Analyzing Spatiotemporal Patterns and Marketing a Changing Community

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Content

- Zapata Economic Development Center (ZEDC)
  - Lack of infrastructure for spatial data
    - ZEDC’s Countywide GIS
- Concepts and Agendas for Sustainable Development
  - Study Area
  - Methods
  - Results
  - Discussion
Introduction

- Lack of Spatial Data Infrastructure
- Record As-Builts
- Spatial Cognition
- ZEDC Countywide GIS
Introduction

- Falcon Lake
- Local and Regional Economy

Falcon Lake
Zapata, Texas
Introduction

Sustainable Development

“Sustainable development is the balance of meeting humankind’s present needs while protecting the environment to ensure the fulfillment of future generations’ needs.” (ESRI, 2014)

✓ Texas Local Government Code, Section 231.172

✓ ICLEI (International Council for Local Environmental Initiatives)

✓ Agenda 21 - United Nations (UN) Rio Earth Summit in 1992. Attended by U.S. President George Bush, Sr. and leaders from 178 other nations

✓ the President’s Council on Sustainable Development by President Clinton’s executive order in 1993

✓ President Obama’s Federal Leadership in Environmental, Energy, and Economic Performance through executive order in 2009
Study Area

- Zapata County
- South Texas
- Rio Grande
- Falcon Lake

Zapata County has a population of just over 14,000 and covers approximately 677,000 acres of land and about 61 square miles of water.
Study Area

- "BASSMASTERS 100 Best Bass Lakes" in the United States in 2012

- Zapata County is a destination for eco-tourism especially in the areas of Fishing, Hunting, and Birding

- pronounced Hispanic culture of music, art, and history with the neighboring town of San Ygnacio within the county being the oldest in Texas and home to nationally recognized historic buildings
Methods

• Implementation of a countywide GIS using ESRI’s ArcMap 10.1

• Using data pertaining to areas of development, economic growth, and patterns in tourism
Methods

Falcon Reservoir

The geometrical transformation which occurs is that of size and form affecting the fishery and other lake activities. Spatial relationships among other objects may also change as a consequence (Yeung and Lo, 2002). Beginning the analysis pertaining to Falcon Reservoir and the local tourism economy consisted of the determination of the limits and occurrences of lake level fluctuations.
Methods

Falcon Reservoir

- Extract pertinent elevation range from digital elevation model
- Generate contours
- Generate generalized polygons representing lake levels
- Include date attribute for time aware layer
Methods

Falcon Reservoir

• Hotel revenue data is associated with the locations of corresponding hotels

• Point features with hotel revenue and date attributes are quantified with graduated symbols

• Total Hotel Receipts and Total Retail Sales are normalized by the percent of Totals symbolized with a Column Chart

View Time Animation
Methods

Falcon Reservoir

- ArcScene is used for 3D visualization using a DEM as a base layer
- The hotel receipts data are now shown as bars rising vertically from the base elevation as graduated symbols

View ArcScene Animation
Methods

Publish Spatial Data

• ArcGIS online is used to create an online geoportal with access to a variety of highly focused special purpose maps

• Increase awareness of available community assets, development constraints, and economic activity

• Comprehensive local business locations
• Voting districts
• FEMA flood zone areas
• Platted subdivisions
• County garbage pickup
• School locations and boundaries.
Results

GIS Implementation

• Effectiveness of the GIS implemented.
• Challenges / Constraints
• Data Availability
Results

Lake Level Fluctuation and Revenues Analysis

• Does not show that sales directly correlate with the rise and fall of lake levels

• The relationship of hotel receipts and retail sales with fluctuations in the reservoir levels shows that when the lake rises and is relatively constant, revenues are generally higher
Results

Publishing and Sharing Spatial Data

• ArcGIS Online

• Presentations

• Public

• Local Government
Results / Discussion

• Publishing and Sharing Spatial Data
• Visualization
• Site Selectors
• Time Animation
• Economic and Sustainable Development
End

• Thank you for your time!

• Questions?