Chicago Metropolitan Agency for Planning

Water Conservation Best Management Practices

Home Water Survey Programs

Sandy Perpignani
Associate Research Analyst, CMAP
22 April 2008

Home Water Surveys

Today's Topics

- What are home water survey programs?
- Costs and benefits
- Case Study: San Francisco PUC

What are Home Water Surveys?

Home Water Surveys

Overview

- Home water surveys are household water use evaluations
  - Single-family and multi-family dwellings
  - Labor intensive (need trained staff)
  - Significant water savings opportunity
  - Program should be long term and ongoing
  - Implementation varies according to program resources, climate, and housing density.

Home Water Surveys

Survey Components

- Assess current water use (indoor and outdoor)
- Review water bills
- Make water savings recommendations
- Make small repairs/changes/upgrades
- Leave water conservation literature

Home Water Surveys

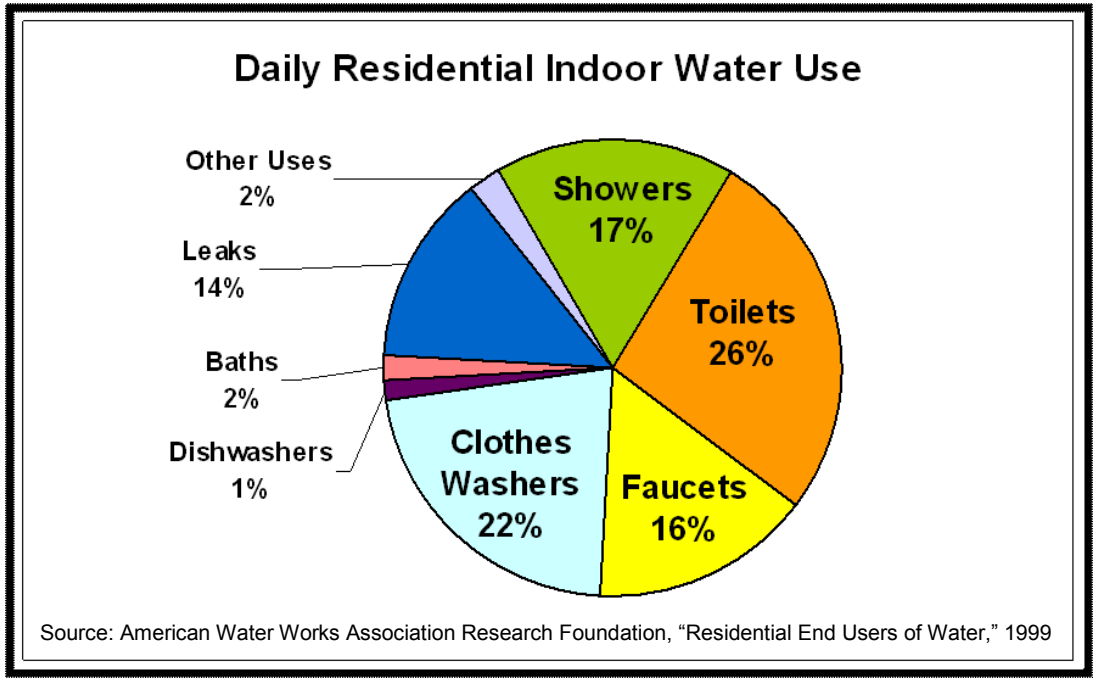
Indoor HH Water Use Audits

- Detect leaks (toilets, faucets, showers)
- Measure flow rates (toilets, faucets, showers)
- Inspect laundry facilities

Home Water Surveys

Indoor Water Savings

- 73% of indoor water use directly addressed



Indoor Water Savings Estimates

- 2-Person HH
  - (Replace 3.5 gpf toilet with 1.6 gpf: ⇒ 19 gpd)
  - Insert toilet displacement device: ⇒ 3 gpd
  - Install quick-closing toilet flapper valve: ⇒ 4 gpd
  - Replace non-conserving showerhead with a low-flow fixture: ⇒ 7.5 gpd
  - Install faucet aerator: ⇒ 12.6 gpd

Home Water Surveys

Outdoor HH Water Use Audits

- Lower Cost Strategy
  - Distribute brochure on outdoor watering
- In-Depth Strategy
  - Leaks (hoses, pools,sprinklers, etc)
  - Turf audit
  - Catch can test
  - Irrigation system and timer
  - Recommend landscape changes

Home Water Surveys

Outdoor Water Savings

- Varies according to
  - Climate and Season
  - Size of landscape
  - Percent lawn and plant types
  - Irrigation system
- Contra Costa Water District (1988-2000): 42-55 gpd

Home Water Surveys

Program Implementation

1. Gather Data
   - No. of SF and MF residences in service area
   - Water use data by household
   - Age of residences in service area
2. Decide on goals for no. of contacts and no. of completes
3. Decide on strategy
4. Contact customers by mail or telephone/Launch marketing campaign
5. Conduct water surveys
6. Evaluate program, measure water savings, verify compliance

How are water savings and program costs calculated?

Home Water Surveys

Calculating Costs & Benefits

- Costs vary according to program specs
- Depreciation of Water Savings Over Time
- Models and Calculators
  - *BMP Costs & Savings Study: A Guide to Data and Methods for Cost-Effectiveness Analysis of Urban Water Conservation Best Management Practices*, CUWCC, Mar 2005
  - *Retrofitting Apartment Buildings to Conserve Water: A Guide for Managers, Engineers, and Contractors*, HUD, May 2002

Home Water Surveys

Example of Water Savings Calc

- Water Savings = Survey Savings * Number of Surveys

Device	Device Savings	Initial Life Span	Decay Rate (per yr)
Low-flow showerhead retrofit	5.5 gcd	3-7 yrs	20%-30%
Toilet displacement devices	4 gcd	2-5 yrs	40% -60%
Faucet Aerators	1.5 gcd	1-3 yrs	40% -60%
Toilet Leak Detection	0.64 gcd (8*8)	7-10 yrs	1% -2%
Other HH Leak Detection	0.5 gcd (12.4*4)	7-10 yrs	1% -2%
Turf Audit	12.2 gcd	4 yrs	40% -60%
Turf Audit with Timer	25.9 gcp (12.2 + 13.7)	4 yrs	40% -60%

Home Water Surveys

Example of Program Costs Calc

- Costs vary widely, depending on extent of program and targeting strategy

Table 2 - Cost of Residential Audit

Action	Hours	Costs
Labor		
Audit	1.25@ $15.43/Hour	$19.28
Administrative Costs		$ 5.86
Labor Subtotal		$ 25.14
Equipment		
Showerhead	0.61@ $2.49	$ 1.52
Toilet dam	1.54@ $1.20	$ 1.85
Bucket (1993 only)		$ 1.80
Faucet aerator		$ 1.19
Information material		$ 3.50
Hose nozzel		$ 0.99
Milage	17 mi.@ $.28/mi.	$ 4.76
Equipment Subtotal		$ 15.61
Total		$ 40.75

Reproduced from CCWD 1994.

Table 3 – Estimated Costs of Implementation for Retrofit Strategies

Install low-flow faucet aerators	$2
Install low-flow showerheads	$5-$17
Install toilet displacement devices	$1
Install quick-closing flappers in toilets	$14-$22
Adjust water level in toilets	$20-$32
Detect and repair toilet leaks	$11-29
Detect and repair faucet leaks	$6
Detect and repair showerhead leaks	$6-$10
Install free aerators, showerheads, toilet inserts	$12 installation cost per set for each apartment unit

Source: Reproduced plumbing retrofit costs from HUD (2002)

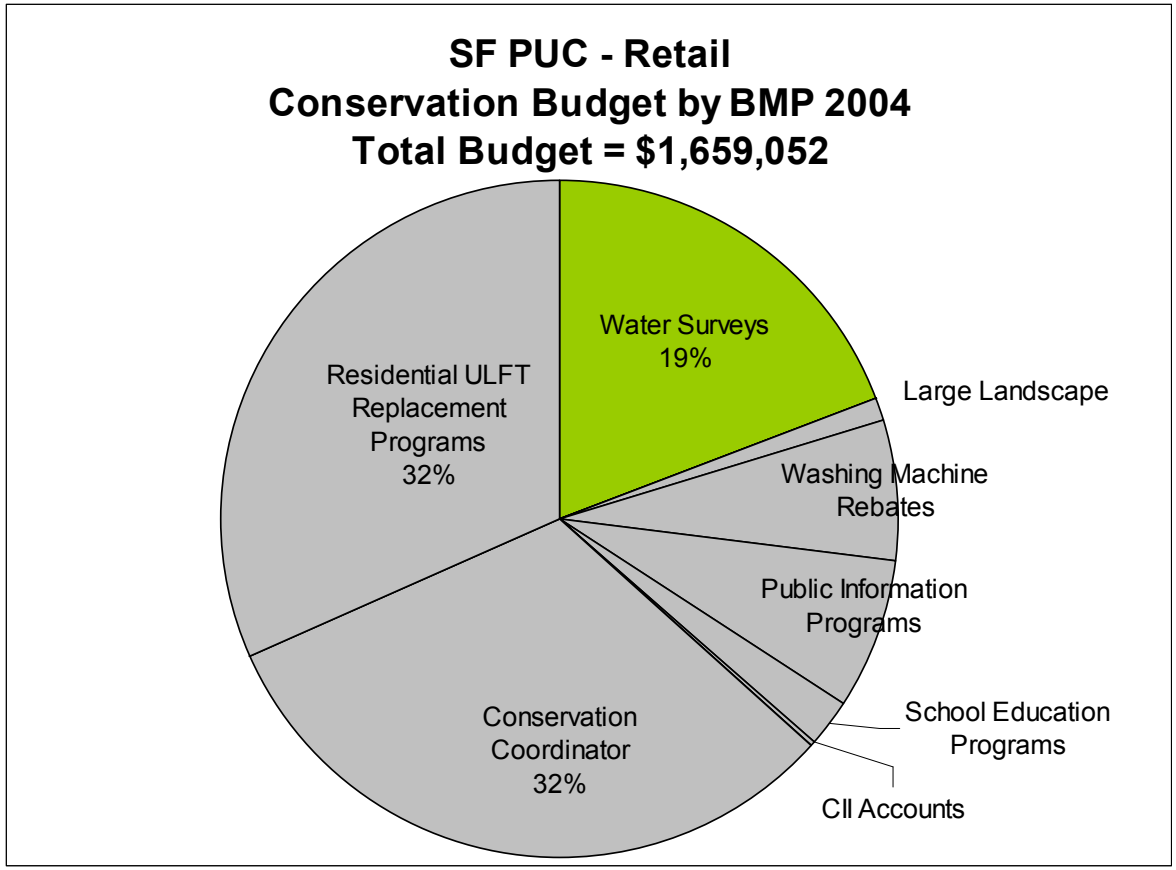
Home Water Surveys

Case Study: SF PUC Retail 1988-2006

- 2 full time inspectors & ½ time admin
- SF Surveys: 636,838 (24% of customer base)
- MF Surveys: 465,549 (35% of customer base)
- Total Conservation Budget: $1M - $2.6M (**decreasing** over time)
- Water Surveys Budget: $150K - $250K (**increasing** over time**)**
- Cost per survey: $22 - $148

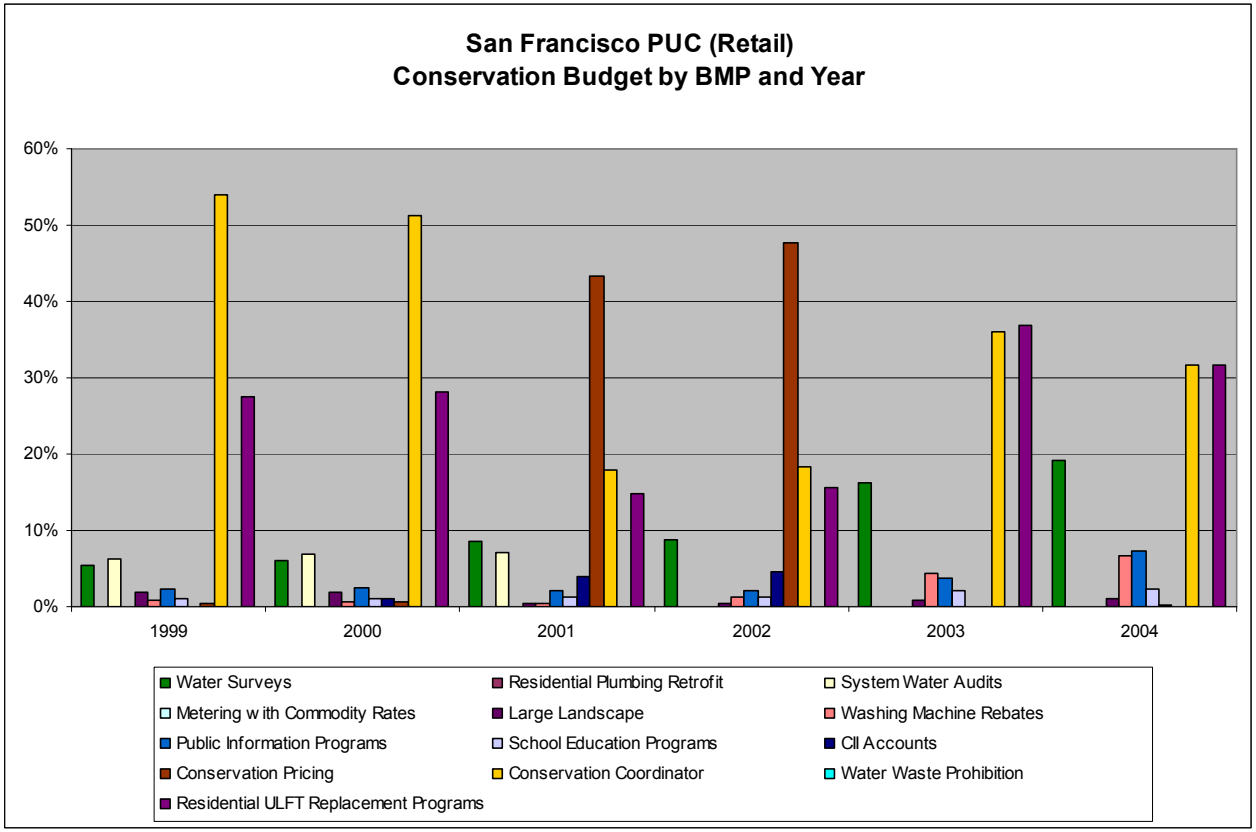
Home Water Surveys

SF PUC Retail Conservation Budget



Home Water Surveys

SF PUC Retail Conservation Budget



Home Water Surveys

Recap

- On-site household water audits for SF and MF homes
- Requires trained staff
- Programs vary according to climate, season, utility resources, housing density, etc (thus costs and water savings vary too)
- Long term commitment required
- Most effective if nested within a comprehensive water conservation program including education and outreach, as well as other BMPs.

Sample Recommendation Statements

Home Water Surveys

Sample Recommendation Statements

- NE IL water utilities should develop programs to offer home water surveys to their single-family and multi-family customers.
- 20% of customers in each class should be contacted within the first five years of the program.
- 5% of customers in each class should be surveyed within the first five years of the program.
- Water savings estimates associated with home water surveys should be tracked.

Thank You.