



KEYSTONE
POLICY CENTER

Colorado Water & Growth Dialogue

Upper Colorado River Basin Water Forum
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Integration of Land and Water Planning



“Planning As If Water Matters”

Policy Levers to Conserve Water

- Behavior
- Technology
- Land use

Land Use Planning

Where can water be saved?

- Outdoor – Less landscaping and lower water using landscaping
- Indoor – More efficient appliance and fixtures

How do you build in those saving?

- Incentives to builders
- Land use regulations
- Plumbing codes

Basic Questions


- What has already been done?
- How much water can be saved?
- What are the best strategies?




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A Growing Opportunity

- ▶ By 2050, Colorado's population is projected to double, greatly increasing the demand for water.
 - ▶ By 2050, most people will live in buildings that are yet to be built.
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Scope

- ▶ **Geography:** The Denver Water and Aurora Water service areas
 - ▶ **Planning time horizon:** 2040
 - ▶ **Stakeholders:** Water providers, land use planners, developers, economic development interests, public officials, and other key stakeholders
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Process

- ▶ Set up the program
 - ▶ Research other regions
 - ▶ Build water quantification model
 - ▶ Joint water and planning models runs
 - ▶ Evaluate management strategies
 - ▶ Scenario exploration to test and refine strategies
 - ▶ Provide local communities with data, information and tool box of strategies to help inform planning decisions
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Research - Residential Density


1. Smaller Lots (\pm 5,000 sq. ft.) consume less water than larger lots.
2. Townhouses consume less water than small lots.
3. Low to Mid-rise multi-family consume less water than townhouses

35-50% per capita

Research – Land Use Regulations

- **Zoning Regulations**
 - Minimum densities; irrigated turf limits**
- Subdivision Regulations
 - Less so – lot sizes generally covered by zoning
- Comprehensive Plans
 - Only if they are implemented, but can serve to bring land use and water planners together
- **Building Codes**
 - Can require water saving techniques & appliances**

Water Quantification Model

- ▶ Assess the relationship between land use development patterns and water consumption in the Denver region
 - ▶ Develop model to estimate water saving with denser residential land use
 - ▶ Add ability to estimate water saving from other management strategies
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Stapleton Development



Cherry Creek North Redevelopment

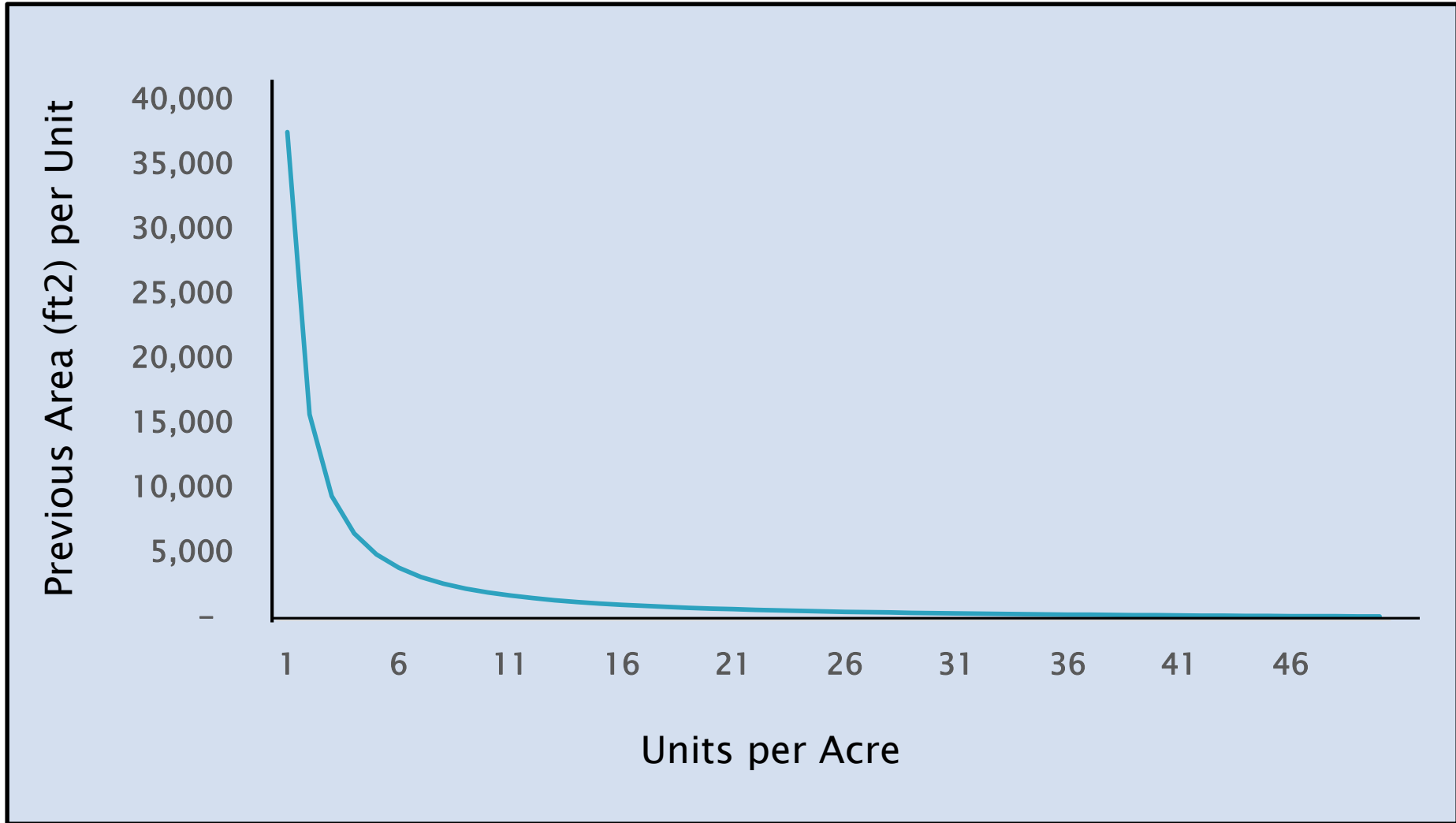


Residential Development Type
Single Family
Row House
Small Multi-family
Condos
Large Multi-family
Office w/Residence
Vacant

Land Use Type Summary

Product Type	Units Analyzed	Avg. Units per Zoned Acre	Avg. Pervious Area (ft ²) per Unit	Avg. Indoor GCD	Avg. Outdoor GSF (pervious)
Large Single Family (>10,000 ft ²)	423	2.8	14,305	54	12
Typical Single Family (6,500 – 10,000 ft ²)	363	5.2	5,497	38	8
Small SFR (2,000 – 5,000 ft ²)	371	8.6	2,191	47	21
Townhome	346	16.0	1,302	53	15
3-Story Walkup	1,336	24.3	604	51	32
Mid-Range Multi Family	1,662	71.9	198	56	83
High Density Multi Family	2,060	115.2	146	55	199

Residential Density Reduces Outdoor Use



Discussion

- What have you been doing to link land use and water?
- Do you have a good sense of the water savings?