

# TREES



Texas  
Resource & Environmental  
Engineering Services

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**Assessing biodiversity concerns of an urban  
sprawl area and projecting smart growth in  
Hays County, Texas.**

Prepared by:  
Texas Resource and Environmental Engineering Services  
(T.R.E.E.S)

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## Introduction

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### **Summary:**

Urban sprawl, also referred to as suburban sprawl, is an uncomplimentary term for the expansive, often volatile and sometimes irresponsible, growth of a metropolitan area, traditionally suburbs over a large area (Wikipedia, 2005). Urban sprawl is a synonym for suburbanization, which is the geographical expansion of urban areas at or beyond their borders. More than 90% of urban growth in the United States has been in suburbs in recent decades (Wikipedia, 2005).

The Texas State Data Center's figures show that Texas's population will almost double to 33 million by 2030. The majority of this population growth will occur along the I-35 corridor and to the east of it. Hays County located along the I-35 corridor is experiencing rapid growth in employment, population and land area affected by development.

Adjacent communities are growing even more dramatically, for example, Hays, Travis and Williamson Counties' combined 2000 population of 1.16 million is projected to increase to over 1.4 million by 2010. The population of Hays County has grown from 1990 to 2000 at a (+ 48.7) change.

Though most people assume that growth pays for itself in generated income, studies indicate differently. New growth does not necessarily translate into new wealth for communities. The Texas office of American Farmland Trust conducted a study of the fiscal impact of existing land uses on the Hays County's budget. The studies showed that farms, ranches and open lands generate three times more tax dollars for a county than the county spends on them for public services. Industrial and commercial properties provide a net fiscal benefit as well, but residential development requires \$1.10 in services for every tax dollar it generates (Texas Environmental Profiles, 2005).

This increase in population will definitely change Hays County and central Texas; however, we can guide and shape this future growth to both curtail the negative environmental, economic, and social impacts and preserve the best aspects of life in our area.

The study by Texas Resource and Environmental Engineer Systems (T.R.E.E.S.) will investigate Travis County's problem with urban sprawl and predict how it will impact neighbors adjacent to Hays County and attempt to guide growth to an area of least unfavorable impact to the environment.

### **Purpose:**

The purpose of this study is to:

- 1) identify where urban sprawl is occurring in Hays County,
- 2) identify the habitat requirements for concerned species in the study area and map out distribution of suitable habitats, and
- 3) project an area for smart growth that has the least adverse impact on these habitats.

## Scope:

The extent of our study will focus on urban sprawl located in Hays County, Texas. Hays County is a county in Texas with a population of 114,193, and a total area of 693.5 square miles (U.S. Census Bureau, 2005). The county is located on the border between the Edwards Plateau and the southern Black Prairie region.

## Data and Sources

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All of the data will be collected from county, city and federal agencies that are accessible on the Internet.

### ***Base Line Data***

*Census Blocks and Tracts* – US Census Bureau

<http://www.census.gov/>

*Census Data* – US Census Bureau

<http://www.census.gov/>

*County Lines* – US Census Bureau

<http://www.census.gov/>

*Digital Elevation Model* – Texas Natural Resource Information System

<http://www.tnris.org/update3.cfm>

*DOQQ* – Texas Natural Resource Information System

<http://www.tnris.org/update3.cfm>

### ***Environmental Data and Sources***

*Aquifer Data and Precipitation* – Texas Water Development Board

<http://www.twdb.state.tx.us/home/index.asp>

*Hydrology* – Capital Area Council of Governments

[http://www.capco.state.tx.us/Information\\_Clearinghouse/](http://www.capco.state.tx.us/Information_Clearinghouse/)

*Soils* – Capital Area Council of Governments

[http://www.capco.state.tx.us/Information\\_Clearinghouse/](http://www.capco.state.tx.us/Information_Clearinghouse/)

*Species* – Texas Parks and Wildlife Department

Personal Inquiry to find Tabular Data on Species in Hays County

*Land Use / Land Cover* – Hays County Land use and cover  
[ftp://issweb.ci.austin.tx.us/pub/coa\\_gis.html](ftp://issweb.ci.austin.tx.us/pub/coa_gis.html)

*Vegetation* – Hays County Vegetation  
[ftp://issweb.ci.austin.tx.us/pub/coa\\_gis.html](ftp://issweb.ci.austin.tx.us/pub/coa_gis.html)

*Building Permits* – Hays County Appraisal District (Hays County Records)  
Personal Inquiry to find Tabular Data on Locations

*Population* – Historic Population in Census Tracts in Hays County  
<http://www.census.gov/>

## Methods

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This project will make full use of spatial analyses software developed by Environmental Research Systems Institute (ESRI) including ArcGIS Desktop 9.1 and Spatial Analyst. Furthermore, production deliverables will employ Microsoft's Office Suite and Adobe's Creative Suite applications. All data will be spatially defined using datum NAD 83 and projected using coordinate system UTM Zone 14N.

T. R. E. E. S. will assemble an inventory of building permits in Hays County with enough frequency over the past ten years to effectively identify spatial growth trends. Processing this data will require geocoding tabular data and determining zonal statistics and surface densities.

Reference information on species habitat requirements will be correlated with known distributions of these species to develop realistic present-day distribution maps for selected species of concern in Hays County. In the way, a model will be created to identify primary habitats for selected species in Hays County and will incorporate the following data:

- Land Use/Land Cover
- Hydrology
- Soils
- Vegetation
- Population
- Precipitation
- Topography
- Building Permits

Any paper maps regarding species distribution will be incorporated into the model using head-up digitizing georectification. Other methods to be used are vector analysis, buffering, raster analysis, raster reclassification, and slope definition.

## Implications

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This study will identify areas in Hays County which are experiencing urban sprawl and identify the habitat requirements for concerned species in the study area and map out distribution of suitable habitats.

Additionally, this study will be used as a guide for future development of Travis County. Furthermore, this study will identify where smart growth should occur in the area with least adverse impact to these habitats.

## Timeline

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- ❖ **Webpage:** (*9 weeks*) The Webmaster will update the webpage throughout the 9 weeks. Initial 8hr design, then weekly upkeep and posting of new information for the client to view our progress.
- ❖ **Data Collection:** (*4 weeks*) Collecting data will be done with a combined effort of all T.R.E.E.S. members. Each member will gather data and then meet with the group to evaluate its contribution to the project.
- ❖ **Data Analysis:** (*4 weeks*) Analysis will begin as data is being processed by some of the members of the group. Analysis will be dedicated to creating maps, writing a report, and generating a model.
- ❖ **Data Interpretation:** (*3 weeks*) Interpreting the data will take place the last 3 weeks of the semester. T.R.E.E.S. will interpret the material and work on the final presentation.

<b>Timetable</b>									
<b>Dates</b>	Sept 25 - Oct 1	Oct 2 - Oct 9	Oct 10 - Oct 16	Oct 17 - Oct 23	Oct 24 - Oct 30	Oct 31 - Nov 6	Nov 7 -Nov 13	Nov 14 - Nov 20	Nov 21 - Nov 27
<b>Webpage</b>									
<b>Data Collection</b>									
<b>Data Processing</b>									
<b>Data Analysis</b>									
<b>Data Interpretation</b>									

## Budget

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### Data Collection

Week 1-2

Technicians: (3), 10 hrs/week\* 2 weeks  
(1), 5 hrs/week\* 2 weeks  
(1), 7 hrs/week\*2 weeks

Total hours	84	
Rate/hr	\$15.00	
	<b>Total</b>	<b>\$1,260.00</b>

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Week 2-4

Technician: (1), 10 hrs/week\* 2 weeks  
(1), 7 hours per week for 2 weeks

Total hours	34	
Rate/hr	\$15.00	
	<b>Total</b>	<b>\$510.00</b>

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### Data Processing

Week 2-4

Processors: (2), 10 hrs/week\* 2 weeks  
(1), 5 hrs/week\*2 weeks

Total hours	50	
Rate/hr	\$30.00	
	<b>Total</b>	<b>\$1,500.00</b>

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Week 4-6

Processors: (3), 10 hrs/week\* 2 weeks  
(1), 5 hrs/week\*2 weeks  
(1), 7 hrs/week\*2 weeks

Total hours	84	
Rate/hr	\$30.00	
	<b>Total</b>	<b>\$2,520.00</b>

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### Data Analysis

Week 6-8

Analyst: (3), 10 hrs/week\* 2 weeks  
(1), 5 hrs/week\*2 weeks  
(1), 7 hrs/week\*2 weeks

Total hours	84	
Rate/hr	\$35.00	
	<b>Total</b>	<b>\$2,940.00</b>

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### Data Interpretation

Week 9

Interpreter: (3), 10 hrs/week\* 2 weeks  
(1), 5 hrs/week\*2 weeks  
(1), 7 hrs/week\*2 weeks

Total hours	84	
Rate/hr	\$35.00	
	<b>Total</b>	<b>\$2,940.00</b>

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**Management**

<u>Manager:</u>	5hrs/week* 9 weeks	Total hours	45	
Rate	\$60.00			<b>\$2,700.00</b>
<u>Assistant Manager:</u>	3hrs/week* 9 weeks	Total hours	27	
Rate	\$50.00			<b>\$1,350.00</b>

**Web Site Management**

8hr start up + 1hr/week* 8 weeks	Total hours	16	
	Rate	\$40.00	
	<b>Total</b>		<b>\$640.00</b>

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**Equipment Costs**

			<b>Total</b>
<u>Stations:</u>	Dell Dimension Desktop	\$1,700.00	\$8,500.00
<u>Printing:</u>	HP Color LaserJet 3700		\$1,300.00
<u>Software:</u>	ArcGIS 9.0 and extensions		\$62,000.00
			\$71,800.00
<u>Depreciation:</u>	Total Value/36 months(equipment life)*2.1months(use)		\$4,188.33
	Rate		
<u>Supplies</u>	\$150.00	5 stations	\$750.00
<u>Maintenance</u>	\$200.00	5 stations	\$1,000.00
<u>Travel</u>	\$0.43	300 miles	\$129.00
		<b>Project Cost</b>	<b>\$22,427.33</b>

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**Final Deliverables**

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The final deliverables for this project will include:

- I) A detailed and comprehensive report that analyzes the environmental effects of urban sprawl in Hays county and recommendations for areas where sprawl would be least harmful.
- II) Poster depicting areas of Hays County that are already affected by the urban sprawl and site selected areas that can handle sprawl without habitat destruction.
- III) A final CD will also be included and will contain
  - ◆ Final report
  - ◆ All maps with analyzed data, sources and metadata
  - ◆ Final poster

## Conclusion

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Recently, urban sprawl among other environmental issues has become a topic of major concern for communities and local government especially along the IH 35 corridor in Hays County. Families are now getting the urge to move out of the metropolitan areas and into a more urban to rural setting in search for a slower pace of life, peaceful surroundings and a great place to raise their children. However, in their search for Utopia, the area in which they choose to develop and subsequently move into has had to succumb to rapid changes with disregard to the many native species that exist in that area.

Our study is necessary to identify where urban sprawl is occurring in Hays County. Secondly, our study will identify the habitat requirements for concerned species in the study area and map out distribution of suitable habitats. In summary, our project will exhibit an area for smart growth that has the least adverse impact on these habitats.

## Participation

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Stephanie Singleton - Project Manager

- ❖ Cover page/Title page/Table of contents
- ❖ Introduction material
- ❖ Implications
- ❖ Timetable
- ❖ Participation
- ❖ References

Ryan Schmidt - Assistant Project Manager

- ❖ Editor
- ❖ Budget

Noah Hopkins - Webmaster

- ❖ Logo
- ❖ Layout
- ❖ Methodology

Mark Adair - GIS Analyst

- ❖ Data
- ❖ Sources

Cherrie-Lee Phillip - GIS Analyst

- ❖ Conclusion
- ❖ Final Deliverables

## References

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Texas Environmental Profiles

<http://www.texasep.org/>

U.S. Census Bureau. 2005

<http://quickfacts.census.gov/qfd/states/48/48453.html>

Wikipedia. 2005

<http://en.wikipedia.org/>