This presentation premiered at WaterSmart Innovations

watersmartinnovations.com
HONEY I SHRUNK THE WATER BUDGET:

Bringing Best Practices to Single Family Homes

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WaterSmart Innovations
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EBMUD

Water and Wastewater Services

Water
- 1.34 million customers
- 190-210 MGD demand
- 35 communities
- 330 sq.mi service area
- >4,000 miles of pipe
- 385,000 accounts

Wastewater
- 650,000 customers
- 75 MGD Avg. Flow
- 83 sq.mi service area
- 100% energy sufficient
Landscape Irrigation Demand

- Residential Outdoor ~ 40 MGD
- Irrigation Only ~ 11 MGD
Not Really What We had in Mind...

You can save the hard way.

Or the easy way.

Reducing your water use by 19% is easier than you might think. One way is to water your lawn no more than 3 days a week. We’re all in this together, and EBMUD is here to help.

For more information, rebates, and water-saving tips, go to www.ebmud.com
Not Really What We had in Mind...

(hardscape or xeriscape?)
Landscape Design & Maintenance: We Can Do Better
Landscape Water Budget Program (1999-2010)

- Obtained digital infrared image of 330 sq. mi. service area
- 9 separate image classifications: (irrigated grass, shrubs, trees, dry grass, buildings, and more…)
- GIS-billing system integration developed in-house:
  - calculates irrigated area of each polygon.
  - captures daily weather data (from CIMIS weather stations).
  - files stored in EBMUD Oracle database
Water Budget Information: “Suggested Water Use”
The Right Circumstances At The Right Time…

-Received a grant from U.S. Bureau of Reclamation
-EBMUD was upgrading its customer billing system
-CA Department of Water Resources was upgrading their California Irrigation Management Information System (CIMIS)
-California Model Water-Efficient Landscape Ordinance (MWELO)
-California came out with its 20x2020 Water Conservation Plan
• Water utilities are provided four methodologies to reduce per capita water use

• EBMUD elected Target Method 2
  – A water budget approach
Where to Start...

- Our service area has 4 CIMIS weather stations
- Targeted toward irrigation customers
- We already had a program for irrigation customers, but challenges getting the information to right person
- We were creating customized water budget reports, but very time consuming
- Infrared (IR) has its challenges with smaller properties
IR with Parcel Boundary Layer
Multiple ET Values Per Site

- All participants adjusted to 80% ET
- 70% ET for new customers (after 1/1/10)
- 100% ET for special landscape areas (e.g. athletic fields)
Single Family Sites – Not So Easy

IR picks up all live vegetation …

…which produces a lot of false positives
Small Parcel IR’s False Positives
Street View…Different Story
Detailed Account Analyses

- Data from County Records
  - Parcel size, building size, number of stories

- GIS analysis
  - Roof Outline
  - Driveway
  - Sidewalk Pathways and Walkways
  - Patio and deck
  - Detached garage
  - Other Structures
  - Pool or other water features
  - Square footage of irrigated and irrigable areas
On-Site Field Measurements
Lesson 1: Do County Records Agree w/GIS Measure of Parcel Lines?
Lesson 2: 1 acre, No Irrigation
Lesson 3: Selecting the Right Property/Meter
Lesson 4: Use as Many Views as Possible
In The End, We Measured More Than 20 Million Square Feet

Calculations:

• Lot factor to represent percentage of hardscape to total parcel size
• Ratio of hardscape to county records of building square footage.
• Percent of irrigated vs. irrigable area
• Percent of total lot size irrigated

Correlations:

• Sidewalk, roofline and patio individually correlated better to building than lot
• Driveway, detached garage, other buildings, pools individually correlated better to lot size
California Irrigation Management Information System (CIMIS)

- Upgraded to spatial ET weather data by zip-codes (62 in EBMUD service area)
  - Previously only weather stations - 4 over 330 s.q. miles with very distinct and micro climate zones
  - Now a two sq. kilometer resolution
Single Family Water Budget

- Determine an indoor baseline:
  - U.S. Census Population of 3 p/p/household as a default (before customer adj.)
  - Assigned 50 gpd/person to define indoor baseline on report
Single Family Water Budget

- Calculate irrigated area: take recorded county parcel size multiplied by our lookup table
- Customizable with customer input (pilot phase has been exceedingly accurate)
- Default ET value at 80% (adjusted globally or individually)
- Used daily CIMIS ET value to determine water budget + indoor baseline

<table>
<thead>
<tr>
<th>Location</th>
<th>Parcel Size (sq.ft.)</th>
<th>% irrigated area of parcel</th>
</tr>
</thead>
<tbody>
<tr>
<td>EOH</td>
<td>0-4000</td>
<td>15%</td>
</tr>
<tr>
<td>EOH</td>
<td>4001-8000</td>
<td>22%</td>
</tr>
<tr>
<td>EOH</td>
<td>8001-12000</td>
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</tr>
<tr>
<td>EOH</td>
<td>20001-24000</td>
<td>18%</td>
</tr>
<tr>
<td>EOH</td>
<td>24000+</td>
<td>16%</td>
</tr>
<tr>
<td>WOH</td>
<td>0-4000</td>
<td>13%</td>
</tr>
<tr>
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Single Family Water Budget

- Email reports up to 4 recipients
- Customer usage from billing system
- Reports sent on bi-monthly billing cycle
- Shows 2-years of water budget history
Specifically Metered Budget Reports

EAST BAY MUNICIPAL UTILITY DISTRICT

Maximum Allowable Water Budget – Recycled Water

Thank you for participating in our Landscape Irrigation Water Budget Program. The following is your customized water usage profiles for the last two years. EBMUD records indicate that this account primarily serves landscape irrigation. The graphical description compares your measured water usage versus your budgeted water usage for each billing period.

Customer Name: City Of San Ramon
Service Address: 9300 Alcosta Bl
City: San Ramon
Account #: 5656700001
Meter #: B50943115
Est. Irrigated Area (ac): 100716

Water Budget Summary

<table>
<thead>
<tr>
<th></th>
<th>Used</th>
<th>Budgeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gallons used last 12 months</td>
<td>3,980,388</td>
<td>3,336,977</td>
</tr>
<tr>
<td>Gallons used previous year</td>
<td>3,011,948</td>
<td>3,047,045</td>
</tr>
</tbody>
</table>

Used: 5,991.756; Budget: 6,416.982; Percent: 93%

Congratulations, meeting your water budget saved you: $1,639

Irrigated Area at 9300 Alcosta Bl

Maximum Allowable Water Budget – Looped Meters

Thank you for participating in our Landscape Irrigation Water Budget Program. The following is your customized water usage profiles for the last two years. EBMUD records indicate that this account primarily serves landscape irrigation. The graphical description compares your measured water usage versus your budgeted water usage for each billing period.

Customer Name: Freeport Homeowners Assn
Service Address: 104 On Rd
City: Alameda
Account #: 53829100001, 5704300001
Meter #: 9719395-0, 000112235
Est. Irrigated Area (ac): 6080

Water Budget Summary

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<th>Budgeted</th>
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</thead>
<tbody>
<tr>
<td>Gallons used last 12 months</td>
<td>2,085,200</td>
<td>1,229,701</td>
</tr>
<tr>
<td>Gallons used previous year</td>
<td>2,008,848</td>
<td>1,223,587</td>
</tr>
</tbody>
</table>

Used: 4,085.183; Budget: 3,514.918; Percent: 194%

Meeting your water budget saved you: $9,634

Irrigated Area at 104 On Rd

*ET*: Represents the estimated water need of cool season grass (in inches) for each billing period. The Water Budget Calculation does not use rain, typically irrigation systems can be turned off for the winter months of November, December, January, and February. The Maximum Allowable Water Budget for recycled water, effective January 2010, is calculated using 100% of Reference Evapotranspiration (ET0) for the irrigated area of established landscapes, using the new Model Efficient Landscape Ordinance from the State of California, Department of Water Resources (DWR). If you feel the irrigated area is not accurate or would like more information on this program, contact EBMUD at (510) 986-7615.

www.ebmud.com/watersmart We make it easy to conserve.
Budgets – Can Identify Faulty Meters (zero use reports)

- Faulty Meter
  - Note sent to meter shop
- Identify possible “looped irrigation”
- Site that has alternative water source
- Investigate for water theft
• EBMUD is changing the way we do business

• Demand firming is here

• And the information era is here

• Increasing shift toward delivering information into our customers' hands

• New tools include web-based services, smart phones, and tablets
Thank You

Zion Wilderness, October 2014

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