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.

Chicago Metropolitan Agency for Planning
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

Daily Residential Indoor Water Use

- Showers: 17%
- Toilets: 26%
- Clothes Washers: 22%
- Faucets: 16%
- Baths: 2%
- Leaks: 14%
- Other Uses: 2%

Home Water Surveys

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

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
Home Water Surveys

Example of Water Savings Calc

- Water Savings = Survey Savings * Number of Surveys

<table>
<thead>
<tr>
<th>Device</th>
<th>Device Savings</th>
<th>Initial Life Span</th>
<th>Decay Rate (per yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low-flow showerhead retrofit</td>
<td>5.5 gpd</td>
<td>3-7 yrs</td>
<td>20%-30%</td>
</tr>
<tr>
<td>Toilet displacement devices</td>
<td>4 gpd</td>
<td>2-5 yrs</td>
<td>40% -60%</td>
</tr>
<tr>
<td>Faucet Aerator</td>
<td>1.5 gpd</td>
<td>1-3 yrs</td>
<td>40% -60%</td>
</tr>
<tr>
<td>Toilet Leak Detection</td>
<td>0.84 gpd (9*8)</td>
<td>7-10 yrs</td>
<td>1% -2%</td>
</tr>
<tr>
<td>Other HH Leak Detection</td>
<td>0.5 gpd (12.4*4)</td>
<td>7-10 yrs</td>
<td>1% -2%</td>
</tr>
<tr>
<td>Turf Audit</td>
<td>12.2 gpd</td>
<td>4 yrs</td>
<td>40% -60%</td>
</tr>
<tr>
<td>Turf Audit with Timer</td>
<td>25.9 gsp (12.2 + 13.7)</td>
<td>4 yrs</td>
<td>40% -60%</td>
</tr>
</tbody>
</table>
Home Water Surveys

Example of Program Costs Calc

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

<table>
<thead>
<tr>
<th>Action</th>
<th>Hours</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labor Audit</td>
<td>1.25 @ $15.43/Hour</td>
<td>$19.28</td>
</tr>
<tr>
<td>Administrative Costs</td>
<td></td>
<td>$ 5.86</td>
</tr>
<tr>
<td>Labor Subtotal</td>
<td></td>
<td>$25.14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Showerhead</td>
<td>$ 1.52</td>
</tr>
<tr>
<td>Toilet dam</td>
<td>$ 1.85</td>
</tr>
<tr>
<td>Bucket (1993 only)</td>
<td>$ 1.80</td>
</tr>
<tr>
<td>Faucet aerator</td>
<td>$ 1.19</td>
</tr>
<tr>
<td>Information material</td>
<td>$ 3.50</td>
</tr>
<tr>
<td>Hose nozzle</td>
<td>$ 0.99</td>
</tr>
<tr>
<td>Mileage</td>
<td>$ 4.76</td>
</tr>
<tr>
<td>Equipment Subtotal</td>
<td>$15.61</td>
</tr>
<tr>
<td>Total</td>
<td>$40.75</td>
</tr>
</tbody>
</table>

Reproduced from CCWD 1994.
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

SF PUC - Retail
Conservation Budget by BMP 2004
Total Budget = $1,659,052

- Water Surveys 19%
- Residential ULFT Replacement Programs 32%
- Large Landscape
- Washing Machine Rebates
- CII Accounts
- School Education Programs
- Public Information Programs
- Conservation Coordinator 32%

4/23/2008
home water surveys

SF PUC Retail Conservation Budget

San Francisco PUC (Retail)
Conservation Budget by BMP and Year

Water Surveys
Residential Plumbing Retrofit
System Water Audits
Metering with Commodity Rates
Large Landscape
Washing Machine Rebates
Public Information Programs
School Education Programs
CII Accounts
Conservation Pricing
Conservation Coordinator
Water Waste Prohibition
Residential ULFT Replacement Programs

4/23/2008
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.