Suburban Growth of San Antonio from 1985 to 2003 – by Spenser Murphy
Project Overview

- Research Objective
- Data and Sensor Platform
- Development of Project
- Site Selection
- Methods of Data Collection
- Results
- Implications
- Research Objective Revisited
- Research Problems
- Future Research
Research Objective

Determine the amount suburban growth that San Antonio has experienced from 1985 – 2003.

– What does San Antonio’s population growth mean for the built environment?
– Which area of San Antonio has experienced more growth?
## San Antonio’s Population Growth

<table>
<thead>
<tr>
<th>Year</th>
<th>San Antonio</th>
<th>% Increase</th>
<th>Bexar County</th>
<th>% Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>1960</td>
<td>587,718</td>
<td>----</td>
<td>687,151</td>
<td>----</td>
</tr>
<tr>
<td>1970</td>
<td>654,153</td>
<td>11.3%</td>
<td>830,460</td>
<td>20.9%</td>
</tr>
<tr>
<td>1980</td>
<td>786,023</td>
<td>20.2%</td>
<td>988,971</td>
<td>19.1%</td>
</tr>
<tr>
<td>1990</td>
<td>935,933</td>
<td>19.1%</td>
<td>1,185,394</td>
<td>19.9%</td>
</tr>
<tr>
<td>2000</td>
<td>1,144,646</td>
<td>22.3%</td>
<td>1,392,931</td>
<td>17.5%</td>
</tr>
</tbody>
</table>
Data and Sensor Platform

- US Census Bureau
- City of San Antonio
- Dr. Xie
- Landsat 5 TM
- Landsat 7 ETM+
Why Landsat Imagery?

- Cost – The images were free.
- Temporal Coverage – 1972 to Present
- Temporal Resolution – 16 days
- Spectral Resolution – 7 bands .45 - 2.35 µm
- Spatial Resolution – 30m
Evolution of Project

- Early Project Ideas
- Associated Problems
Loss of Native Vegetation

- Study the effects of suburban development on native vegetation.

- Problem: Distinguishing between different types of vegetation.
Opium Production in Afghanistan

- To see if opium production had decreased under the new democratic government.
- Problem: Finding images and ground truthing.
Detecting Suburban Growth

- To test claims made by the City and U.S. Census Bureau about San Antonio’s population growth.
- Reasons: The images were accessible and ground truthing.
Site Selection

- Areas of major population growth
- North, Northwest, and Northeast
Methods of Data Collection

- Spectral Angle Mapper (SAM)
- Change Detection Algorithm
- Change Detection Statistics
Site #1 - 1604 and Culebra Rd
Results of Change Detection
Site #1 - 1604 and Culebra Rd
Site #2  Converse and Randolph AFB
Results of Change Detection
Site #2 - Converse and Randolph AFB
This sample area saw 60% increase in suburban development.

In area, the sample site saw increase of 1081 acres or 438 hectares.
This sample area saw 82% increase in suburban development.

In area, the sample site saw increase of 1255 acres or 508 hectares.
Research Implications

- Real Estate Values
- Water Resources
- Environmental Impact
Implications Continued

Environmental Impact

Herbicide and Fertilizer Runoff

Increase in Traffic and Air Pollution

Suburban Sprawl
Determine the amount suburban growth that San Antonio has experienced from 1985 – 2003.

– What does San Antonio’s population growth mean for the built environment? The two sites saw a 60% and 82% increase in suburban growth.
– Which area of San Antonio has experienced more growth? Of the two sites selected, Site #2 Converse and Randolph AFB saw the largest increase in growth.
Research Problems

- Including structures that were not suburban development.
- Spatial resolution not high enough.
Future Research

- Analyze suburban growth over Aquifer Recharge Zone
- Use higher resolution imagery for better data.