



MSUS Culminating Experience Final Report

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Project Name: Community Values Mapping for Apache Junction

Project Clients: Joshua MacFadyen, PhD, and City of Apache Junction

1. Abstract

The City of Apache Junction is located in an environmentally and culturally rich location on the eastern edge of the Phoenix Metropolitan area. This suburb is expected to grow in the future with undeveloped land zoned for development. Despite its uniqueness, the city is challenged by a negative reputation in the region. To help improve the city's image and promote development, the City of Apache Junction has partnered with Arizona State University's Project Cities program. This Culminating Experience project is one of several initiatives working for and with the city to help improve quality of life for city residents. The project asks: how can we measure, identify, and promote locations of high community value in Apache Junction to attract new residents and create more development opportunities? A PPGIS methodology was used to survey residents about their favorite locations in Apache Junction; participants were asked to mark their favorite locations on the map with stickers. Each sticker had a different color and corresponded with different values. The values were: recreational, cultural, spiritual, aesthetic, and special place values. All survey responses were transferred from physical maps to online geographic survey website, Maptionnaire. 6 locations in Apache Junction were identified to have the highest number of values. This information will be provided to the city of Apache Junction for more informed decisions on future development and integration into the Positively Apache Junction rebranding campaign. ASU's online class HST 485 History of the Wild expanded the survey by making it publicly available online.

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3. Introduction

The macro-economic issues of higher poverty rates in an outlying suburb can be addressed by fostering a stronger local community and promoting a better image of a green city to drive the economy into a better future (Simona, 2015). Long-term economic issues can be addressed through promotion of local environmental amenities, cultural ties to the land, and differentiating the city as a destination for nature to increase tourism. The goal of this project was to quantify the emotional connections of visitors and residents to the natural and cultural amenities of Apache Junction (AJ). The City of Apache Junction's aim is to improve its reputation and attract development and growth; providing the results of this project to the city will give them a tangible example of how local residents appreciate their city's places. The benefit of a participatory geographic study lies in its ability to combine locations and emotions into quantifiable data, which then can be used for promotional marketing to improve the reputation of the city. The city needs increased economic development into the future to improve the wellbeing of its current and future residents. Using values from the community to promote valuable assets will help connect outside perspectives with the experiences of the community. The normative nature of sustainable development implies a need for empathy to guide the decision making of the city to benefit residents' wellbeing. There is a lack of knowledge by the city about how the community experiences and values locations; this project quantifies these values and makes them available for development decisions.

The project described in this report is a case study among a wider initiative to improve the City of Apache Junction's reputation in the Metropolitan Phoenix area. To meet this challenge, this project aimed to produce a deliverable that appropriately displays the link between the local amenities and values of the community. By surveying the local population, the project aimed to display qualitative data like values, experiences, and history. The expectation of this project was to have respondents identify their favorite locations in and near the city, and corresponding each location with a specific value. These community values would then be translated into a publicly available, interactive, online map for the community to promote itself and improve the perception of Apache Junction. It would also serve as a tool for the city government to learn from the citizen's preferred locations. The connection to sustainability lies in the process of public participation and pathways to sustainability through promotional usage of the data. The city of AJ is will update its General Plan in 2020, and is actively incorporating findings by ASU's Project Cities for sustainable development into the future.

Using a Public Participation Geographic Information System (PPGIS) method of surveying at community events, citizen's historical experience with local amenities will offer the City of Apache Junction an opportunity to positively promote itself and improve the city's brand. This is important because measuring how the local population values their nearby locations will provide a positive reason to visit Apache Junction, which then becomes an incentive for more people to live and visit the city (Lo and Jim, 2010). The city envisions building and

interconnecting more nature trails (City of Apache Junction, 2016, p. 2-6), and this project gives the government additional tools to determine locations of high value to the community. Increased connectivity to the area's amenities will improve the city's brand and drive future economic development (Willemsen and Van der Veen, 2014). Local sustainability was improved by gathering data on citizens' historical experiences through public participation, giving city planners historical data to make more informed decisions, and providing the public their responses by placing it online (Cohen, M., Wiek, A., Kay, B., and Harlow, J., 2015).

Beyond sustainability, the geographic information available to the public increased from the updating of the online mapping website, OpenStreetMaps (OSM). After updating OSM with previously unmarked popular trails, the open-platform map website has further detail than it did previously before this CE Project. This website can be used by anybody and is already used by a wide range of mapping applications. Due to this increased capacity, the city and public can gather more data for development, promote present and future nature trails, community connectivity, and multi-modal transportation as it undergoes sustainable development into the future. Additionally, this CE Project will provide the city of Apache Junction with a Final Report of this project. If they desire, they can integrate further PPGIS methods into their community outreach. In the long-term, these improvements will help the city to improve for future generations.

4. Project Context

Apache Junction is a small city of 39,954 in the Phoenix Metropolitan area on the eastern edge of the metro region in Pinal County. Incorporated in 1978, the city has always been on the periphery of the urban area and is mostly known for winter-time seasonal residents and western-themed businesses (Apache Junction Public Library, 2017). Bordering the Tonto National Forest, the city has proximity to environmental amenities and historic sites, like the Apache Trail and Lost Dutchman State Park. Geographically positioned as a suburb to Phoenix, Apache Junction has undeveloped land within its city limits with plans to develop it. The city is positioned to grow in population into the future.

The city is also known in the Valley for having a negative reputation. Apache Junction has long-term challenges of poverty, educational attainment, and homelessness that is above average for the rest of the region. In 2015, 24% of people were in poverty, in 2016, only 13.1% of adults older than 25 years had a bachelor's degree or higher, the median household income was \$35,671, and 15.9% of people under 65 years had a disability. In comparison, neighboring Mesa, AZ had a poverty rate of 16.5%, 24.9% of adults older than 25 held a bachelor's degree or higher, median household income was \$48,809, and 7.7% of people under 65 years had a disability (US Census Bureau, 2017). These statistics and realities have translated into the negative perception of the city. As an example, the city council passed an anti-camping

ordinance in May 2017 that criminalizes anyone sleeping with bedding materials on public property (ACLU Arizona, 2017). Essentially, this ordinance targets homeless individuals from sleeping on public property. From the perspective of people living outside of AJ, hearing about a homelessness ordinance is an example of information that further ingrains the negative reputation of the city. The city's crime rates of the past also contributed to the current negative reputation. In Apache Junction in 2003, the theft rate was 1235 per 100,000 residents. In 2016, the theft rate had improved to 597 per 100,000 residents. In comparison, Mesa, AZ had a theft rate of 3,997 per 100,000 residents in 2003. In 2016, Mesa's theft rate was 1,757 per 100,000 residents (City Data, 2018). Apache Junction's crime rate has been trending downward, and is now just below the state average. This shows how stereotypes created from the past are held by outsiders into the future, even after realities have improved.

To combat negative messaging reaching the wider public, the city needs to make a concerted effort to highlight positive aspects that counter the prevailing feelings about the city. The city is already well known for its proximity to natural trails and historical sites. To visit the many trails and campgrounds in Tonto National Forest, most visitors from the Phoenix Metropolitan Area have to drive through Apache Junction. The many RV's and mobile homes in the city is a representation of how people are already willing to travel long-distances to visit nearby natural amenities. The natural amenities that lay just outside the city allows many regional visitors to simply drive through the city and avoid spending any money or time in Apache Junction, especially with Mesa, AZ being a much larger neighbor. Along with attracting tourists, the city would like to become a regional destination for new residents, and new development opportunities. The city's population varies with the seasonal temperatures, it swells in the Winter months from seasonal residents and decreases during the Summer. The city's population is projected to grow substantially in the coming decades, from 55,100 in 2015 to 125,400 in 2050 (Maricopa Association of Governments, 2016). A large portion of the land in Apache Junction is undeveloped, with most of it planned for future development south of the US 60 freeway. There is an urgent need for sustainability to be included in its long-term development and urban planning strategy. Decisions made in the upcoming years will long term consequences and determine the environmental, social, and economic wellbeing of current and future residents. The city recognizes this, indicated by its participation with Project Cities at ASU.

There is a pathway to a better future for the city and its residents and visitors; AJ just needs some help to plan its development in a better way, especially in light of limited resources among city planners. An example of limited resources is Apache Junction's lack of access to the Valley Metro public transportation network, which ends several miles away from AJ's boundaries in Mesa, AZ. Absence of public transit will continue to hamper socioeconomic statistics into the future. Furthermore, the city relies on sales tax for revenue and is vulnerable to increases in online shopping, they do not have property tax (City of Apache Junction, 2018). Funding further investments to improve the wellbeing of residents and sustainability of the city

becomes more challenging with decreased revenues, until tax laws change. The city needs new ways to promote itself, enhance the community, and protect its natural amenities. ASU has recently begun a program called Project Cities, which aims to partner ASU students with local cities to work on projects related to sustainability. Apache Junction, AZ is the first city to join the program; as of Spring 2018, they have projects ongoing and classes working with the city through the Project Cities program. One of those projects, Positively Apache Junction, has the goal of improving the city's image and increasing tourism to the city (Apache Junction – City Description, 2017).

The rebranding strategy of Positively AJ aims to change the traditional narrative that led to an image problem. This CE Project helped move the city's messaging toward leveraging its uniqueness in the region. By focusing on the community experience and their most valued locations, AJ has a new model to not only promote itself but begin to establish its own identity into the future. In practice, this means: more urban in-fill of undeveloped lands with public amenities, such as parks and libraries, integrating the many biking and equestrian trails that intersect the city into a multi-modal transportation network, identifying key locations of civic activity, and increasing targeted investment toward further social infrastructure. Investing in infrastructure that facilitates social interaction, and brings together residents and visitors, will leave lasting positive impacts on the community as it grows. Ideally, the future new developments of the city will be planned and zoned to include lessons learned from Project Cities case studies. This will help improve the city's reputation into the future, therefore attracting more population growth and economic activity. Incorporating the information from this CE project, and other sustainability case studies, into the city's General Plan in 2020 will improve the wellbeing of current and future residents.

5. Literature Review

Landscape values mapping has beginnings in forestry frameworks. Rolston and Coufal (1991) argue that the traditional forest values should expand to include other elements, like humanity. Specifically, the PPGIS framework of that measures 13 different values originated in this article. The article mentions values like scientific, spiritual, and natural history. These values are mostly experienced through the human lens, which was a departure from traditional forestry. In 2004, McIntyre et. al. combined survey methods with the environmental values framework. The article was an example of PPGIS, people would take photos and mark their favorite areas of the Dog River area along with their feelings about the location. After they recorded their experience, a survey was administered to gather data on the visitor's values. Tyrvaainen, Makinen, and Schipperjin (2007) conducted a PPGIS study in an urban environment in Helsinki, Finland. They mailed surveys to respondents to comment on their positive or negative qualities of urban green areas. They found that the highest ranked values were of naturalness, which implies urban residents highly value accessible beautiful greenspace in the city.

Beyond just gathering environmental values, Zhu et. al. (2010) used statistical analysis to find trends in the data. The authors' density mapping showed clusters along the river, implying that high valued areas in the community generated the most environmental value and visitation. Maptionnaire is survey software used to capture and organize geographic data from respondents. As a case study for Maptionnaire, Helsinki, Finland successfully used the mapping website for their own stakeholder engagement. Helsinki's City Planning Department adopted a 10-year master plan to guide development that focused on sustainable neighborhoods, ecological solutions, and increasing quality of life for a growing city. 4,700 respondents voluntarily marked more than 33,000 improvement ideas on the city's map. The successful usage of a tool like Maptionnaire is reliant on community feedback (maptionnaire.com). Results showed a geographically wide distribution of public participation data that is useful for city planners. Public input on their past experiences, current perceptions, and future desires is a powerful tool that can guide planners to develop the city more sustainably. It is a useful way to combat the top-down approach to city management and is relatively fast to gather data from a large number of the population (yleiskaava.maptionnaire.com).

Public Participation GIS has been used in the past to establish an environmental history of a defined area and local population (MacFadyen, 2016). Like this CE project, a cultural values study has been done before in Prince Edward Island, Canada (Novaczek et. al., 2011). PPGIS is useful to understand qualitative data in a defined area. One of the drawbacks of this method is representativeness; the demographics of participants tend to be different than the general population of an area. Online surveys often skew toward individuals who have internet and technology access, free time, and who are engaged with the local environment. Individuals do not even need to physically be in the area, seasonal residents and locals can complete the survey questions on the internet (Munro et. al., 2017). Apache Junction has seasonal visitors that come for the Tonto National Forest, yet they have to combat a negative reputation in the Phoenix area. The local culture of walking through trails can show people outside the community the benefits of living in Apache Junction and importance of nearby protected areas (Levin, Lechner, and Brown, 2017).

The City of Apache Junction aims to attract new residents, tourists, and create development opportunities. Due to the city's location among naturally and culturally rich amenities, the city government understands that protecting and expanding access to these amenities positively impacts residents. Overall, this is in-line with sustainable development. The negative reputation facing the city is a problem that challenges that stated goal. This challenge hinders the economic growth of the city, which then hinders the city's future potential to improve the socioeconomic statistics, and overall health and wellbeing, stated in the Introduction. To counter the prevailing reputation, the city has already partnered with ASU's Project Cities and its rebranding of Positively Apache Junction. From a governmental and institutional level, the partnership with ASU and Positively AJ is the subscribed sustainability solution. This CE Project shifts from the grand institutional sustainability perspective to individual values.

If a city has a negative reputation from people living outside the city, then the best way to counter this is with perspectives of local residents. The key is public participation. Solutions are more sustainable when those being impacted by the change are directly engaged and participate in that process. How can a city quantify qualitative information like values and make those values tangible enough to be transferable to the wider public in a rebranding initiative? A PPGIS methodology can integrate individual engagement and package their values as locations on a map. Public participation is necessary to make the values credible, and the GIS is necessary to locate these values on a map. To promote positive aspects of a city, it is necessary to learn from local residents to find the most valued places in the community. People experience their community in locations, and those locations have feelings attached to them. For example, during the engagement process in Phase 3 of this CE Project, many residents referred to Superstition Mountain as ‘my mountain’. Learning, quantifying, organizing, and promoting a community’s values is an antidote to a negative reputation. Public Participation GIS does most of this, it is then up to the City of Apache Junction to promote the most valued locations of its residents. Thanks to Project Cities, this is likely to occur. The result of this project is a better narrative to promote the city. This project, using PPGIS, provides a pathway to sustainability.

6. Client Deliverables Phase 1 and 2

This project was initiated through a combination of my personal interest in Geographic Information Systems (GIS) and a connection with an ASU professor named Joshua MacFadyen. He would be teaching an online history class that provided deliverables to the city of Apache Junction, through ASU’s Project Cities program, during the same semester of this project. He became my main client and acted as a point of communication for me to contact city officials at AJ. The project was separated into 3 distinct phases, each phase leading into the next. Phase 1 was general improvements to OpenStreetMap information in and around Apache Junction. Phase 2 was combining historical aerial photographs of Apache Junction into single images for use by the HST 485 class. Phase 3 was a community values survey, and main focus of the project. Phase 3 had the greatest impact on sustainability, so is the majority of this Final Report starting at Heading 7.

Below are the descriptions and results of Phase 1 and Phase 2 of this CE Project.

Phase 1: OpenStreetMaps (OSM) Improvements

Phase 1 was necessary because Phase 3 would benefit from a more up to date basemap for the online version of the community values survey. Maptionnaire, the website used to

facilitate the online version of the survey, uses OSM as a basemap. OSM is a crowd sourced, publicly available, completely free website where users can voluntarily update the map of the world. It is integrated into many mapping applications, similar to the well-known Google Maps. There was a noticeable lack of local hiking, biking, equestrian, and mixed use trails in and around Apache Junction identified on OSM prior to this project. Satellite imagery of the area is somewhat useful to identify trails, but many trails blend in with the surroundings and are difficult to identify from aerial photographs.

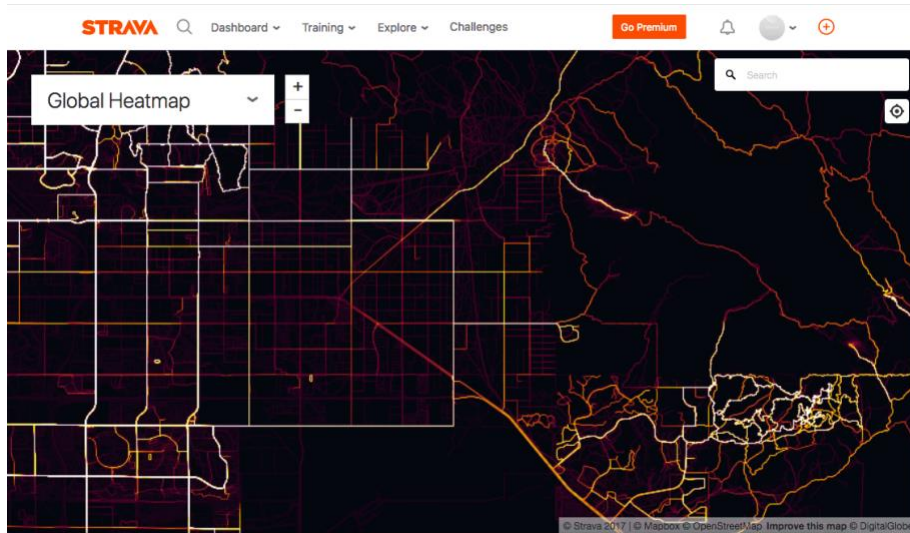


Fig 1. STRAVA Heatmap showing area around Apache Junction, AZ.

According Fig 1, the brighter colors indicate an area with higher traffic. People use wearable technology as they hike, bike, run, etc. This is useful because people are known to walk off of a declared path and establish trails on their own. With this map, OSM was updated with trails that were previously unmarked. Below is a simple example of the improvements that were made to OSM. These improvements are mostly to unmarked trails visible from aerial photographs but not yet marked on the OSM website.

Community Values Mapping for Apache Junction, AZ

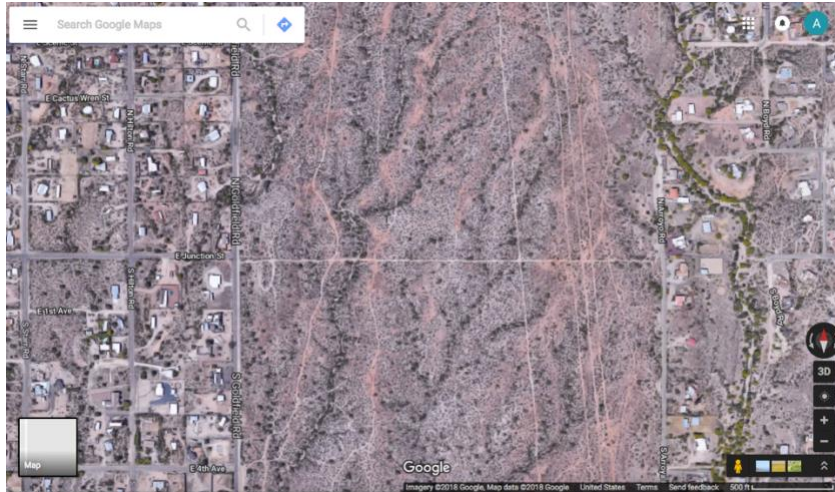


Fig 2. Trails shown along Junction St, between Arroyo Rd and Goldfield Rd. Apache Junction, AZ. This was not marked in OSM but still visible and identified through STRAVA.

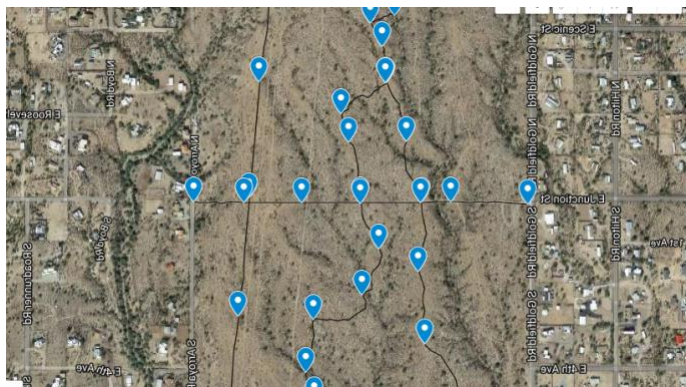


Fig 3. The black lines are the actual lines created and added to OSM. A blue flag is a visual aide during the creation process.

Community Values Mapping for Apache Junction, AZ

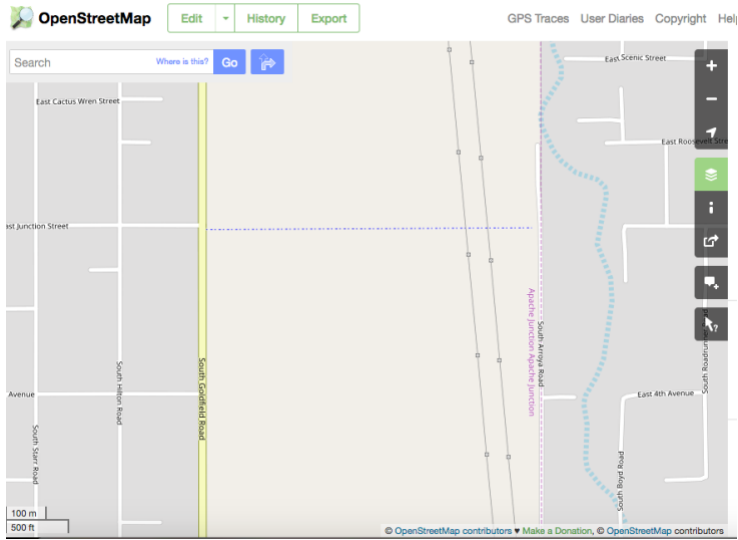


Fig 4. Example of a final update made on OSM. The blue line running left to right, which identifies a previously unmarked trail, is an update made during Phase 1 of the project. This is the same aerial location as Figures 2 and 3. OpenStreetMap.

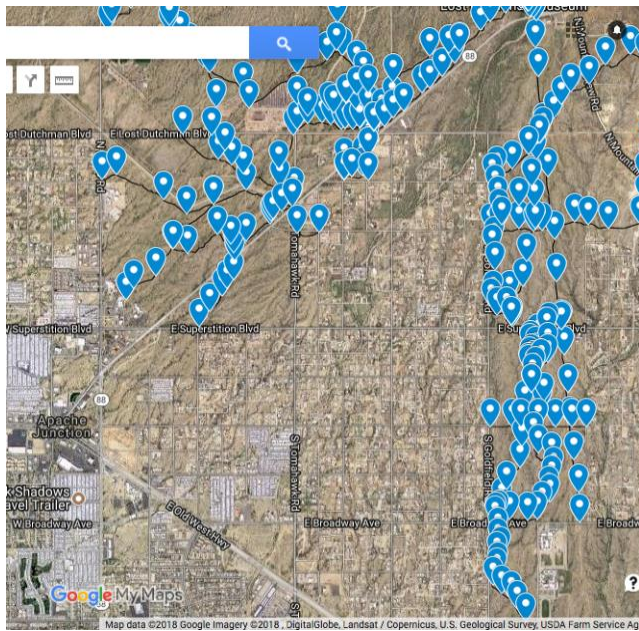


Fig 5. A representation of all trail updates made on OSM during project. It is difficult to show all updates on OSM because they are only visible when zoomed in closely, like Fig 3. This representation on Google Maps is to display total updates completed.

With more trails added, the online version of the survey would have more information available to respondents. One of the Maptionnaire base layers is OpenStreetMaps. The online survey on Maptionnaire directly benefitted from the OSM updates by displaying more trails to residents. Outside of the scope of this project, OSM is open to the public. These trail updates to the area can be used by locals and integrated into other GIS applications that use OSM as its basemap.

Phase 2: Creation of Historical Basemaps

ASU's HST 485 class needed historical images of Apache Junction to perform a project that documented the change and expansion of the city over time. As a deliverable to the main client, Professor Joshua MacFadyen, this CE project combined 4 separate historical aerial images into a more useable combined single image for 1985 and 2004. The class used these combined images to study the historical development of the city and identify places that are mentioned in historical texts, like scrap books. This class project was performed by the class for the city of AJ and outside the scope of this CE project. by....

Work was performed using Esri ArcMap 10.5 software. Eight individual aerial images of AJ were provided in the .tif file format, 4 images from 1985 and 4 from 2004. Each individual aerial image was georeferenced, and given GPS coordinates to use in GIS software. Once given coordinates, the images were combined using the Mosaic tool in ArcMap. This tool combines multiple raster files, image files with colored pixels, into a single .tif file as a colored image. This work process was done for both the 1985 images and 2004 images. A total of 8 aerial images were georeferenced, and 2 combined images were delivered to the client as deliverables.



Fig 6. Aerial image of Apache Junction taken in 1985. Combined 4 separate images into 1 single image. Work performed on ArcMap 10.5 software. Original aerial image files provided by ASU's Geospatial Hub.



Fig 7. Aerial image of Apache Junction taken in 2004. Combined 4 separate images into 1 single image. Work performed on ArcMap 10.5 software. Original aerial image files provided by ASU's Geospatial Hub.

With the creation of these maps, HST 485 was able to complete their projects and provide additional deliverables to the City of Apache Junction. Their projects, and the base images this CE project created, are part of the greater overall deliverables provided to the city as Project Cities and Positively Apache Junction. The class studied the place history of the city. This was related to this CE project because the class is compiling a history going back to sources from the 1960's, and this CE project is compiling locational values from residents in the present.

7. Phase 3: Community Values Mapping

Methodology: Why Public Participation GIS (PPGIS)?

The City of Apache Junction aims to attract new residents, tourists, and create development opportunities. Due to the city's location among naturally and culturally rich amenities, the city government understands that protecting and expanding access to these amenities positively impacts residents. Overall, this is in-line with sustainable development. The negative reputation facing the city is a problem that challenges that stated goal. This challenge hinders the economic growth of the city, which then hinders the city's future potential to improve the socioeconomic statistics, and overall health and wellbeing, stated in the Introduction. To counter the prevailing reputation, the city has already partnered with ASU's Project Cities and its rebranding of Positively Apache Junction. From a governmental and institutional level, the partnership with ASU and Positively AJ is the subscribed sustainability solution. This CE Project shifts from the grand institutional sustainability perspective to individual values.

If a city has a negative reputation from people living outside the city, then a strong way to counter this is with favorite places of local residents. Places that are highly valued by residents will offer a clear vision into the community by those living in AJ without outside stereotypes. The key is public participation. Solutions are more sustainable when those being impacted by the change are directly engaged and participate in that process. How can a city quantify qualitative information like values, and make those values tangible enough to be transferable to the wider public in a rebranding initiative? A PPGIS methodology can integrate individual engagement and package their values as locations on a map. Public participation is necessary to make the values credible, and the GIS is necessary to locate these values on a map. To promote positive aspects of a city, it is necessary to learn from local residents to find the most valued places in the community. People experience their community in locations, and those locations have feelings attached to them. For example, during the engagement process in Phase 3 of this CE Project, many residents referred to Superstition Mountain as 'my mountain'. Learning, quantifying, organizing, and promoting a community's values is an antidote to a negative reputation. Public Participation GIS does most of this, it is then up to the City of Apache Junction to promote the most valued locations of its residents. Thanks to Project Cities, this is likely to occur. The result

of this project is a better narrative to promote the city. This project, using PPGIS, provides a pathway to sustainability.

Survey Implementation

The culmination of this project revolved around the community values survey. It was during this time many residents, volunteers, government officials, and visitors of Apache Junction were met. Essentially, Phase 3 was a two week dive into the community of Apache Junction. 3 community mapping survey sessions were performed at 2 different events. All data gathering sessions were nearly identical except for the location, with similar materials and survey period of 4 hours. This CE Project was generously provided space at the City of Apache Junction's booth to conduct the survey. The first event was at the Lost Dutchman Marathon Health and Fitness Exposition, held at the Apache Junction Multi-Generational Center on Saturday, February 17th 2018. This event was both a time to sign up for the marathon happening that weekend and for vendors and organizations to set up booths and talk to people. The second event was at the Lost Dutchman Days Rodeo on February 23rd and 24th. This event is much larger; it attracts thousands visitors. There is a large carnival area, a rodeo arena with elevated seating, and booths for selling items and food. All three survey sessions were 4 hours long.

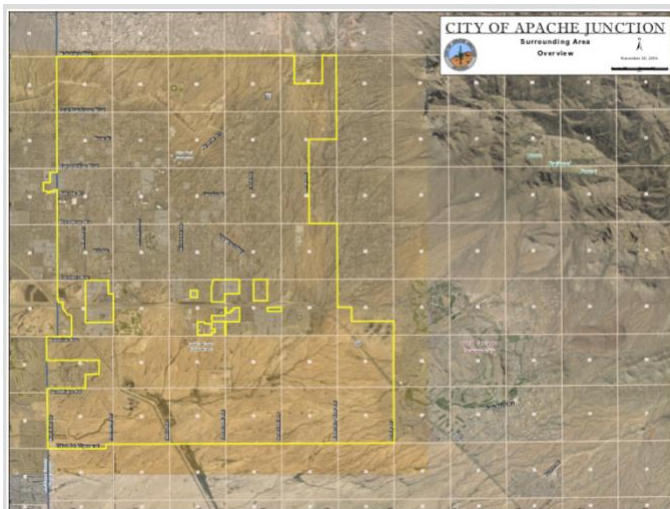


Fig 8. Map of Apache Junction used to conduct Phase 3 Community Values Survey. Yellow border is AJ city limits.

A 48in by 36in map of Apache Junction and surrounding area was placed on a foam board for stability. The survey administrator stood with stickers and engaged with anyone who would walk by. The administrator initiated the conversation with a simple, “Hi, would you like to participate in a sticker survey? You get to mark your favorite places in Apache Junction on the

map.” From there, the interaction might end with the individual not participating. Once someone was interested, the administrator engaged with them to participate and establish a connection. During this process, the administrator raised a clipboard with simple color-coded instructions. There were 5 different colors of sticker, with each color signifying a different value. The values were recreational, spiritual, cultural, aesthetic, and special place value. Special Place was included for people to indicate locations that had meaning to them personally. This was the source of many stories, like the sites of weddings and other favorite memories. These values were chosen to keep the survey simple and leave enough space for self-expression. Almost always, survey respondents would express themselves by telling speaking about their favorite locations.

Definition of Survey Values

These definitions were only provided to survey respondents if requested. Otherwise, residents were informed about the color coding for stickers and left to contribute to the map as they pleased. Strict definitions were mostly avoided to maintain that participant’s own values and feelings came through in the data, and were not otherwise influenced by the methodology. In practice, respondents were influenced by the group they were at the event with. Definitions below also are imbedded into online format of the survey.

Recreational Value- Yellow

A place where you like to go to enjoy yourself. Outdoors, indoors, wherever you go to enjoy nature, the city, and people.

Aesthetic Value- Green

A place that is beautiful. It can be good for pictures or stunning to experience in-person. This can be natural or man-made.

Cultural Value- Red

A place that is important to understanding local experience and holds local activities. This can be anything: outdoor, indoor, natural, man-made, temporary, or permanent.

Spiritual Value- Blue

A place that is a source of mental, emotional, and inner peace or strength. This can be serene, religious, peaceful, personal, or for a group. This can also be subjective.

Special Place Value- Gray

A place that is meaningful to you for whatever reason you like. You may have a fond memory or history with this place. If the other 4 values are not adequate, then chose this point.

Synopsis of Survey Sessions

Survey Session 1

The first event was at the Lost Dutchman Marathon Health and Fitness Exposition, held at the Apache Junction Multi-Generational Center on Saturday, February 17th (2018). This was the first the survey session of the project, so it was a kind of training session on how to best administer the survey. The administrator stayed with the booth, and actively spoke to any of the city employees or other booth volunteers who were also stationed around me. Most of the stickers placed that day was from city volunteers. This is mostly due to people signing up to participate in the marathon that weekend, most were from out of town and did not have any knowledge of the community to place values on the map. When speaking to them, they were excited to run and discover AJ during their stay. Survey performed from 8:30am to 12:30pm.



Fig 11. Sticker survey Results from February 17th 2018 at Lost Dutchman Fitness Marathon Exposition. Total of 46 values.

Values Gathered on Saturday, February 17th

Survey Map 1	Recreational	Cultural	Special Place	Spiritual	Aesthetic
Total= 46	13	7	13	6	7

Survey Session 2

The next weekend was the second event to administer the survey. Lost Dutchman Days Rodeo on Friday, February 23rd 2018 was a cold, windy, and cloudy day. The wind was so strong a trip to the store was needed to buy large black paper clips to keep the map attached to the foam board. Otherwise, the survey map, along with the table cloth, would have blown away. Due to poor weather, very few people attended the rodeo event during the survey session. To ensure that some data was gathered that day, the survey administrator walked around the fair grounds to engage volunteers working booths. Most of the survey responses came from volunteers and city workers because attendance was low. Survey was conducted from 2pm to 6pm.



Fig 12. Sticker survey results from February 23rd 2018. Total of 35 values.

Values Gathered Friday, February 23rd

Survey Map 2	Recreational	Cultural	Special Place	Spiritual	Aesthetic
Total= 35	17	4	6	5	3



Figure 9. A group of children participating in the survey on February 23rd.



Figure 10. A group of event volunteers participating in the survey on February 23rd.

Survey Session 3

The second day of the Lost Dutchman Days Rodeo, February 24th 2018, was clear weather and many thousands of people attend the day's festivities. There was engagement from

people walking by the map, many were curious about the project. It was the largest data set out of any of the three days, and it was a culmination of my other two days of practice. Study was performed from 10am to 2pm.



Fig 13. Sticker survey results from February 24th 2018. Total of 105 values.

Values Gathered Saturday, February 24th

Survey Map 3	Recreational	Cultural	Special Place	Spiritual	Aesthetic
Total= 105	32	19	27	10	17

8. Findings of Phase 3

Survey Totals

All Surveys	Recreational	Cultural	Special Place	Spiritual	Aesthetic
Total= 186	62	30	46	21	27

According to the survey results, the most used value category was Recreational, followed by Special Place, Cultural, Aesthetic, and Spiritual values. Survey respondents marked recreational as 33% of all values, this indicates that people appreciate places that either provides entertainment activities or a is a place that facilitates them. A high use of special place values reveals that people hold locations close to their own feelings and experiences. This is a major

opportunity to quantify the feelings of residents and help facilitate empathy between outsiders and locals. Many people marked their own homes as a special place. From a normative perspective, the city's pathway to sustainability might be to connect neighborhoods with locations with high density of values. To care about resident's special places leads to connecting those places to other highly valued areas for convenient transportation options. Spiritual and aesthetic values were the least used value. This might mean the city needs to improve the spiritual and aesthetic opportunities in AJ, or the survey respondents themselves preferred the other values as choices to participate. Churches were often marked as spiritual.

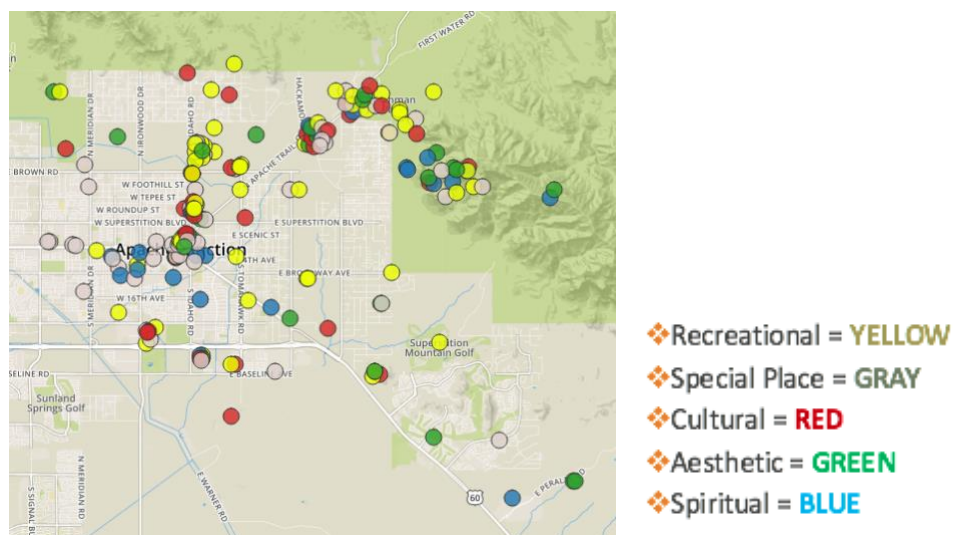


Fig 14. Results of all 3 paper maps placed on the online version at Maptionnaire.com. Every color has a value. Grand total of 186 values.

Density Maps and Areas of Interest

Density maps highlight areas that have a high concentration of values nearby one another. This is signified by changing colors and enlarged spots on the map. In the maps below, red areas are very dense, with blue areas having one or two values. These maps are useful to identify important locations in the community. Identifying these locations was vital to the success of the CE project.

Community Values Mapping for Apache Junction, AZ

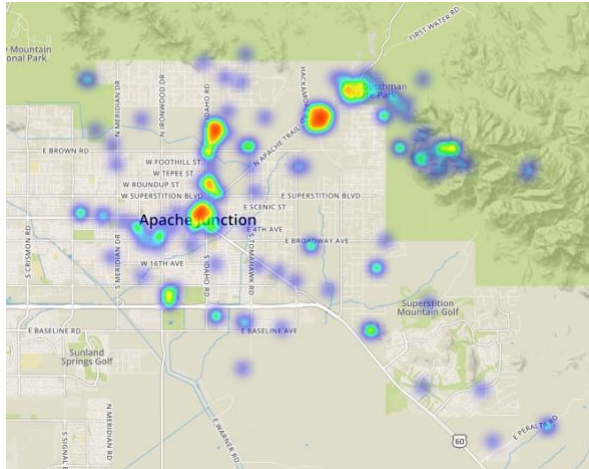


Fig 15. Density map of total survey results over survey area.

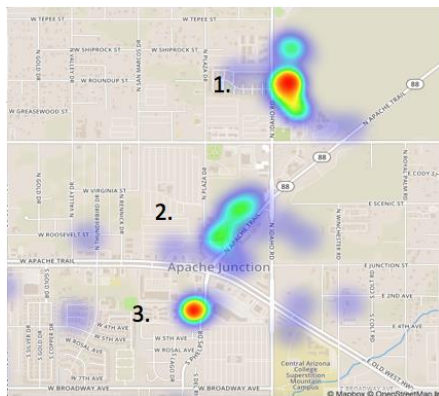


Fig 16. Density map of central city area. 1.) Northernmost hotspot is Apache Junction Public Library, Multigenerational Center, and City Hall. 2.) Green hotspot in center is Flatiron Park. 3.) Southernmost hotspot is Los Gringos Locos restaurant.

Several dense spots of values are noticeable in AJ. These are all within city limits and are mostly from public investment. Libraries, parks, and community centers are all valued by the community. It is noteworthy that all of these locations are close together, within 1 mile of each other. This means the rest of the city is not within a short distance of these highly valued amenities. In situations where a resident does not have transportation, getting to these locations would be a challenge due to distance. The city is not connected to Valley Metro and does not have location public transportation. Los Gringos Locos is the outlier as a restaurant, there is more than one restaurant in AJ.

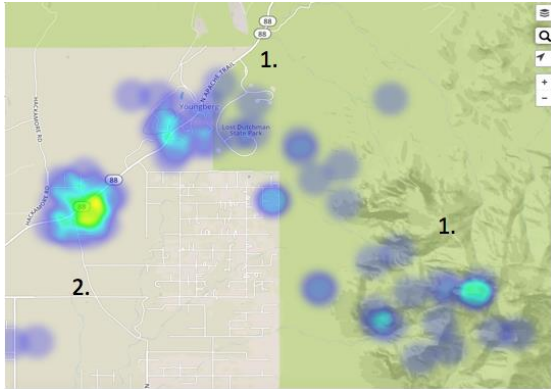


Fig 17. Density map Northeast of Apache Junction city limits. 1.) Green hotspot to the West are the Lost Dutchman – Superstition Mountain Museum and Elvis Presley Memorial Chapel. 2.) Long band of values that cover Superstition Mountain from Southeast Corner of image to Lost Dutchman State Park hotspot, North-Center of image.

These areas to the Northeast of AJ are outside of city limits. The distribution is spread out over a wide area, Superstition Mountain is widely valued. The chapel and museum is valued in proximity to the state park. On the ground, the transition between the museum and the state park is seamless. It all feels like a single connected area, with nature and desert not interrupted by development from the museum to the mountain.

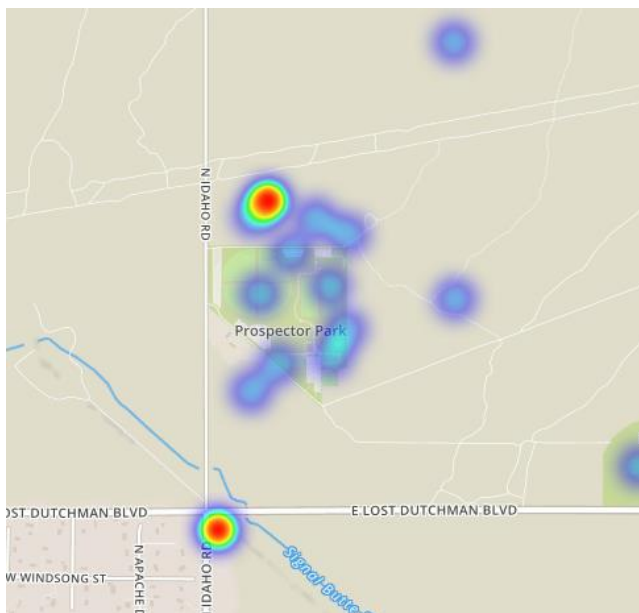


Fig 18. Density map of Prospector Park area. North-central area of the city.

The distribution of points around Prospector Park indicates the natural areas on the North side of AJ are valued by survey respondents. The nature trails and Rodeo grounds are marked and are nearby to Prospector Park.

6 Most Valued Locations

Below is a list and description of areas identified in Figures 16, 17, and 18 as having the greatest number of values. The density maps were used to identify the hot spots for values, and the below maps offer a zoomed in image with each value being visible.

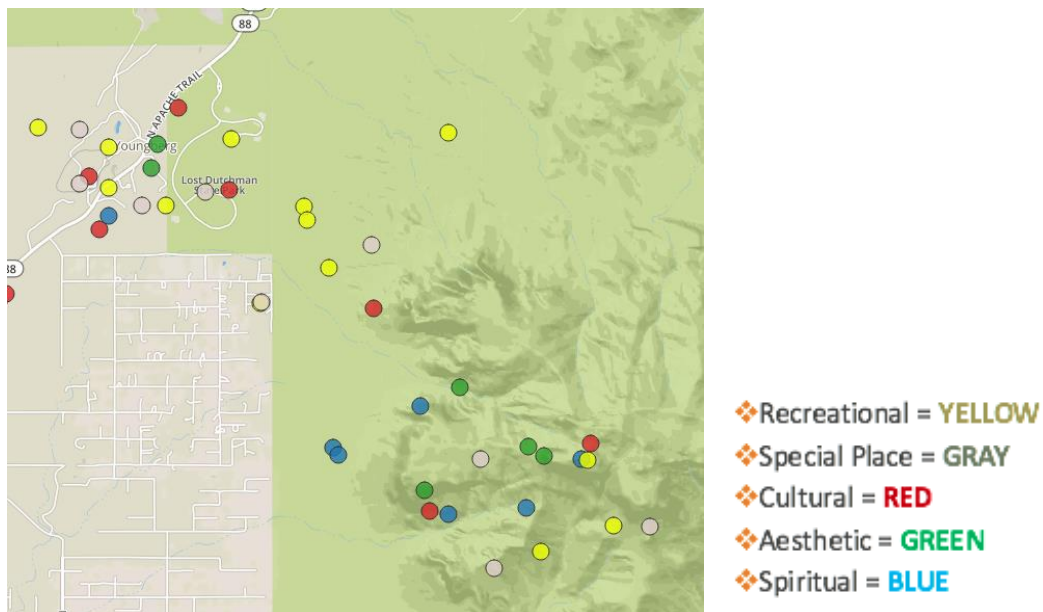


Fig 19. Superstition Mountain and Lost Dutchman State Park. 40 values total. 12 Recreational. 8 Special Place. 7 Cultural. 6 Aesthetic. 7 Spiritual.

Superstition Mountain and Lost Dutchman State Park

Superstition Mountain is visible from any part of Apache Junction; Lost Dutchman State Park is 6 miles away from downtown. It towers over the city and is a major source of local pride. Lost Dutchman State Park opened in 1977 and is at the North Western base of the mountain. It is a popular destination for hiking and camping. Historically, it is a key entry point to the Apache Trail into the Superstition Mountain Range. The hike to the top of the mountain, Flat Iron trail, is renowned as a difficult and beautiful hike that many of the locals have accomplished. All of the values are high, but spiritual values are highest in this area compared to all of the other locations. This shows how residents have deep feelings attached to the area and is an important fixture that brings the community together.

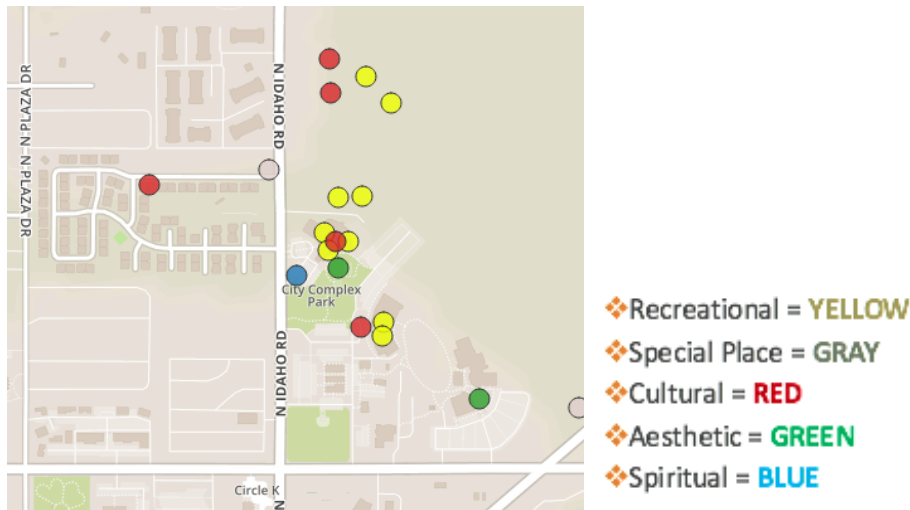


Fig 20. Apache Junction Public Library, Multigenerational Center, and City Hall. 19 values total. 9 Recreational. 2 Special Place. 5 Cultural. 2 Aesthetic. 1 Spiritual.

Multigenerational Center and Library

The Multigenerational Center is a central location for residents of Apache Junction to come together for many different activities. It is a catalyst in a way, fostering community fabric community through events and exercise rooms. The building is purposefully integrated with the surrounding mountain views and desert landscape with large windows for unobstructed views. Built in 2006, the desert-like architecture is an example of the city maturing with modern amenities for the public that match the natural surroundings. The library was also stated as a favorite place to go. These buildings are right next to each other, it seems there is synergy by having them nearby and creating a richer feeling of community in a single location. Recreational and cultural value is high here, indicating the community frequently uses the area for social gatherings and the arts.

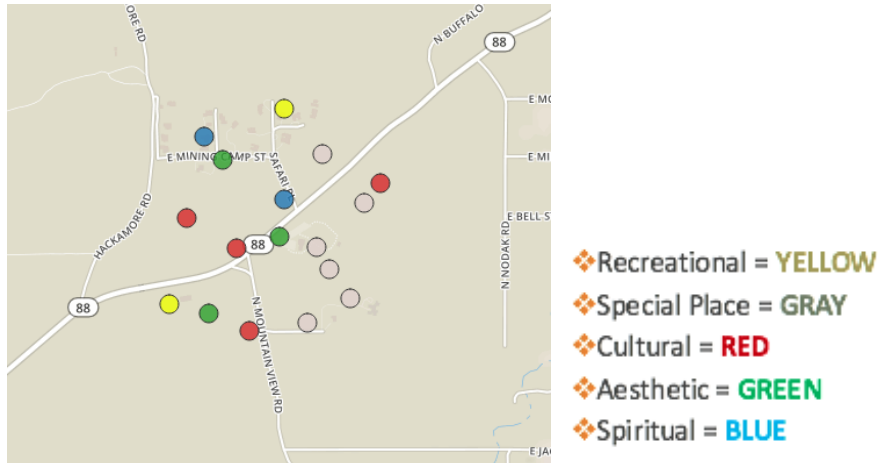


Fig 21. Superstition Mountain – Lost Dutchman Museum and Elvis Presley Memorial Chapel. 17 total values. 2 Recreational. 6 Special Place. 4 Cultural. 3 Aesthetic. 2 Spiritual.

Superstition Mountain – Lost Dutchman Museum and Elvis Presley Memorial Chapel

Opened in 1990, the Superstition Mountain Museum is a cultural and historical center for the entire region that is the Superstition Mountains. It is just outside of the Apache Junction city boundaries. A major attraction to this location is the Elvis Presley Memorial Chapel. It is a popular wedding venue with a beautiful view of Superstition Mountain behind it. The museum complex hosts many events and is very busy on the weekends. The site is locally popular because it incorporates outdoor elements into the museum, it is not a single building but a part of the community. The higher Special Place values is notable, with the Elvis Presley Memorial Chapel for weddings and other events.

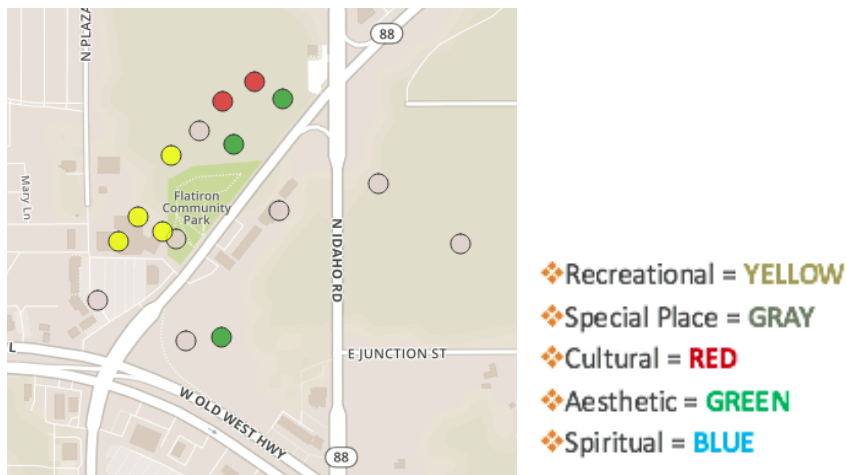


Fig 22. Flatiron Park. 16 total values. 4 Recreational. 7 Special Place. 2 Cultural. 3 Aesthetic. 0 Spiritual.

Flatiron Community Park

By far the newest location on this list, Flatiron Park was a favorite of many people who participated in the survey. Opened in 2017, this park is right in the middle of the city in the downtown area. It is mostly a green grass park that can also be used as an event space. There is a small hill, concrete sitting area, child play sets, and water spouts that come out of the concrete floor. Respondents stated it was a mark of progress for the city and a favorite place to go on a regular basis. There is a noticeable lack of spiritual values in this area. Perhaps the downtown intersection is not known for its spirituality, and the brand new park does not have enough history to hold spiritual value like older places around AJ.

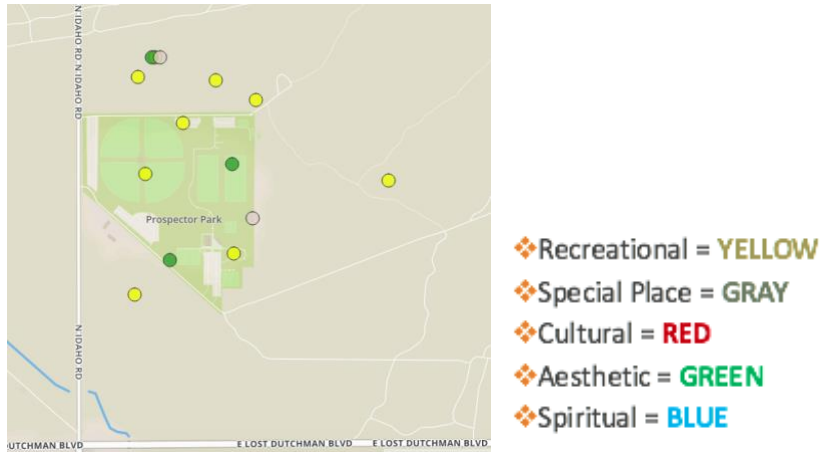


Fig 23. Prospector Park. 14 values total. 9 Recreational. 2 Special Place. 0 Cultural. 3 Aesthetic. 0 Spiritual.

Prospector Park

Prospector Park is a location in Apache Junction that packs many uses in a single location. There are: 4 lighted softball fields, 2 lighted sports fields, a playground, horseshoe pits, 2 volleyball courts, racquetball courts, tennis courts, basketball courts, 11 picnic ramadas, and additional grass turf and natural desert landscape greenspace. The park is located in an undeveloped area of the city, so the surrounding areas are desert landscape. The park is designed to be integrated with the wider nature trail network. Trails begin, end, and go past the park. It is also within 1 mile of the Lost Dutchman Days Rodeo grounds. Recreational values were high at Prospector park, which indicates the respondents value this park as a place for sports and physical activity.

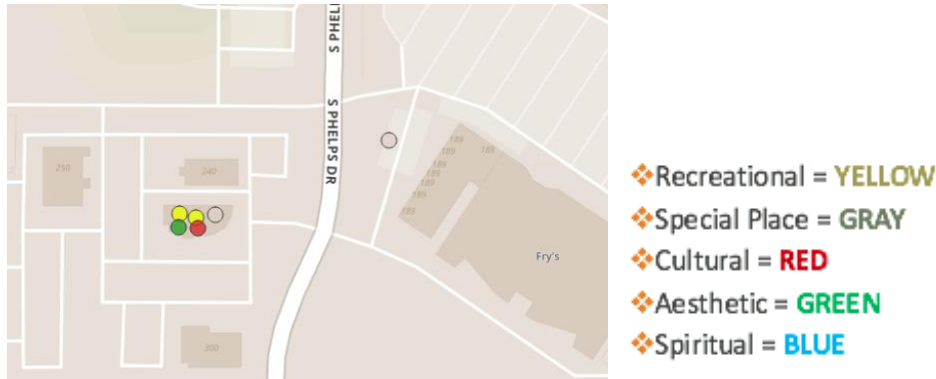


Fig 24. Los Gringos Locos Restaurant. 6 values total. 2 Recreational. 2 Special Place. 1 Cultural. 1 Aesthetic. 0 Spiritual.

Los Gringos Locos Restaurant

Los Gringos Locos was a common restaurant cited as a favorite place to socialize and eat. This was the only business with a large cluster of values, indicating that this particular restaurant is a local favorite. It opened in 2002 and is in the downtown area with a central location. This site was given value by multiple respondents across different survey days, not of the same group and therefore did not coordinate. No other individual restaurant, church, or shopping center was mentioned as much as this restaurant. This privately owned social location holds a valuable place in the community above other similar locations, at least within the particular group of people who participated in the survey.

Summary

In summary, there were 6 locations identified by the community with highest number of values. All of these locations combine account for 112 values and 60% of total values. The most valued location, Superstition Mountain and Lost Dutchman State Park, had 40 values, which is 21% of total values from the CE Project. This area acts as a monument for the community, always visible from any direction and visually stunning. The importance of this location was highlighted by people referring to Superstition as “my mountain” or “our mountain”. 3 of the highly valued locations are product of city investment. The values from the Multigenerational Center and Public Library, Flatiron Park, and Prospector Park all add up to 49 values and 26% of the total values from the entire project. The two locations that are privately owned, the Superstition Mountain – Lost Dutchman Museum and Elvis Presley Memorial Chapel and Los

Gringos Locos Restaurant, add up to 23 values and 12% of the total project's values. Each of the 6 locations have uniqueness to them within the community, and this might explain why they were chosen as highly valued locations. The most prominent sports facility, Prospector Park, was highly valued for recreation. There is only one Multigenerational Center and Public Library in AJ and the complex is highly valued for culture. Superstition Mountain is the most prominent natural feature in the area can be seen from any point in AJ; the surveyed residents resoundingly chose the mountain with the most values. In some cases, these highly valued locations feed off of the other ones to increase value as cultural and natural amenities. The Superstition Museum and Elvis Chapel are near Lost Dutchman State Park, the chapel benefits from the natural beauty of the state park.

9. Discussion of Survey Findings

Of those that participated in the study, it is obvious that the built environment is highly valued by the community. Out of the 6 most popular locations in Apache Junction, 5 were in the built environment of the city. Only the Superstition Mountain itself and the neighboring Lost Dutchman State Park had a large cluster that was primarily a natural area. Lost Dutchman State Park arguably has built environment elements with camping spaces and infrastructure. This is interesting because the values of the community do not reflect the prevailing feeling of why people move to Apache Junction. Generally, people will retire there or stay seasonally for a warmer winter. There are many choices in Arizona for this lifestyle, but many who choose AJ do so because of the natural beauty and many nature trails. This CE project assumed that there would be more values on desert landscape areas without development, but it is mostly bare.

There are some implications to this. Most the respondents did not prioritize undeveloped desert land to mark on the map over other locations. Of course, there are locations marked on the map that are nature trails. The survey results visually skew toward hotspots, and not the overall distribution of marked values spread across undeveloped land. Politically, and from a policy perspective, it is easier for the government to meet the needs of local residents by focusing on locations with a higher density of values. Therefore, it would be expedient to develop over land that is less valued and protect locations that are have high density of values. In terms of improving the reputation of Apache Junction, the 5 of the 6 most valued locations are a combination of public investment, historical values, and recreation. Los Gringos Locos is the exception as a local business. Additionally, the value with the highest amount of stickers was recreational value, with 62 out of the 186 total. With this new public participation data, the city can market these locations and help improve the reputation of the city as a place for recreation and unique local culture.

From a sustainability perspective, the locations that were identified provide value to the wider community that benefit the local residents. There is a positive feedback loop between

inherent value and perceived value. For example, the historical value of the Lost Dutchman Mining Town brings positive economic impacts to the city as a tourist attraction. The businesses there provide services and jobs for local residents, and the local culture is promoted through appreciation of the history. This location is a place of social gathering, adds to the local economy, and promotes awareness of the environment by maintaining a historical Western USA theme that integrates with the desert. These locations provide value to the community, and are thereby valued by the residents themselves.

10. Future Directions

This Culminating Experience project is being extended by other students. Dr. MacFadyen's online history class is conducted an expanded survey to what this project completed. Instead of performing it on a paper map with stickers, the students will be sent out survey links on the internet and respondents completed the survey online through Maptionnaire. Another difference is the historical context being gathered and connected to locations. Beyond what is being done by the online history class, there is a major gap exposed by this CE project that will need to be addressed for future studies: better metadata. One of the difficulties of performing the survey through paper and stickers is that the demographics of the individual is not always clear. The community values data would be much more useful if the values could be further separated into categories of a local resident, seasonal resident, or passing through visitor. Separating the survey data into more categories gives depth to the data and trends would be easier to identify. This would allow the city of AJ to better understand what kind of person values certain amenities. This project and survey method was only administered by one person. This report suggests adding additional sustainability agents to engage with people and help administer the survey, it would be potentially powerful to incorporate long-form stories and feelings attached with locations on a map beyond a predetermined value. A more ideal PPGIS survey would gather and organize stories with specific locations.

The greatest opportunity for the next group of students lies in the usage of the data itself for promotional purposes. In the case of this CE project, it stopped at the gathering stage and it is up to the city to utilize it for the betterment of its residents. If a team of students is able to act on the completed Maptionnaire data, that would be a needed expansion to the study. At the end of this semester, the online survey and data set was expanded from HST 485's online survey respondents. The expanded data set revealed similar trends with density of values around 5 main areas, excluding Los Gringos Locos Restaurant. It is likely Apache Junction will utilize any sustainability help, since it is participating in ASU's Project Cities Program. A sustainability communications solution is needed to address negative stereotypes about the city. For example, the issue of crime rate and safety in Apache Junction has improved to a point of proving the stereotype to be incorrect. As with all stereotypes, this one is built on a misconception that does not reflect the full experience of the community. The most highly valued locations are mostly

open to the public. Enjoying recreation or their special place out in the open with other residents in nature is a message that needs to be promoted. A growing community with access to nature trails that listens to its residents is a potent positive image that should also be promoted. This CE project, as a pilot study, has proven that the PPGIS methodology can generate useful stakeholder data and quantify how the community feels.

There is an opportunity for the city to perform the same survey for a longer period and in an online format, generating a much larger data set and finding other highly valued places in the community. The city should bring these highly valued amenities to current areas of the city that are lacking, and invest in connecting these locations with multi-modal transportation trails for easier access. As the city develops empty land, they now have a framework of values and amenities to include with urban growth. Future investment should prioritize characteristics of favored sites identified by residents, like community centers and maintained grass parks. These new locations must improve the wellbeing of the community, which will aid goal of attracting new residents and tourism. This project would be improved by gathering a place history from residents. It would be powerful to attach locations on the map with entire histories and experiences. Resident stories were heard during the survey process of this CE project, but were not written or quantified. This could be further incorporated into decision making for development by the city. A major opportunity for improvement, and a sustainability communications project, is the development of marketing materials from data gathered in this project. To achieve the full potential of this CE project, marketing materials need to be created that incorporates insight, stories, and empathy from stakeholder engagement and promoted. Web pages, videos, travel guides, and place histories are all viable options. The promotional materials need to convey the values of the community attached to the highly valued location.

11. Conclusions

Results of the community values mapping process clearly reveals places in the city of Apache Junction that are valued by residents in the community. At a minimum, there are 6 locations identified in the data that provide location and values associated with that place. People gravitated toward certain locations that showed widespread value among those in the community that were surveyed. With these locations, the City of Apache Junction can prioritize them in a promotional effort to improve the city's reputation. One of the challenges facing Apache Junction is a negative reputation, which inhibits the city's ability to attract development and provide better welfare to its residents. The results of this Public Participation GIS methodology reveal that there is a pathway to sustainable development by looking at locally valued locations and promoting them as vital locations in the community. Parks, historical sites, mountains, museums, community centers, public investment, these are all amenities and investments that

will attract investment and new residents when marketed properly. Coupled with the city's other established goals of sustainable development, like an active transportation plan and increasing connectivity of the city's mixed-use trials, further public investment into unique amenities is a pathway to further public appreciation of their city. This is a pathway to sustainable development, through data gathering and public participation.

AJ should be promoted as a city that is safe, has unique cultural and natural amenities, and is being built for the future with sustainable planning. Project Cities is providing advice that, if acted upon, would help transform the city into a highly desirable destination for new residents and economic development. As the city doubles in size to 125,400 by 2050, important amenities will need to be spread to new areas of the city. Currently, most of the natural amenities are to the Northeast of the city, and the rest of the identified locations of high value are clustered in the center of the city. Most new development will be built South of the US 60 freeway, and this new development needs to incorporate sustainability lessons learned from the Project Cities partnership. This CE project provided solutions to address the challenging negative reputation that is negatively impacting the city's development. Natural and cultural amenities that are important to the community have been identified, and can be used as lessons for increasing the wellbeing and development of Apache Junction. Increasing access to parks, community centers, commercial centers, and conserving natural desert areas are all goals that should be promoted within the city and promoted outside the city. The unique history, landmarks, and young age of Apache Junction is a combination that is ripe for sustainable development. The city has to act and plan properly to make this happen. The survey methodology can be repeated by the city to gather more stakeholder engagement into the future.

At the conclusion of this semester, Spring 2018, the Maptionnaire data will be given to the City of Apache Junction. Larry Kirch, Development Services Director of the Planning & Zoning Department at Apache Junction, is the point of contact with the city and will receive the computer files. The data from this CE Project, public participation survey sessions with paper maps and stickers, was combined with the online surveys of HST 485 as a single data set. Shapefiles useable in ArcMap software and Excel files will be provided, these files will then be analyzed and used by Apache Junction's Geospatial Lab for city purposes. Combining this project's findings with other findings from ASU students in HST 485 provided the city with a more robust data set. Directly providing the data for the city quickly makes the data accessible for decision making. In addition to providing the data to the city, the findings of this CE Project was presented on a poster and at the Project Cities Showcase on April 25th 2018. This event was open to the public and was attended by members of the Apache Junction government. The historical findings of the HST 485 course and this CE project were presented together as a package of values and history stakeholder engagement to the city of AJ. Combined with the online class, the survey had 1100 values marked on the map. ASU had paid for 3 months of use of Maptionnaire. The City of AJ is interested in using the survey website to gather more stakeholder engagement, but a high cost to access the software is prohibitive. Finally, a Final Report

Deliverable was provided to the main client, Professor Joshua MacFadyen, and will be sent to the City of Apache Junction along with the historical findings of the online class. This will directly deliver findings of the project to the city for their own use. Recommendations for urban development to improve resident wellbeing will be provided. All recommendations and insights were generated from the PPGIS data and public engagement.

The data presented in this Final Report can be slightly muddled when only viewed in this static word document. The survey data is best observed within the Maptionnaire website and ArcMap software. A powerful function of the Maptionnaire platform, and why it was chosen for data processing of the PPGIS data, is that the viewing of the data can change on-demand. This survey is publicly available, the link is presented in Heading #12 Appendices and Acknowledgements. Map layers, data layers, and analytical tools can be filtered and combined for data viewing that easily reveals trends. With that in mind, it is best that the source data and final Maptionnaire survey materials are being provided to the city for easy access for their purposes.

12. Appendices and Acknowledgements

STRAVA's Global HeatMap was used to identify trails in Apache Junction and marked in OpenStreetMap.

Strava Global Heatmap. (n.d.). Retrieved February 3, 2018, from <https://www.strava.com/heatmap#7.00/-120.90000/38.36000/hot/all>

OpenStreetMap. (n.d.). <https://www.openstreetmap.org/>

Maptionnaire was the website used to compile the survey results and generate density maps. Results presented in this report are just the beginning of a larger public survey that will be given to City of Apache Junction. Students from ASU's HST 485 History of the Wild online class, Spring 2018, will have added their own data from online respondents on top of the results from this CE project.

Maptionnaire - gather local insight for smarter urban planning. (n.d.). Retrieved November 12, 2017, from <https://maptionnaire.com/>

Direct Link to survey and data from this CE Final Report:

<https://app.maptionnaire.com/en/analysis/4009/>

ASU's Geospatial Hub provided the 8 historical aerial images of Apache Junction to this CE Project. During Phase 2 of the project, 2 historical images were created by consolidating 4 images each into a single image.

<https://lib.asu.edu/geo>

Thanks

Thank you to Larry Kirsch and the City of Apache Junction for allowing me to use the city's booth during the Lost Dutchman Day's Rodeo and Lost Dutchman Marathon Fitness Expo. They provided space and materials to conduct the survey. Thank you to Anne Reichman for supporting the project with ASU materials to hand out to survey respondents. Thank you to Professor Joshua MacFadyen, for not only being a client but a mentor during this CE Project. Thank you to ASU's Geospatial Hub in the Noble Library for aid in creating the two historical aerial images from 1985 and 2004. Particularly, Jill Sherwood was instrumental with trouble shooting the Mosaic tool in ArcMap to properly combine images.

Note: To keep the file size of this report smaller, many of the images in this Word document are of low quality. If original higher quality images were added the file size of this document would be much larger.

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