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Proposed Educational Community Garden Locations in Tacoma, Washington

Urban gardening is an expanding practice in Tacoma, with numerous community gardens already thriving in this highly urbanized city. These gardens give community members the ability to grow fresh, affordable produce, where availability would otherwise be limited. And with community gardens located throughout Tacoma, a wide range of individuals are able to do so. However, despite the abundance of community gardens in Tacoma, there is a lack of space that is designed for the youth of Tacoma; even less that are used for educational purposes. It was this void that I sought to fill in my research, by finding available parcels of land in Tacoma that could sustain an educational community garden.

I initially gained interest in the topic of using gardens for educational purposes when I became the coordinator for the University of Washington-Tacoma Giving Garden. The primary goal of the garden is provide low-income community members with access to fresh, organic produce, which we accomplish by donating 100% of our harvest to local food banks, as well as providing a space for students of all ages to engage in garden-based learning. Whether designing and implementing experiments on plants grown in various soil, or studying the soil itself, students are able to learn in ways classroom instruction could not provide. As I became more involved in the garden and working with students of various ages, races and income levels, I quickly noticed a severe disconnect between the students and the natural world. Despite age, the majority of the students I have worked with had little to no knowledge of how to plant, grow or harvest food, and in many cases, were unaware that the food they buy from the store looks starkly different from its original form in the garden. This disconnect

Garden-based learning provides a unique opportunity for students to experience predominately classroom taught lessons, outside. Far exceeding mere gardening skills, the outcomes of garden-based learning include "personal development, social development, moral development, vocational and life skills, community development, food security and sustainable development" (Desmond et al. 2004), to name a few. Remembering my own experiences with students, I felt that an ideal project for the GIS program would be to identify vacant parcels of land, throughout Tacoma, that could sustain an educational community garden. In these gardens, students would have the opportunity to "study of facts of growth, the chemistry of soil, the role of light, air, moisture, injurious and helpful animal life, etc." (Dewey 1915). As well students and community members would have the opportunity to experience first-hand how to grow and harvest food for themselves and their community.

Planning Process

Before any analysis was conducted to determine the available parcels of land in Tacoma that could sustain an educational community garden, I began by determining the parameters needed for such a garden. To do so, I began by reading various literatures that discussed gardens and garden-based learning and formed a literature review of these sources. A 2010 article by Fontenot et al., proved to be most useful for determining the physical parameters of a garden, including appropriate size and slope, both vital qualities of a successful garden.

The next step in the planning process was to form a project overview, in which I presented the background information on my proposed topic, as well as highlighted what I intended to do in my project and whom my project would appeal to. This overview helped to

narrow down our specific ideas, as well as create significance for our proposed topic. Upon completion, I turned my attention to what I would specifically need to run my analysis.

The primary goal of my research was to find vacant land in Tacoma that would provide K-12 students with a space to observe nature and natural processes, as well as engage in hands-on experience in gardening and the origin of food. According to 1995 North Carolina Environmental Education Plan, "hands-on experiences are the best way for students to develop an understanding of their complex world and their place in it". However, a common theme in my research was that the established school gardens found it difficult to maintain their gardens in the summer months, when schools are on summer break. In an attempt to alleviate this problem, I decided to consider community organizations that involve individuals of varying ages in my research. In general, community organizations, such as churches, YMCA's and daycare are open year round and contain individuals who could not only provided help during the summer months, but who could also benefit greatly from an educational garden setting. Parks were also considered in my analysis, as large groups of people generally frequent parks during the summer and similar to community organizations, could provide valuable help, as well as benefit from the garden.

From my research and personal experience in gardening and garden-based education, I ultimately decided to choose the garden locations based on their proximity to a variety of community centers and activities, the lack of impervious surfaces the parcels contained and the median income and children population density of each parcel. Once I identified the data I would need for my analysis, I began the collection process.

Methods

After the planning process was complete, I began by setting up my data directory, file geodatabase and feature dataset to store data downloaded. Once my directory was complete and I had a correct place to store my data, I began collecting the raw data I would need for my analysis. I used four main sources for my data collection that included the US Census, WAGDA, the USGS and the Tacoma/Puyallup phonebook. I first downloaded land use data, school locations data and parks data from the WAGDA website, to be used in my initial analysis. I proceeded to download impervious surface data and slope data from the USGS website, as well as income and child population data for Tacoma from the US Census website. Next, I geocoded a variety of addresses that corresponded to community organizations that I felt would be able to benefit greatly from the involvement in an educational community garden. These organizations included YMCA's, daycares, recreation centers, churches, vet centers, Boy Scouts of America and Boys and Girls Clubs. Once all data was downloaded to a temporary folder, I began adding each file to either my file geodatabase or feature dataset.

After all data was placed into the correction portion of my data directory, I began clipping all parcels to the extent of Tacoma, as this is where my analysis was focused. After the extent was clipped, I selected-by-attributes all vacant parcels of land from the land use file and exported these vacant parcels to their own shapefile. Next, I selected all elementary, middle and high schools and created a separate point feature class for each level.

Upon completion of the general extent and level of each downloaded file, I then conducted a network analysis of my data. Within network analyst, a 1, 5, and 10 minute walking service area was placed around each point of data including schools, parks, and community

organizations. I chose this as I would want every student and person to be able to walk to the garden, thusly promoting activeness and sustainability; added bonus of my project.

After all service areas were formed, I began determining which parcels of land would service the most entities (schools, parks and community organizations). I began by narrowing down the vacant parcels that were completely within the service areas of the community centers. The result of this analysis was vacant parcels that were completely contained within the most community organizations. I then took these results and conducted the same analysis with the parks' service areas. The resulting file contained vacant parcels that could serve the most community and park locations. Finally, I ran the same analysis with the schools' service area (each school level, elementary, middle and high, was analyzed separately). After I was complete, I had the vacant parcels of land that were within a 10 minute walk of each considered factor.

Once vacant parcels of land were chosen for distance, I began narrowing down the parcels based on size and slope. According to the 2010 article by Fontenot et al., an "ideal garden size for 400-500 students is 30' x 40'". Fontenot et al.'s prediction equates to roughly $3ft^2$/student. Obtaining school population data online, I found the average Tacoma elementary school population is about 380 students, which equals 1140 ft^2 of garden space. The average middle school population is about 611 students, equaling 1833 ft^2 and the average high school population is about 915 students, which equals 2745 ft^2. Using these approximate sizes, I narrowed down vacant parcels for each school level, with only those of the appropriate size remaining. Of those that remained, I removed any vacant parcels that were shown to be 'steep' (in this case higher than a 20 degree angle) as shown on the slope file downloaded earlier in my analysis.

I continued my analysis by analyzing the impervious surface data downloaded previously compared to the remaining parcels of vacant land. Although I feel that a person can successfully garden in many places, including those with pervious surfaces, namely through the use of raised beds, for this analysis I focused on pervious surfaces where gardening could be done directly in the ground.

My final analysis involved narrowing down the parcels according to median income and child density. I chose to focus primarily on low-median income and high child density parcels, as a long standing goal of my work has revolved around providing low income community members with access to fresh, organic produce, as well as provide them with the tools to garden themselves.

Once my analysis was complete, I conducted a ground truth of each parcel that remained. Although I was able to determine parcels based on the data, the data is not always reflective of current conditions. From this post-analysis, I found that several lots were under construction and no longer vacant, some were forested land, so undevelopable and others were not publically accessible. Upon completion, I had one parcel of land that would effectively serve the most community organizations and school levels individually.

Results

After my analysis was complete and I had determined that the parcels were actually vacant and suitable for my goal, I was left with four parcels. One of my final parcels was within a ten minute walk of Wilson High School (Photo 1). This 3800ft^2 parcel was large enough to contain the high schools' 1300 students, with a convenient location off of N 23rd St. There were four community organizations and parks within a 10 minute walk from the parcel (Figure 1).

Although overgrown with native plants and shrubs, this parcel would be well suited as an educational garden, incorporating numerous community members and students.

My second parcel was within a 10 minute walk of Fawcett Elementary School (Photo 2). Servicing five community organizations and parks (Figure 2), this 2300 ft^2 parcel is ideal for the schools' 400 students. This parcel was the most prepared for an immediate installation of a garden, as nearly the entire parcel was flat, mowed land.

My two final parcels were both within a 10 minute walk of First Creek Middle School. Because it would be unnecessary to have two parcels serving the same school, I ultimately chose the one parcel that I found to be most adequate in my ground truth. The 4400 ft^2 parcel (Photo 3) that I chose was by far the most appropriate parcel, and personally my favorite out of all parcels that I found. The parcel was completely exposed to the sun, was flat and was very conveniently located off of Portland Avenue. Although overgrown, this parcel would be more than adequate to sustain First Creek's 800 students and the five community organizations and parks (Figure 3) within its service area.

Discussion

In the end, I felt that my research was adequate in determining which vacant parcels would best serve as an educational community garden. My results conveniently provided me with a parcel what would serve each school level, which surprised me, however strengthened my project I believe. I had hoped that more community organizations and parks would have been served in my analysis, as there were several original points in my analysis. Perhaps if I had not sought parcels that lay completely within the various service areas, but instead partially, that would have provided me with more organizations served. Additionally, I had hoped that the vacant parcel locations would have spanned the city more uniformly, however the two parcels

that served Fawcett Elementary and First Creek Middle were relatively close together, while the parcel that served Wilson High was further away (Figure 4). I attribute this to the size of the parcel, as well as possibly choosing parcels in relatively undeveloped areas (such as those in the southeastern region of Tacoma. I feel that another large reason for the location of the parcels was due to the median income distribution of the city. The parcels serving Fawcett and First Creek are in an area of predominately low income, which could again explain why two parcels were so close together.

Conclusion

The benefits of garden based learning are endless and provide a variety of individuals with the means to enhance their learning, as well as their connection to the natural world. "In other words, it involves teaching children through personal discovery in natural settings, where they learn ecological principles that govern all life, as well as develop a sense of connection with the land" (Marturano 1999). My discovering available parcels that could sustain these gardens, further implantation can be completed if permitted. I feel it is feasible to implement a garden at one, if not all of the proposed sites and am personally interested in doing so. Although time, planning and resources are crucial for such a task, the rewards of establishing an accomplished learning site are well worth the effort. My hope is that over time garden-based education will become a core component of the curriculum for all grade levels and more students will have the opportunity to experience what this world is all about.

Photos and Figures


Photo 1: A 3800 ft^2 parcel of land is located on the corner of N 23rd St & N Villard St and serves Wilson High School


Photo 2: This 2360 ft2 parcel of land is located near A St & S 62nd St. and serves Fawcett Elementary School


Photo 3: This 4400 ft^2 parcel of land is located near E Portland Ave & E 59th St. and serves First Creek Elementary

Location	Walking Distance
Central Bible Evangelical Free Church	5-10 Minutes
Church in Tacoma	5-10 Minutes
D.A. Gonyea Branch- Boys and Girls Club	5-10 Minutes
Kandle Park and Playfield	5-10 Minutes

Figure 1: Community organizations and park locations within walking distance from the vacant parcel serving Wilson High School

Location	Walking Distance
Love &Kindness Childcare Center	1-5 Minutes
Unity Children's University Childcare	5-10 Minutes
Calvary Baptist Church	5-10 Minutes
Good Shepard Lutheran Church	5-10 Minutes
Stewart Heights Park	5-10 Minutes

Figure 2: Community organizations and park locations within walking distance from the vacant parcel serving Fawcett Elementary School

Location	Walking Distance
Eastside Kooia Pre-School and Childcare	5-10 Minutes
Portland Avenue Evangelical Church	5-10 Minutes
Pilgrim Rest Baptist Church	5-10 Minutes
New Hope Baptist Church	1-5 Minutes
Cloverdale Park	5-10 Minutes

Figure 3: Community organizations and park locations within walking distance from the vacant parcel serving First Creek Middle School

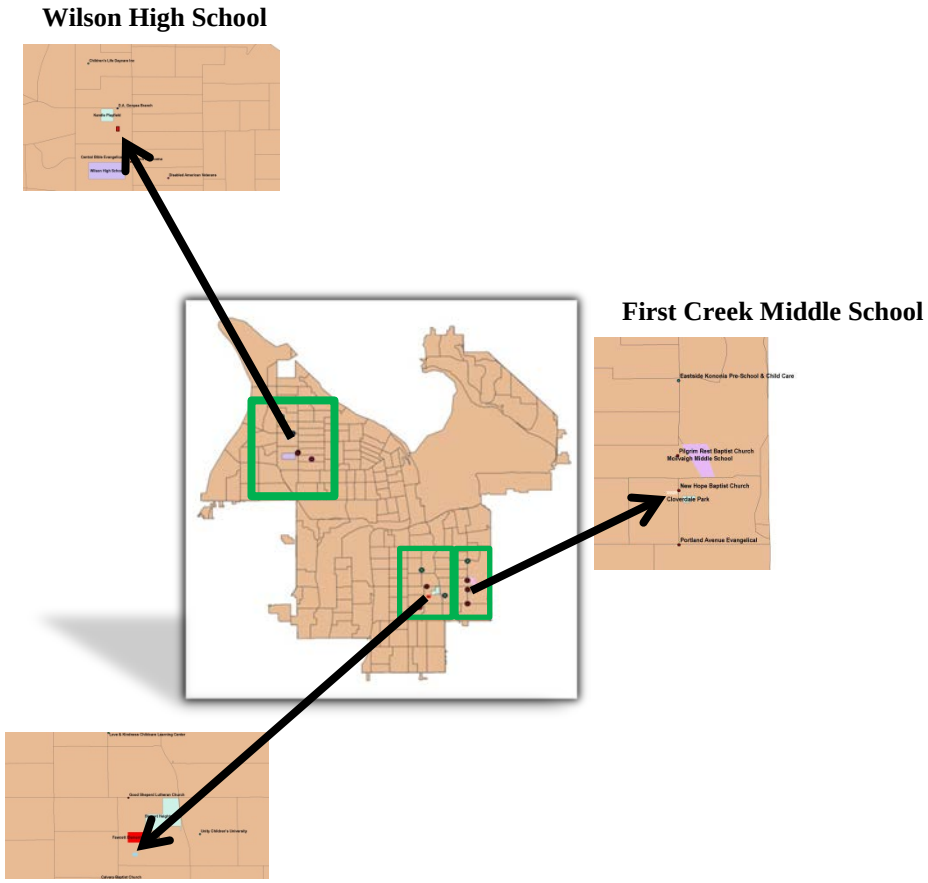

Figure 4: Vacant parcel locations relative to each other and the Tacoma boundary.
School locations, community organizations and park locations are shown relative to the vacant lot parcel.

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