

# *Water Demand Analysis & Management Using Aerial Imagery and GIS*



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# Overview

- *Water Conservation Goals and Limitations*
- *Potential Role of GIS in Meeting Goals*
- *Colorado Springs Water Demands*
- *Applications of GIS in Colorado Springs*
  - *Landscape Irrigated Return Flows (LIRF)*
  - *Spatial Demand Research*

# Conservation Goals

- *Maintain low residential use per capita*
- *Gain a better understanding of how commercial customers use water in order to reduce commercial use per customer*
- *Reduce peak day demand, specifically in geographic areas with high peaking factors*
- *Develop and maintain collaborative relationships that encourage water conservation and efficient water use throughout the region*

# *Factors Limiting Ability to Achieve Stated Goals*



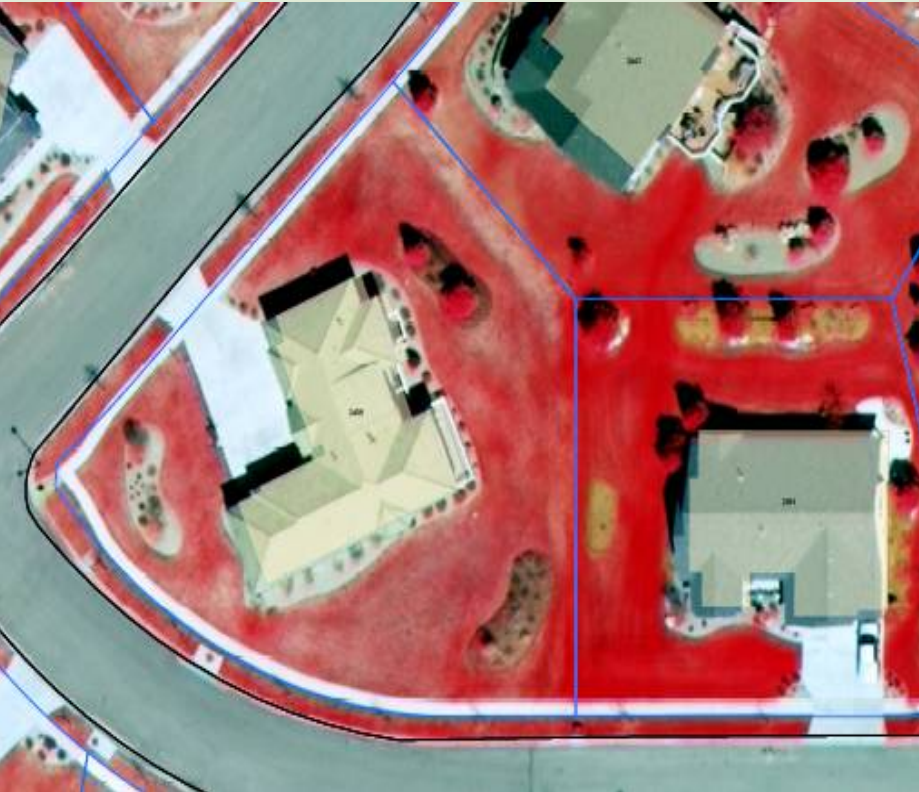
- *Internal Factors*
  - *Staff time and budget*
  - *Inadequate data*
  - *Poor communication*
- *External Factors*
  - *Relationships*
  - *Acceptance of measures*
  - *Accessibility to solutions*

# *The Potential Role of GIS*



- *Multipurpose tool that may...*
  - *Save time and money*
  - *Provide new information*
  - *Improve communication*
  - *Develop relationships*
  - *Help measures gain acceptance*
  - *Improve accessibility to solutions*

# *Demand-related GIS Applications in Colorado Springs*

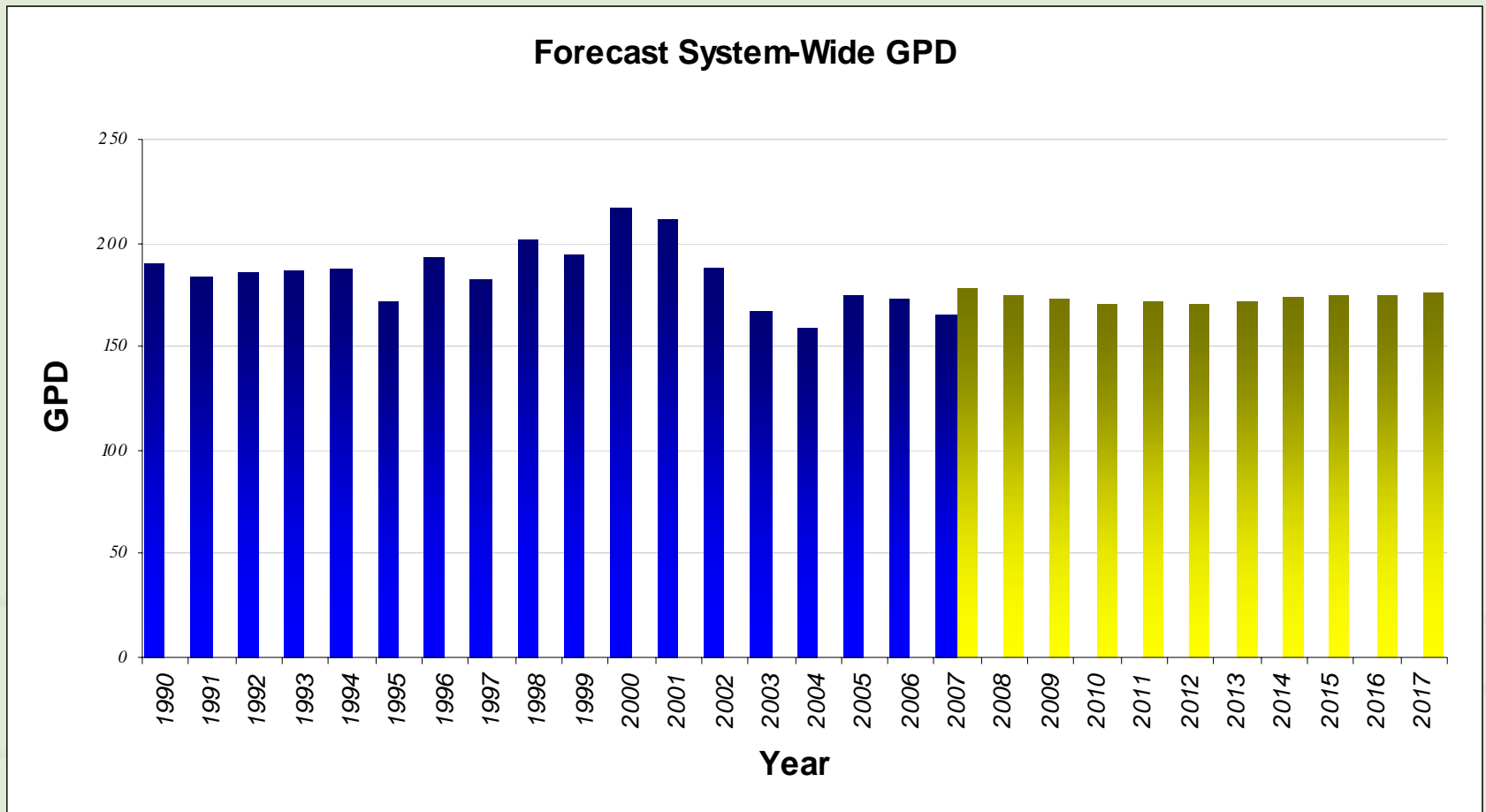


- *Landscape Irrigation Return Flow Study (LIRF)*
- *Spatial Demand Research*
- *Demand Management Tools for Staff and Customers*

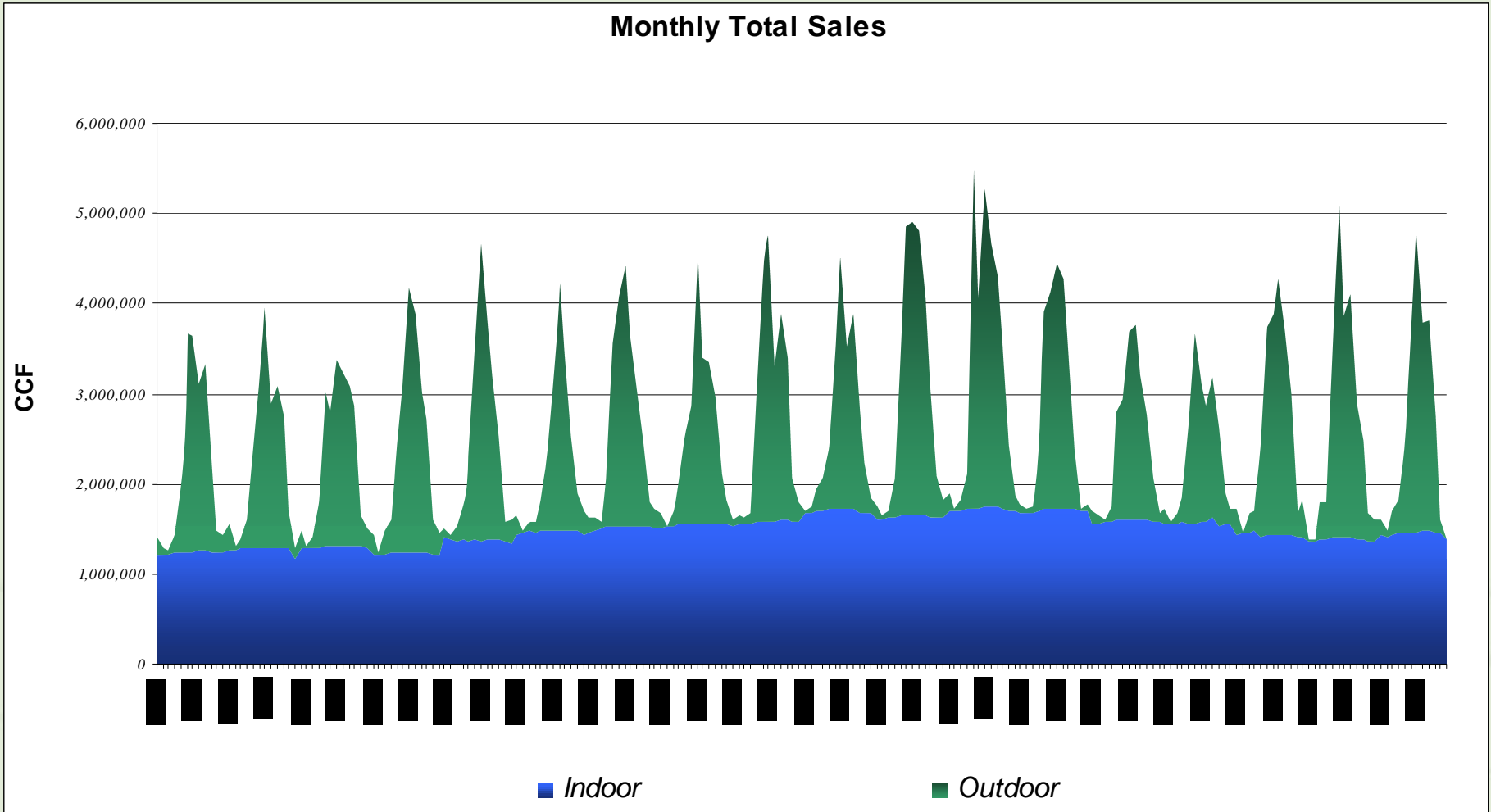
# LIRF

- *Quantify turf irrigation return flows attributable to irrigation from potable and non-potable water systems.*
- *Utilize color infrared photography (CIR) within Utilities' operational inventory.*
- *Determine amount of non-sewered return flow water that Colorado Springs can claim, capture and reuse.*

# Forecast Demand



# Peak Demand



# *Demand Research Ideas*

- *Quantify irrigated area and demand by parcel*
- *Quantify change in irrigated area and irrigation behavior*
- *Quantify “new” vs. “old” homes*
- *Evaluate Commercial Landscape Code*
- *Delineate water demand “neighborhoods”*

# *Irrigation Demand by Parcel*



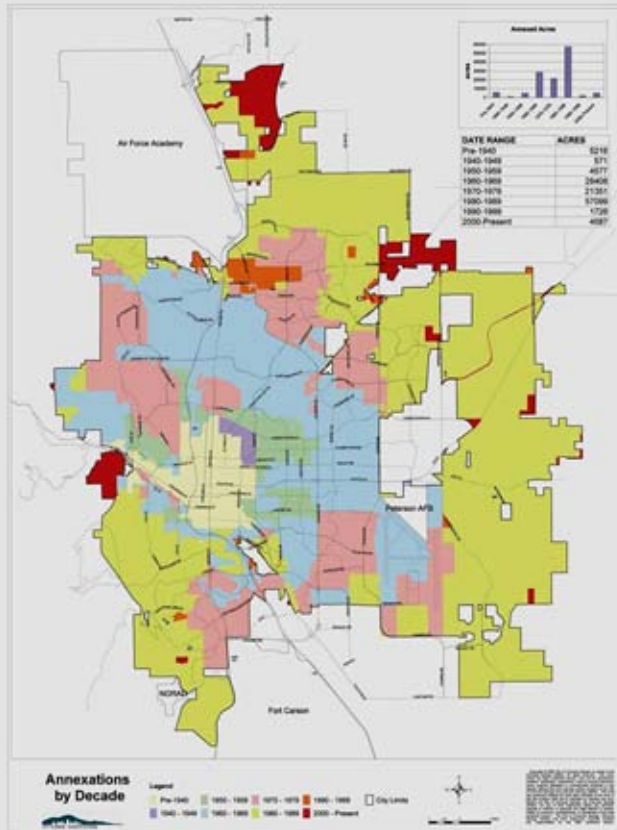
- *Evaluate landscape composition – total irrigable, irrigated turf, irrigated other, non-irrigated, & tree canopy*
- *Calculate water budgets*
- *Target excess use*
- *Develop tools to monitor and communicate*

# *Change in Landscapes*



- *Quantify reduction in irrigated area by parcel and land use*
- *Quantify change in watering habits – demand per area*
- *Behavior or technology?*
- *What can we depend on?*

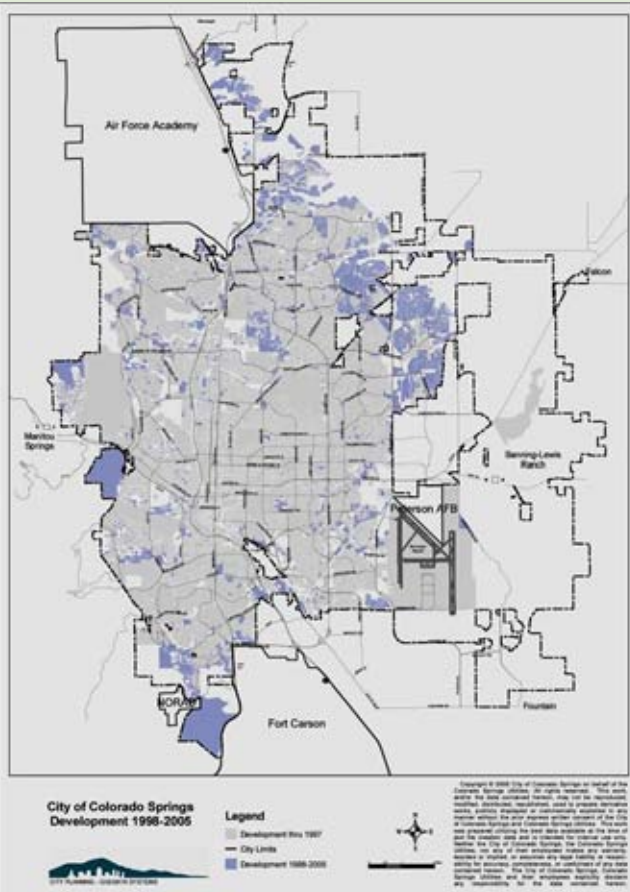
# New Homes vs. Old Homes



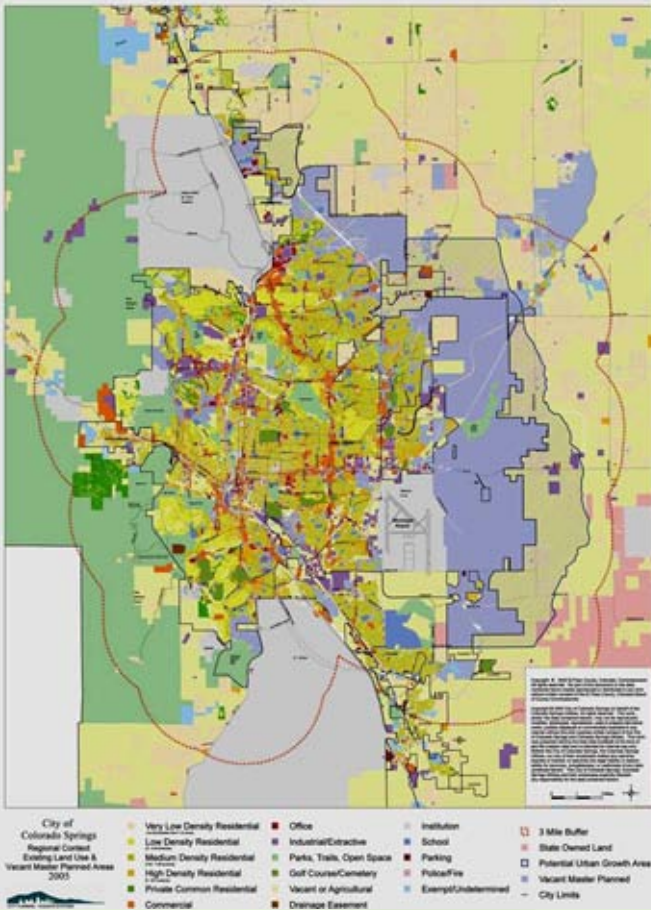
- Compare irrigable, irrigated turf and other, non-irrigated, and demand patterns
- Lots may be smaller, but is demand?
- Who is getting it right... and how?

# Evaluation of Ordinances

- *Quantify physical characteristics of landscapes and demand patterns under ordinance*
- *Compare to others*
- *How do they differ?*
- *Is the ordinance working?*
- *What may need to change?*



# Demand “Neighborhoods”



- *Delineate based on end uses and/or demand patterns*
- *Map demand “hot” and “cool” spots for total and peak use*
- *What factors may differentiate these spots?*
- *Are there unexpected patterns?*
- *Do they mean anything?*
- *Will this help us?*

# *Partners and Relationships*

- *Internal*
  - *Water Supply and Water Resources Departments*
  - *IT and GIS groups*
  - *Customer information and billing*
  - *Account managers*
- *External*
  - *City of Colorado Springs*
  - *Local Universities*
  - *Large user groups*
  - *CWCB*
  - *Conservation groups*

# Review

- *GIS may help us meet our goals by...*
  - *Providing a tool to understand residential and commercial demand patterns spatially and in great detail*
  - *Helping us see, evaluate and target specific “high-use” customers and “neighborhoods” with appropriate measures*
  - *Communicate more effectively and develop new and better relationships with a wide variety of stakeholders*

# *Questions/ Thoughts?*

