A Weighted Site Suitability Analysis

For Tiny House Communities in Tigard, Oregon

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Introduction

There is very little in-detail research about site selection for tiny house communities, which serve as an alternate form of multi-family residential that can serve low-income families. Some proponents of tiny houses emphasize their utility on lower costs for residents, while others emphasize their improved environmental impact as a distinctly attractive quality.

The priority of this project, then, was to find locations in Tigard that could be utilized as Tiny House communities without immediately damaging the currently preserved environment, and then ranking them based on their ability to provide the best services to the mixed communities that seek Tiny Houses.

Methods

Due to a lack of literature on the subject of tiny houses themselves, this analysis instead considered Accessibility literature to have more meaningful insight. Literature indicates that most (60%) people travel less than 10 minutes drive to their primary grocery store, but for all people, especially people without cars, closer is better (Jiao et al., 2012).

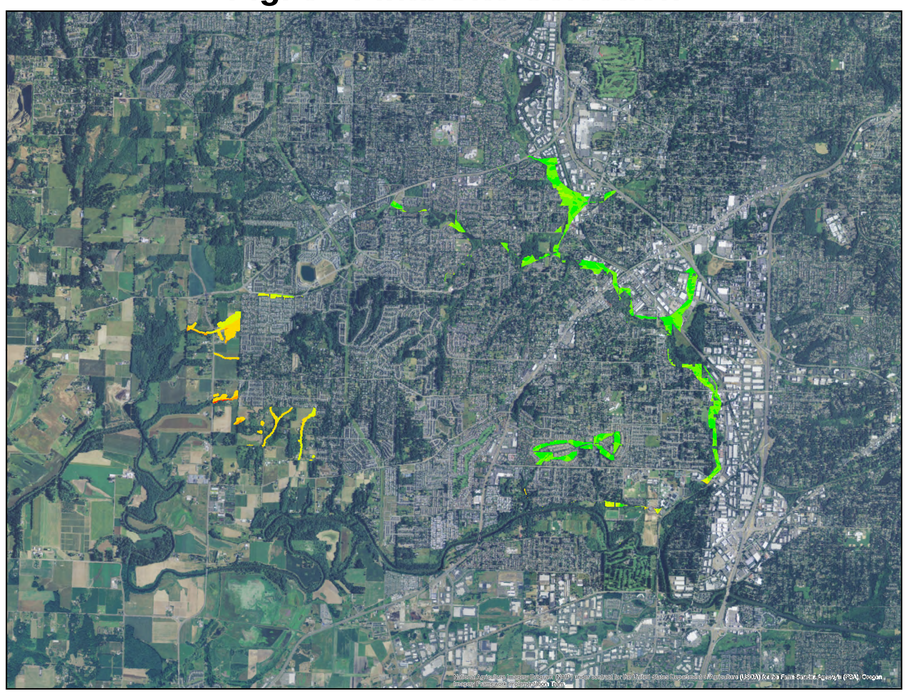
Distance from Grocery Stores was calculated using a Service Area Analysis utilizing the length of Tigard streets.

Slope for Tiny Houses is a considerably important factor, as Tiny Houses are often built on the backs of cars and trailers, and often don't have foundations that can balance them. For the Weighted Overlay analysis, Slopes that were under 16° were given a value of 10, while slopes between 16-20° were given a 5. All slopes above that were given a value of 1.

Foda & Osman (2010) identify bus-stop accessibility based on average walking speed of 1.3 m/s, and on previous literature recommend that a 400 meter area be considered reasonable.

Aspect (Not shown) was considered to be the lowest priority, as it was considered important for Tiny House owners that wished to live off-grid, but not as important to the analysis as other qualities. Aspects were reclassified to consider their southern-facing:
South = 10
Southeast & Southwest = 7
East, West, & Flat = 5
Northeast & Northwest = 3
North = 1

Fig. 5 - Final Site Selection



Legend - All Maps

Reclassified Values

1
2
3
4
5
6
7
8
9
10

Detailed Legend:

Fig.1: 10 = 0.5mi, 9= 1mi, etc.
Fig. 2: 10 = <4° Slope, 9 = <8° Slope, etc.
Fig 3: 10 = 400 meters, 9 = 800 meters, etc.
Fig 4: Analysis Weights
Distance to Grocery Stores: 35%
Slope: 25%
Aspect: 15%
Distance to Bus Stops: 25%

- Food Store Locations
- Tigard Tri-Met Stops

For the final step in this analysis, it was important that the potential locations be placed on currently Open Lots, which were not zoned as Parks. Figre 5 displays the output of the Weight Overlay analysis, clipped into locations that satisfy this prerequisite.

Fig. 6 - Count of Potential Sites by their Area Groups

	Weight								
Sq. Ft.	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**Grand Total**
Less than 10,000	2	7	26	53	47	63	124	105	**427**
10,000-24,999	1	1	3	3	4	16	14	22	**64**
25,000-49,999			2	3	2	3	6	5	**21**
50,000-74,999				1	1	1	6	6	**15**
75,000-99,999				3	3		5	2	**13**
100,000+				6	2	1	16	17	**42**
Grand Total	**3**	**8**	**31**	**69**	**59**	**84**	**171**	**157**	**582**

Fig. 1 - Distance to Grocery Stores

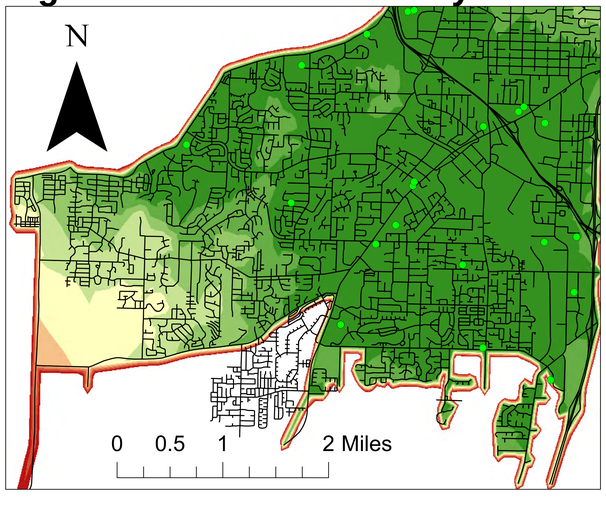


Fig. 2 - Reclassified Slope

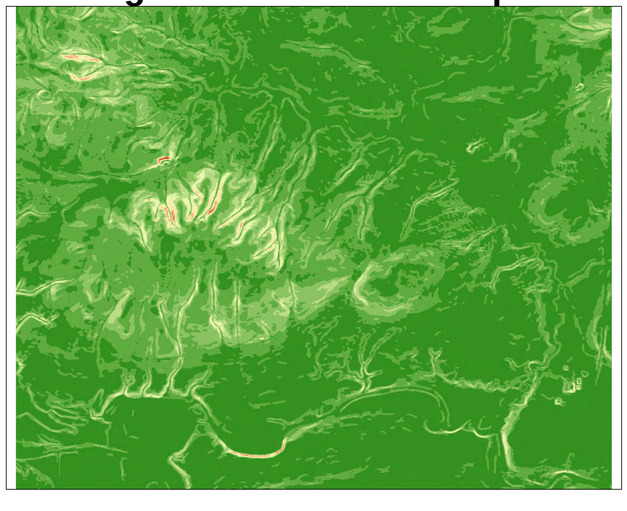


Fig. 3 - Distance to Bus Stops

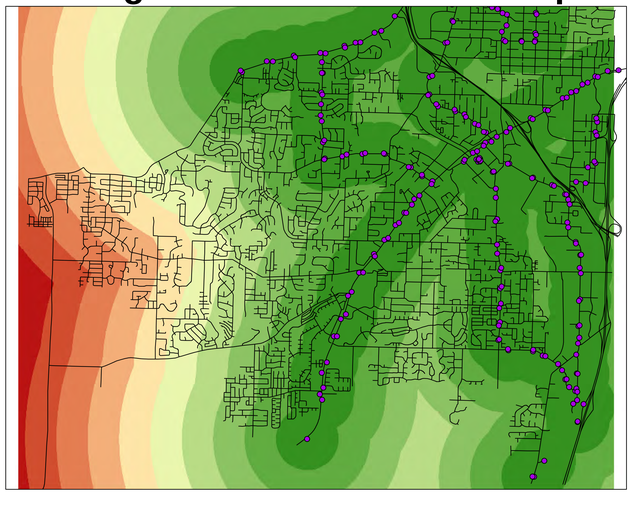
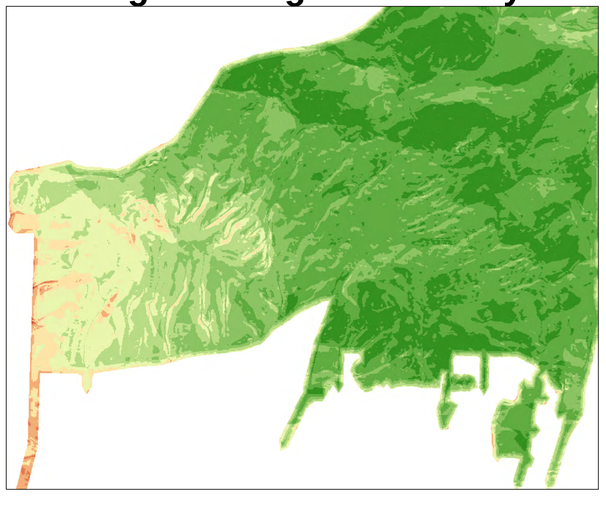


Fig. 4 - Weighted Overlay



Sources:
Oregon Geospatial Data Clearinghouse
City of Tigard
Tri-Met
Oregon Explorer Natural Resources Digital Library

Foda, M.A., Osman, A.O. (2010). Using GIS for Measuring Transiit Stop Accessibility Consideirng Actual Pedestrian Road Network. Journal of Public Transportation, 13(4), 23-40.

Jiao, J., Moudon, A. V., Ulmer, J., Hurvitz, P. M., & Drewnowski, A. (2012). HOW TO IDENTIFY FOOD DESERTS: MEASURING PHYSICAL AND ECONOMIC ACCESS TO SUPERMARKETS IN KING COUNTY, WASHINGTON. American Journal of Public Health, 102(10), e32–e39. http://doi.org/10.2105/AJPH.2012.300675