6-1-2010

Site Suitability Model / Analysis - Adult Entertainment in Tacoma WA.

Adonis E. Ducksworth

Adonis Ducksworth
GIS Certificate Final Paper

Site Suitability Model Scripted with Python

According to a 1993 ruling by the Massachusetts Appeals Court, zoning ordinances that leave no land available for adult business are unconstitutional (Lawlor, 2006). In the Fall 2009 Maps and GIS course, TGIS 311, a GIS analysis of Tacoma Washington's Title 13 Land Use Regulatory Code as it relates to adult entertainment was conducted. It was discovered that the areas that the city's zoning permits for adult entertainment are not suitable for any type of development. This breach of constitutionality is unacceptable and as a result has prompted a site suitability analysis for adult entertainment use in Tacoma. If Tacoma were to one day consider itself a city that follows the United States constitution, a rezone that allows for adult entertainment use is in order.

The purpose of this project is to create a model using Python scripting that prepares data for further analysis. The purpose of the analysis is to identify individual parcels, as well as clusters of parcels, that are ideal for adult entertainment. These parcels represent potential new zones for adult entertainment. The current zoning could be changed to include adult entertainment as a use based on the findings of this project as well. This project uses two initial income and demographic census data variables to create a raster landscape of areas that are predetermined to represent densities of children and income levels by the user of the model. This raster landscape is joined with a parcel feature class of the user defined geographic extent. For each parcel a number between 0 and 1 is assigned in the Zonal Stats Mean field; 0 being bad and 1 being good for adult entertainment use. A street layer is also created for further analysis in Network Analyst. The point of this is to determine the proximity of ideal parcels which are

indentified in the parcel feature class to sexual health service centers which are represented by hospital points.

The theoretical framework for this project is derived from a brief literature review of sex work and adult entertainment.

Adult entertainment, by its nature, is controversial (Hubbard, 2010; Hubbard et al., 2008). On the one hand, strip clubs and adult oriented video stores are protected under the United States Constitution's first amendment, which guarantees the right to free speech. Moreover, courts continue to rule in favor of the individual's right to privacy. Yet, on the other hand, according to Hubbard et al. (2009), "such forms of entertainment…often [face] vehement opposition from religious and morality groups concerned that the presentation of the undressed body as erotically charged might corrupt or deprave the viewer" (p.722). Respecting the influence such groups have in shaping public policy, it becomes necessary for a rezone that allows for adult entertainment to take such groups' perceptions into consideration. One such perception is the threat adult entertainment posses to the community.

Perceptions of safety to the community can be defined as how members of a defined geographic or social extent perceive threats to the individual, to the public health, and to the economic well-being of that extent (Brents & Hausbeck, 2005). Proponents and opponents of adult entertainment suggest that the point of the state's regulation of adult entertainment is to do just this, protect the individual, protect public health, and protect the economic well-being of the community (Brents and Hausbeck, 2005). Hubbard et al. agree and offer spatial solutions to this challenge. For example, Hubbard (2005) suggests that adult entertainment be politically situated away from affluent and gentrifying areas as well as areas with many children. This is because wealthy people see adult entertainment as a threat to land values and certain segments of society

see adult entertainment as a threat to social values concerning children. Based on these interpretations, adult entertainment venues should not be located in high income areas or areas where there are high densities of children.

In Symanski's (1974) exploration of legalized prostitution in Nevada, the argument is made that the legalization of sex work will lessen the threat to public health as it will force sex workers to undergo mandated health checkups. While the legalization of prostitution, which also can be defined as sex work, is politically tolerated in Nevada, it is not realistic in other parts of the United States. Yet, sex work persists throughout the country in not only the form of prostitution but also in the form of stripping and peep shows (Hagner, 2009). Those for and against these types of sex work would argue that stripping and peep shows pose a threat to public health as it encourages the consumers and suppliers to engage in risky sexual behavior. Because not all types of sex work are legal and therefore regulated by the states, there are no mandates for sex workers to get routine STD checkups. It would seem logical that for any community that was concerned about public health there would be relatively easy access to sexually transmitted disease testing, condoms, and sexual health counseling services for sex workers.

The problem according to Shannon et al. (2008) is that there are structural challenges to accessing the services needed to ensure public health, especially in low income areas. Shannon et al. conducts a community mapping survey of street-level sex workers in British Columbia. The point of their study was to discover what was preventing sex workers from accessing health and harm reduction services (Shannon et al., 2008). They concluded that because police surveillance and harassment is more prevalent in low income areas, people engaged in risky behavior tended to avoid health service centers located in these areas (Shannon et al., 2008). If public health is a concern for the community, establishments that promote risky sexual behavior

should not be situated in low income areas because sex workers may be reluctant to access sexual health services in that area.

According to this literature review, four variables should be taken into consideration when rezoning for adult entertainment. Because adult entertainment poses a threat to property values, they should not be located in high income areas. Because of the perceived threat to social values and how they relate to children, adult entertainment venues should not be located where there are high densities of children. Because sex work poses a threat to public health, venues that promote such behavior should be located near sexual health service centers. Finally, because adult entertainment venues promote risky sexual behavior, the venues should not be located in low income areas as this will prevent sex workers and consumers from accessing the sexual health services they may require.

Chiueh et al.'s (2008) study of how funds are allocated to neighborhoods impacted by waste incinerators provided the foundation for a method of analysis. Using GIS, they based the dollar amount awarded to each neighborhood on the severity of the environmental impact of the incinerator on the neighborhood (Chiueh et al. 2008). The environmental impact assessment, or score, was determined by totaling the score of different weighted categories. For example, factors of air quality and traffic congestion were given a score then totaled into four categories for each neighborhood. Higher scores represent a greater impact to a neighborhood which in turn means more funds will be distributed to that neighborhood to offset the impact.

Savitsky's use of Gap Analysis compliments Chiueh et al.'s work. According to Savitsky (1998), "…Gap Analysis provides a method for assessing present measures to protect biological diversity and for identifying focus areas for optimal preservation" (p.152). Gap Analysis allows researchers to assess whether particular areas of biodiversity are currently being protected. While

this is geared towards environmental conservation, the same kind of analysis can be used to identify areas where adult entertainment should be located. Gap Analysis uses layers that have been weighted with a score. When the layers are placed on top of each other and totaled, a score is returned. With Gap Analysis, scores that fall below a certain number qualify for conservation interventions. Where Gap Analysis looks for holes in conservation, the analysis of this project looks for areas that have a maximum score similar to Chiueh et al.'s work. These areas are ideal for adult entertainment uses.

In applying Chiueh et al.'s work to this project, scores are given to individual parcels that represent ideal locations for adult entertainment use. The scores are based on the proximity to high and low income areas as well as the density of children. To obtain this score, income and demographic data are made into raster layers. From these layers, predetermined areas that represent low densities of children and moderate income levels are selected using the single map algebra tool. The areas that meet these criteria are assigned a 1 and areas that do not are assigned a 0. Zonal Statistics as Table are used to assign scores to a parcel layer. Parcels with higher scores represent ideal locations for adult entertainment use and parcels with low scores represent areas that are not ideal for adult entertainment use. Clusters of parcels with higher scores are potential new zones for adult entertainment use. These parcels also represent potential opportunities for changing zoning law to allow for adult entertainment use. This parcel layer can be combined with a resulting street layer for further analysis of the proximity of sexual health services to ideal parcels using Network Analyst.

While this project focused specifically on rezoning Tacoma, the issue of where to locate adult entertainment venues is an issue for many jurisdictions. This is why it is beneficial to develop a method that can be replicated no matter the geographic extent. This is achieved

through geoprocessing. According to ESRI's (2007) website, "Geoprocessing supports the automation of workflows by providing a rich set of tools and a mechanism to combine a series of tools in a sequence of operations using models and scripts." (ESRI, para. 2). Geoprocessing provides the framework for incorporating various GIS tools such as clipping and interpolation into one process through either, or a combination of, ArcCatalog's modelbuilder interface or Python scripting language. The point is to not only make workflows more efficient but also create processes that can be automated and replicated based on an outside user's input. To this end, this project scripted a user friendly geoprocess that identifies sites suitable for adult entertainment uses with Python programming language.

Developing a model using Python scripting was challenging. Three iterations of development were necessary to produce the final product. The first iteration was a simple exercise in applying the theoretical framework and method to the problem of identifying ideal locations for adult entertainment use without using Python scripting. This process proved to be beneficial and educational as it not only created a blueprint for the model but it also exposed potential problems that may have been encountered during the next two iterations of development.

Considering the blueprint and potential pitfalls discovered in the first iteration of development, the second phase of development was meant to build a model using the Modelbuilder interface. While Modelbuilder is useful for developing simple geoprocesses such as performing batch clipping, complex geoprocesses such as this project proved to be challenging. One such challenge was the handling of derived data. According to ESRI (2006), "In the normal course of building a model, tools will update their derived (output) data elements to reflect changes that will be made by the tool when it executes" (ESRI, para. 1). If the tool has

not been executed, data is not produced (ESRI, 2006). When data is not produced, making subsequent calculations becomes challenging as there is no data to be calculated. This coupled with the issue of reclassifying data prompted a sooner than expected exposition into Python.

There was little choice but to complete the second phase of development using Python scripting. While Python proved to be more flexible than Modelbuilder, there were syntax challenges with parameters and challenges to understanding how local variables worked. For example, the select by location tool uses an expression parameter. In normal operation outside of Python, the SQL expression uses quotes. This means inside of the select by attribute expression parameter, the expression ends up with double quotes. Python returns an error when expressions are double quoted. To remedy this problem, a variable attached to an argument was created so that the user can input the expression themselves and Python will assign the quotes. The result was an expression that did not return an error. While this iteration proved to be informative, the resulting product was cluttered and cumbersome and took well over 20 minutes to run.

Now somewhat comfortable with Python scripting, the final iteration was done using only Python scripting. While there were challenges with syntax and concatenations, the resulting final product was flexible enough to handle incomplete derived data and open to user inputs which allowed for a robust and complete model that did not return errors. In other words, the model worked. All data was clipped to a user defined geographical extent. A feature class of parcel data included a Zonal Stats Mean field that produced a number between 0 and 1. A street layer was also produced which contains a DriveTimeMinutes field. This layer can be used for further analysis using Network Analyst. This model represents a method of organization and

analysis that can be engaged to identify ideal locations for adult entertainment use no matter the geographical extent.

Even though this project does not produce new knowledge, it does highlight the gap between those who are experienced with census data and well trained in GIS and those who are not. Elwood (2006) would argue the participatory GIS agenda is meant to lessen this divide. According to Elwood, "Participatory GIS practices democratize GIS-based decision making processes for marginalized groups." (p.697) She goes on to state that, "these practices are also being adopted by dominate institutions in a kind of 'mainstreaming' of participatory GIS." (Elwood, 2006, p.697) While it would be foolish to infer religious and moral groups are marginalized, if these groups knew how to use and manipulate this model, it might prove beneficial in giving them a legitimate voice in where adult entertainment should be located, thus providing a counter argument to the multi-billion dollar industry of adult entertainment. But in order for this to be a reality, religious and moral groups would need well trained GIS technicians on their staff. This is something that not all these groups can afford.

Even though this project was successful in accomplishing some of its goals, there is more to be done. While the model produces information relevant for jurisdictions that are interested in identifying locations for adult entertainment use, it also highlights problems of the digital divide. To alleviate this problem the model could be developed into a web based system with more user friendly instructions and controls. This potentially would increase access for marginalized groups to its decision making potential which would further the participatory GIS agenda. But of course, this is a challenge perhaps taken up in another course.

References

Brents, B.G. & Hausbeck, K. (2005). Violence and legalized brothel prostitution in Nevada: Examining safety, risk, and prostitution policy.Journal of Interpersonal Violence,20, 270-295.

Chiueh, P-T. et al. (2008). A GIS-based system for allocating municipal solid waste incinerator compensatory fund. Waste Management, 28, 2690-2701.

Elwood, S. (2006). Critical issues in participatory GIS: Deconstructions, reconstructions, and new research directions. Transactions in GIS, 10(5), 693-708.

ESRI. (2007). What is geoprocessing? ArcGIS 9.2 Desktop Help. Retrieved on May 25, 2010 from: http://webhelp.esri.com.

ESRI. (2006). Incomplete derived data. ArcGIS 9.2 Desktop Help. Retrieved on May 25, 2010 from: http://webhelp.esri.com.

Hagner, D. (2009). Tenth annual review of gender and sexuality law: Criminal law chapter: Prostitution and sex work. The Georgetown Journal of Gender and the Law, 433, 1-31.

Hubbard et al. (2008). Away from prying eyes? The urban geographies of 'adult entertainment'. Progress in Human Geography, 32(3), 363-381.

Hubbard, P. (2010). Opposing stripotopia: the embattled space of adult entertainment. Sexualities, 12(6), 721-745.

Lawlor, J. (2006). Ordinance leaves no place for adult business. Planning, 72(9), 53-53.

Savitsky, B.G. (1998). Overview of gap analysis. In B.G. Savistsky & T.E. Lacher (Eds.). GIS Methodologies for Developing Conservation Strategies: Tropical Forest Recovery and Wildlife Management in Costa Rica. (pp.151-157). New York: Columbia University Press.

Savitsky, B.G. & Lacher, T.E. (1998). A GIS method for conservation decision making. In B.G. Savistsky & T.E. Lacher (Eds.). GIS Methodologies for Developing Conservation Strategies: Tropical Forest Recovery and Wildlife Management in Costa Rica. (pp.179-197). New York: Columbia University Press.

Shannon, K. et al. (2008).Mapping violence and policing as an environmental-structural barrier to health service and syringe availability among substance-using women in street-level sex work. International Journal of Drug Policy, 19, 140-147.

Symanski, R. (1974). Prositution in Nevada. Annals of the Association of American Geographers, 64(3), 357-377.