

CONCLUSION

It is clear from a century of historical data that exurban expansion in southwestern Alberta is a feature of the population and economic boom that is having a profound effect on the reconfiguration of the rural landscape, particularly in the last four decades.

The geostatistical modeling process describes some key spatial trends associated with this phenomenon. The new Albertan exurbanite wants a room with a view and the perception of living in the wilderness, but also to be close to the office, big-city conveniences, and recreational amenities such as golf courses.

In addition to building an increased understanding of exurban expansion, a robust tool has been created with the potential to inform future land use planning and policy. Future research will focus on the differences between growth on the urban-rural fringe and more remote locations.

ACKNOWLEDGEMENTS

We are grateful to Alberta Ecotrust and Alberta Municipal Affairs for their generous support of this research.



FOR MORE INFORMATION

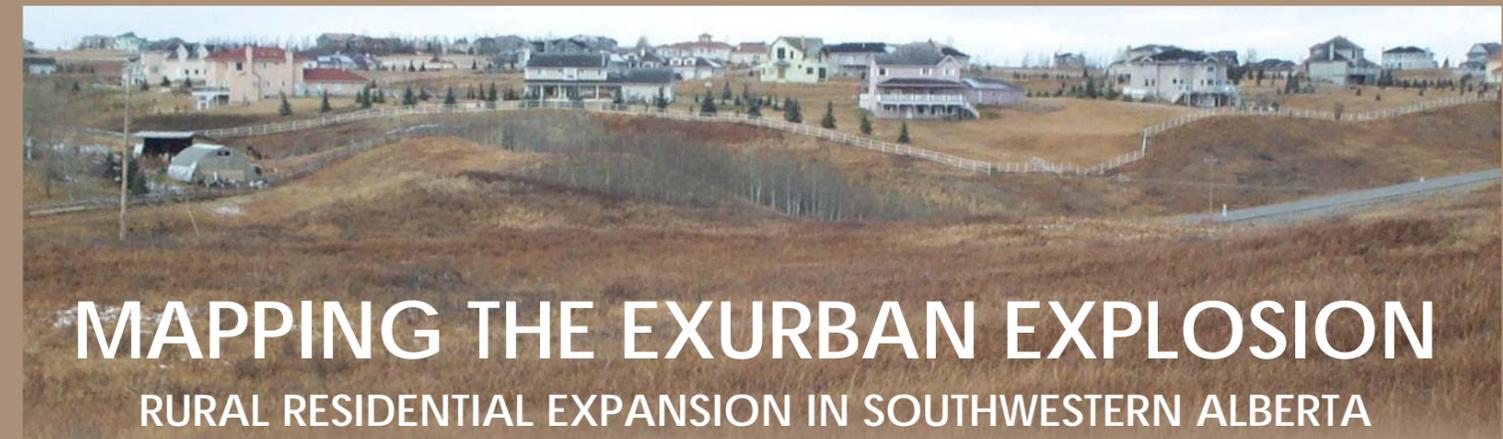
A comprehensive explanation of the first phase of this project can be found in the 2003 Miistakis Institute report, titled “Spatial Analysis of Rural Residential Expansion in Southwestern Alberta”. It is downloadable from our website, at www.rockies.ca/programs/program2a.htm.

An article describing project methodology and findings in greater detail is being prepared for peer-reviewed publication. In the interim, any questions about the details of the modeling process can be directed to the Miistakis Institute (see information below).

ABOUT MIISTAKIS

The Miistakis Institute is a non-profit charitable organization, affiliated with the University of Calgary. Miistakis undertakes and supports research respecting the ecosystems of the Rocky Mountains and surrounding regions, and facilitates collaborative ecosystem management. The Institute’s mandate is to bridge the gap between science and decision-making, using technology to deliver decision-ready information.

For more information on the Institute, email (institute@rockies.ca), phone (403.220.8968), or visit our website (www.rockies.ca).



MAPPING THE EXURBAN EXPLOSION

RURAL RESIDENTIAL EXPANSION IN SOUTHWESTERN ALBERTA

Miistakis Institute, University of Calgary

INTRODUCTION

This report presents initial results from ongoing Miistakis Institute research to quantify, map and analyze exurban expansion in southwestern Alberta, one of Canada’s most rapidly changing landscapes.

Southwestern Alberta is in the midst of a “boom” period; of the ten fastest growing municipalities in Canada, four are in this region. This has given rise to an increased interest in long-term land use planning, and to concerns regarding the capacity of existing infrastructure and resources to keep up with rapid growth.

The phenomenon of exurban expansion – the conversion of formerly agricultural or working landscapes to rural residential land uses – is common and widespread throughout much of North America. Within commuting distance of any urban settlement one can find these low-density, large-lot, often luxury residences. Although the growth of cities and development on the rural-urban fringe are well understood, less attention has been paid to rural residential expansion and its effects.

The research described in this article focuses on the Municipal Districts of Foothills, Pincher Creek, Ranchland, Rockyview, Willow Creek, and Cardston County (figure 1).

METHODS

The first phase of the research involved obtaining and harmonizing a century’s worth tax roll data, which catalogues new structures by date and quarter-section for the six Municipalities listed above. Tabular data was attached to a GIS spatial layer showing quarter sections, and aggregated by decade and township. The result is a map that shows the change in number of residential structures per township for the study area (figure 2).

Some general trends are apparent from the map regarding the historical expansion of rural residential land use. However, the map also generates a number of questions. What factors are driving this expansion, and creating this spatial pattern? Where are the rates of development the highest, and what is it about the landscape or other characteristics at these locations that make them more attractive? And what areas are most likely to be considered for future development, based on spatial trends to date? The second phase of this research seeks to answer those questions through geostatistical modeling.

A closer examination of the historical data (figure 3) shows a marked increase in the rate of rural residential expansion in the 1960’s. For this reason, the modeling process was applied to data from the 1960’s to the most current data available.

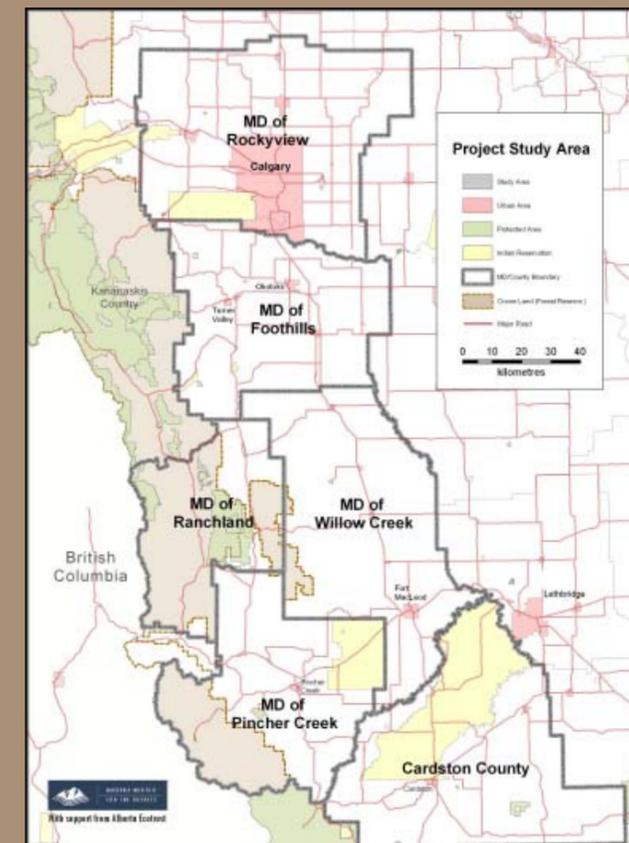


Figure 1 - Study Area

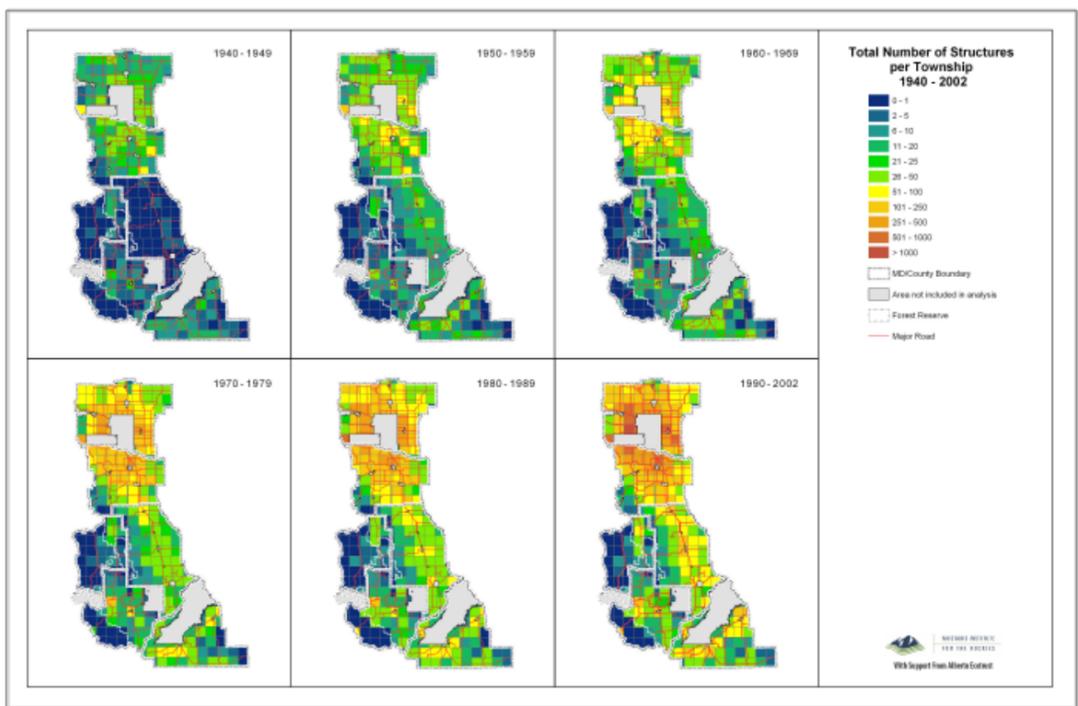


Figure 2 - decadal time series showing change in residential density by township.

Stepwise multivariate regression was used to model change in number of residential structures per quarter section against a broad suite of landscape-based and amenity variables that were anticipated to influence choice of location for rural residential developments. Multivariate correlation analysis was used to narrow the field of candidate variables to those that

demonstrated the strongest predictive power.

Once a regression equation was derived, it was applied to the GIS layer, producing a map that shows the predicted magnitude of change in residential structures over the past four decades for every quarter section in the study area.

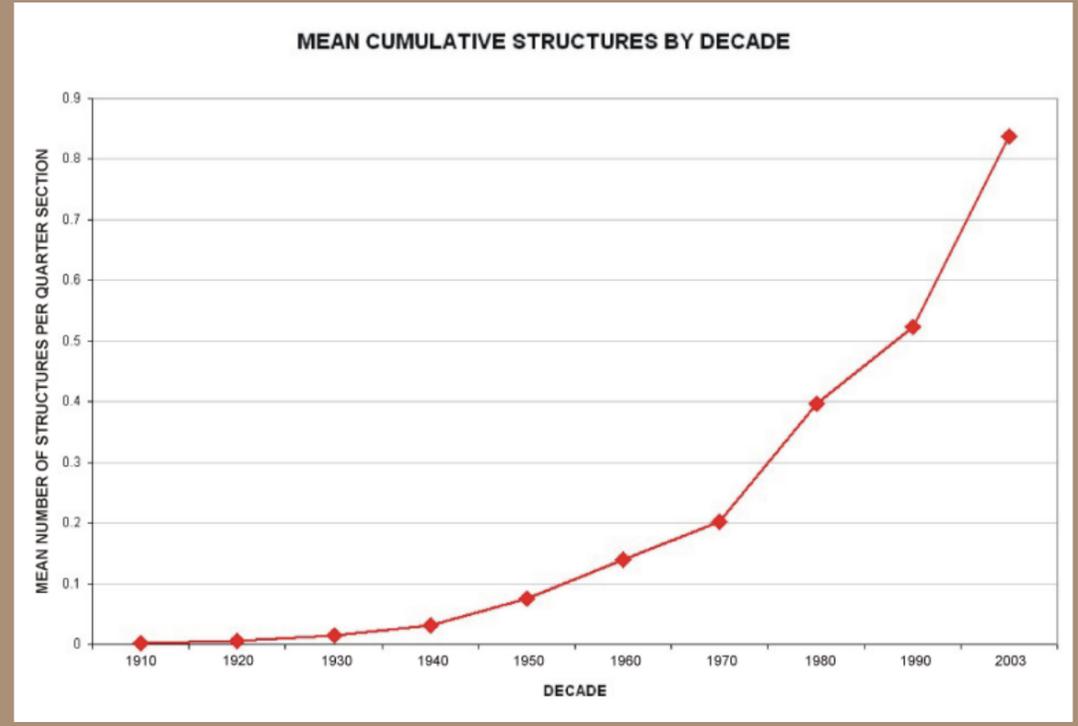


Figure 3 - Graph showing growth of rural residential development by decade.

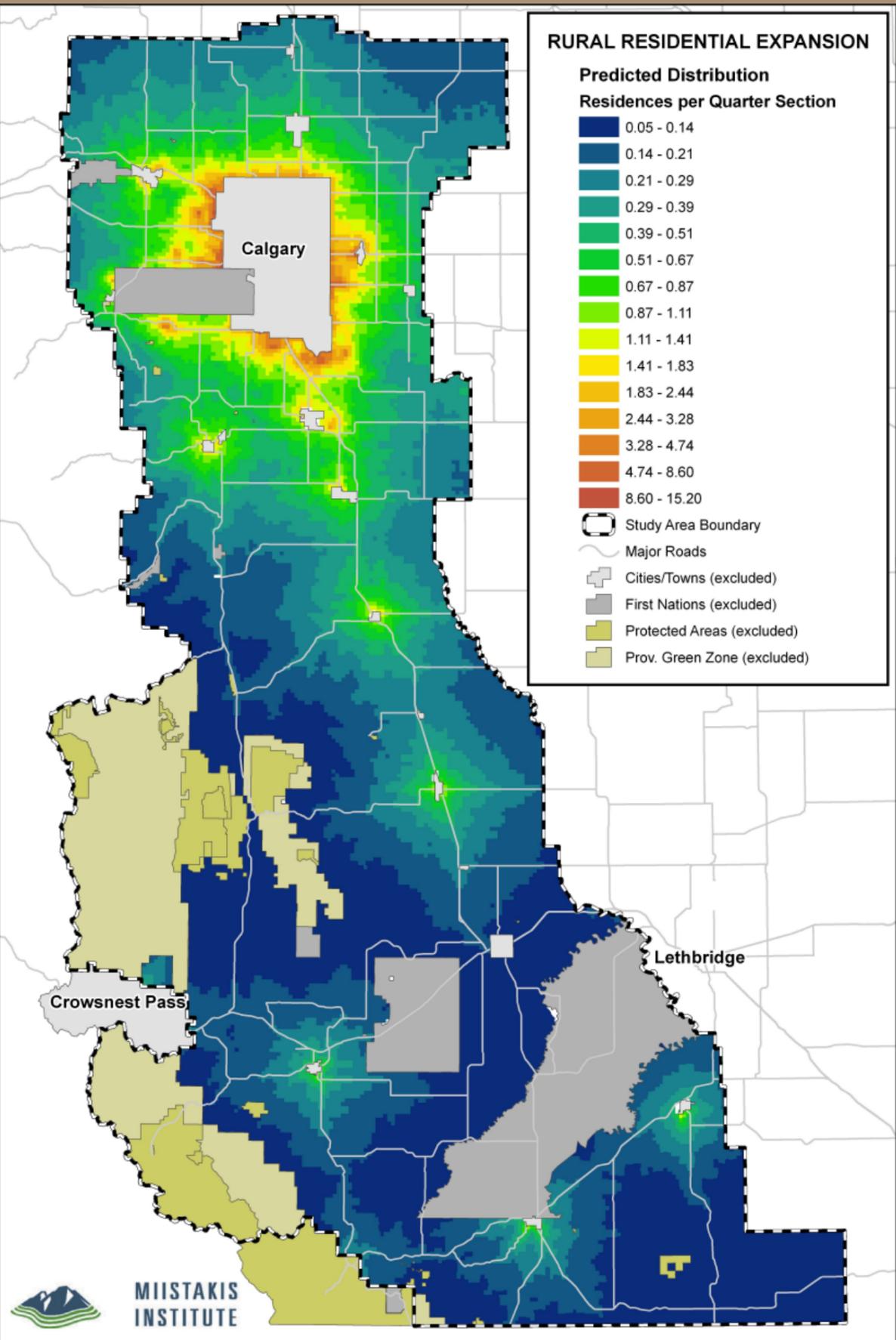


Figure 4 - Regression surface showing modeled distribution of rural residential growth between 1960 and 2002.

RESULTS AND DISCUSSION

The regression surface map is presented in figure 4. It depicts the probable distribution and magnitude of rural residential development based on three site characteristics: location is most influenced by travel time to the city of Calgary, travel time to the nearest golf course, and scenic views of the Rocky Mountains.

The model does not consider potential detractors of development, such as prevailing wind speeds and directions, proximity to large-scale industry or agriculture, air quality, or groundwater availability.

Location is most influenced by travel time to the city of Calgary, travel time to the nearest golf course, and scenic views of the Rocky Mountains

The degree to which the regression equation “fits” the actual tax roll data is sufficient to explain the general spatial patterns of rural residential development. However, there are some factors influencing location that are practically impossible to model spatially, such as the microeconomics of land transactions between individuals, or the change in land use policy, zoning, and political boundaries within each municipality. This model illustrates the general patterns of development and the candidate areas for expansion, holding all non-spatial factors constant.

This modeling was conducted using municipal tax roll files, and GIS data that are freely available throughout Canada. The methodology is sufficiently robust that it could be applied to any region.