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Evaluating Changes in Water Use and Conservation Effectiveness

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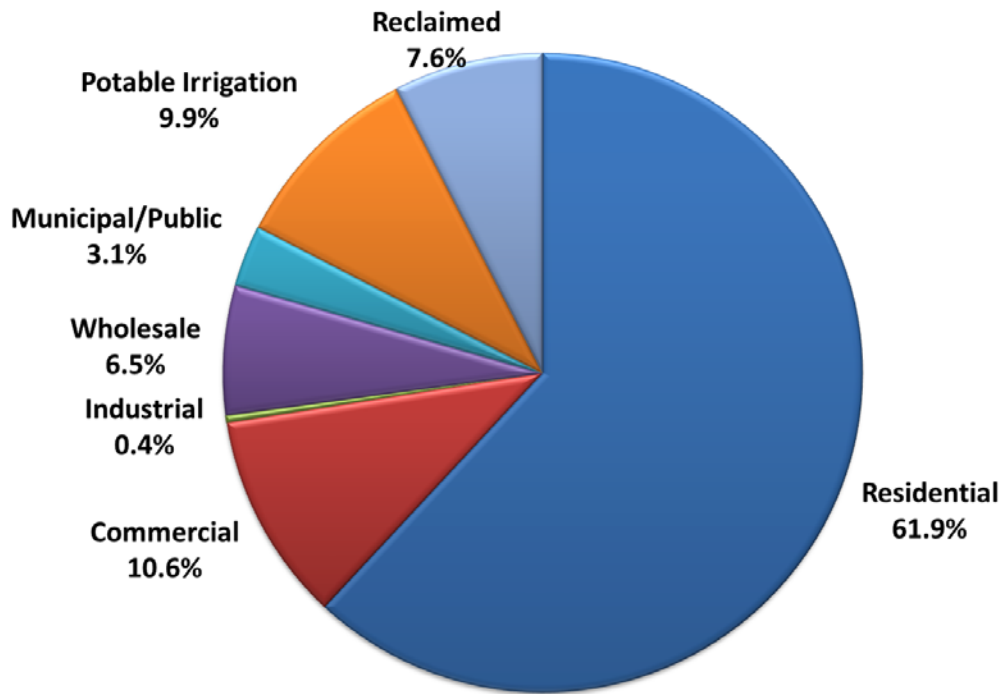
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Westminster, Colorado



2010 Water Demand in Westminster, CO



- Growing suburban community
- Served population of 123,627 in 2010
- Forecast future population of 179,500 (+45%)

2011 End Use Research

- Assess current SF residential water demands and efficiency level
- Determine penetration rates of conserving fixtures and measures
- Determine irrigation efficiency
- Evaluate changes in water use
- Use results to inform and help develop Westminster's new Water Conservation Plan
- Westminster worked with Aquacraft to conduct study and prepare conservation plan

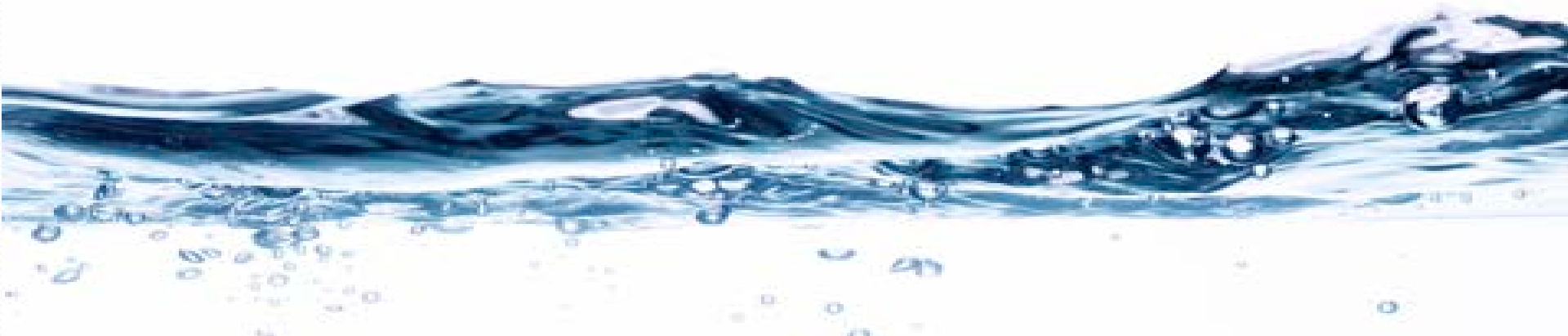
Why Perform This Study?

- Westminster Developing a Comprehensive Water Supply Plan
 - Accurate demand projections
 - Conservation as a water supply
 - Conservation plan developed to help meet gap
- Trends for revenue projections
 - Permanent vs. behavioral savings
 - Indoor vs. outdoor
 - Wastewater implications
- Drought Shadow?

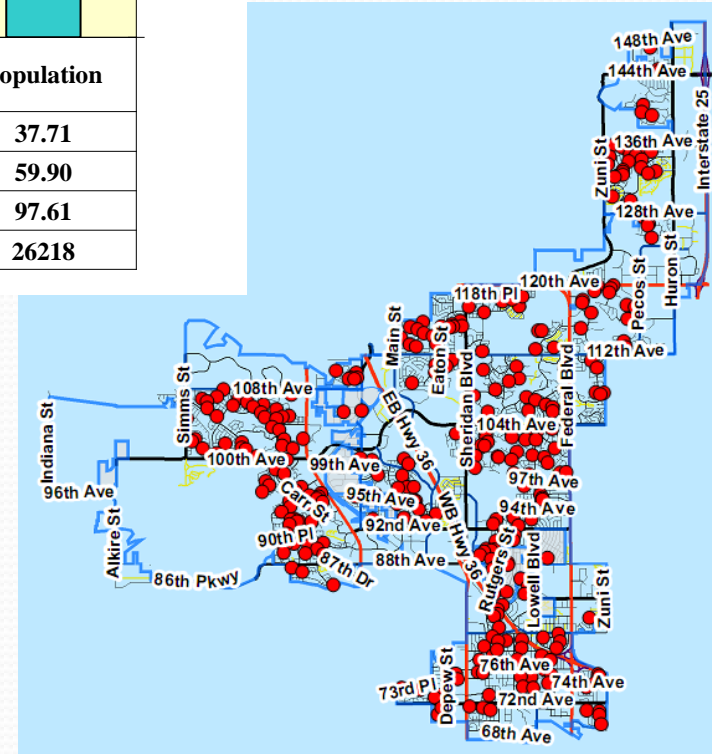
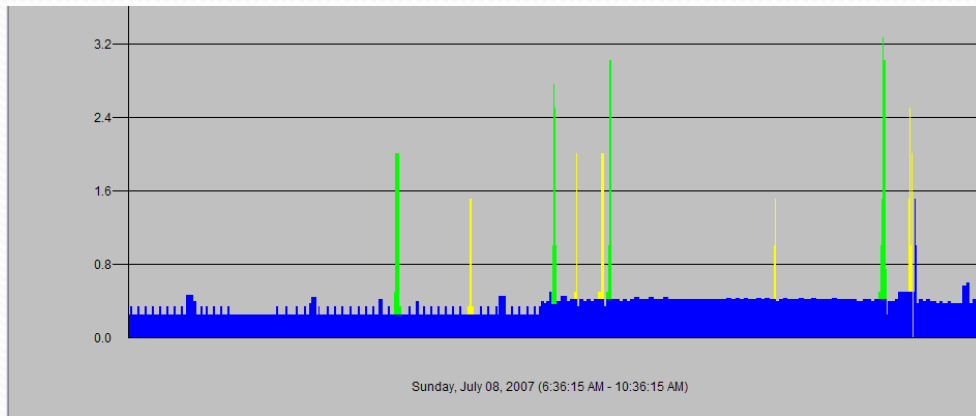
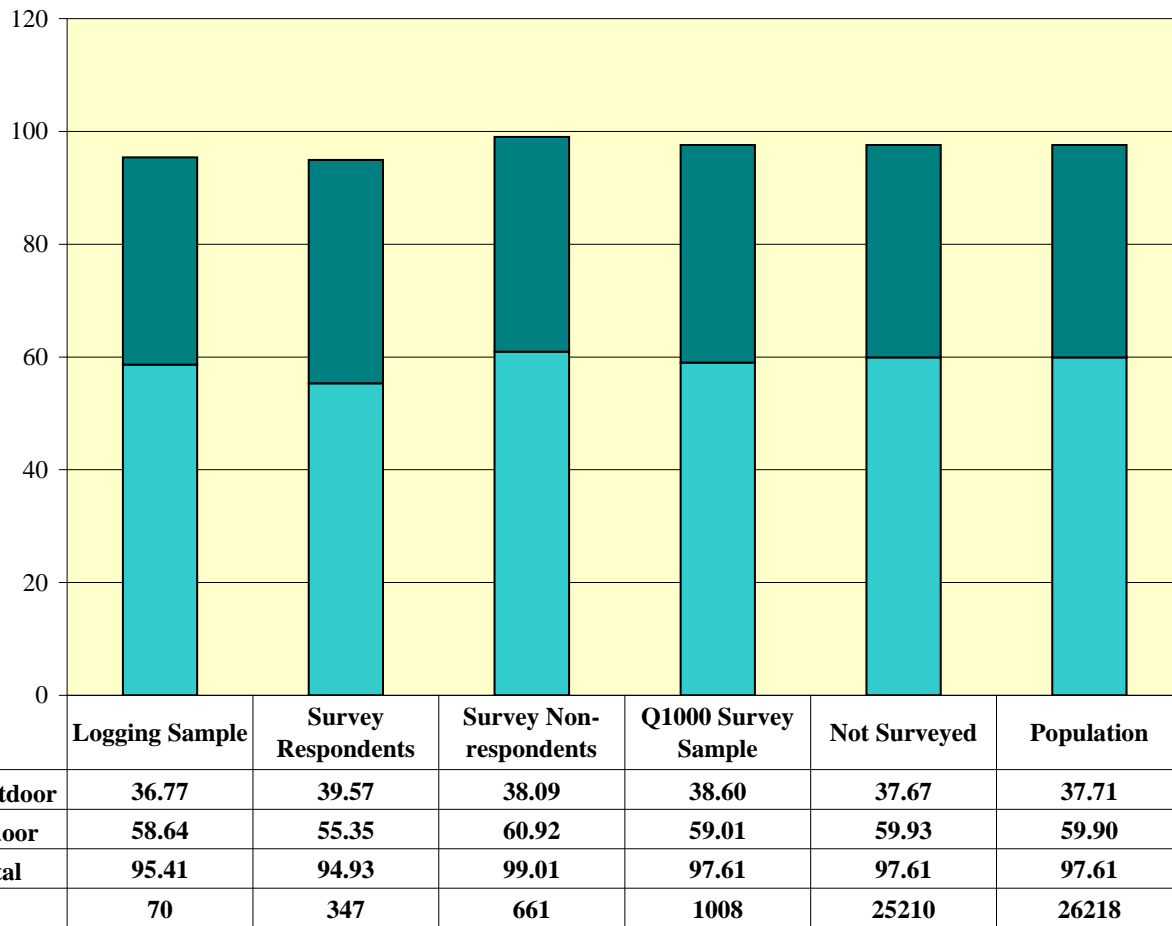


Methodology

- Assemble customer level data
- Select representative sample of 1,000 SF customers to receive survey
- Design and implement customer mail survey
- Select sample of 60 accounts for end use analysis
- Collect and analyze two weeks of end use data for 60 account sample
- Prepare research database
- Evaluate water use in Westminster



Average 2009 Water Use (kgal)



A Few Survey Results

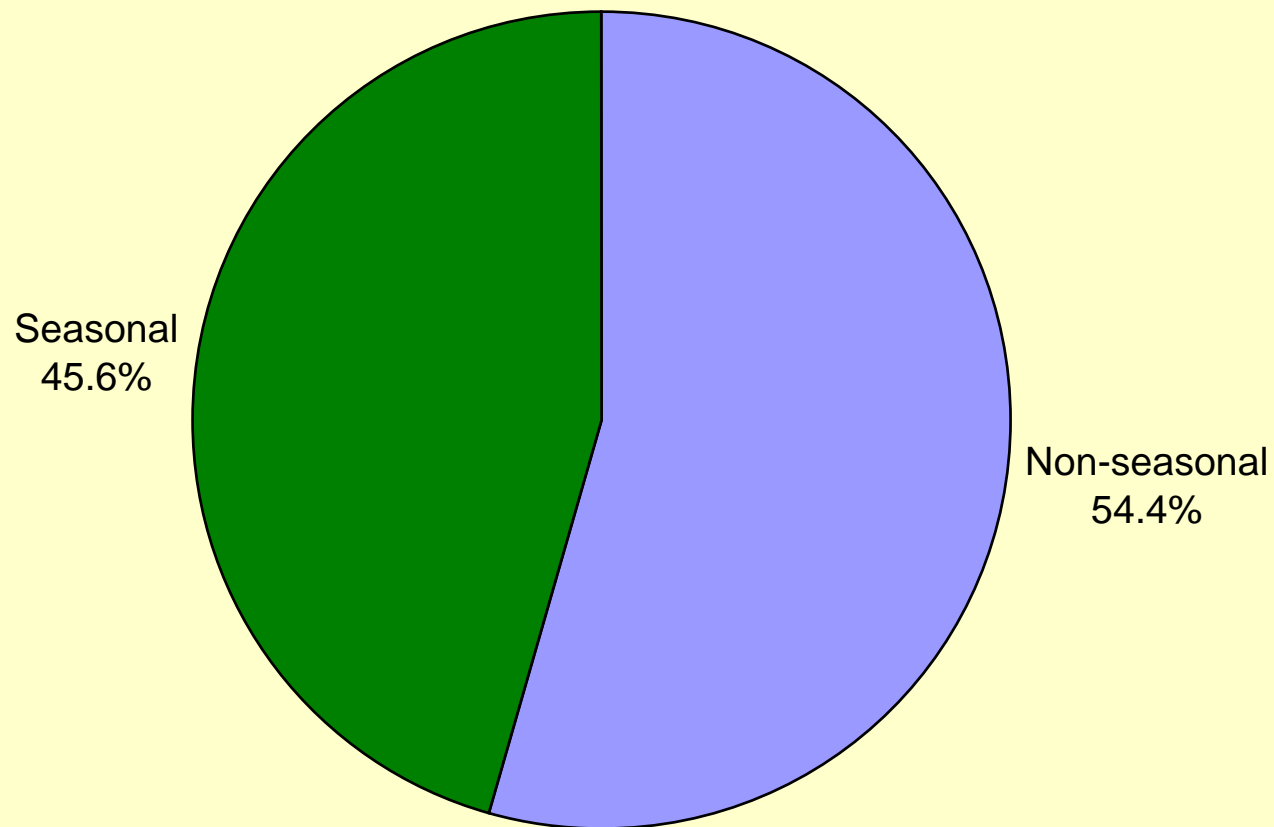
- Overall response rate = 35.7%
- Average home built in 1982
- Oldest home - 1940
- Newest home - 2008
- Average move-in year - 1995
- Average of 2.57 people per house
 - 2.03 adults
 - 0.07 infants
 - 0.28 children
 - 0.19 teenagers
- Average of 0.67 adults at home during the day

A Few More Survey Results

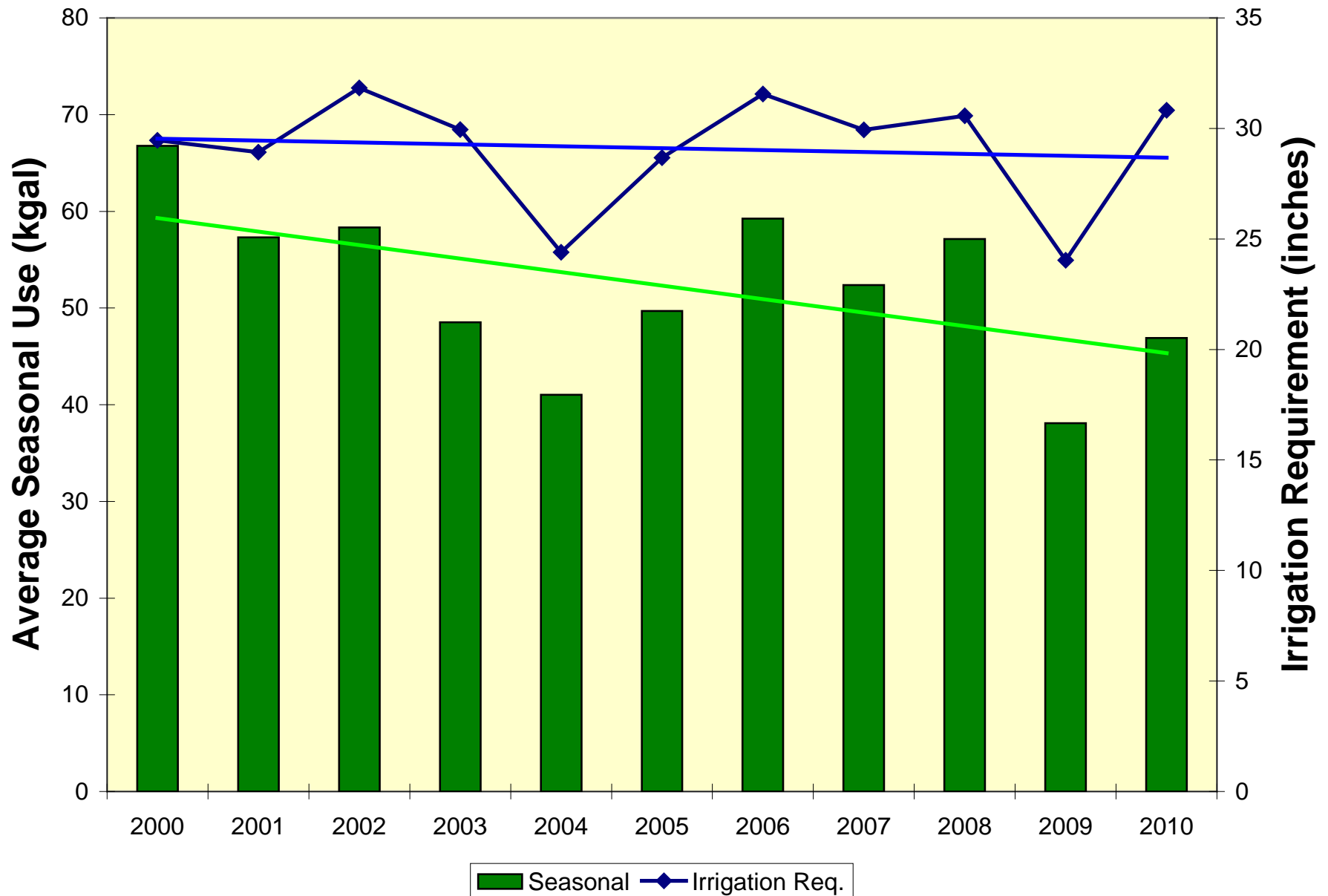
- **Regular outdoor irrigation** - 90.6% irrigate regularly
- **Automatic irrigation systems are the norm** – 67.4% have auto system.
- **Irrigation timing is adjusted frequently** - >50% adjust the timer at least once per month.
- **No rain or soil moisture sensors**
- **A few hot tubs, fewer swimming pools**



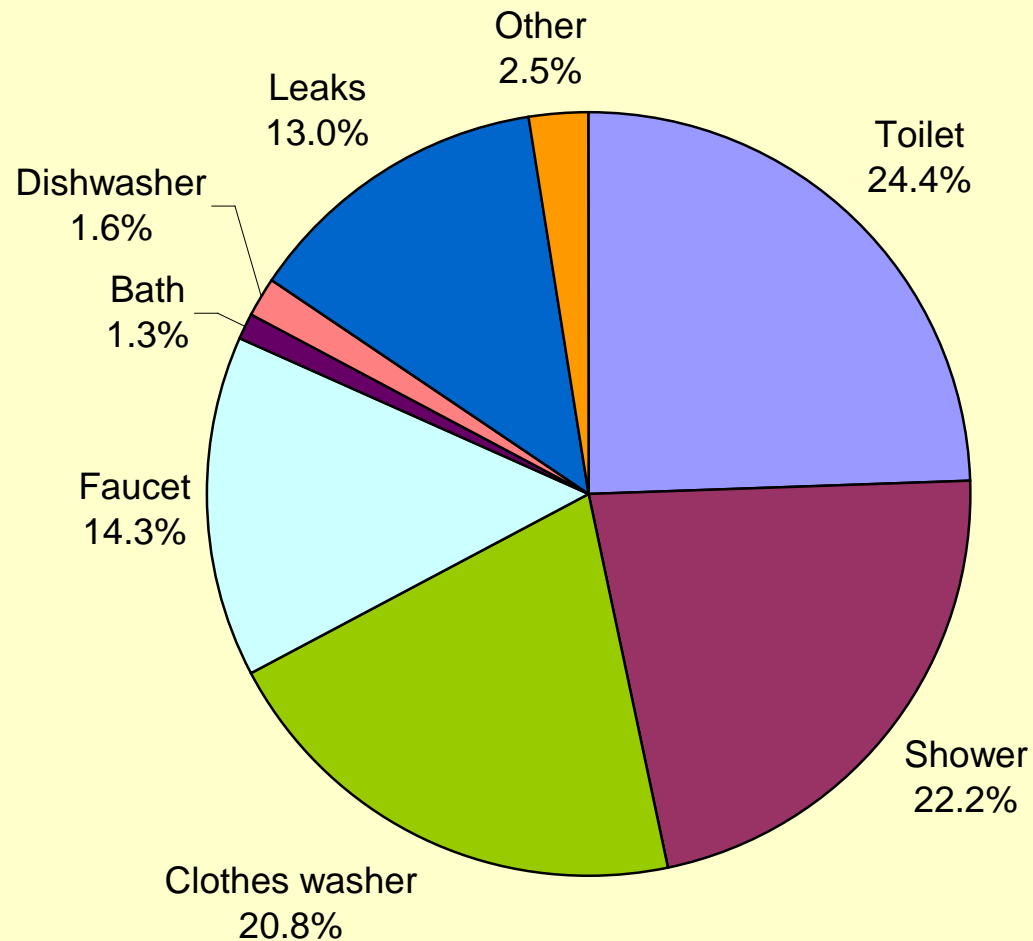
2010 residential indoor and outdoor use %



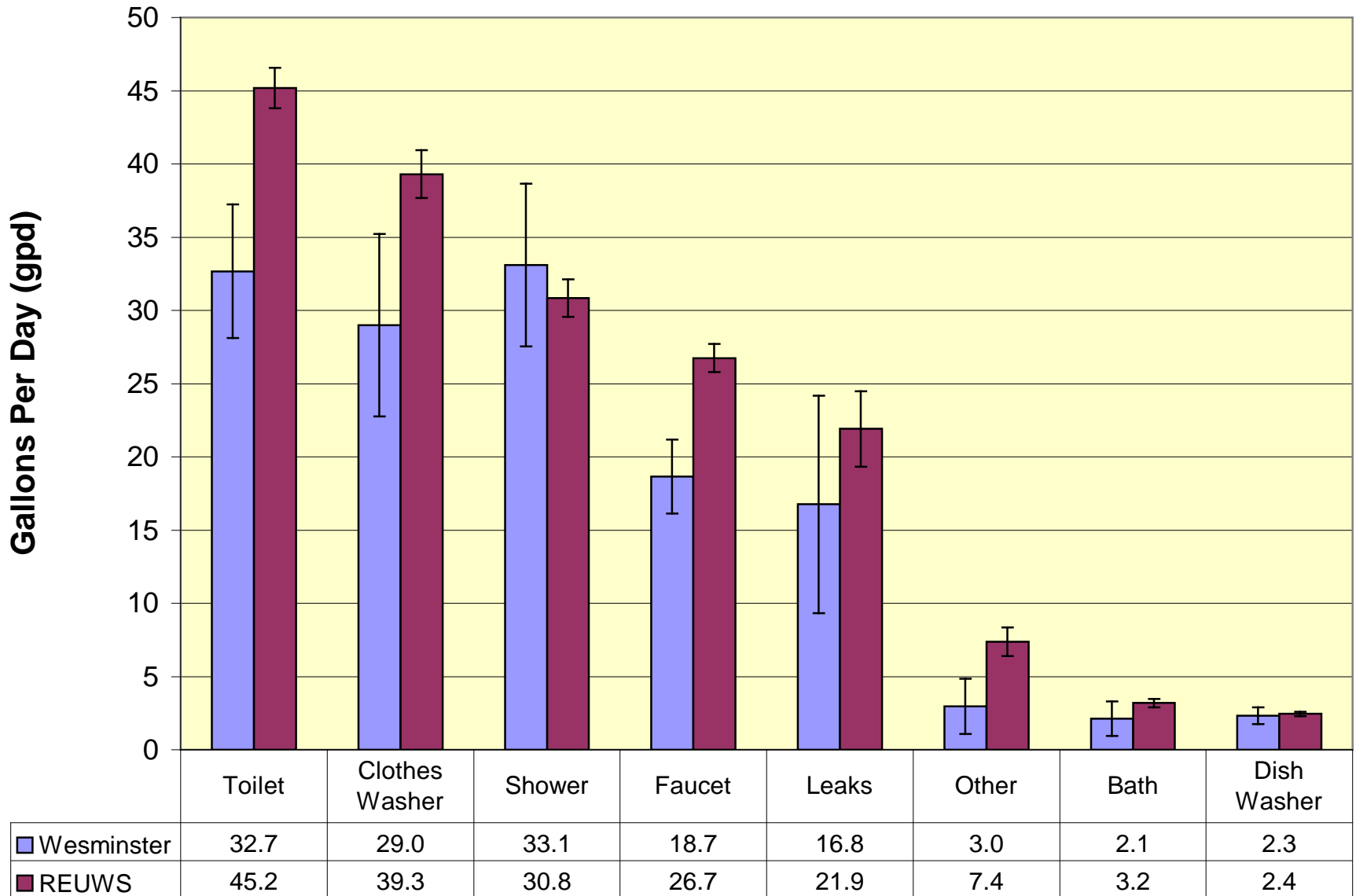
Outdoor Use and Irrigation Requirement



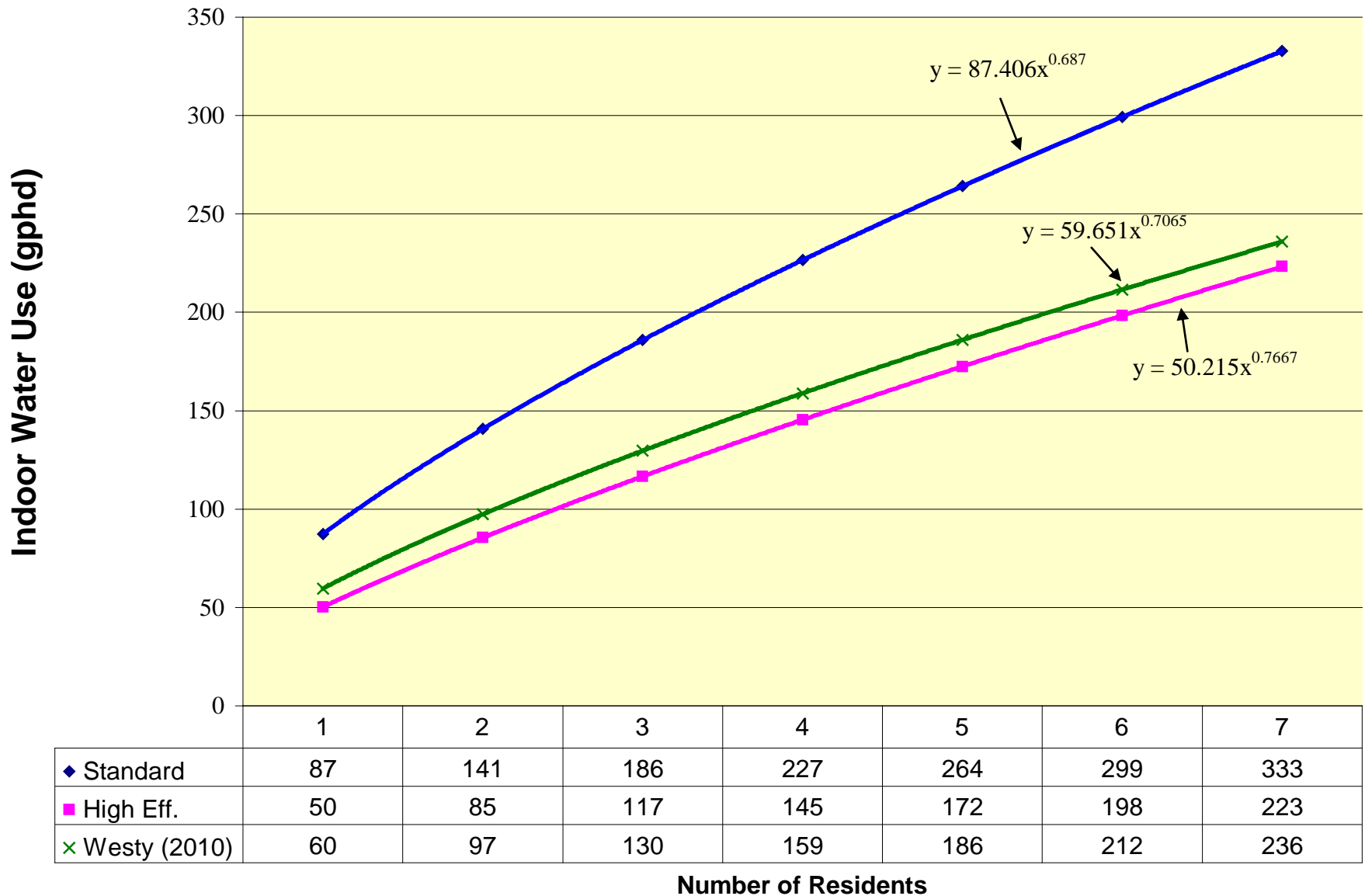
Indoor Per Capita Use %



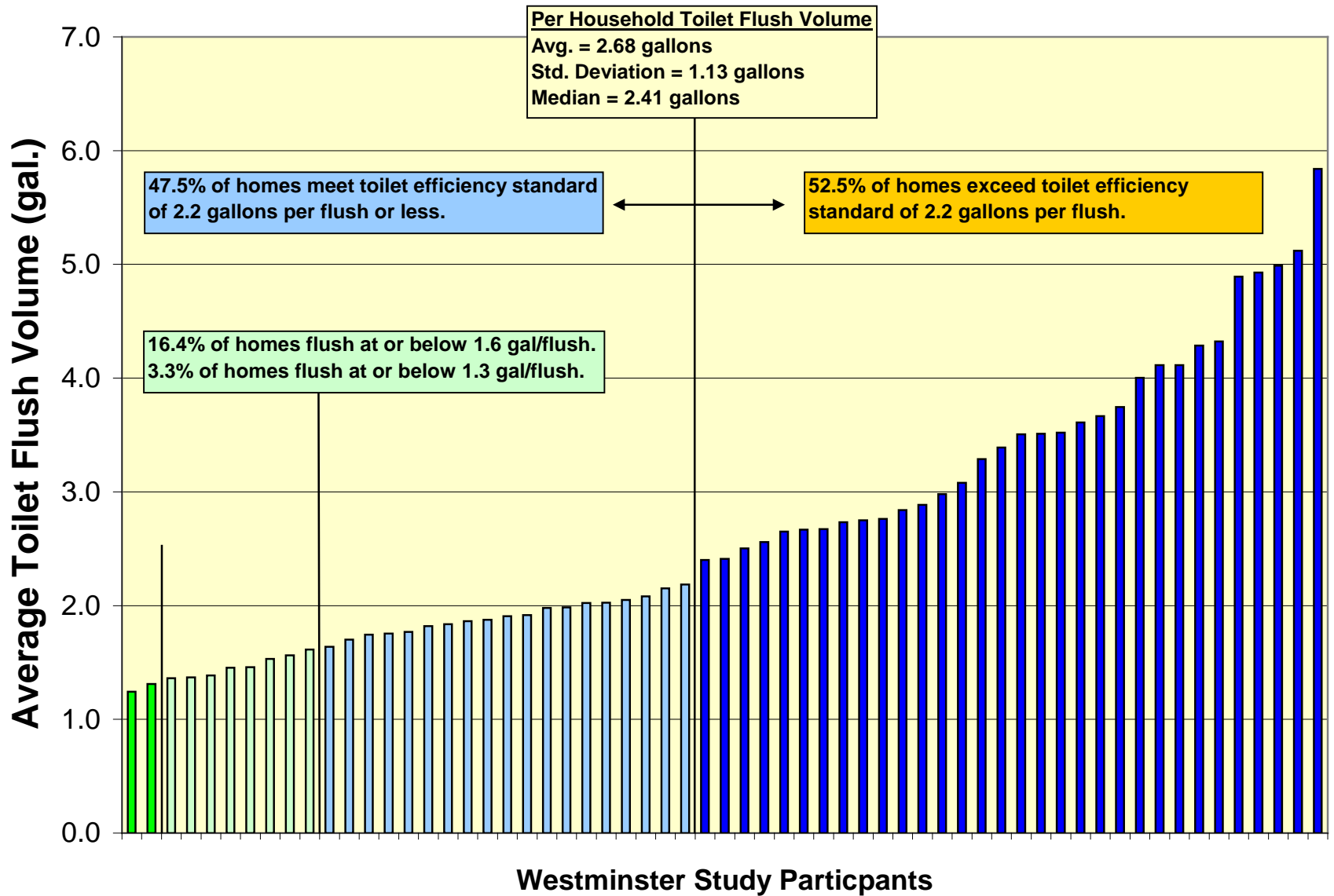
Westminster Compared with National Average



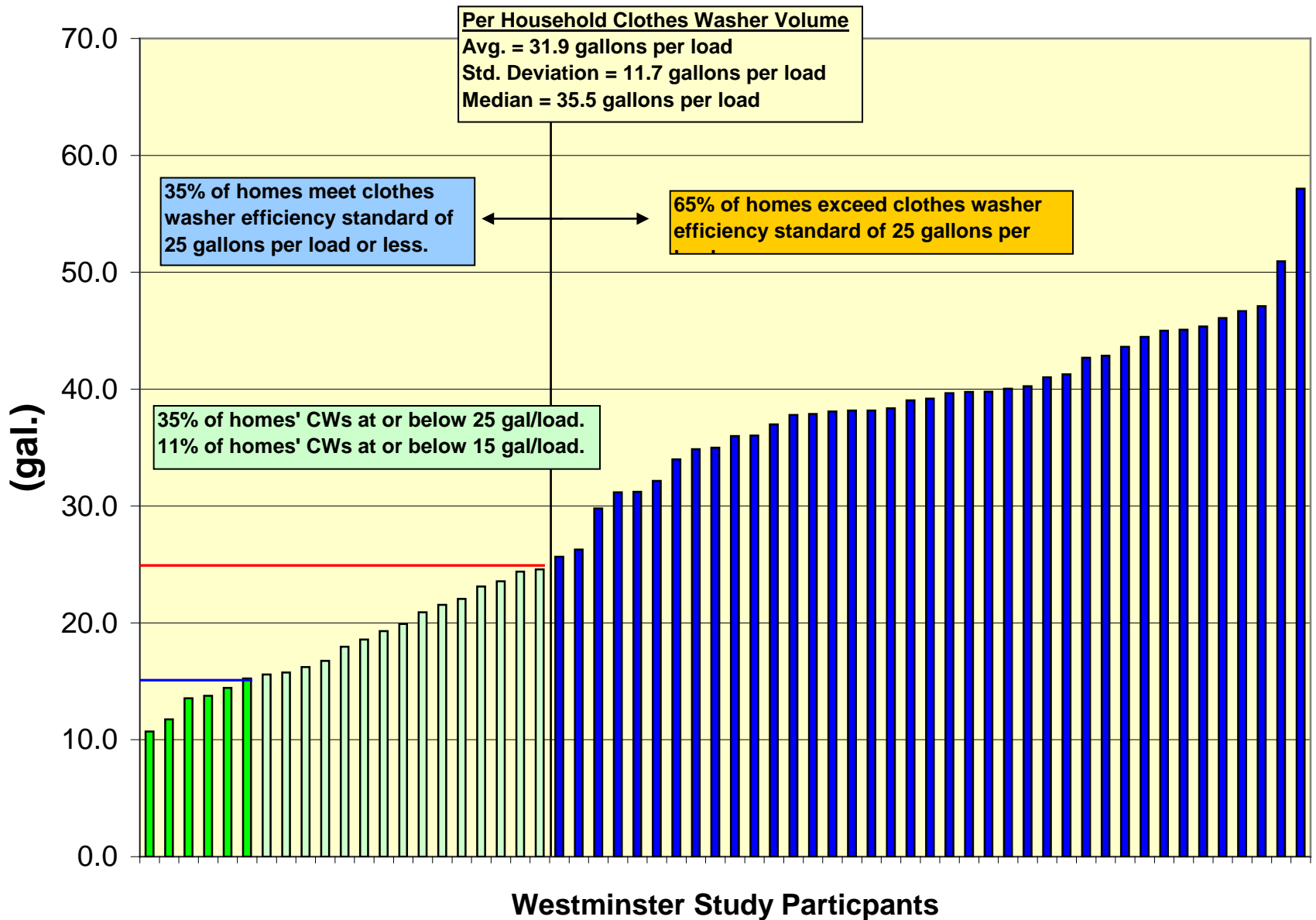
Indoor water use versus number of residents



Toilets



Average Clothes Washer Load Volume

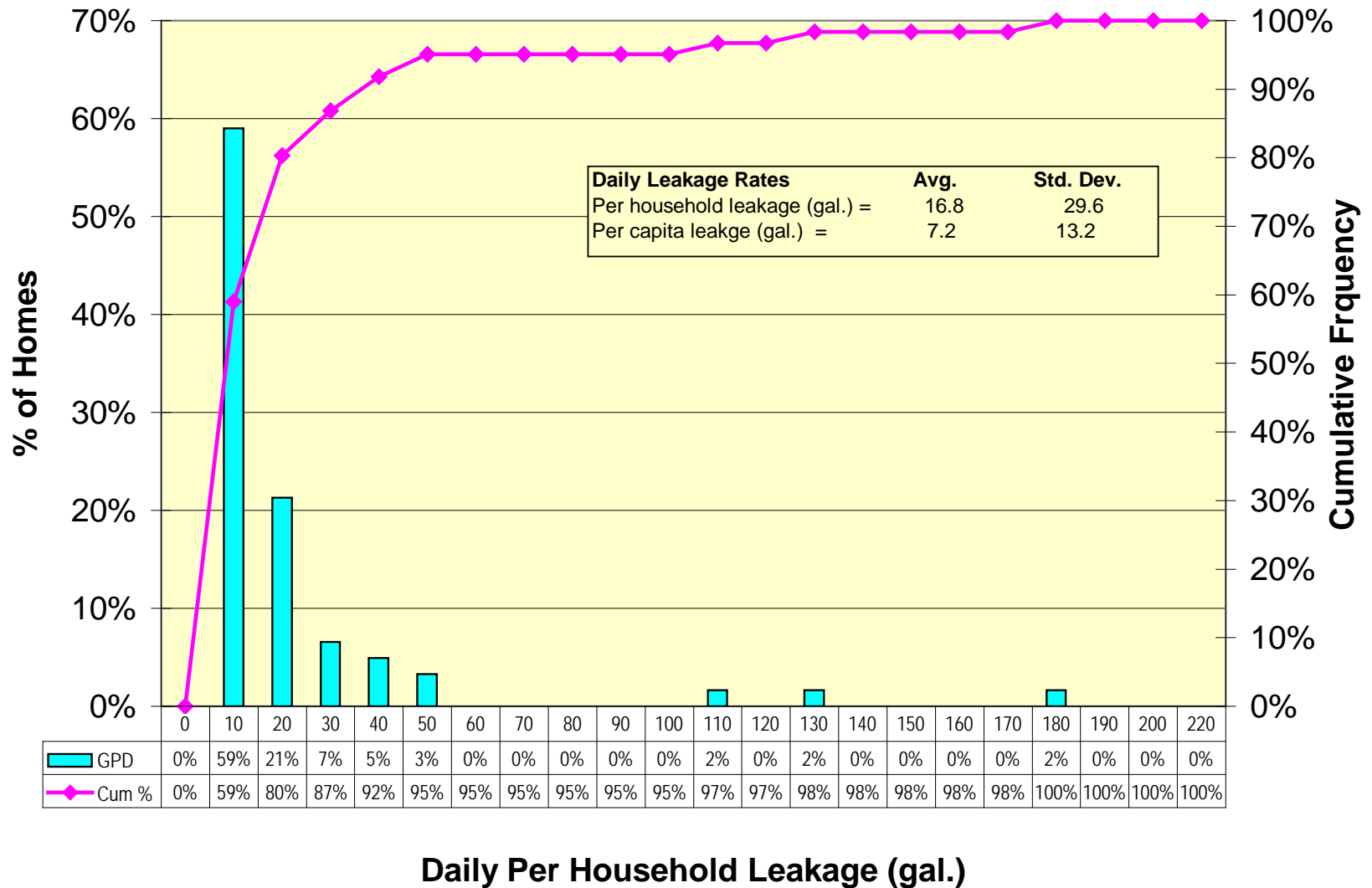


Showers

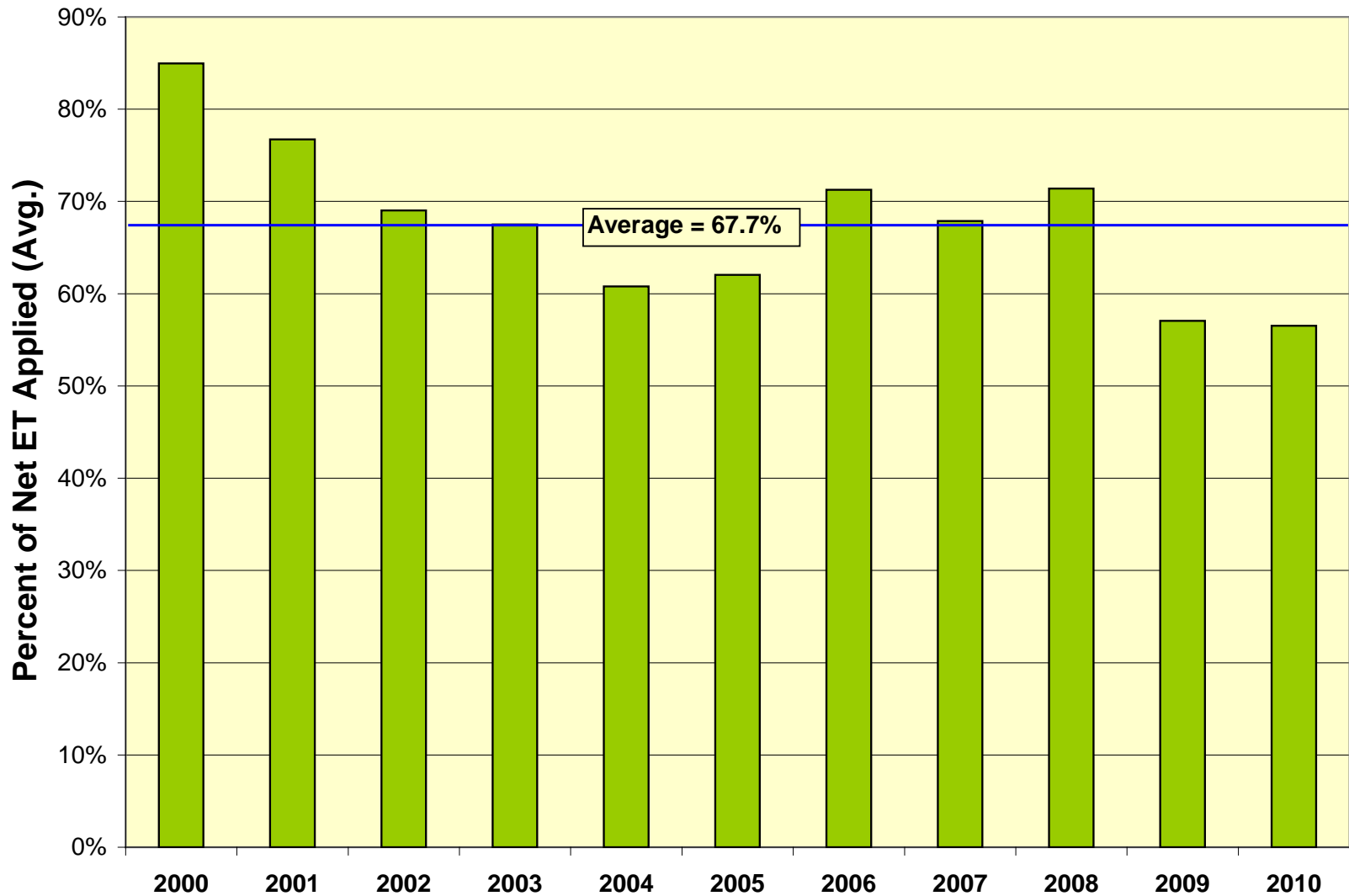
- Average shower volume = 16.95 gallons
- Average shower duration = 8 minutes and 52 seconds.
- Typical shower flow rate = 2.0 gpm
- In the 1999 REUWS, the average shower used **17.2 gallons**, the typical flow rate was **2.2 gpm**, and the average duration was **8 minutes and 12 seconds**.



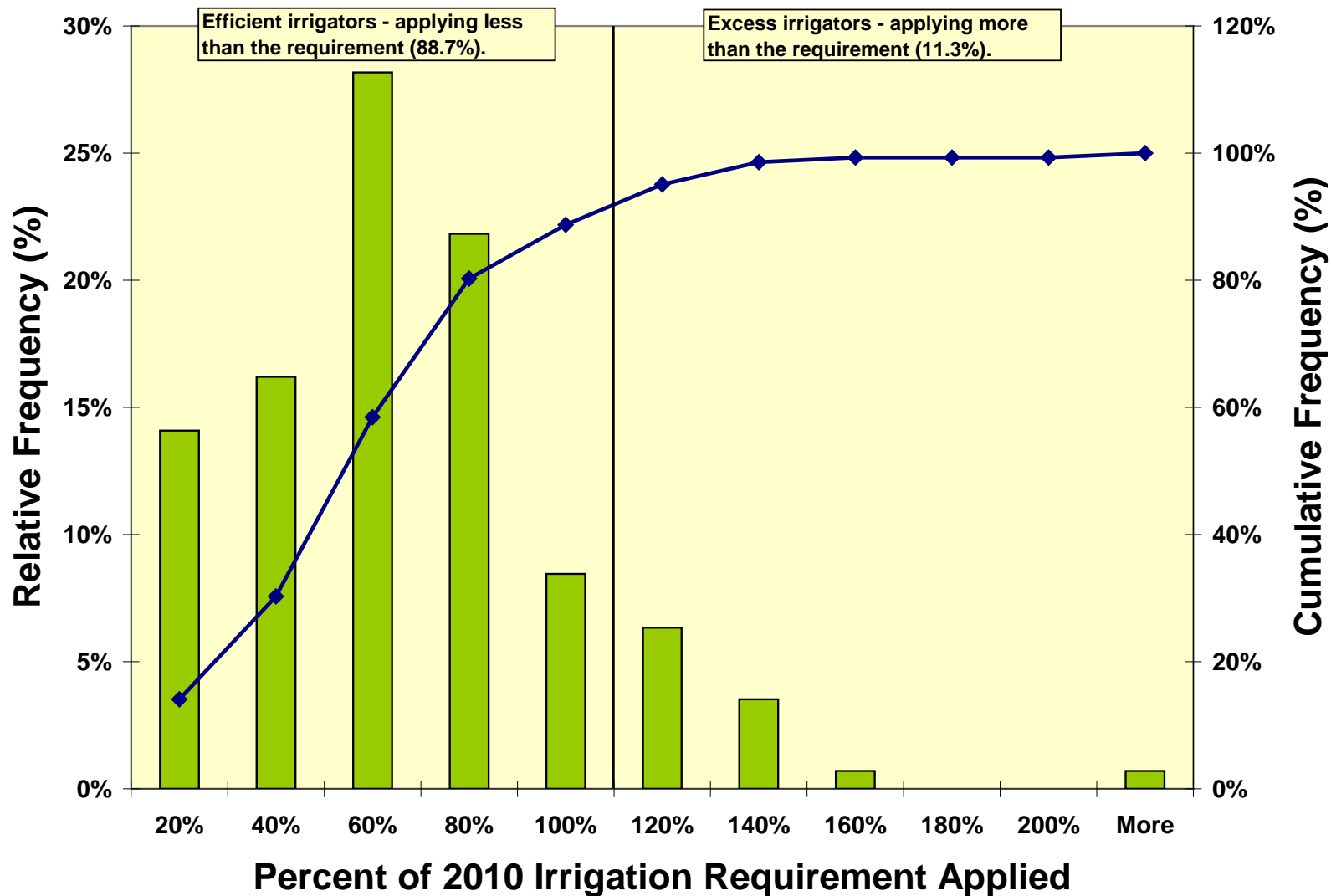
Leakage Distribution



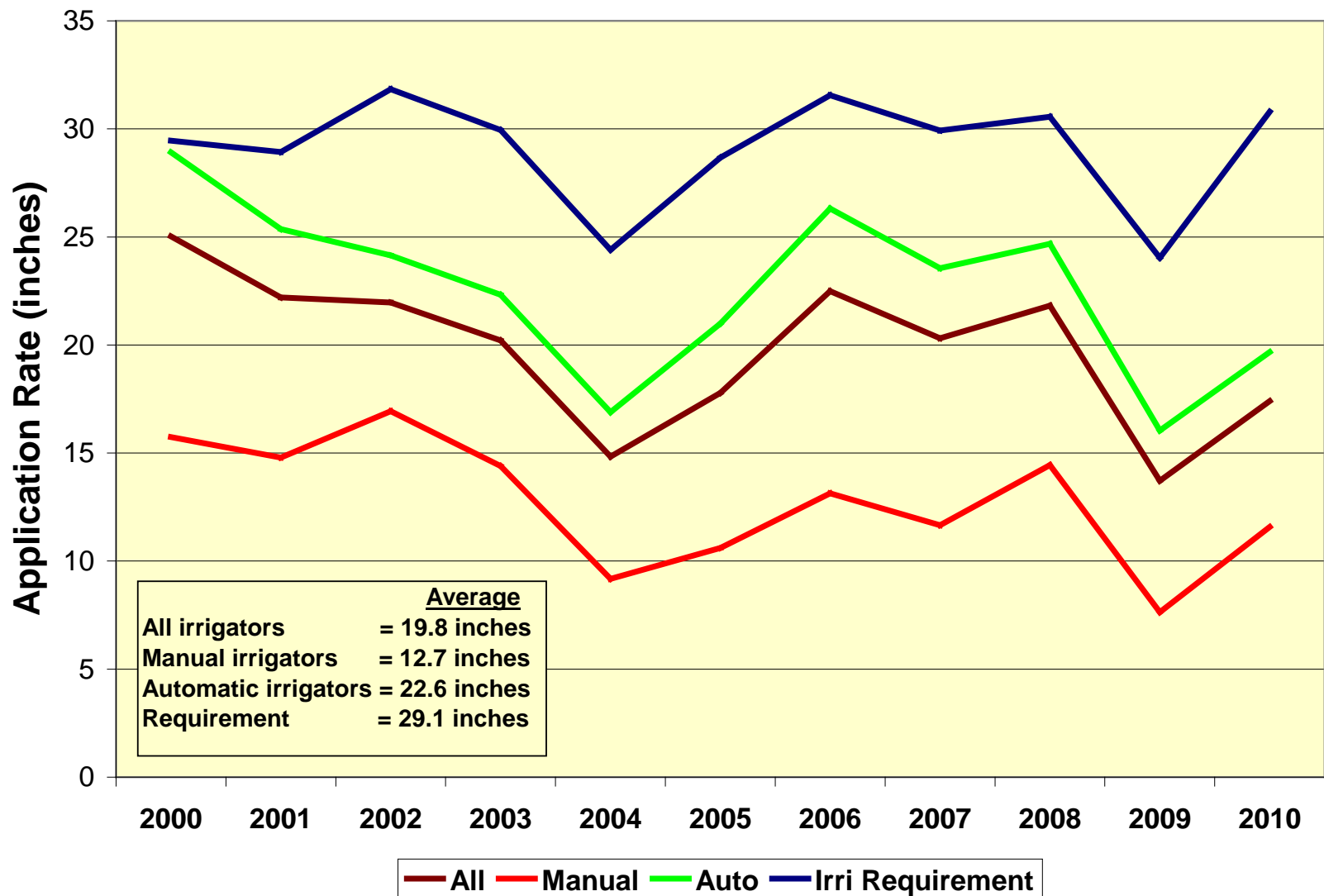
% of Net ET Applied



2010 Irrigation Application



Irrigation Method Comparison



Conclusions and Recommendations 1

- Residential water use in Westminster in 2011 is efficient.
- Expect only small reductions in future indoor demand from current customer base.
- Outdoor demand is already low. It could easily *increase* in the future.
- Demographic changes could impact demand in future.

Conclusions and Recommendations 2

- Focus conservation program efforts on:
 - Outdoor use (maintain current savings)
 - Landscape regulations
 - Irrigation efficiency
 - Water rates and rate structure
 - CII sector
- Install a local weather station capable of calculating ET using the Penman-Montheith method

Questions and Comments



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