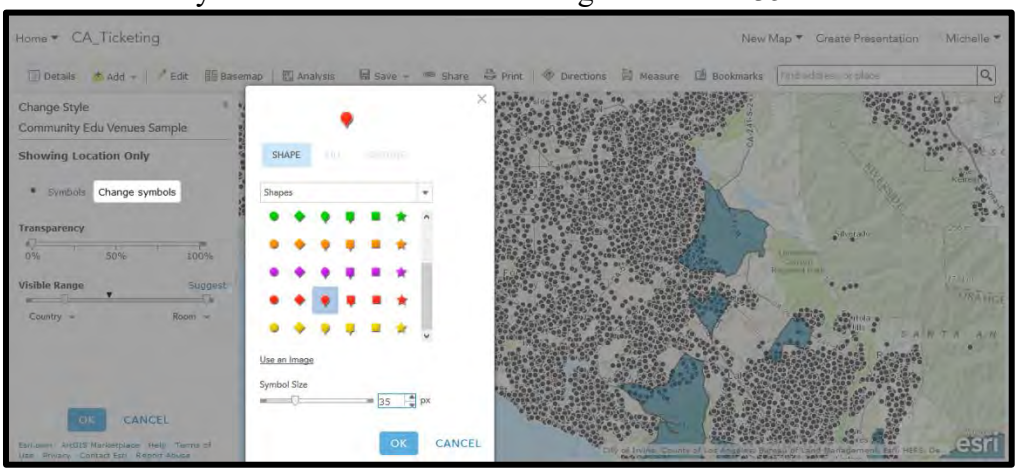
9. Make sure all fields match the columns of the Excel spreadsheet



10. Click “Add Layer”
11. Under “2 Select a drawing style” Click “Select” under “Location (single symbol)
12. Click “Options”

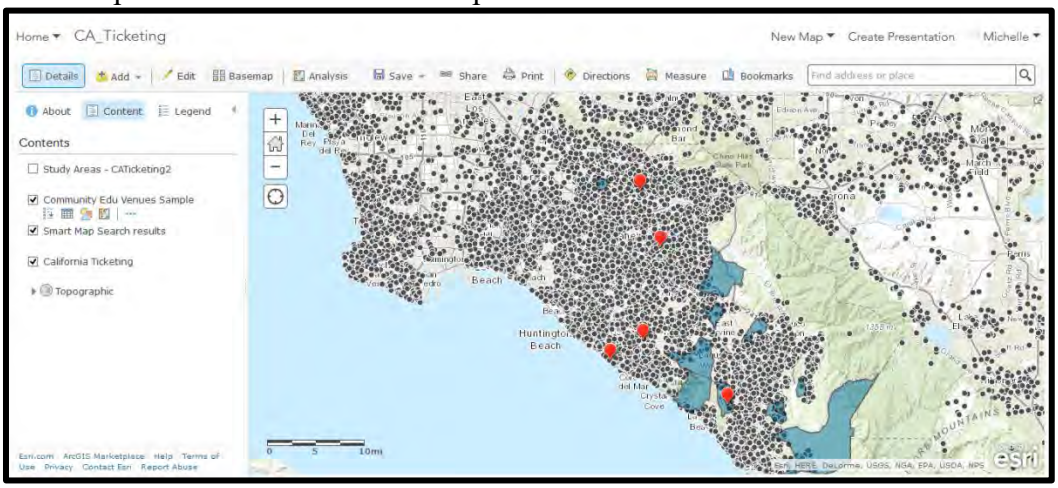


13. Click “Symbols”
14. Select the red symbol shown below and change the size to 35



15. Click “OK”

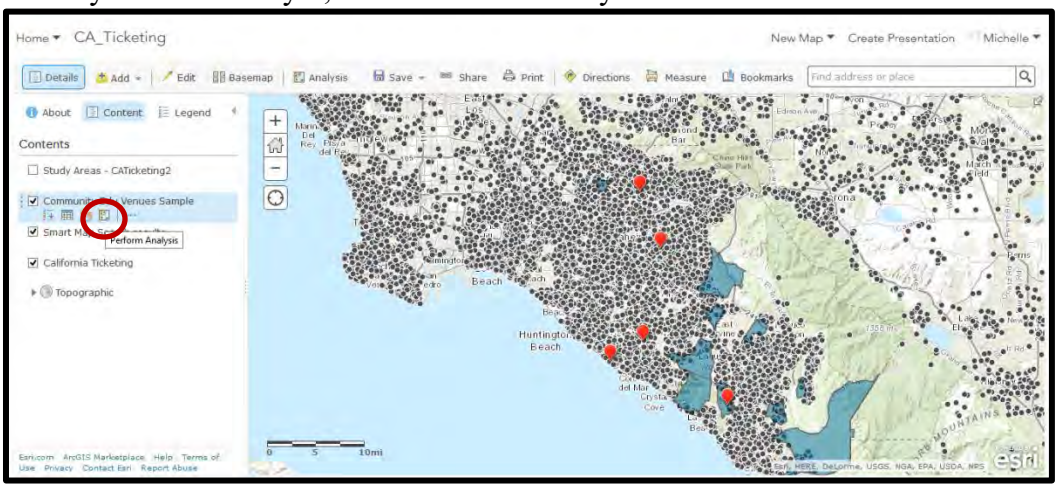
16. Click “Done”
17. Your map should look similar to the picture below



18. Save map

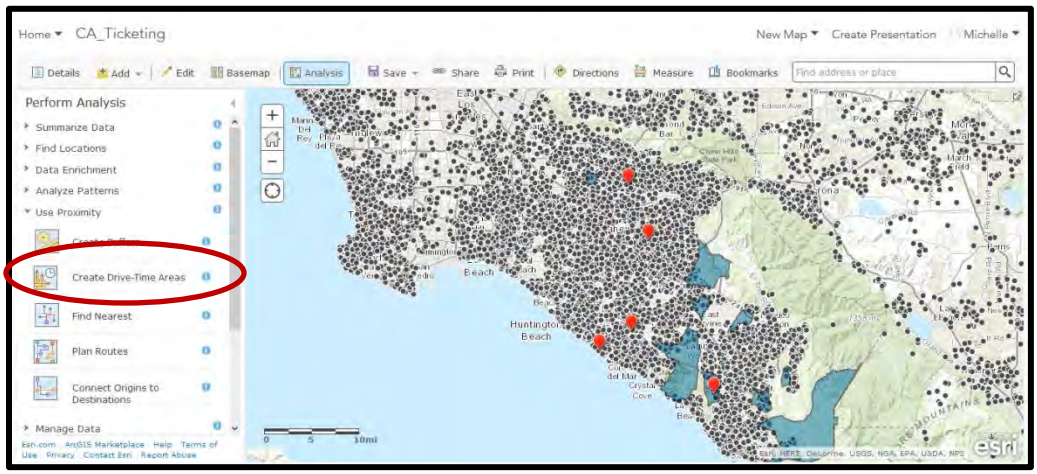
<u>Creating Drive Time Buffers</u>

1. Under your Venues layer, click “Perform Analysis”

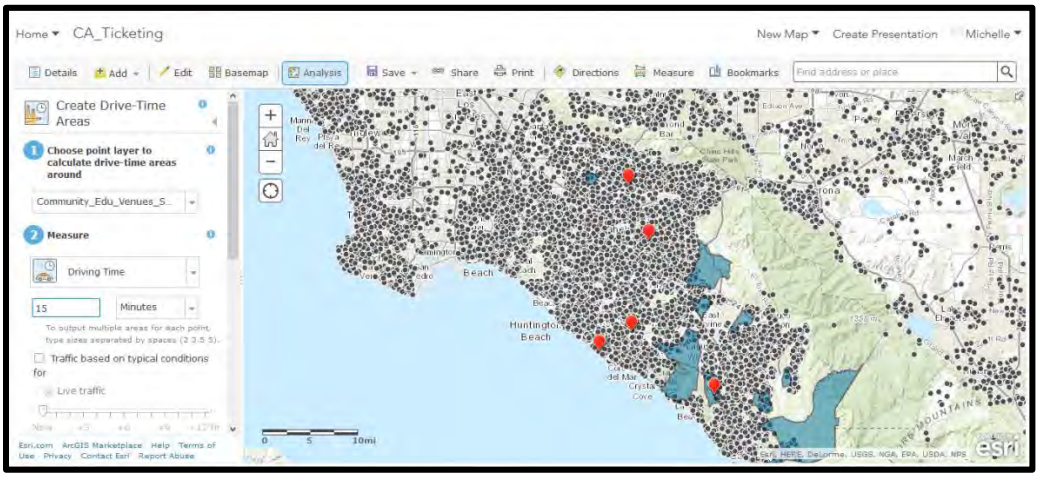


2. Click “Use Proximity”

3. Click “Drive-Time Areas”

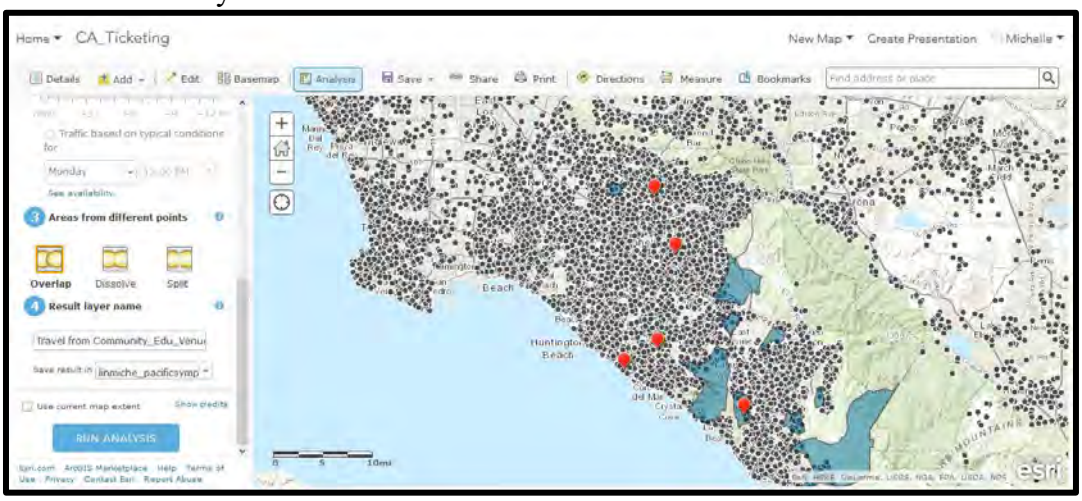


4. Ensure that “1 Choose point layer to calculate drive-time areas around” ensure that the Venues layer is selected
5. Under “2 Measure” select Drive Time and type in 15 (or desired time) and ensure Minutes is selected

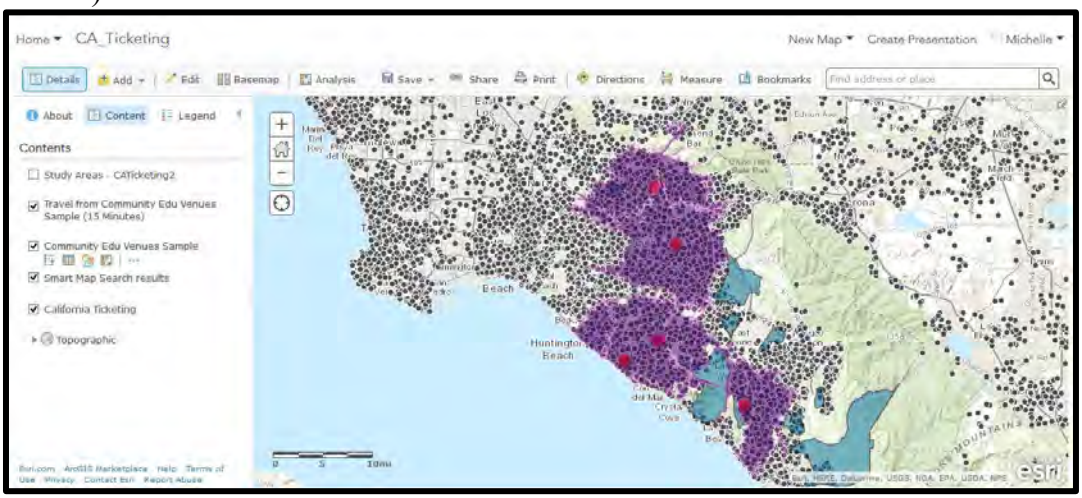


6. Uncheck “Use current map extent”

7. Click “Run Analysis”



8. Save map (Should look something like this depending on your venues and drive time buffers)



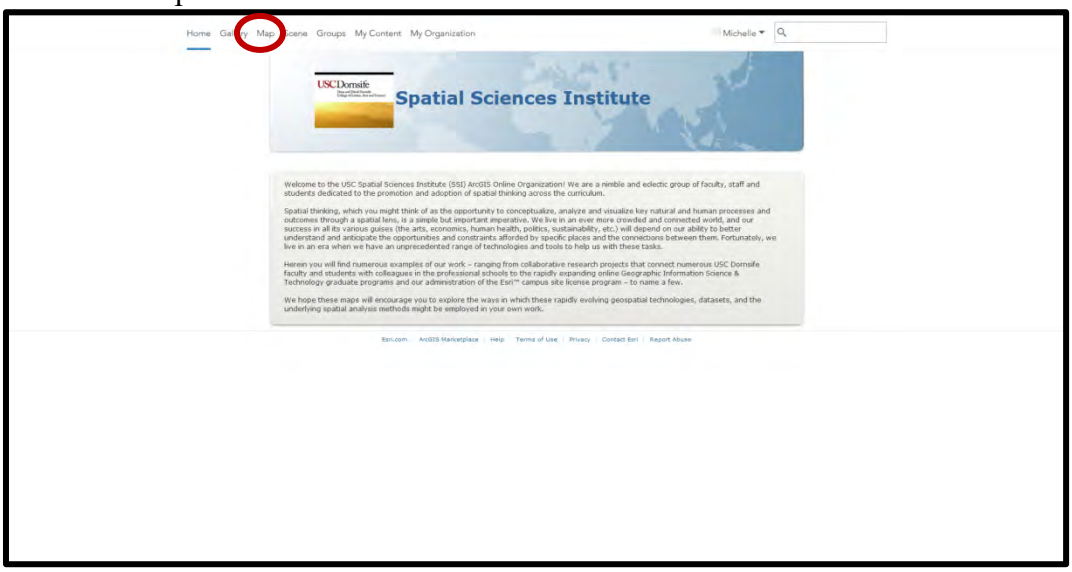
Appendix B: ArcGIS Online Step-by-step Guide – Finding Demographic/Tapestry Data of Donors – Attracting Potential Donors

Log into ArcGIS Online

4. Go to www.arcgis.com
5. Log in with your credentials

Bringing in Donor layer

10. Click on "Map"

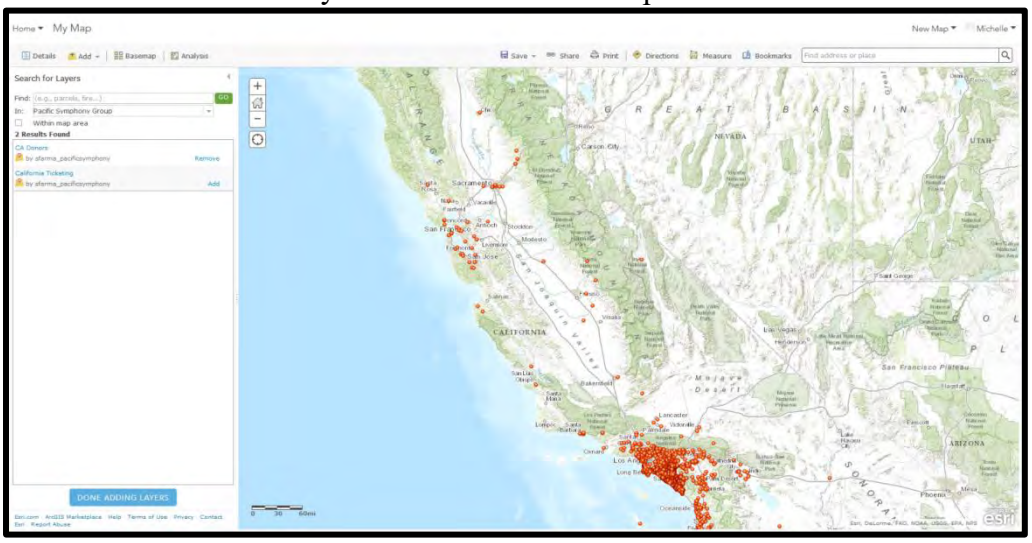


11. Click on “Add”

12. Click “Search for Layers”

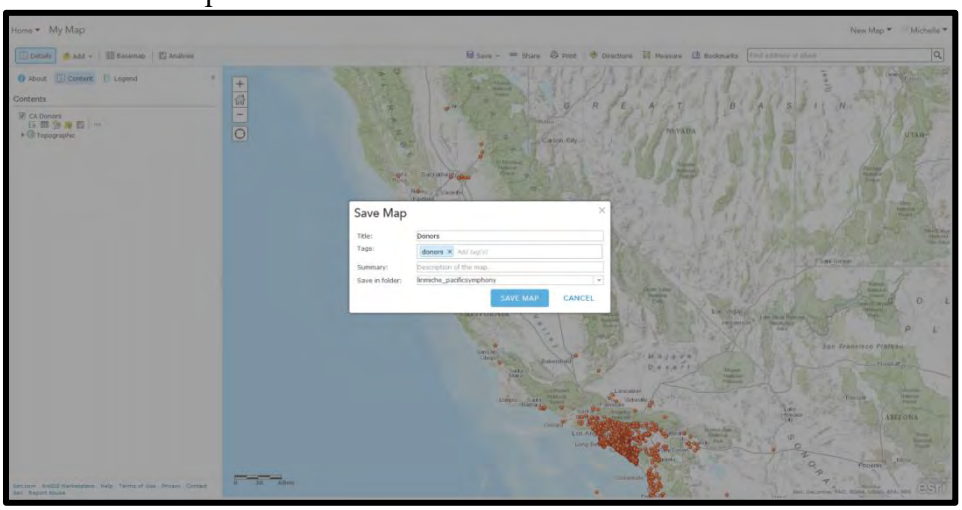
13. Uncheck “Within map area”
14. Under “In” click the drop down menu and select “Business Analyst Online Group”

15. Find the “CA Donors” layer and click “Add to map”



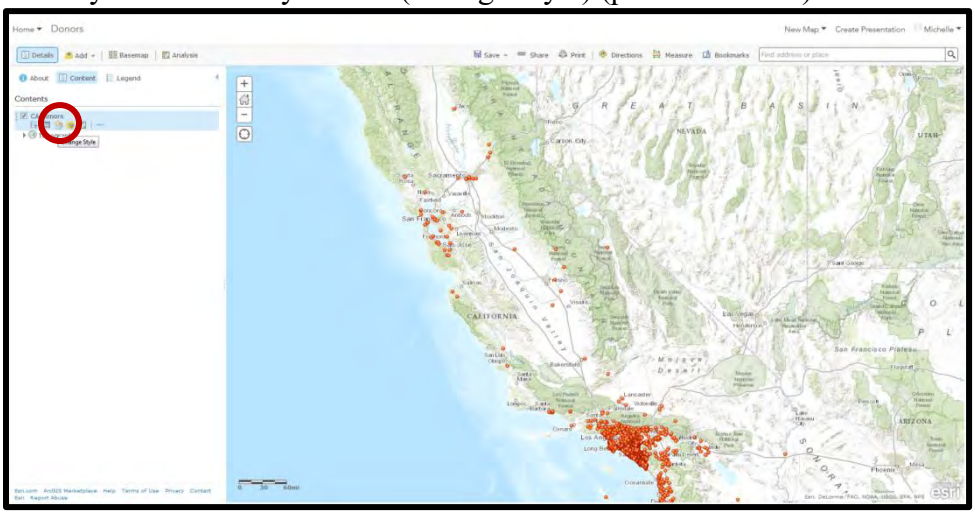
16. Click “Done Adding Layers”
17. Save map

18. Click “Save Map



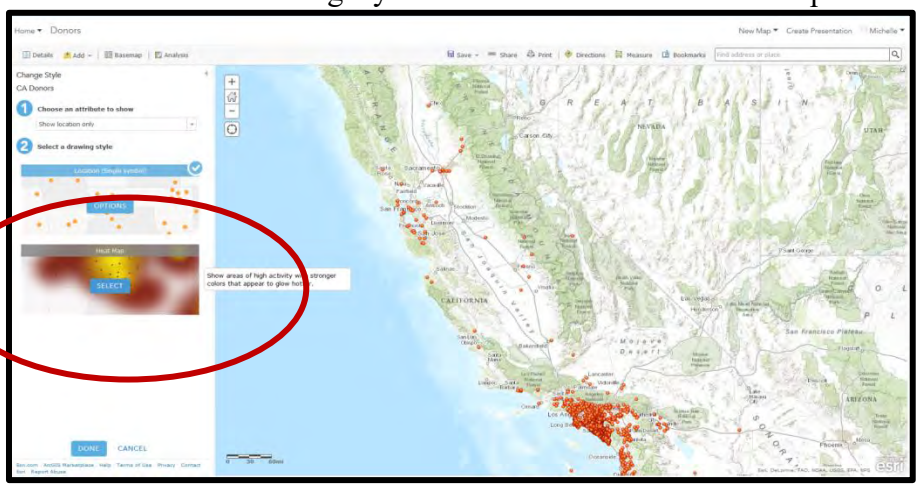
Creating a Heat Map

6. Under your Donors layer click (Change Style) (pictured below)



7. Under “1 Choose an attribute to show” select “Show location only”

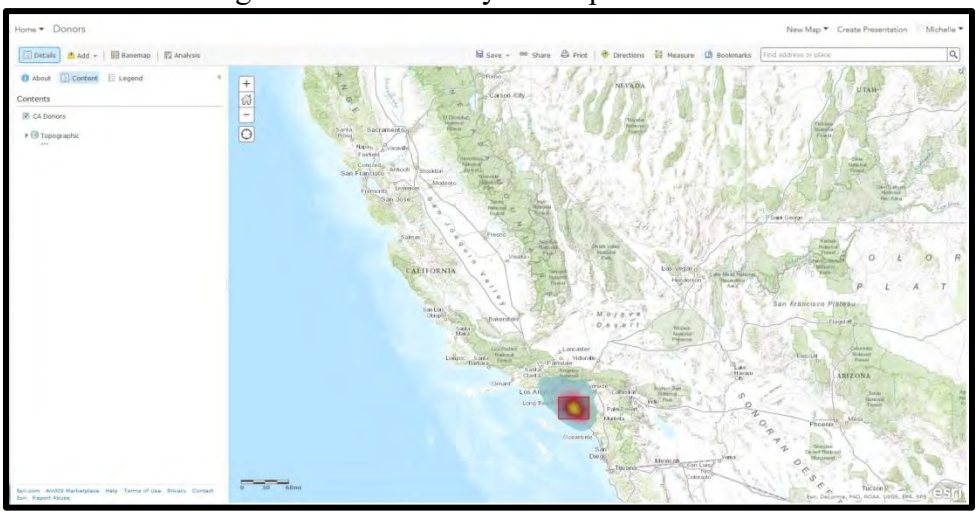
8. Under “2 Select a drawing style” click “Select” under Heat Map



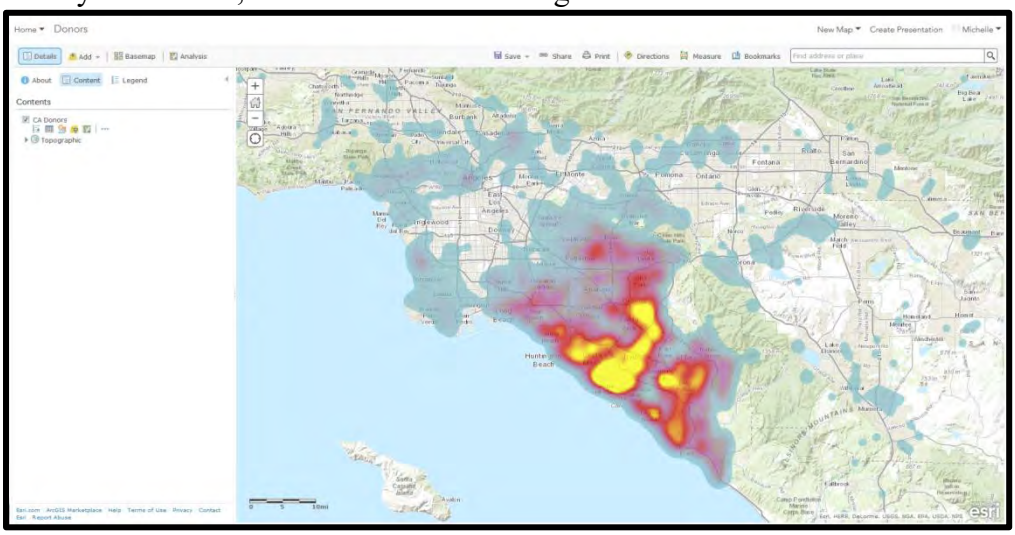
9. Click Done
10. Save map

<u>Drawing Map Notes</u>

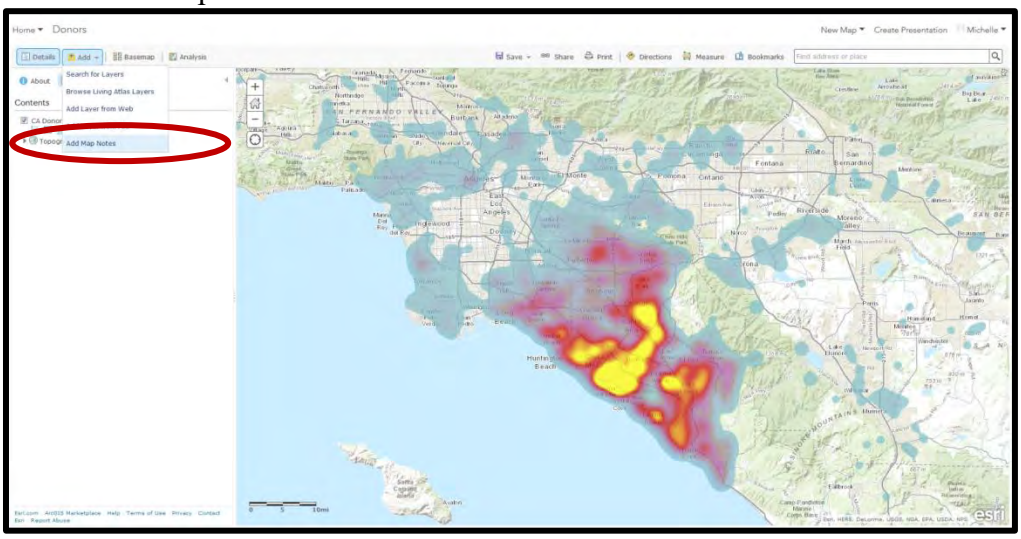
14. Zoom into Orange County by holding the “Shift”key on your keyboard and taking your mouse and drawing a box around the yellow spot



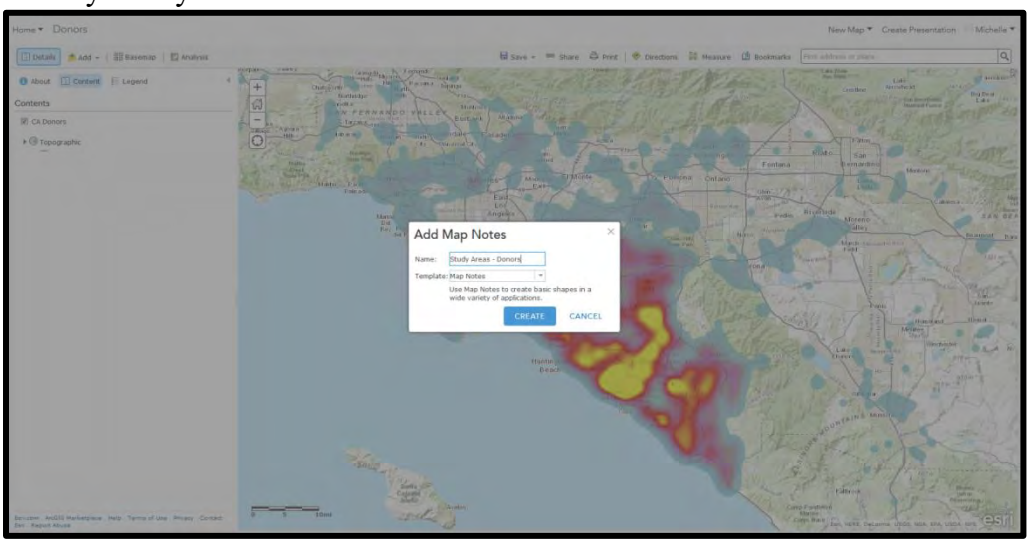
15. After you zoom in, it should look something like this



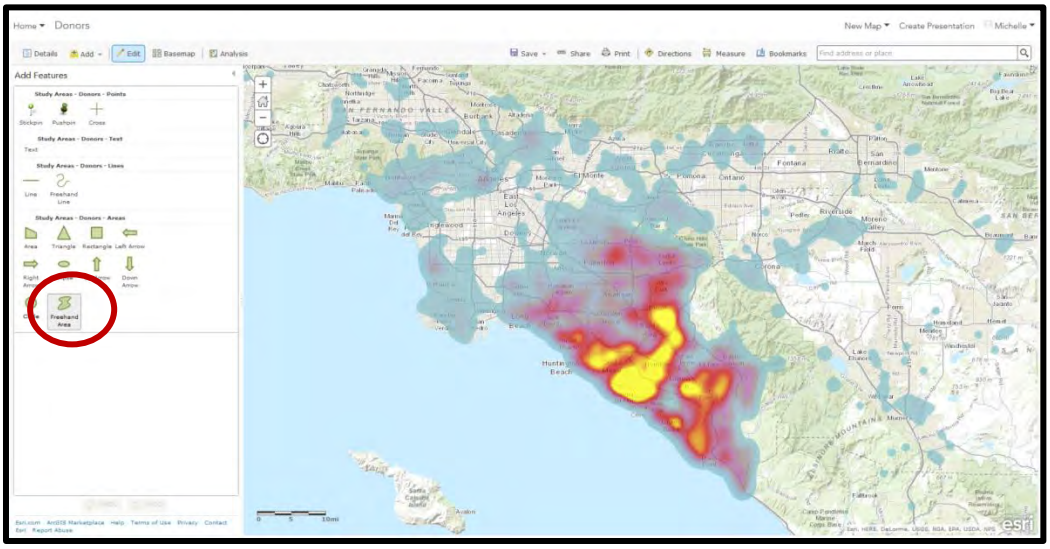
16. Click “Add”
17. Click “Add Map Notes”



18. Name your layer and click “Create”

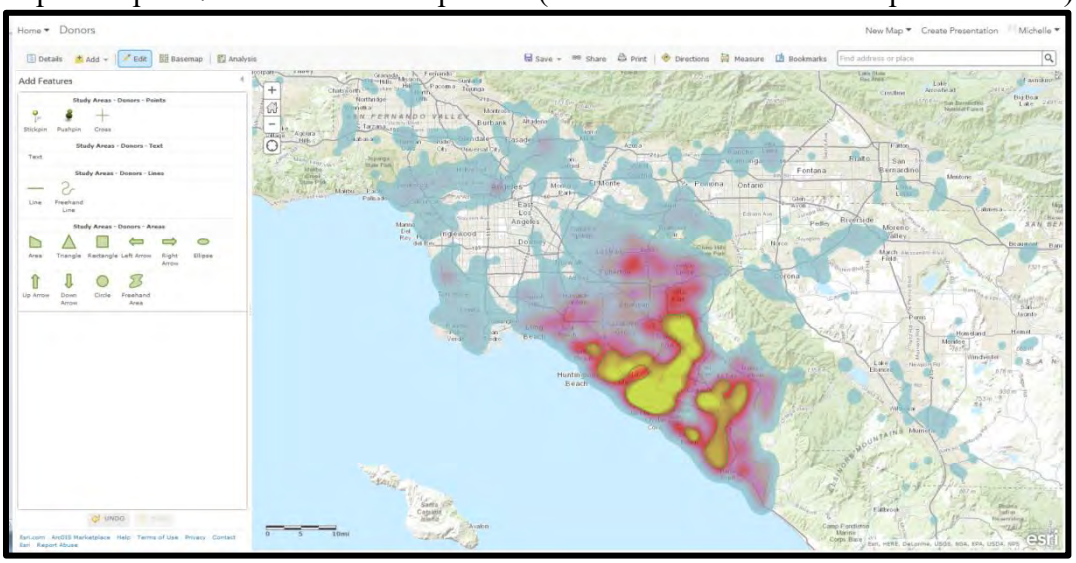


19. Click “Freehand Area”



20. Press down and trace around the hot spots
21. Click “Close” when the pop up comes up
22. Click anywhere within the map to finish the drawn map note

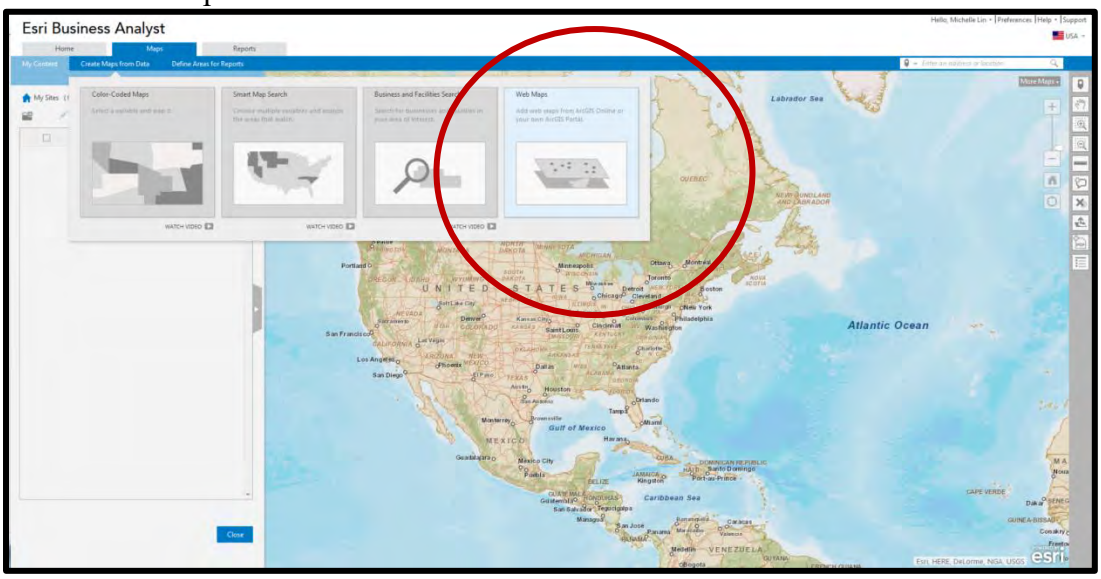
23. Repeat steps 4-7 to draw more map notes (Should look similar to the picture below)



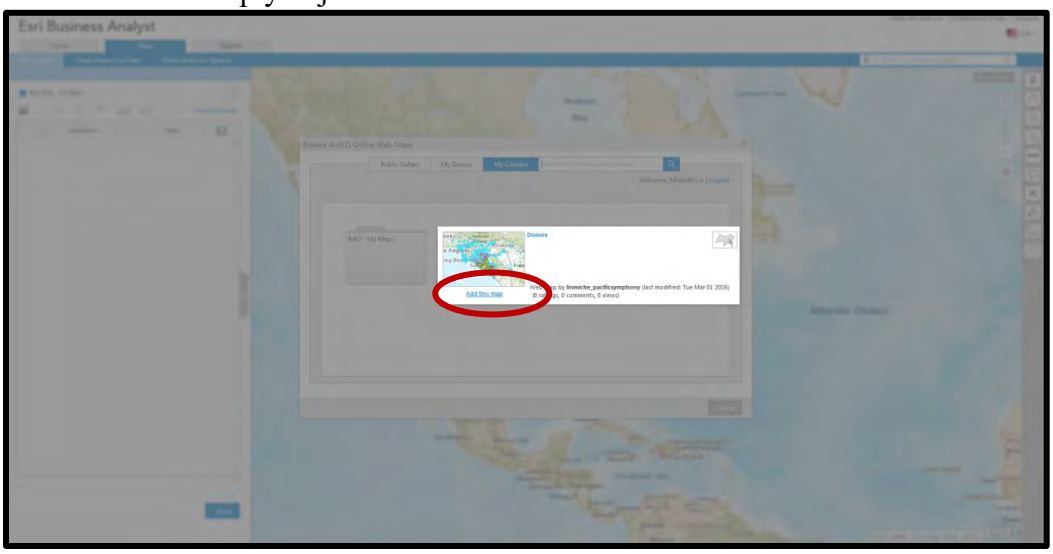
24. Once all of your map notes are drawn, click “Edit”
25. Save map

<u>Transitioning Map Notes into Business Analyst Online</u>

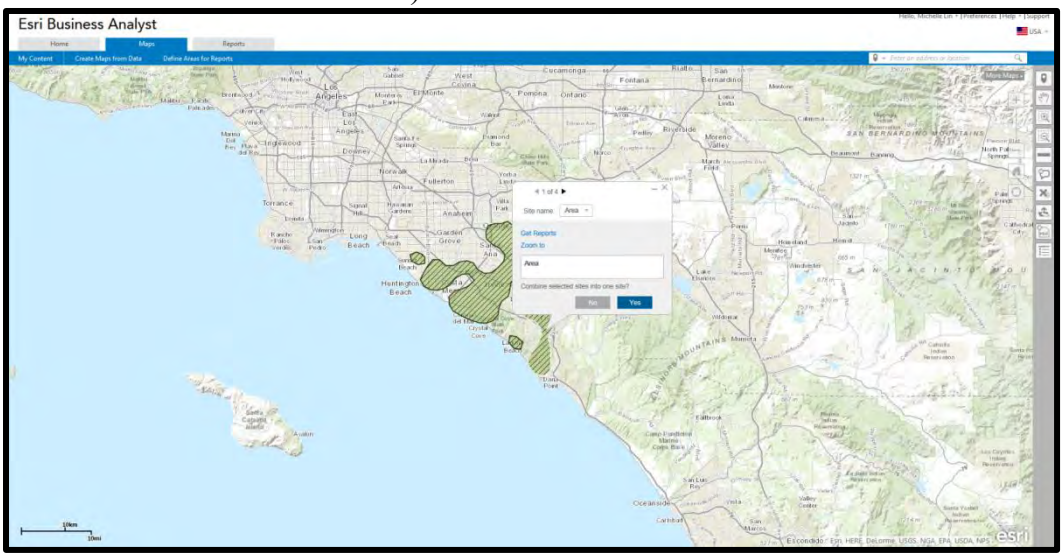
9. Log into Business Analyst Online: https://bao.arcgis.com/esriBAO/login/
10. Click “Map” tab
11. Click “Create Maps from Data”
12. Click “Web Maps”



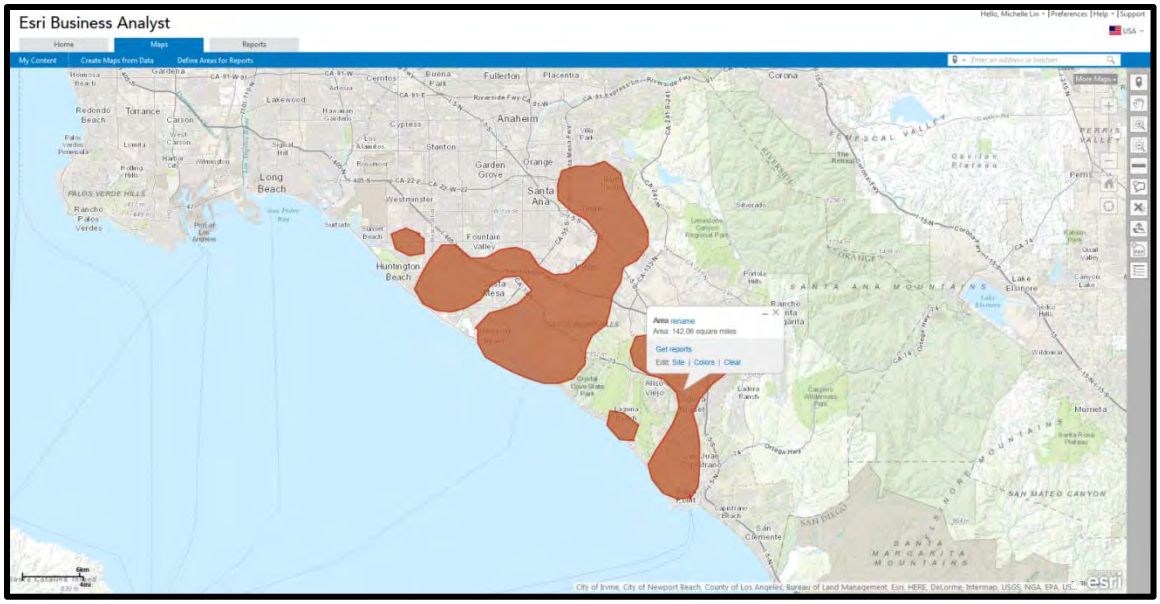
13. Hover over the map you just created within ArcGIS Online and click “Add this to map”



14. Hold the “Shift” key on your keyboard and select all the map notes
15. A popup should display asking “Combine selected sites into one site?” Click Yes (Should look like the screen shots below)

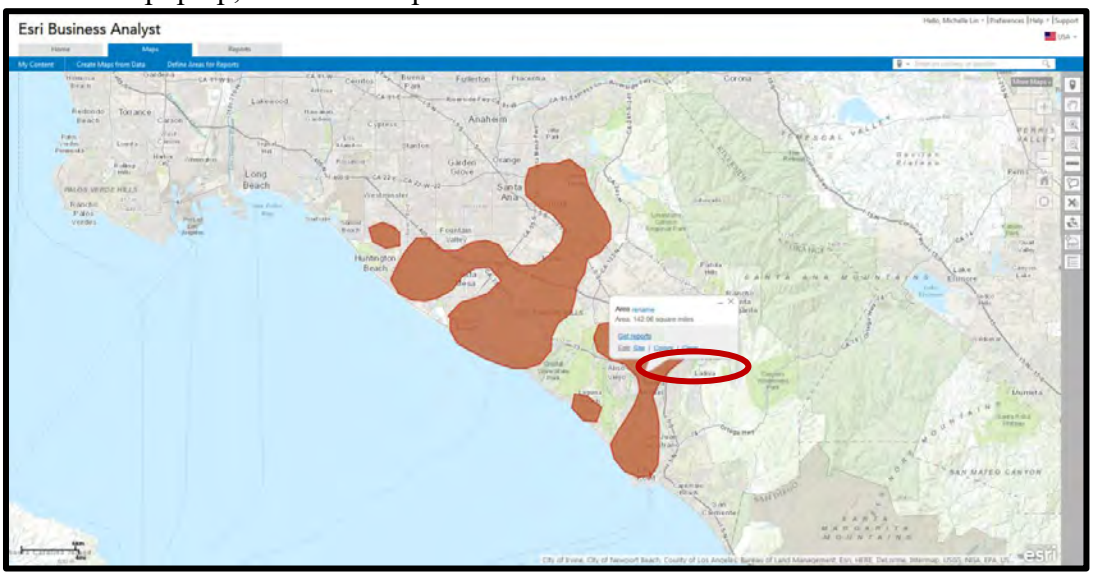


    a. There is a bug within the software where it may not ask you this right away. Please repeat this step until you see it (may take several times)

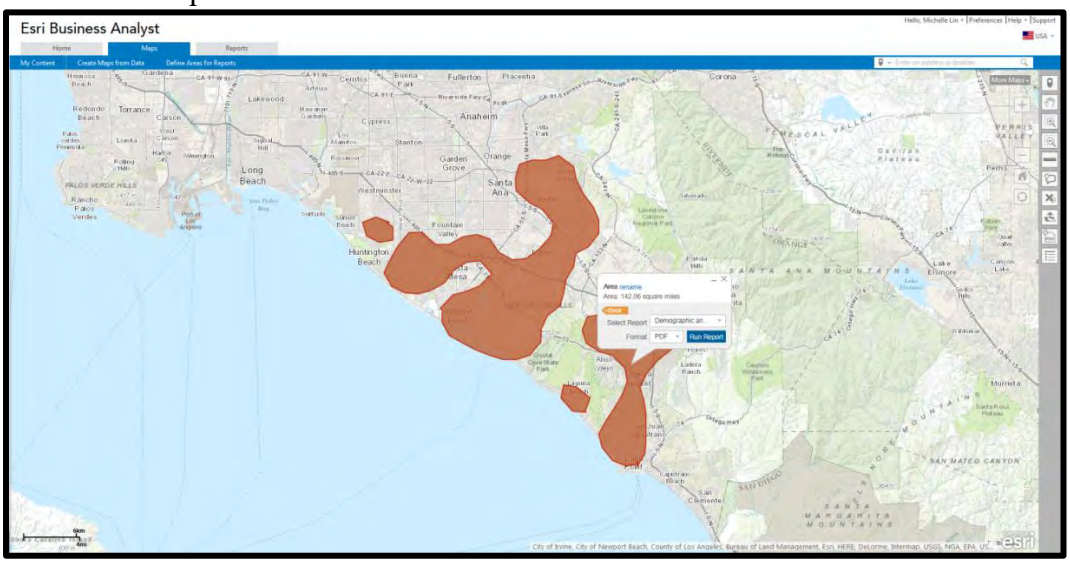


Printing out Data Reports

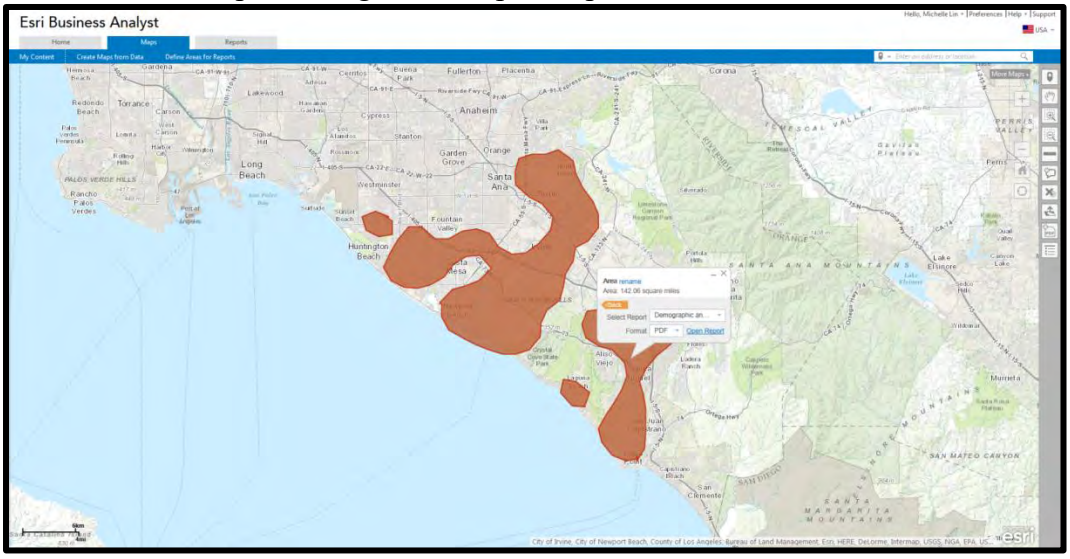
1. Within the pop up, click “Get reports”



2. Select the report you are looking to analyze
3. Click “Run Report”



4. Once it’s finished processing, click “Open Report”



5. Save PDF within your own computer for your records

Demographic and Income Profile

Area: 142.06 square miles

Prepared by Esri

Summary	Census 2010	2015	2020
Population	767,402	789,828	817,656
Households	295,168	301,825	312,418
Families	191,727	196,488	203,620
Average Household Size	2.56	2.58	2.58
Owner Occupied Housing Units	184,017	182,455	187,686
Renter Occupied Housing Units	111,149	119,370	124,732
Median Age	39.9	41.0	41.3

Trends: 2015 - 2020 Annual Rate	Area	State	National
Population	0.69%	0.73%	0.75%
Households	0.69%	0.74%	0.77%
Families	0.72%	0.76%	0.69%
Owner HHs	0.57%	0.61%	0.70%
Median Household Income	2.57%	3.36%	2.66%

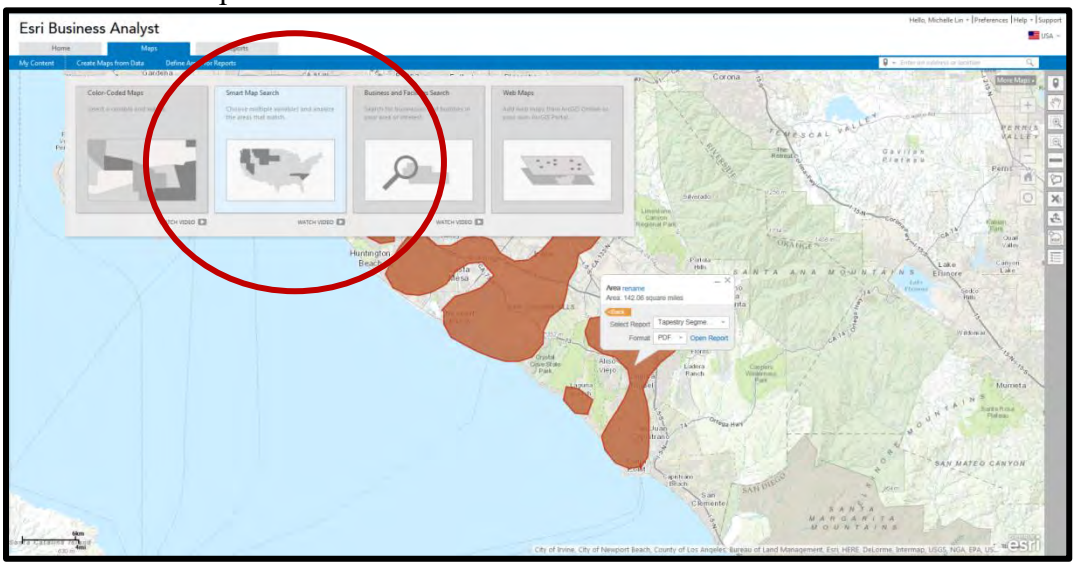
	2015		2020	
Households by Income	Number	Percent	Number	Percent
<$15,000	19,999	6.6%	18,048	5.8%
$15,000 - $24,999	15,570	5.2%	11,178	3.6%
$25,000 - $34,999	18,232	6.0%	14,882	4.8%
$35,000 - $49,999	26,949	8.9%	24,364	7.8%
$50,000 - $74,999	46,097	15.3%	42,868	13.7%
$75,000 - $99,999	39,949	13.2%	44,228	14.2%
$100,000 - $149,999	55,499	18.4%	62,273	19.9%
$150,000 - $199,999	30,977	10.3%	38,067	12.2%
$200,000+	48,551	16.1%	56,506	18.1%
Median Household Income	$88,386		$100,328	
Average Household Income	$122,943		$139,682	
Per Capita Income	$47,432		$53,843	

	Census 2010		2015		2020	
Population by Age	Number	Percent	Number	Percent	Number	Percent
0 - 4	39,078	5.1%	37,868	4.8%	38,763	4.7%
5 - 9	43,141	5.6%	41,836	5.3%	40,618	5.0%
10 - 14	46,859	6.1%	46,495	5.9%	44,485	5.4%
15 - 19	53,397	6.9%	50,301	6.4%	48,357	5.9%
20 - 24	51,728	6.7%	54,672	6.9%	48,643	5.9%
25 - 34	99,209	12.9%	106,322	13.5%	118,439	14.5%
35 - 44	107,055	14.0%	98,961	12.5%	105,652	12.9%
45 - 54	118,961	15.5%	114,721	14.5%	106,449	13.0%
55 - 64	95,065	12.4%	105,108	13.3%	111,523	13.6%
65 - 74	59,169	7.7%	74,283	9.4%	85,638	10.5%

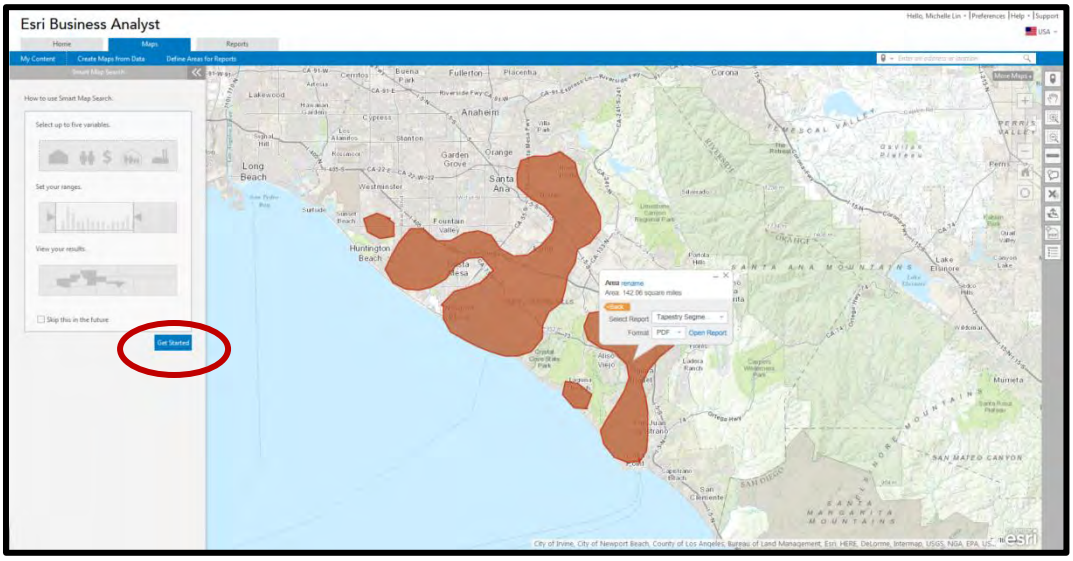
6. To print out additional reports, repeat steps 1-5

<u>Creating a Smart Map</u>

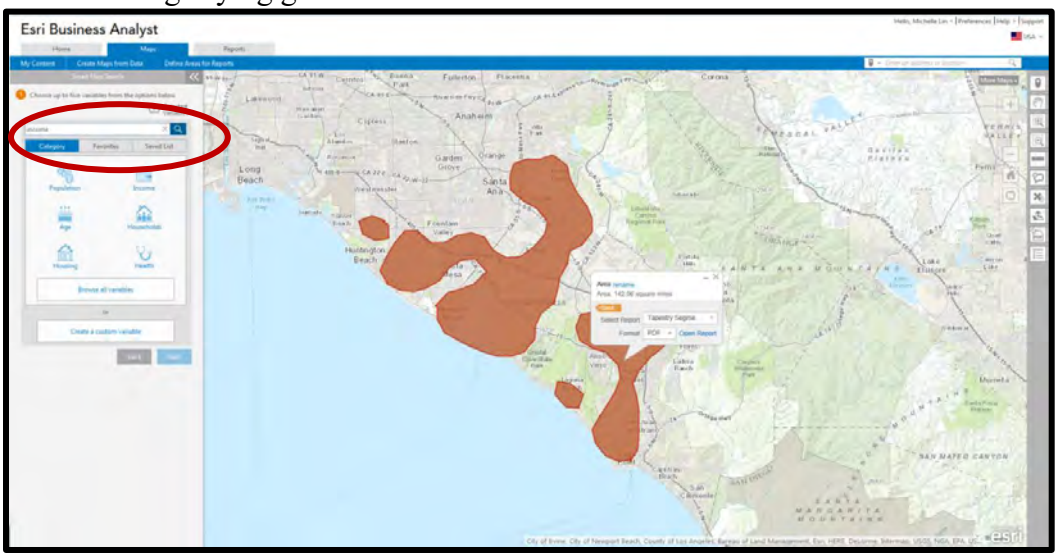
2. After analyzing your data, you will know what variables you would like to add and view on your map
    a. The variables I have chosen are: income ($75,000 – 200,000+), Tapestry (Enterprising Professionals), and ages 25 - 74
3. Click “Maps”
4. Click “Create Maps from Data”
5. Click “Smart Map Search”



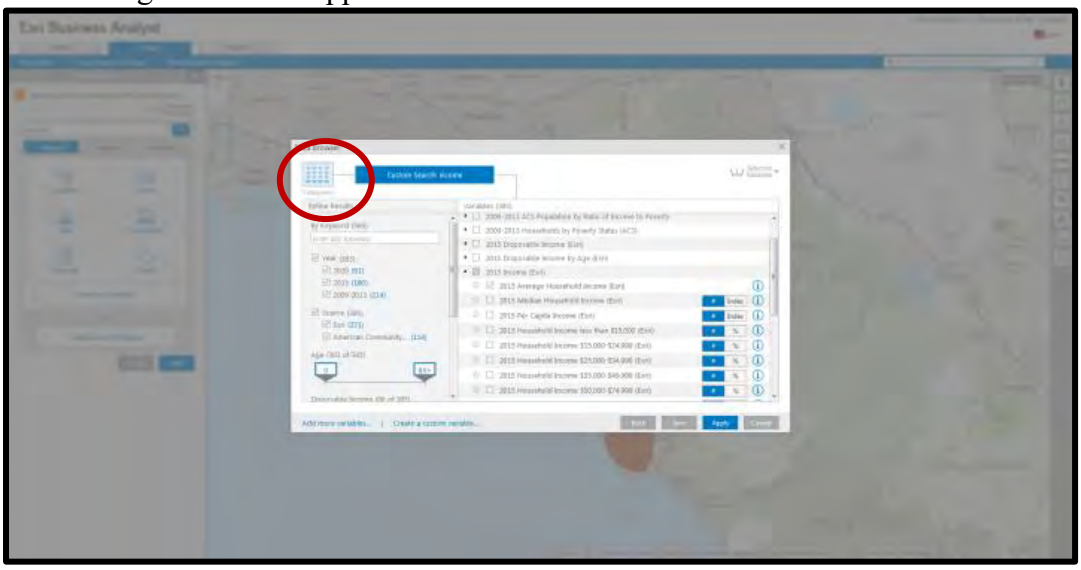
6. Click “Get Started”



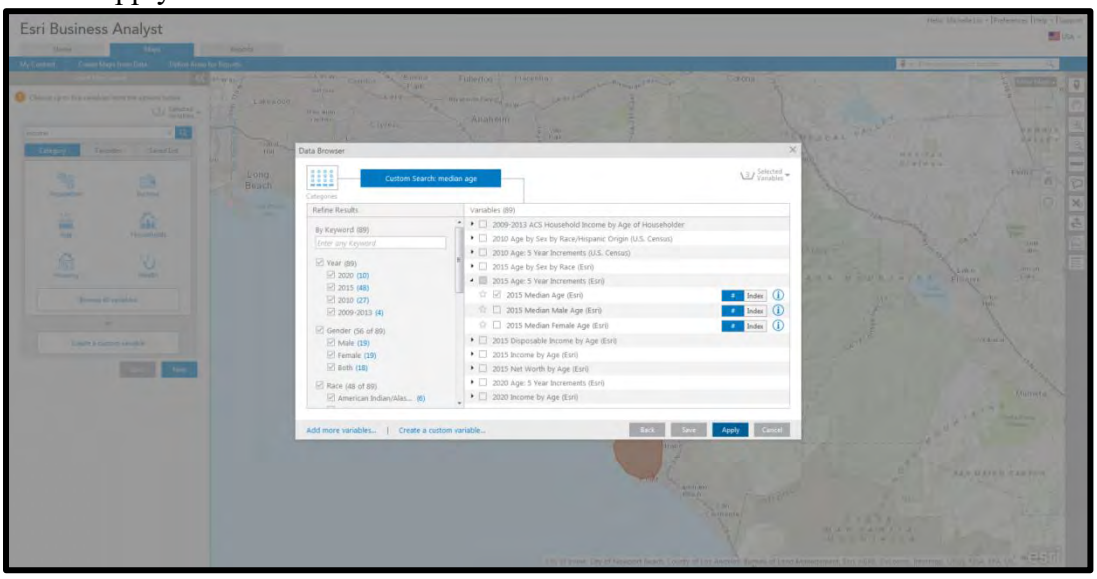
7. Type in the variable you are looking to add to your map
8. Click the magnifying glass



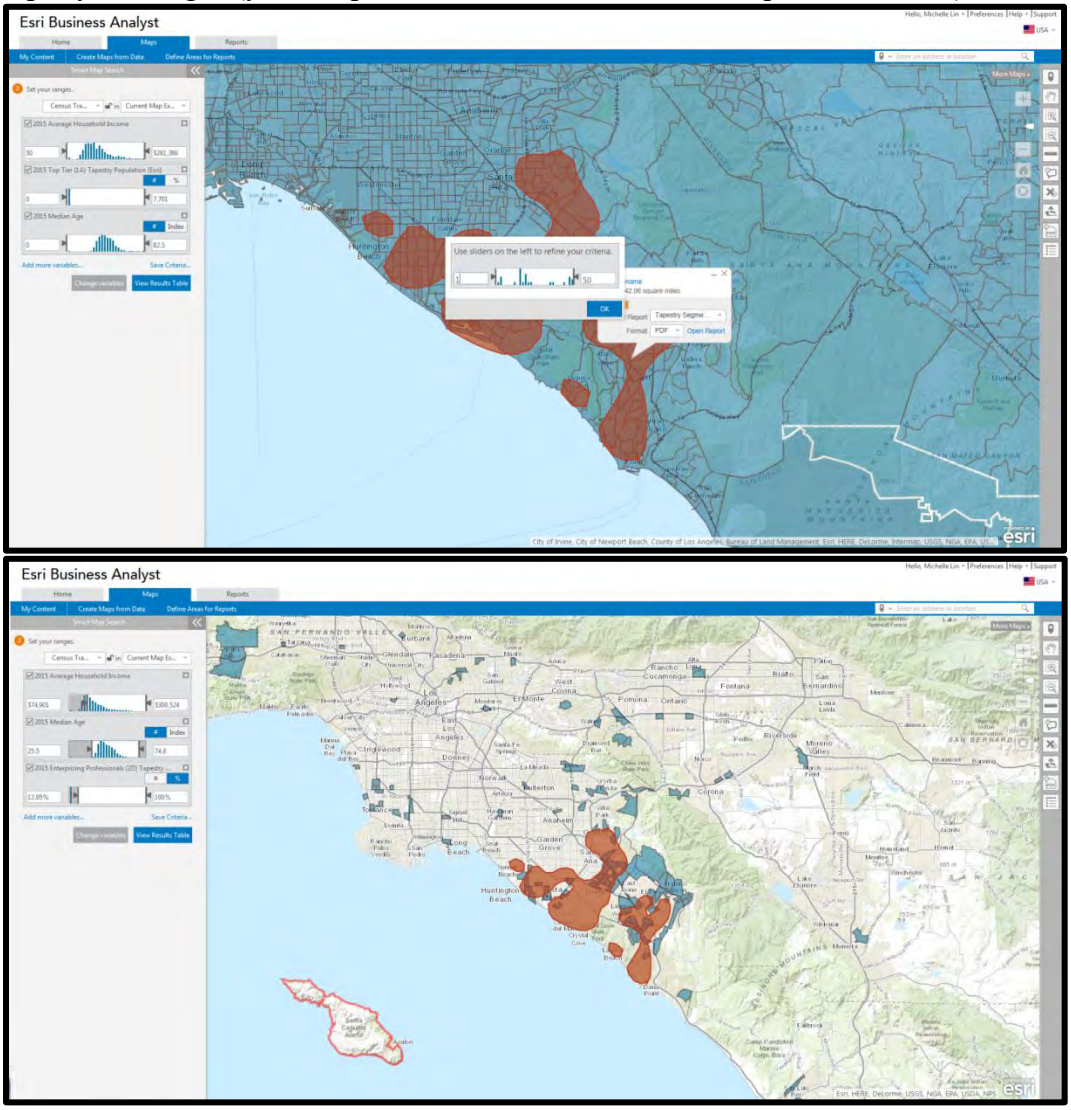
9. Select your desired variables
10. Click Categories on the upper left hand corner to search for additional variables



11. Click “Apply”



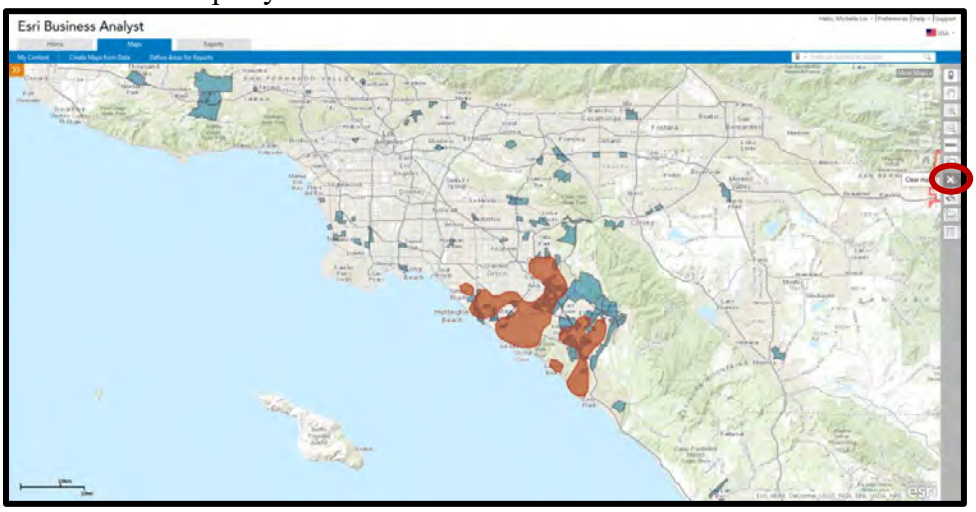
12. Input your ranges (your map should look similar to the one pictured below)



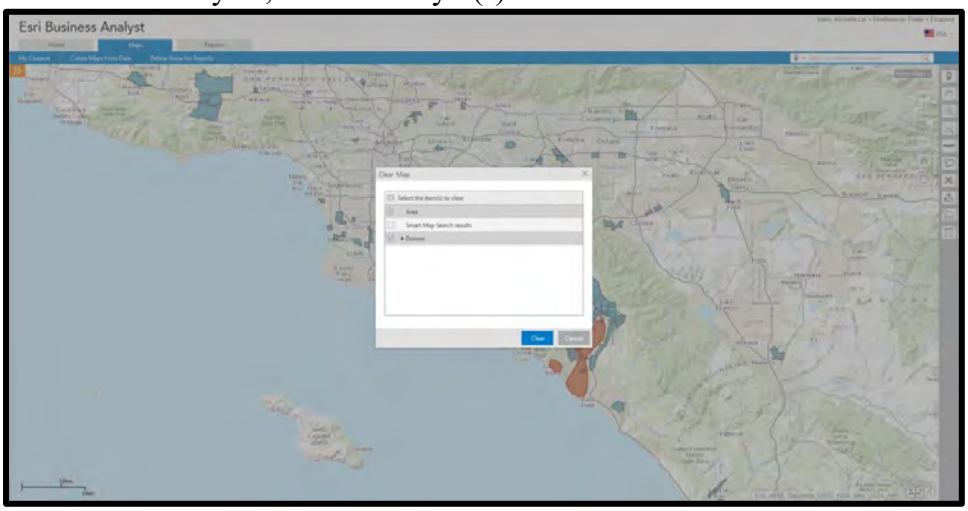
a. Drag the sliders – there is a bug in the software that will not let you type in the desired numbers
b. Income is best left as #
c. Tapestry segmentation, education attainment, and race are best applied as %

Move Smart Map Layer Over to ArcGIS Online

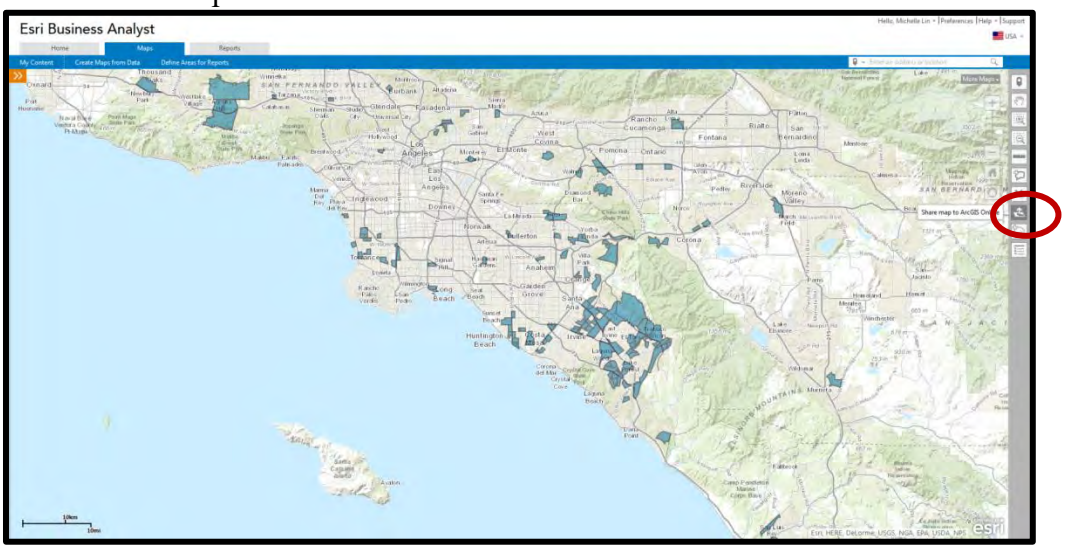
1. Click “Clear Map” symbol



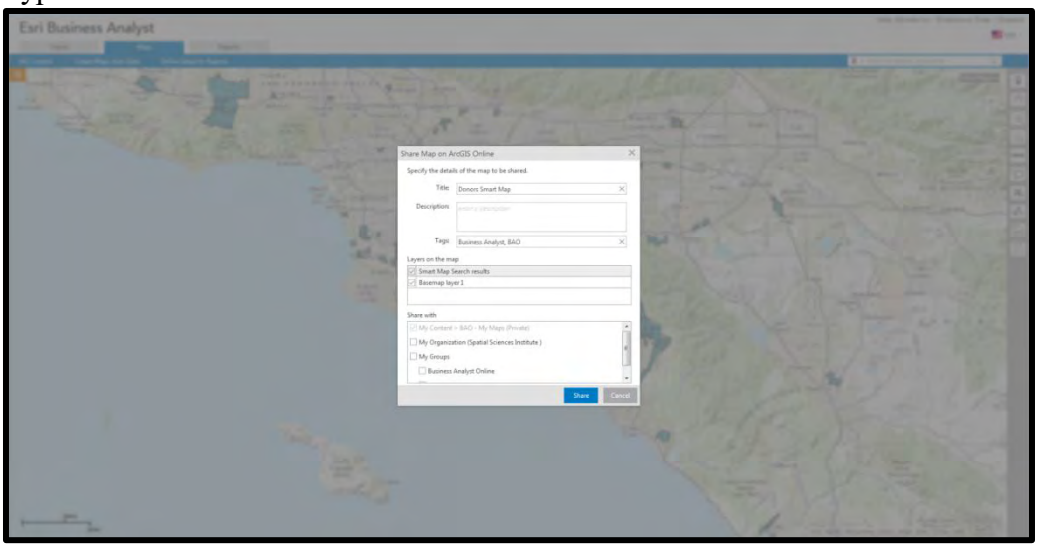
2. Clear everything **EXCEPT** the Smart Map Search result
    a. To clear other layers, select the layer(s) and click Clear



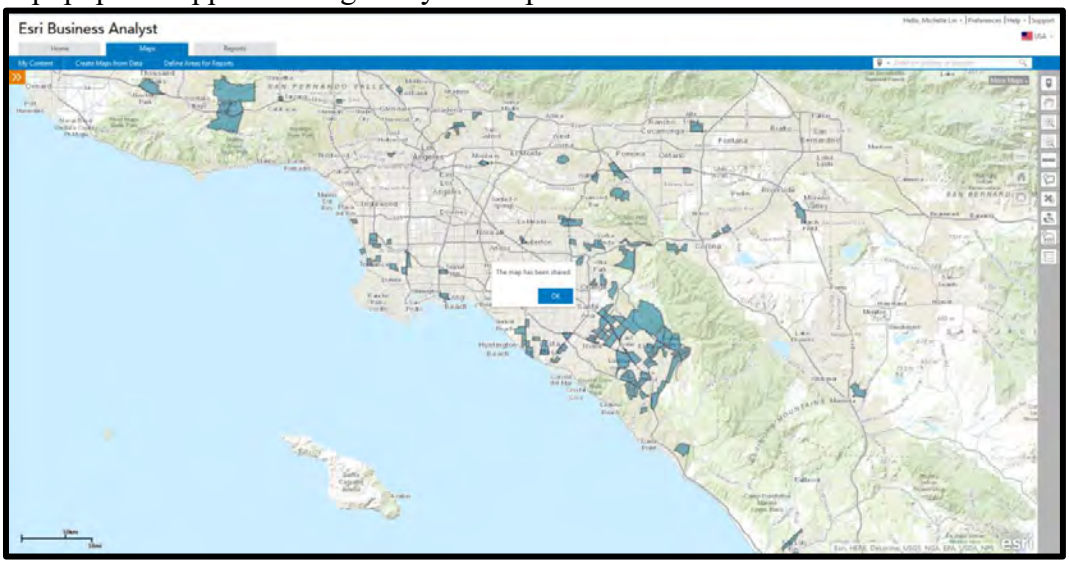
3. Click “Share map to ArcGIS Online”



4. Under “Layers on the map”, make sure **ONLY** the “Smart Map Search result” and “Basemap layer 1” is selected – Clear everything else
5. Type in desired title

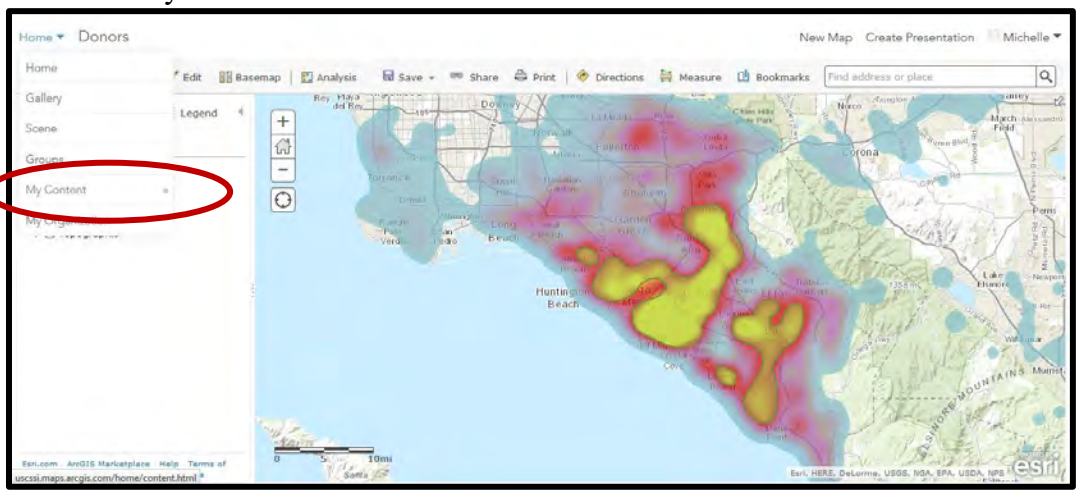


6. Click “Share”
7. A popup will appear stating that your map has been shared to ArcGIS Online



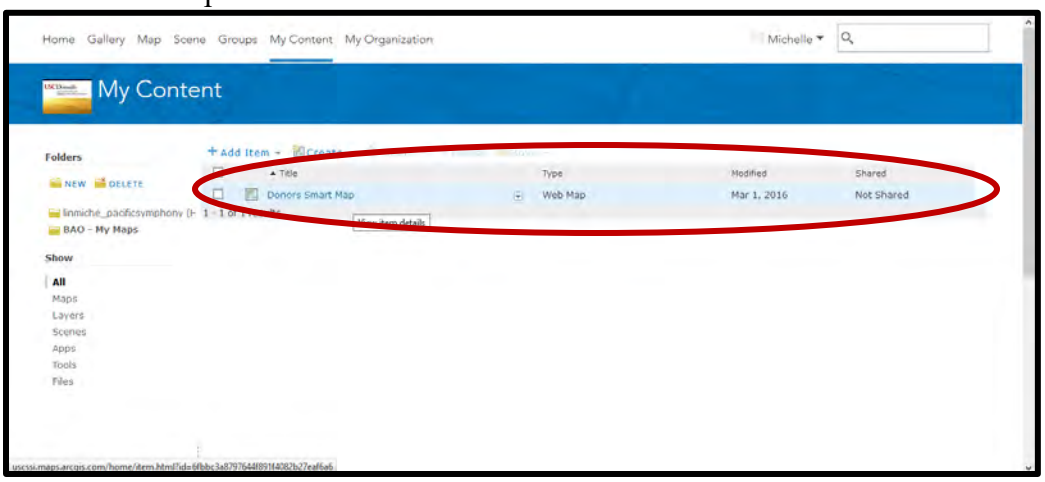
Transitioning Back to ArcGIS Online

30. Go back to your previous tab where you had ArcGIS Online or log back in
31. Click on “Home”
32. Click on “My Content”

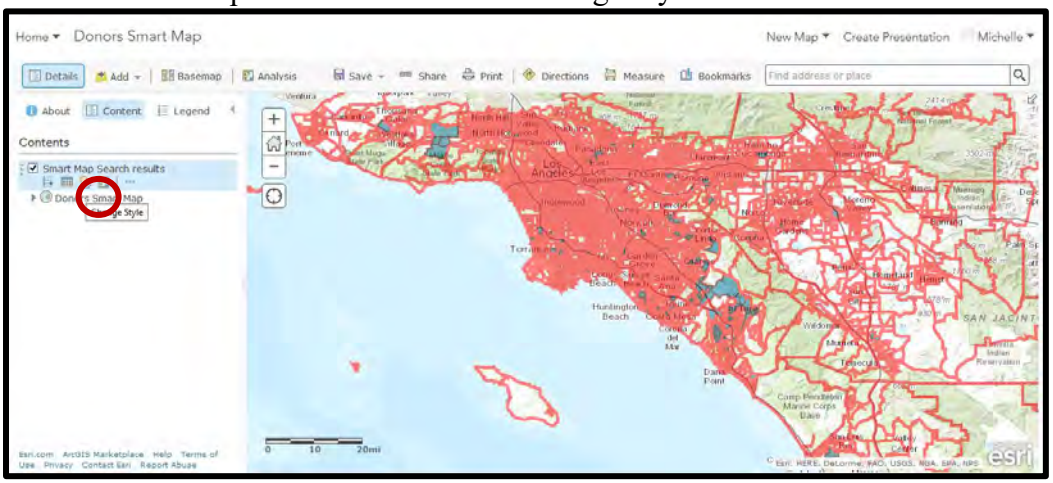


33. Click on the folder to the left “BAO – My Maps”

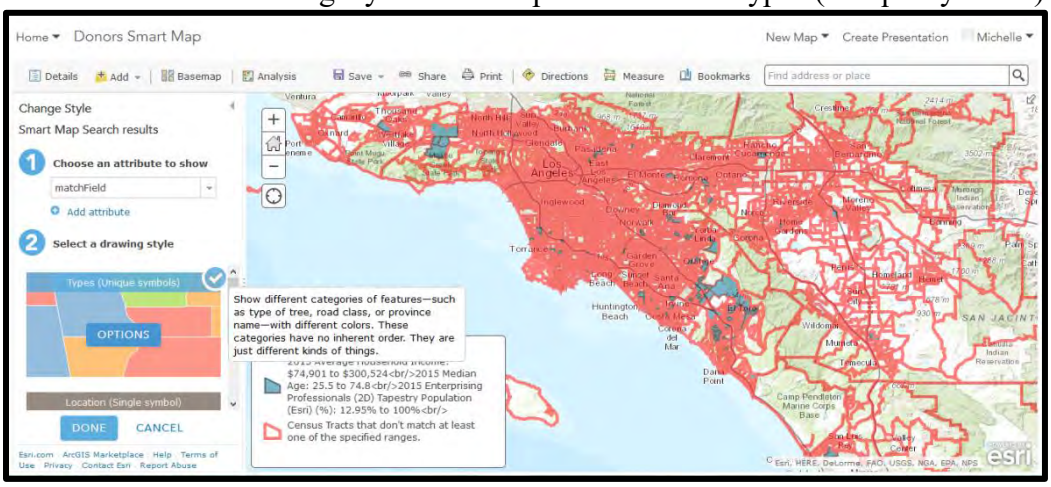
34. Click on the map



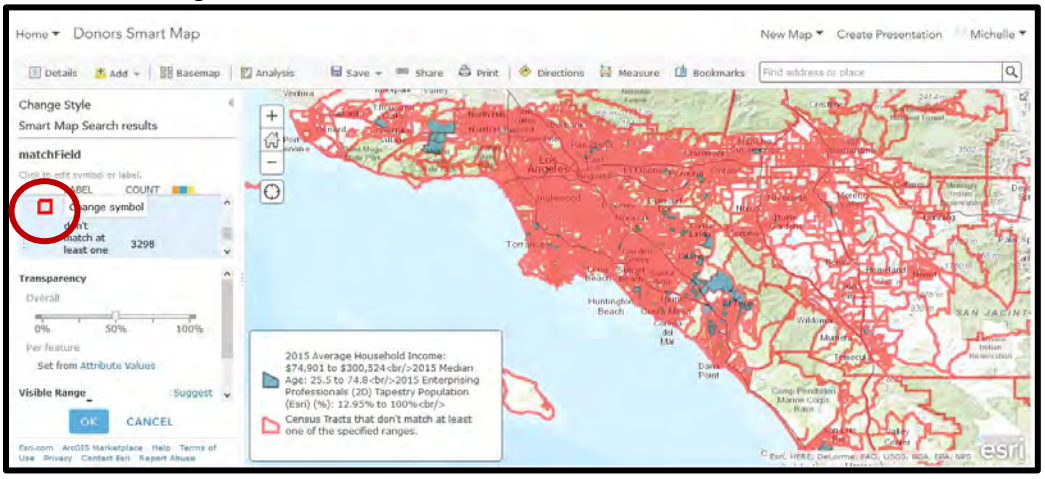
35. Click on the map again
36. Under “Smart Map Search results” click Change Style



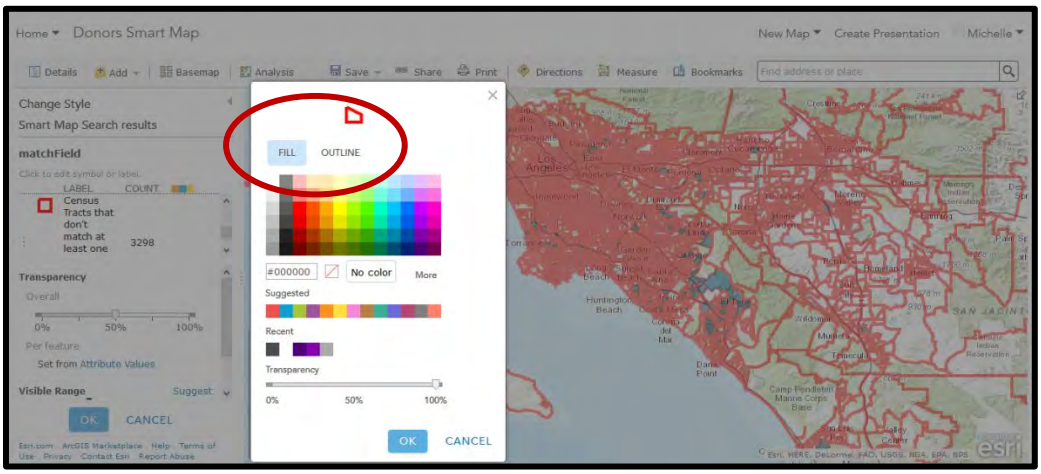
37. Under “2 select a drawing style” click “Options” under “Types (Unique symbols)



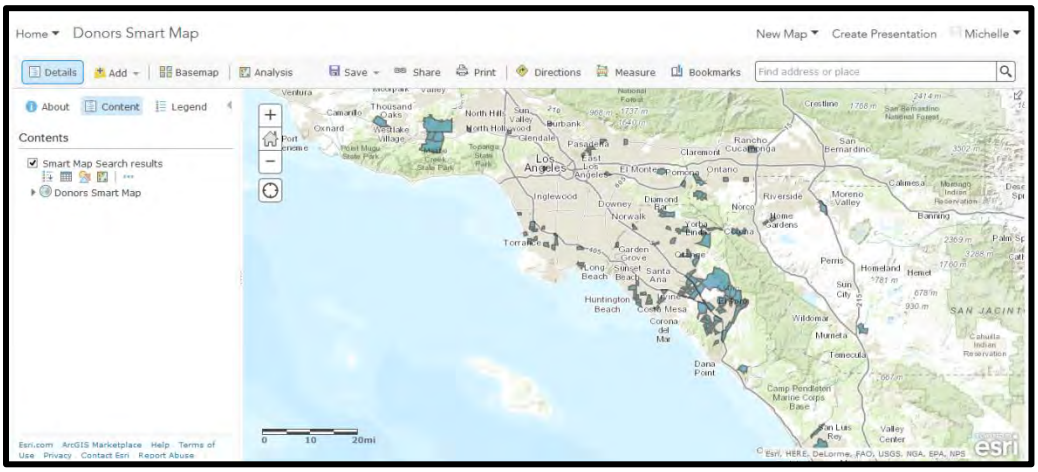
38. Click the red square



39. Under “Fill” and “Outline” select “No color”

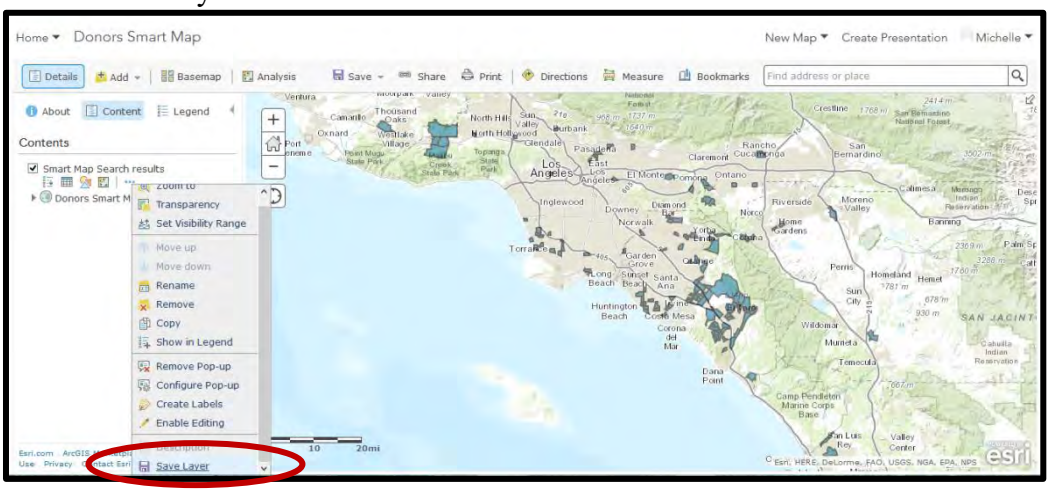


40. Click OK
41. Click Ok
42. Click Done

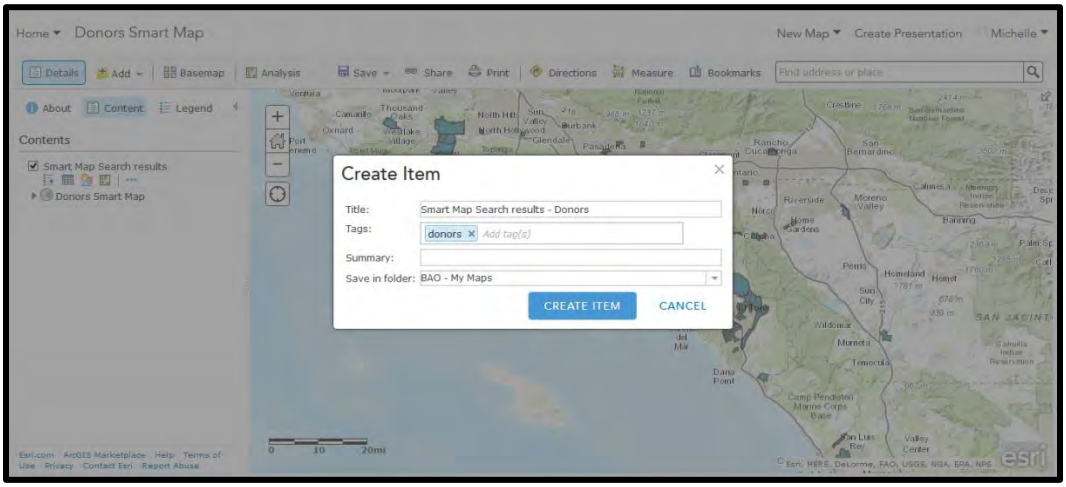


43. Under “Smart Map Search results” select More Options

44. Click “Save Layer”

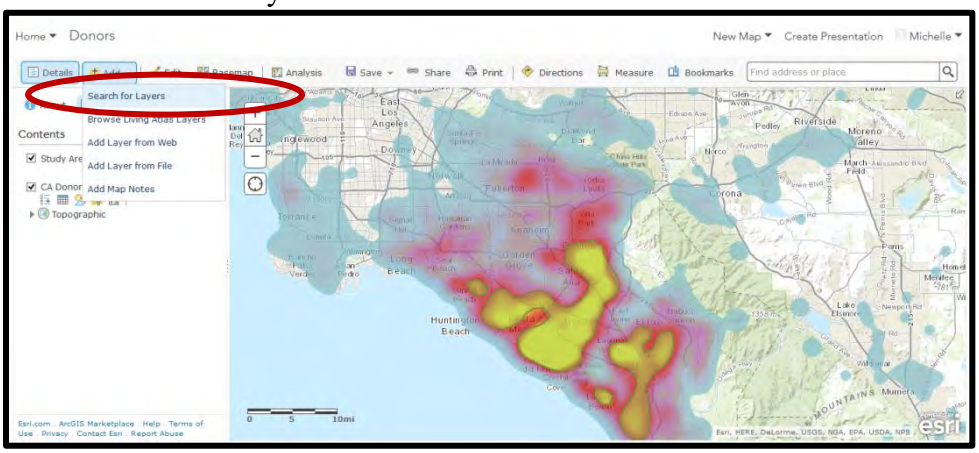


45. Add Title and tags
46. Click “Create Item”

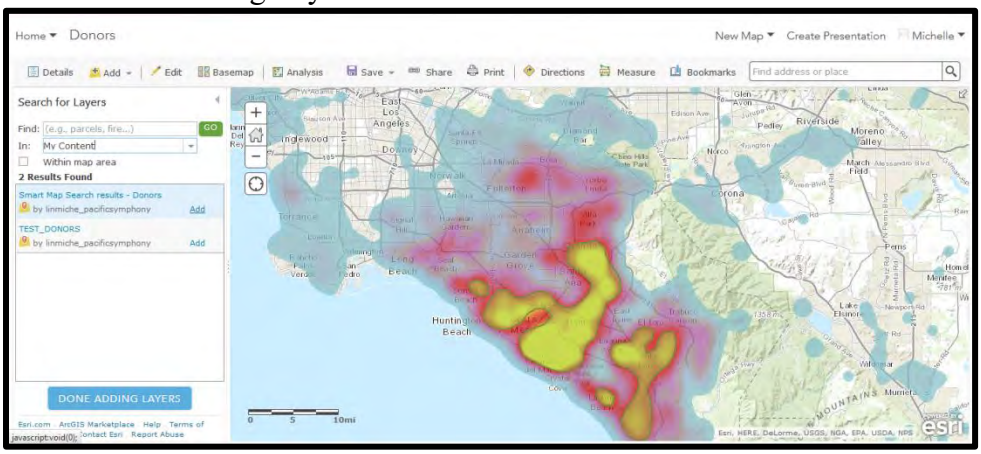


47. Save map
48. Click “Home” and click “My Content”
49. Go back to your original map (ex: Donors)
50. Click “Add”

51. Click “Search for Layers”

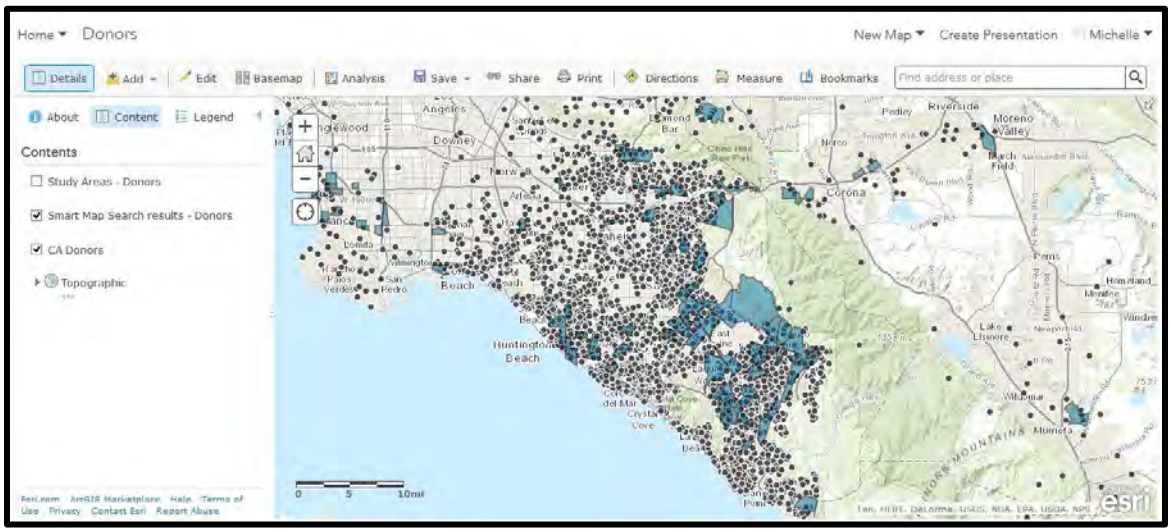


52. Uncheck “Within map area”
53. Go to “My Content”
54. Go to “Smart Map Search result” and click “Add”
55. Click “Done Adding Layers”



56. Uncheck your map notes layer (optional, but recommended)

57. If you would like, you can change your heat map back to regular dots on a map to make the map more clear
    a. Under Donors, click Change Symbols
    b. Under “2 Select a drawing style” click Select
    c. Click “Done” (Pictured below)



58. Save map