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GEOG 544: GIS and Spatial Analysis

Project: 3


# Site Suitability Analysis for Daycare in Oakland City California

## INTRODUCTION

Daycare is daytime care for the needs of people who cannot be fully independent, such as children or elderly people. But this project will focus only on children.

The U.S. Bureau of Labor Statistics projects that day care businesses will have some of the fastest employment growth of all industries through 2020, and, according to new data from Sageworks, child day care businesses in the U.S. have consistently grown sales in recent years, even as many other industries struggled in the economic recession and subsequent recovery.

The number of child care facilities has increased greatly over the last several decades, with U.S. Census Bureau figures showing an increase to 766,401 child care facilities in 2007 from 262,511 facilities in 1987. Demand has been driven by increased numbers of working women, the Census Bureau says. In fact, 61% of mothers with kids under the age of three are working or looking for work, and changes in family structure and the desire to provide young children with educational opportunities have also contributed to demand, according to the government. Nine in 10 child care businesses don't have employees (other than the owner), and these businesses, many of which are operated in-home, require less financial investment than larger centers and therefore, allow owners to readily enter and exit the market as needed.

With the increasing number of households in which both parents work full time, this industry has been one of the fastest growing in the U.S. economy. However as unemployment rates spiked and child care costs increased, enrollment rates have been on the decline. Conversely, those parents employed are often working extra hours or multiple jobs and require increased child care, partially offsetting declines. Now that the economy is improving, parents are employed and more people are opting to have children which will create greater need for the child care industry.

Alison T. Jacks, an Enrolled Agent (EA) who specializes in tax-related work for child care providers in the San Francisco Bay area, said many of her clients are "in about as good a position as they have been in a while" financially. "The economy is holding up here in the San Francisco Bay area, and we have some better employment numbers," she said

All the above mentioned reasons are strong enough to convince me to make investments in Daycare business. Unlike other baseness it is not affected by the continuous fluctuation of demand and supply in the market. Beside the increasing involvement of families in labor is also another impetus that gave me the feeling that this will have a great Potential in the future.

To start my analysis I had to select a place where I will establish my daycare. Therefore, I decide to do some preliminary survey using the business analysis to identify states which have highest number of children under 5. Besides, states which have a highest number of parents with a child who are in the labor force. These two variables helped me in selecting the area. First, since my business target children under 5, it is very import to understand their distribution across the nation. Second, those families who needs daycare for their children are in most case employees. So, understanding their pattern will be very helpful in making my choice.
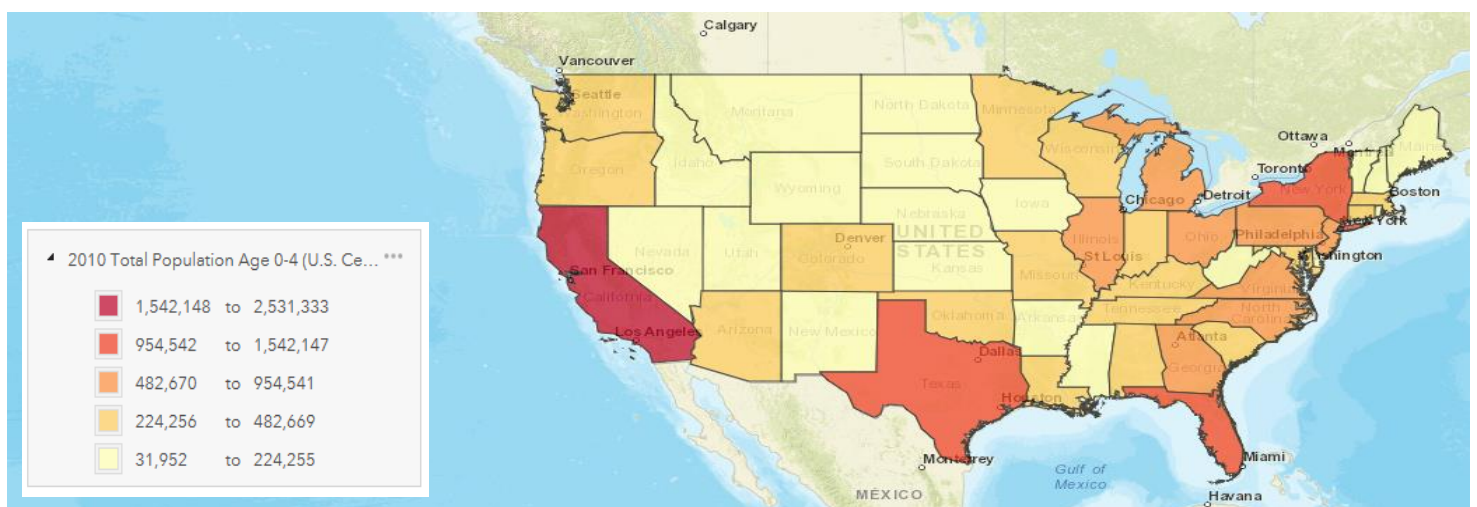


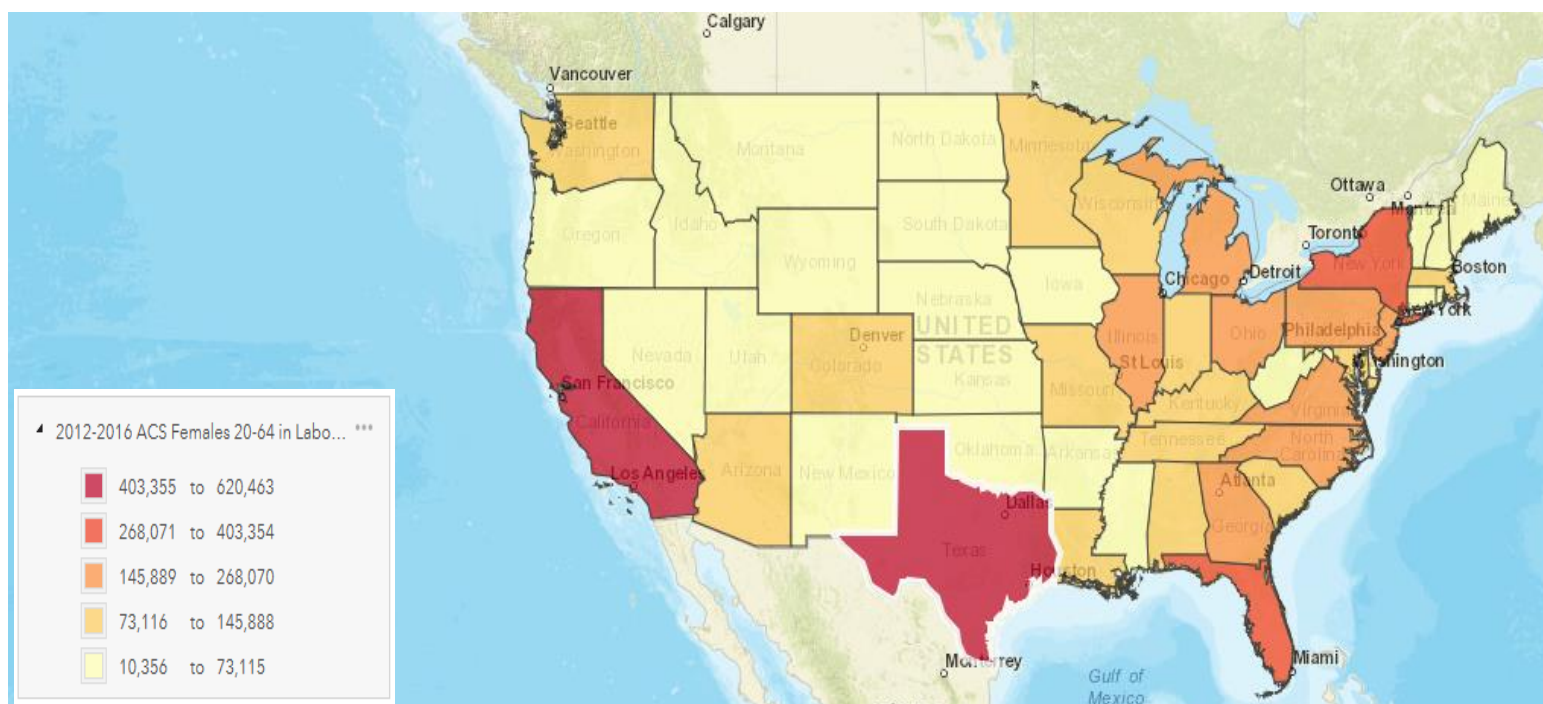Fig. 1. 2010 Total Population Age 0-4 (U.S. Census)

Fig 2. Female 2 – 64 In Labor Force With Own Child Under 5 Years Of Age.

Both of the above variables indicates that California is the state where there are highest number of children under 5 and women who have children under 6 and still engage in labor force. This mean this area has high potential for day care to be established. Therefore, I decided to establish my Daycare in the state of California. Then I selected the city of Oakland as my area of interest.

Once I decide to establish my buisess on Okaland city, I searched on the internet to find the daycare providers on this city, after I gather about 63 daycare providers, I fromated the adress so that I can use it to geocode their locations. I geocod them and uploaded into arcgis.

The number can seem intimidating as far the chances of market is concerned. However, I took the number as a positive indicator. Because, if there were no demand to such services., the number would not have been that much high. So, I am conviced that there

will still be chances to invest in the sector. The table below shows some of the daycares and their adressess.

| FID | Shape * | Name | Adress | Latitude | Longitude | Type | Zip_code |
|---|---|---|---|---|---|---|---|
| 0 | Point | Duck's Nest - Piedmont | 4498 Piedmont Avenue, Oakland, | 37.831682 | -122.244975 | Center | 94621 |
| 1 | Point | Duck's Nest Arts and Sciences | 5714 Broadway, Oakland, | 37.843295 | -122.246588 | Center | 94621 |
| 2 | Point | Early Birds Kindergarten Preparatory School | 934 Chester Street, Oakland, | 37.808026 | -122.29474 | Center | 94621 |
| 3 | Point | East Bay Academy | 1011 7th Avenue, Oakland, | 37.792533 | -122.254909 | Preschool | 94621 |
| 4 | Point | Escuela Bilingue Internacional | 410 Altraz Ave, Oakland, | 37.851171 | -122.257103 | Preschool | 94621 |
| 5 | Point | Kids of The Kingdom Child Center | 8800 Fontaine Street, Oakland, | 37.760995 | -122.151341 | Center | 94619 |
| 6 | Point | Lakeview Preschool | 515 Glenview Avenue, Oakland, | 37.811921 | -122.24484 | Preschool | 94619 |
| 7 | Point | Laney College Children's Center | 900 Fallon Street, Oakland, | 37.796866 | -122.263148 | Center | 94619 |
| 8 | Point | Little Elephant Montessori | 5782 Miles Avenue, Oakland, | 37.846155 | -122.249458 | Preschool | 94619 |
| 9 | Point | Little Hands Child Care | 3525 Kansas St, Oakland, | 37.794004 | -122.199126 | Center | 94619 |
| 10 | Point | Little Kings & Queens Preschool | 1800 55th Ave, Oakland, | 37.769773 | -122.19964 | Preschool | 94619 |
| 11 | Point | Live Learn and Laugh | 1444-1446 Havenscourt Blvd, Oakland, | 37.762301 | -122.191588 | Center | 94618 |
| 12 | Point | Lossieland Preschool | 8130 Plymouth Street, Oakland, | 37.757789 | -122.175736 | Preschool | 94618 |
| 13 | Point | Love Always Child Care Center | 3261 Martin Luther King Way, Oakland, | 37.822317 | -122.270551 | Center | 94618 |
| 14 | Point | May May's Family Day Care | 8008 Earl Street, Oakland, | 37.76982 | -122.155846 | Center | 94618 |
| 15 | Point | My Own Montessori School | 5723 Oak Grove Avenue, Oakland, | 37.846229 | -122.252379 | Preschool | 94613 |
| 16 | Point | O.U.S.D. - Emerson Child Development Center | 4801 Lawton Avenue, Oakland, | 37.83421 | -122.258388 | Center | 94612 |
| 17 | Point | O.U.S.D. - Fruitvale Child Development Center | 3200 Boston Avenue, Oakland, | 37.796278 | -122.213766 | Center | 94612 |
| 18 | Point | O.U.S.D. - International CDC | 2825 International Boulevard, Oakland, | 37.779377 | -122.230619 | Center | 94612 |
| 19 | Point | O.U.S.D. - Lakeview Child Development Center | 746 Grand Avenue, Oakland, | 37.811027 | -122.248602 | Center | 94612 |
| 20 | Point | OUSD - Greenleaf Elementary | 6328 E. 17th St., Oakland, | 37.764684 | -122.194781 | Center | 94611 |
| 21 | Point | OUSD - Highland | 1322 - 86th Avenue, Oakland, | 37.7518 | -122.177708 | Center | 94611 |
| 22 | Point | OUSD - Hintil Kuu Ca | 11850 mpus Drive, Oakland, | 37.791792 | -122.167708 | Center | 94611 |
| 23 | Point | OUSD - Howard School | 8755 Fontaine Street, Oakland, | 37.762239 | -122.152239 | Center | 94611 |
| 24 | Point | OUSD - Jefferson | 1975 - 40th Avenue, Oakland, | 37.778796 | -122.21412 | Center | 94611 |
| 25 | Point | OUSD - Manzanita | 2618 Grande Vista Avenue, Oakland, | 37.791837 | -122.226183 | Center | 94610 |
| 26 | Point | OUSD - Parker | 7901 Ney Avenue, Oakland, | 37.765855 | -122.165644 | Center | 94610 |
| 27 | Point | OUSD - Piedmont | 86 Echo Avenue, Oakland, | 37.828676 | -122.248594 | Center | 94610 |
| 28 | Point | OUSD - Stonehurst | 901 - 105th Avenue, Oakland, | 37.735793 | -122.174716 | Center | 94610 |
| 29 | Point | OUSD - Webster Academy | 7980 Plymouth Street, Oakland, | 37.759292 | -122.176841 | Center | 94610 |
| 30 | Point | OUSD - Yuk Yau | 291 - 10th Street, Oakland, | 37.799824 | -122.269142 | Center | 94610 |
| 31 | Point | Oakland Early Head Start - F.A.M.E. | 3717 Telegraph Avenue, Oakland, | 37.82613 | -122.265632 | Preschool | 94609 |
| 32 | Point | Oakland Garden School For Children | 4012 Maybelle Avenue, Oakland, | 37.791817 | -122.190591 | Center | 94609 |
| 33 | Point | Oakland Head Start - 85th Avenue Center | 8501 International Boulevard, Oakland, | 37.752469 | -122.177413 | Preschool | 94609 |
| 34 | Point | Oakland Head Start - Arroyo Viejo Park | 7701 Krause Avenue, Oakland, | 37.761833 | -122.176113 | Preschool | 94609 |
| 35 | Point | Oakland Head Start - Fannie Wall | 647-55th Street, Oakland, | 37.840012 | -122.265898 | Preschool | 94607 |
| 36 | Point | Oakland Head Start - Frank Mar | 274 12th Street, Oakland | 37.801464 | -122.267949 | Preschool | 94607 |

(0 out of 63 Selected)

Daycare_UTM

Fig. 3. Shows the address of the daycares geocoded for this project

PARAMETERS FOR MY DAYCARE:

1. It will be located in areas where there is high number of children under 5

2. It will be in areas with high income area

3. It will be in areas where the households either a single mother, or single father and both parents with a children are in labor force

4. It will be one Kilometer away from the closest Daycare

Before I start to use my data. First I define the projection into NAD 1983 and then I projected to UTM 11. Because California is located in this zone. Thus all of the files maintained the same coordinate system and projection

BUFFERING

In order to identify the area which is one km away from the nearby daycare center, I put one km buffer. Besides, in order to make the map readable I dissolve the buffer.
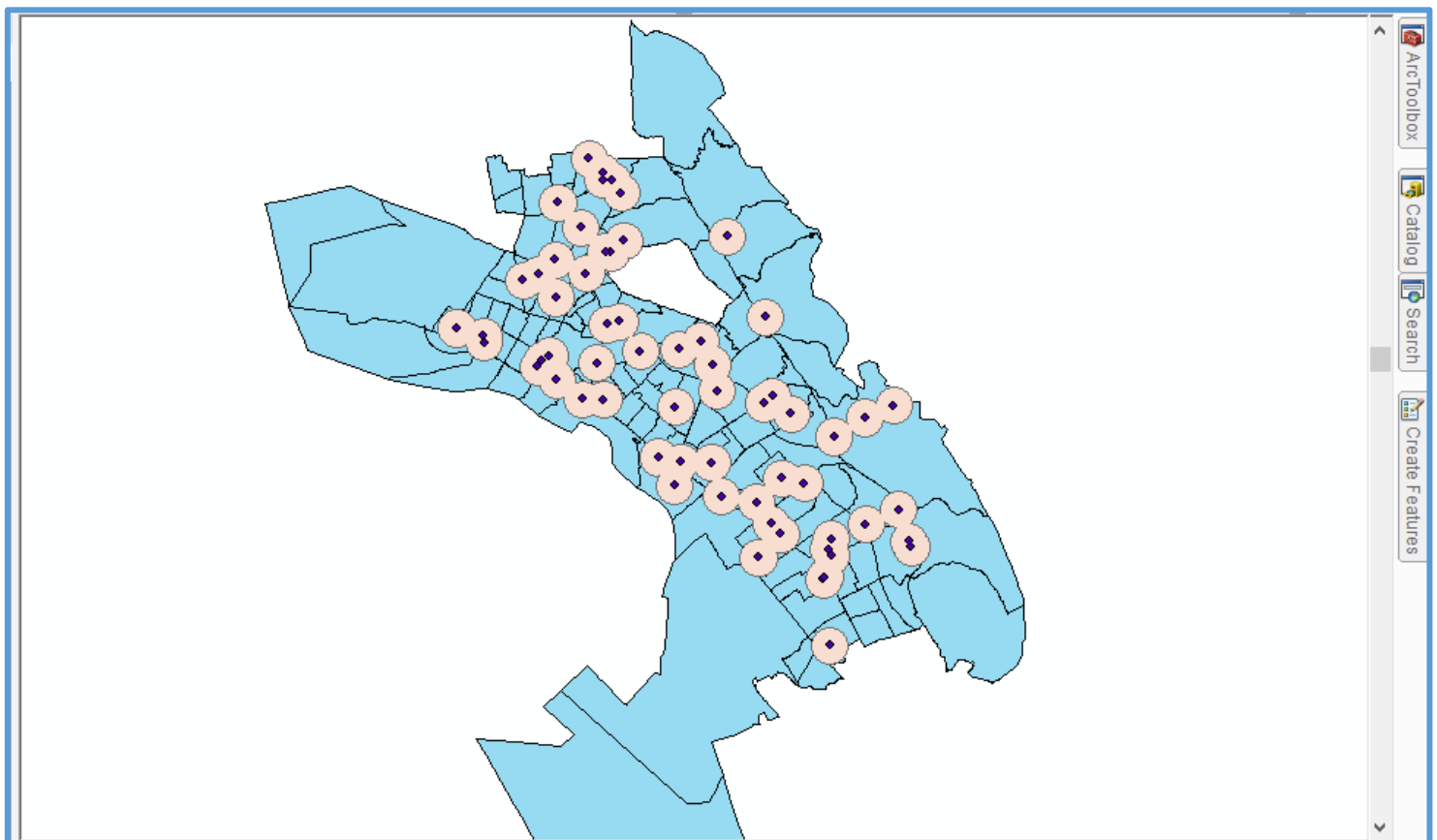


Fig 4.  One km buffer around Daycares in city of Oakland

JOINING SHAPEFILE AND EXCEL FILE

Next I downloaded census data from fact finder about the number of children under 5. Then I joined with the tiger file. As it can be seen below, it is displayed in graduated color to see the concentration of children across the city
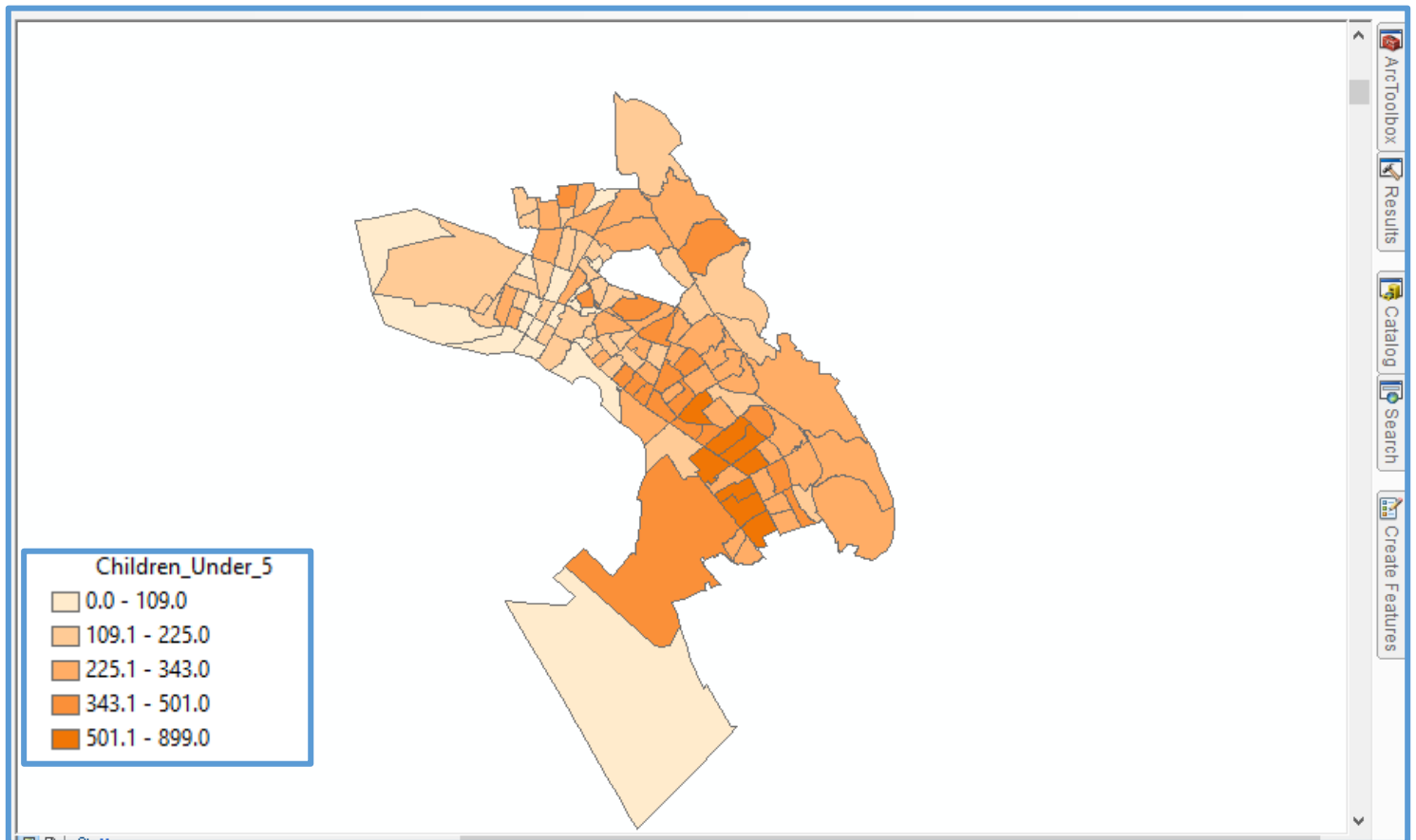
Fig 5.Distribution of children Under 5 in the city of Oakland

Next, the involvement of families in the labor force is one of the determinant factor in daycare market. The assumption is that if both the parents are in the labor force, then they will look for someone to look after their child, when they are at work. The same assumption is applied to either a single mother or a single father. Since the census provide three class: single mother with a child, single father with a child and couples with a child, I generated three maps to see their distribution.
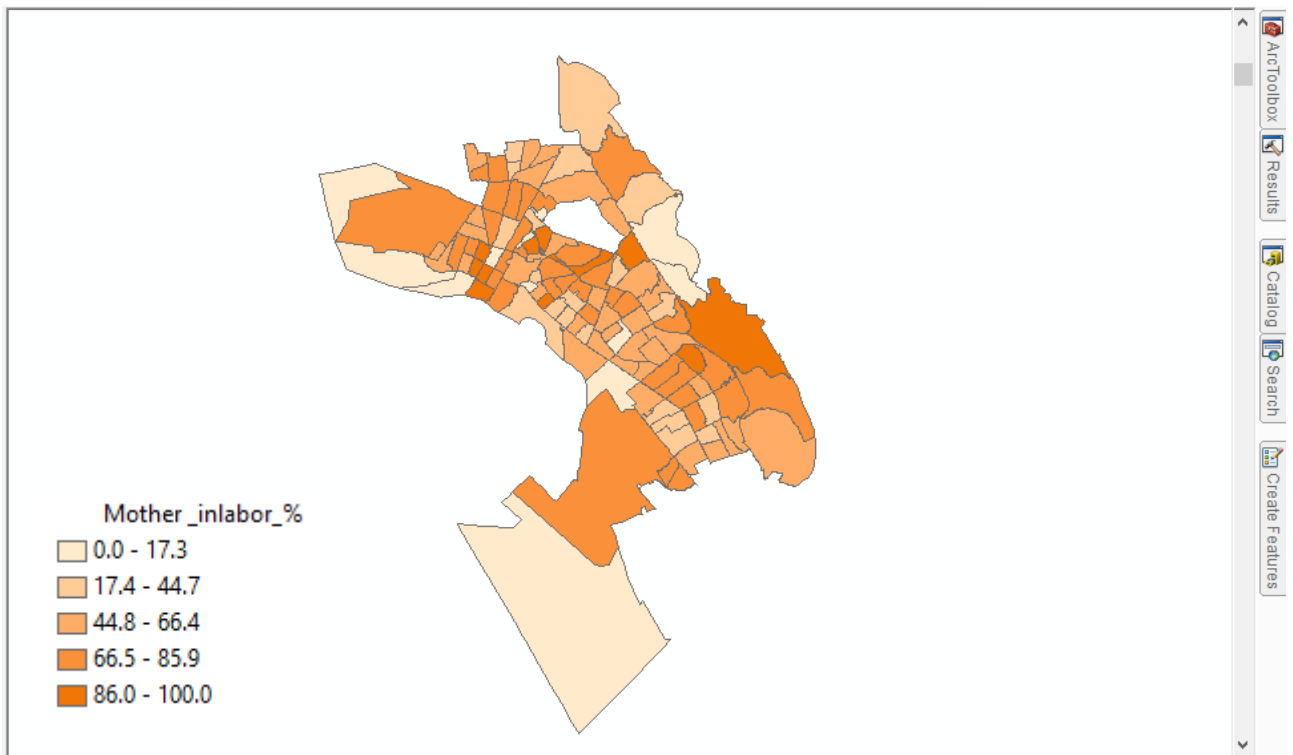
Fig 6. Single mother with her own child in labor force
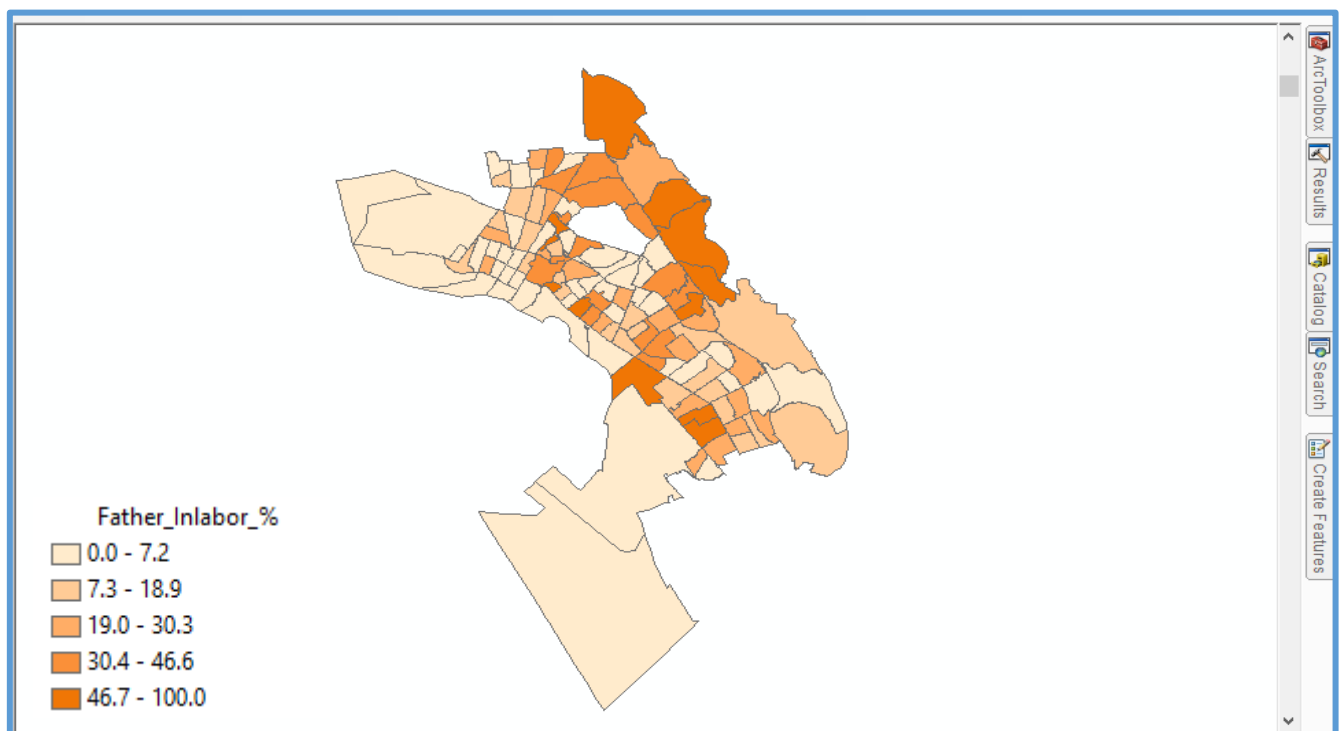


Fig 7. Single father with his own child in labor force
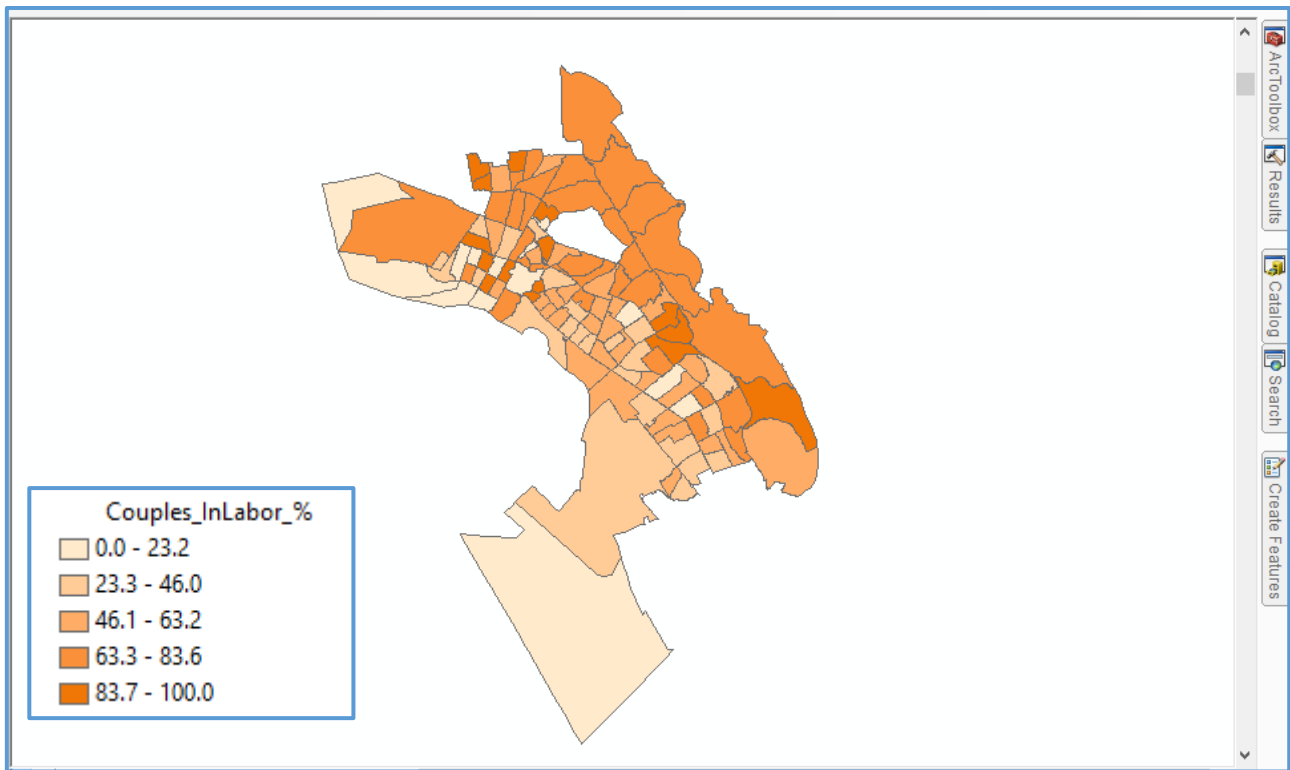
Fig 8. Couples with their own child both in abore force

The next factor is Median household income. This is also one of the main factors that dectate the choice of location. Because the investment of the parents is dectitated mainly by their income. Therefor, locating area where there are families with high Median income is a curcial step.

The distribution of Median household income was not uniform, instead it was a liitle bit skewed. So I choice a natural break to give it a fair classification. Otherwise, other classification like equal interval does not reflect the exact distribution.
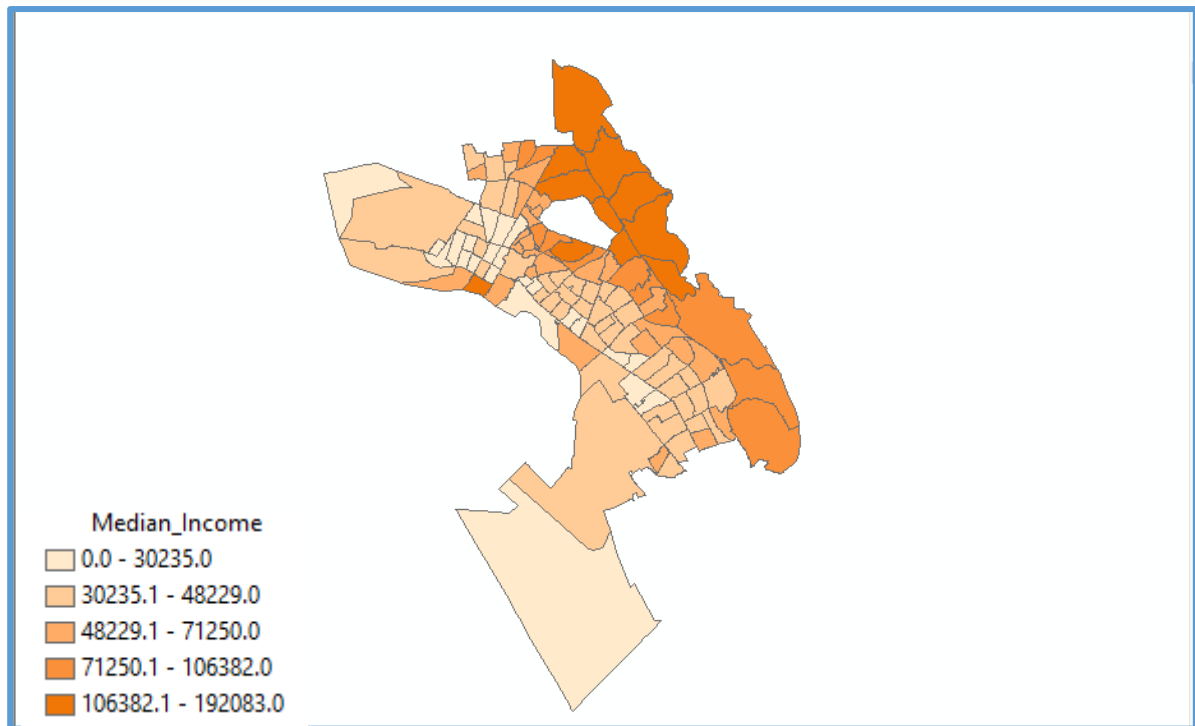
Fig 9. Median household income Okland city, CA, 2010

Once I generated all the maps I need to do the suitability analysis, I changed all the data into Raster and reclassify them. So that it will be easy to identify the suitable place using the Raster calculator.
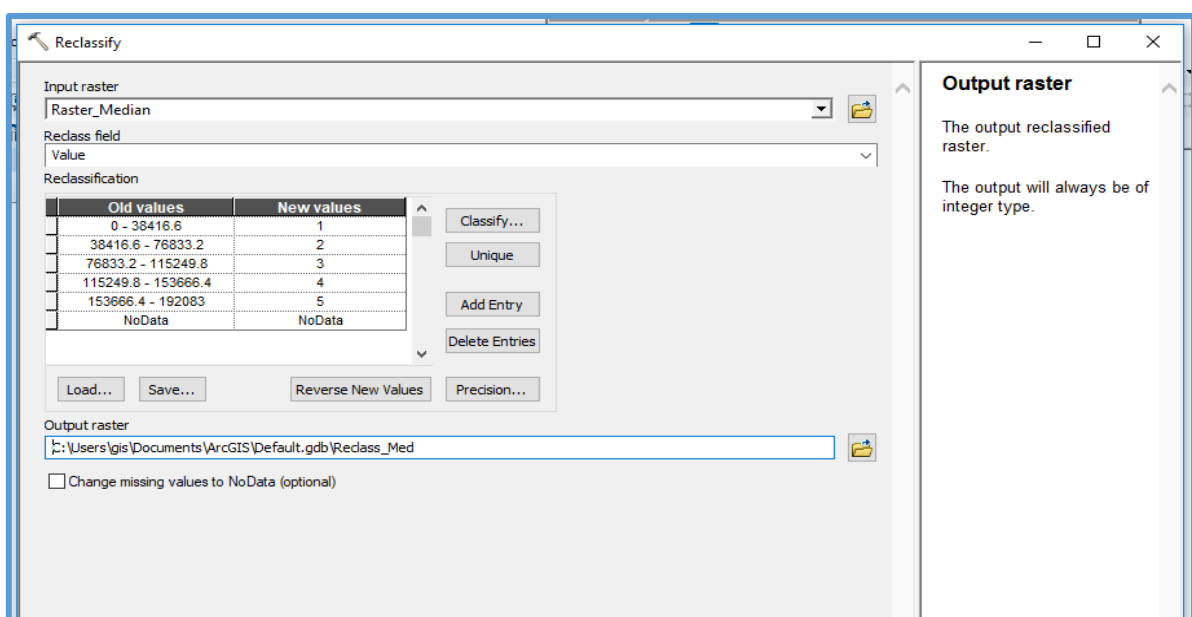
RASTER CONVERSION AND RECLASSIFICATION



Fig 10. Shows Median Income being reclassified

These are the data converted into raster with new classification assigned. In this case all of these data have 5 classification. The higher number indicates the most desirable area. But in the case of the buffered daycares, the No data value is assigned "1"while area that falls within the 1 km are assigned "0". Because any area which is less than 1 km away from a nearby daycare is not a desirable place.
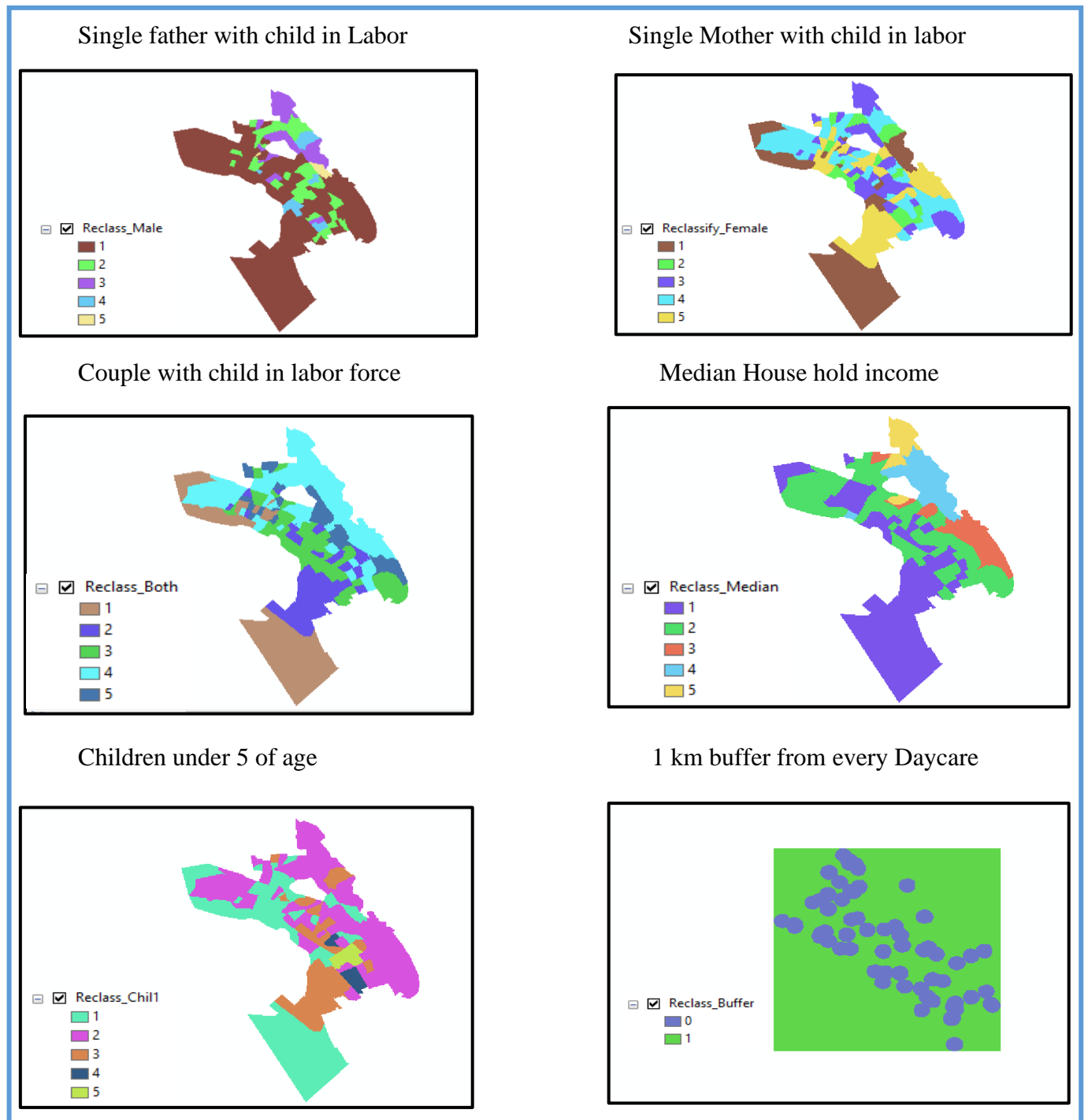
Single father with child in Labor

Single Mother with child in labor

Couple with child in labor force

Median House hold income

Children under 5 of age
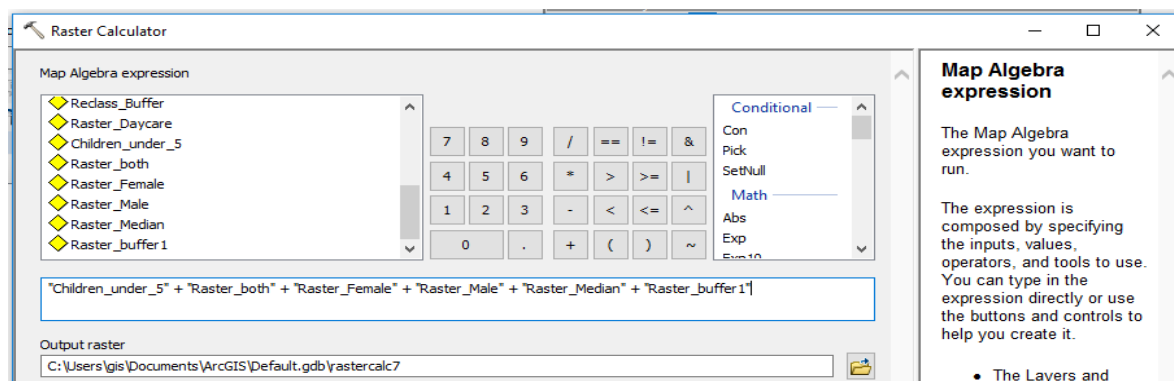
1 km buffer from every Daycare

Fig 11. Showing the converted Raster files

The next is to use the raster calculator to combine all the data I have converted into raster and get the aggregates. Here, since, I assigned higher value for the desired places, the ideal place would be an area with higher aggregated value. Contrary to this, area with lower value would imply undesirable place.
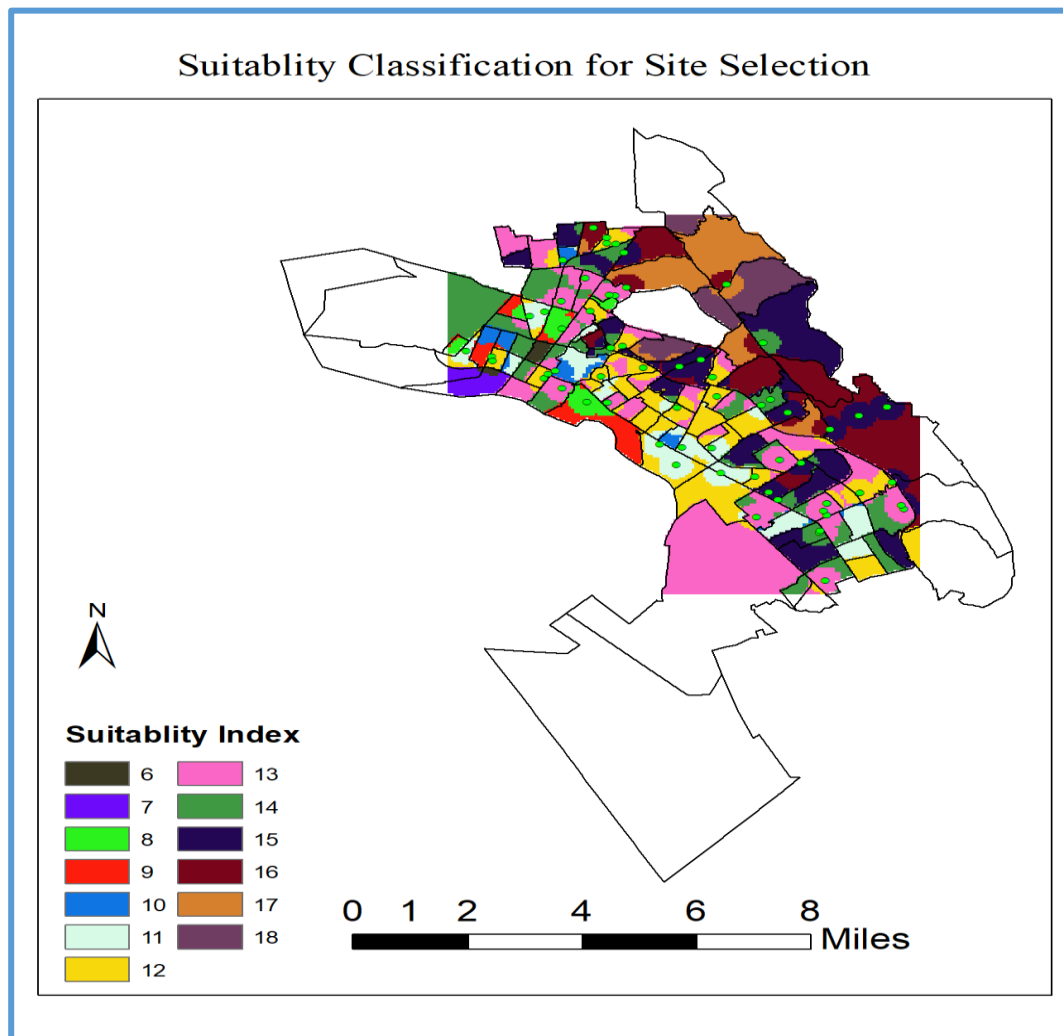


Fig 12. Shows the index every class.

In the above map I generated 16 categories ranging from 6 to 18. As I have already mentioned, the lower value imply undesirable area, while the higher value indicate the most desirable place. When we visually analyses the Map we can clearly see those area marked as the most suitable places. Overall, we have four regions which are suitable for the establishment of the Daycare. In the Map they extend from the center to the North and North east of this Map. When we try to compare with the distribution of the daycare which are already existed in the area, my analysis looks fine. Because those area marked as a desirable place do not have any daycare. Even if we refer back to the maps we generated in the previous pages, they align to the pattern. Therefore, to be clear for the reader, I reclassified the above map. So, here 1 represents the ideal place and 3 less ideal.
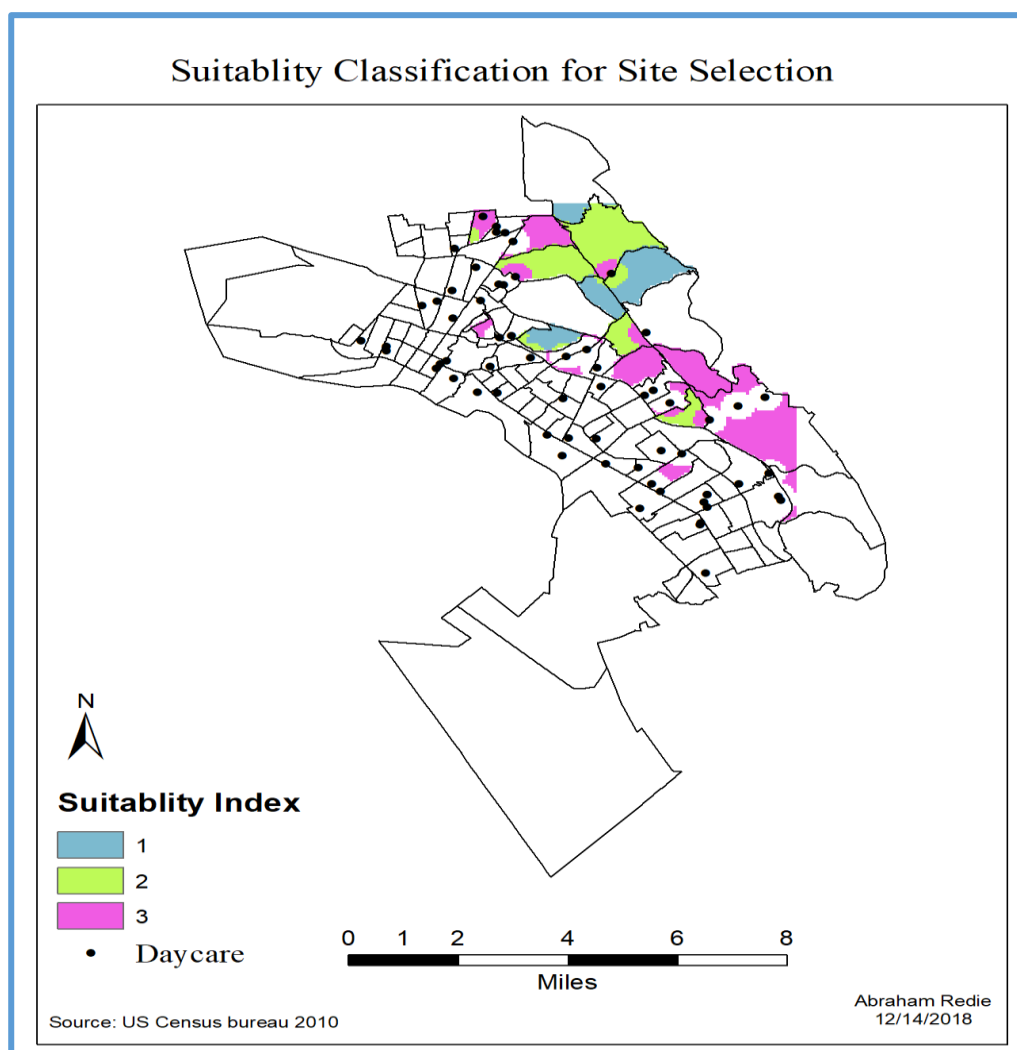


Fig 13. Shows the top 3 suitable areas

Finally in order to single out the most suitable area from the rest, I used two colors. One is for the most suitable area while the second one is for the rest. Overall, we have about 5.3 km$^2$ area which is ideal for the establishment of Daycare. I got this figure based on the cell size and the count of cells which falls on the most suitable Category. We have about 792 cells and the cell size was 82m. Therefore the total area is about 5.3 km$^2$.
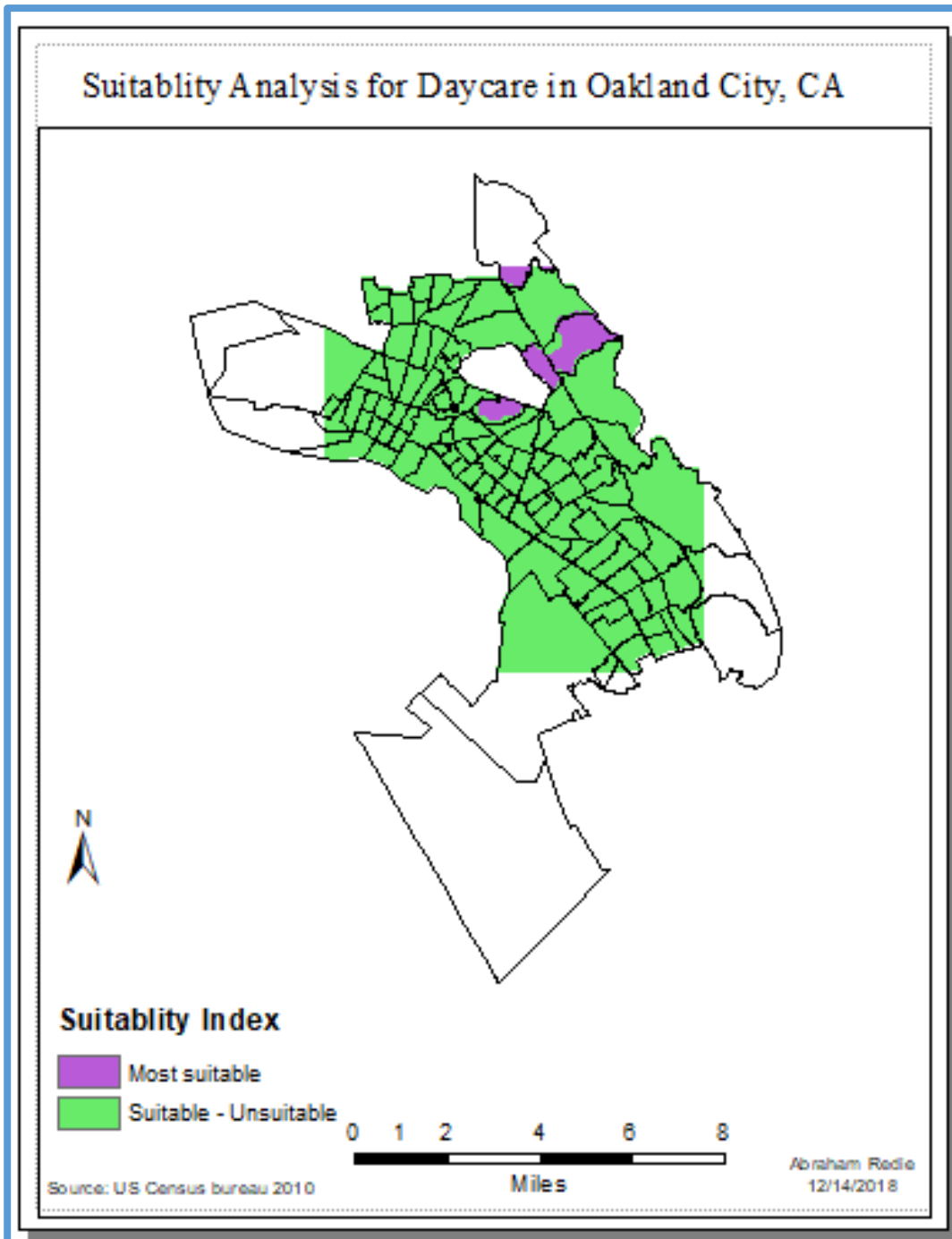


Fig 14 Shows the most Suitable place

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- https://ezinearticles.com/?The-Daycare-Industry-in-the-US&id=2201617