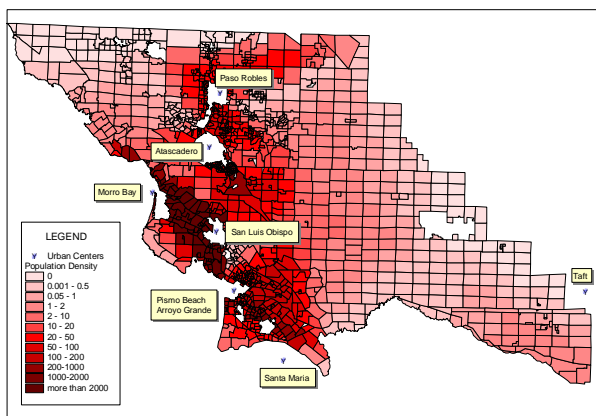


***Predicting the Spatial Pressures of Development in San Luis Obispo County: Is the Transferable Development Credits Program Controlling Urban Sprawl?***

*By: C. Chay Casso, Jaime Diethofer, Amanda Eichel, and Chih-Hung Huang<sup>i</sup>*

San Luis Obispo County is slated to grow by 32% over the next decade.<sup>ii</sup> This increasing pressure on a primarily rural county has forced the local government to consider alternatives to channel new growth and meet the demands of an additional 325,000 new residents by 2010.

Specific land characteristics should affect development decisions. Therefore a meaningful approach to land use planning can account for development pressures associated with these features. This analysis uses a hedonic model that incorporates a variety of predictive variables, associated with both environmental and socio-economic characteristics, to portray the probability of land use conversion throughout the county. While previous policies have relied on general criteria and *Planning Area Standards*, a more quantitative method for land use determinations may be necessary. This project has developed an analytical tool that can be used to guide these determinations.



Population Density of San Luis Obispo County

**Introduction**

Like all growing communities in the United States, cities and counties throughout California are

having a vigorous debate on the choice of alternative policies to control for the environmental externalities associated with urban sprawl. A major trend in regulation has seen municipalities moving away from command-and-control policies and moving toward market-based mechanisms. In general, economists point towards these market-based mechanisms as a more efficient means of accomplishing policy objectives; individual firms may choose the most appropriate level of compliance, given their individual demand and supply functions.

One mechanism looks to reallocate growth through the transfer of development rights or credits (TDRs/TDCs), severing these rights from a particular lot of land without threatening other “rights” or private property ownership. In general, development rights will be transferred from an area intended for preservation (sending site) to an area of targeted growth (receiving site). Once these rights are transferred, the sending site lot will be protected via application of a conservation easement, in perpetuity.

San Luis Obispo County represents a local example of a community struggling with the planning implications of urban sprawl. On the one hand, residents wish to preserve open space and protect the rural character of the County. On the other, they resent and protest increased density within city borders. This public concern has recently taken the form of litigation and a subsequent Grand Jury Hearing to review the countywide TDC program. It therefore becomes important for County Planners to create and employ a General Plan that targets the most acceptable, and community-backed locations for preservation and, alternatively, future development.

**Objectives**

Planning decisions, within the County, rely on adherence to General Plan designations and associated land use ordinances. While the goals of these tools are still solid, Geographical Information Systems (GIS) are emerging as the primary tool for land use decision-making. The inclusion of GIS could eliminate some of the subjectivity in the planning process that has, in the past, led to public dissent and litigation. We therefore incorporated this technology, and asked the following questions:

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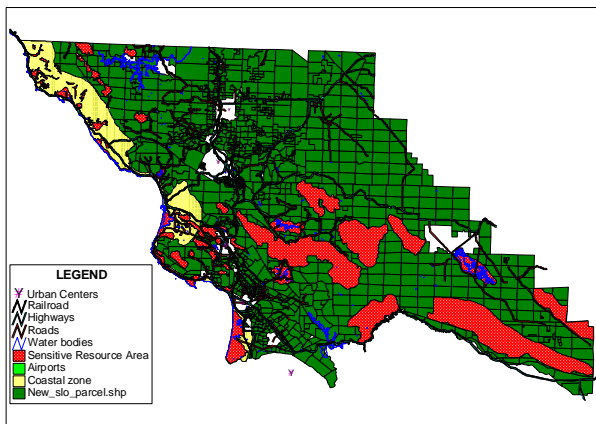


- What are the predicted spatial pressures of development in San Luis Obispo County using a hedonic framework in coordination with a Geographical Information System?
- Is the County TDC program controlling urban sprawl?

There are therefore two phases to this Group Project. The first phase introduces the Geographical Information System in order to analyze the ordinance within a spatial framework. The final product of this phase is an analytical tool that provides a basis for future planning decisions, as it draws on specific and objective spatial data to determine relative pressures for development. The second phase takes the form of a program evaluation, based only on known community characteristics, ordinance intricacies, and a comparison with other market-based growth control programs throughout the country.

## **Approach**

This analysis is based on the use of a hedonic model, which determines the value of a parcel of land in residential (or agricultural) use, based not only on current land value, but also on community characteristics which have a bearing on the perceived value of a piece of property. Previous models valuing open space have tended to focus on zoning and housing characteristics, instead of the amenities that living in a certain location might bring, such as safety, access to business, and schools.



Open Space and Amenities

In order to incorporate these additional characteristics, our model used a linear regression to study the effects of open space and access to amenities on land values for residential and agricultural use. We use a double-

log functional form to predict the relationship between land value and amenities,<sup>iii</sup> by regressing the log of parcel page prices on a log combination of environmental and socio-economic characteristics.

The hedonic framework therefore assumes that land with the greatest approximated “hedonic” value (in residential use, and considering costs of development) will face the most development pressure. Therefore we can create a map showing the relative development pressure exerted on each land unit within the study. Comparison of these values allows us to determine potential development pressures across the county and analyze the placement of sending and receiving sites under the current program.

Finally, comparing some of the most prevalent TDR or TDC programs in the United States to the San Luis Obispo County program is helpful in determining some of the optimal community characteristics for the implementation of a successful TDC program. While some facets of a program may ensure its success in any area, others are specific to certain regions and community situations. Some of the more particularly unique or defining characteristics of each program are then compared to those of the San Luis Obispo County program in order to define potential improvements that could be made to the existing ordinance.

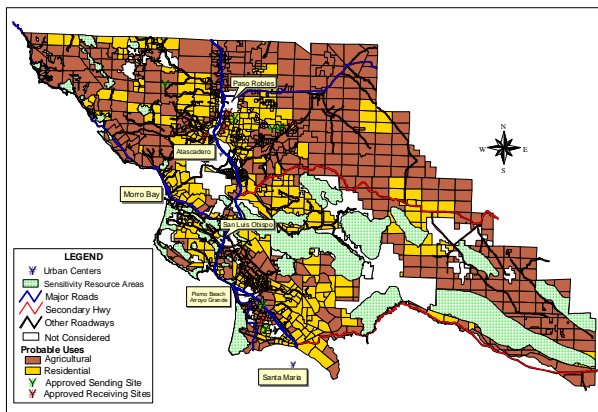
## **Results**

### ***Phase 1***

Results from the regression are used to determine the relative influence of each variable in the calculation of land value, either in residential or agricultural (open space) use. Values for each variable are then input into both the residential and agricultural hedonic model to determine new land values in both uses.

By comparing these values we can suggest where land conversion is most likely. Our results show development occurring on the fringes of current urban uses and nearby road networks. While urban centers and roads are generally accepted as good predictors of development, this model also shows that lesser known variables, such as scenic amenities, hospitals, schools and other infrastructure can exert strong influences on choices for land conversion. Additionally, the inclusion of these other variables also predicts a pattern of rural fragmentation not associated with urban amenities.

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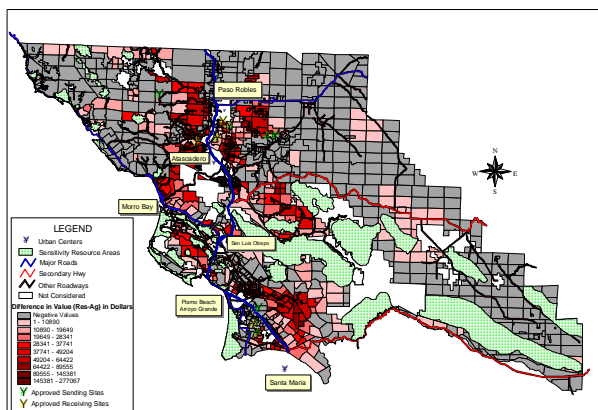
Land Conversion Probability

This pattern of fragmentation potentially poses an even greater threat to ecologically sensitive areas and open space lands by virtue of its potential to disrupt existing natural corridors and viable habitats.

Examining the land conversion probabilities we recognized eight potential areas of concern:

- West of Paso Robles (Adelaida)
- Northeast of Cayucos
- Area between Morro Bay and San Luis Obispo
- Northeast of Nipomo (Hwasna)
- Santa Margarita Lake
- El Pomar/Estrella Planning Area
- Southwest of California Valley Reserve Area
- State Hwy. 166 East of Los Padres National Forest (New Cuyama)

Areas of heightened development pressure were best seen in our land conversion pressure gradient map that shows the locations with the greatest potential of land conversion.



Land Conversion / Pressure Gradient

After using our model to calculate development pressure we applied the GIS analysis to the current TDC ordinance in the County and examined the locations of sending sites for appropriateness.



Denny Sending Site

Although some of the sites (i.e. Denny Sending Site) are suitable for preservation, the maps show the sending sites only weakly meeting the ordinance objectives. Therefore, we assume that the current sending/receiving site criteria do not take into account development pressures adequately.

## Phase 2

The County TDC ordinance, which is intended to facilitate market-aided relocation of development from areas considered valuable in open space to areas within the urban core, was recently the subject of a Grand Jury Hearing. Local objections and a sluggish market may affect the future of the ordinance. By comparing and contrasting the main components of successful programs throughout the country, we provide recommendations regarding local planning decisions and the implementation of a TDC program.

Based on our analysis of other programs we believe that the following factors are essential for a successful TDR/TDC program:

- **Voluntary in Nature** - Mandatory programs have difficulties with the takings issue and public resistance.
- **Local Preservation** - Residents are able to connect with the program if they are able to see local, tangible results.
- **Targeting of Land** - If preferred land is chosen beforehand, residents and planners are able to

# ***Predicting the Spatial Pressures of Development in San Luis Obispo County: Is the Transferable Development Credits Program Controlling Urban Sprawl?***

GROUP PROJECT BRIEF

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better take advantage of opportunities.

- **Credit Banking** - The use of a credit bank allows for sending and receiving sites to be accepted separately, allowing for flexible land purchase and development.
- **Working with Other Measures** - TDRs work best in combination with other conservation measures such as urban growth boundaries (UGBs).

## **Conclusions**

The final output from our model shows specific trends for development occurring on the fringes of current urban uses and nearby road networks, as expected. What was unexpected was the influence of lesser-known variables, such as scenic amenities, hospitals, schools and other infrastructure, which can exert strong influences on choices for land conversion. Additionally, the inclusion of these other variables also predicted a pattern of rural fragmentation, a primary concern in San Luis Obispo County not associated with typical urban amenities. This pattern of fragmentation actually poses an even greater threat to ecologically sensitive areas and open space lands by virtue of its potential to disrupt existing natural corridors and viable habitats. Utilizing the development pressure output we were able to examine the sending site criteria listed in the TDC ordinance and assess their effectiveness.

The TDC criteria, as listed in the County ordinance, seem to be adequate in addressing the areas of concern: agricultural resources, natural resources, and antiquated subdivisions. The subjective nature of the criteria does necessitate, however, additional factual information regarding specific land characteristics. There seems to be ambiguity in how specific sending and receiving sites are approved under the specific and/or general criteria. Having either a land rating system pertaining to soil, slope, residential/agricultural amenities, and development pressures could make the process more concise and decisions more valid.

It is not apparent that all of the approved sending sites are strong candidates for protecting the resources listed in the ordinance, and on occasion these sites only very weakly meet criteria. While this may be an inevitable tradeoff for a voluntary TDC program, some effort should be made to establish specific target areas beforehand to avoid haphazard sending and receiving site designation, as well as to

recognize the marginal nature of some participant sites. Additionally, the process by which the sending sites are approved can incorporate the land conversion probability model we have included to assess the location of the most severe development pressures and areas that would best be suited in alternative uses. In addition, this tool can provide future forecasts of development as local conditions change.

Given our analysis, a TDC program in San Luis Obispo County can be successful in protecting small amounts of land from rural fragmentation and urban sprawl. This program, however, should be utilized as one of the many conservation tools employed by the County. Furthermore, the County should not attempt to use this program as the primary preservation tool,<sup>iv</sup> and should instead encourage communities (similar to Cambria, and Nipomo) to develop regional based TDC programs to supplement their planning efforts. In this way, the TDC program can efficiently allocate growth, due to its preferential use as a small-scale conservation tool.

We have developed a method to model development pressures across San Luis Obispo County. The model itself is adaptable, allowing for the inclusion of new information and new methods of including information easily in the future. Our model suggests that the TDC program in San Luis Obispo County currently fulfills its mission to some extent, but that it could easily be improved using development pressures and other GIS-based mapping tools to further assess needs for the County. The TDC program's future is under discussion, but this tool serves as a general guide for future targeting of preservation.

<sup>i</sup> Faculty advisors were Antonio Bento and Frank Davis.

<sup>ii</sup> <http://www.ucsb-cfp.com/publs.htm>

<sup>iii</sup>  $\log P = \beta_0 + \beta_1 \log X_1 + \beta_2 \log X_2 + \dots + \beta_n \log X_n + e$

<sup>iv</sup> The Boulder County, Colorado transfer program could serve as a template for San Luis Obispo County, given that Boulder uses the program as one of the tools in a toolbox (primarily during recession years), relying on other programs to carry the weight of conservation.