



## POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT WATERWISE™ PROGRAM

SPONSORED BY:



SUBMITTED BY:  
RESOURCE ACTION PROGRAMS®



2008-2009 SCHOOL YEAR



# Post Oak Savannah Groundwater Conservation District WaterWise Program

Sponsored by:



## Program Summary Report 2008 - 2009

Submitted By:

**Resource Action Programs®**



**July 2009**



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## EXECUTIVE SUMMARY

This report summarizes the 2008 - 2009 Post Oak Savannah WaterWise Program which was requested and implemented by teachers at Caldwell Intermediate, Cameron Elementary, Gause Elementary, Snook Elementary, and St. Paul's Lutheran Church School. The program was used by three hundred twenty one (321) 4th-grade students and their families, and was funded by Post Oak Savannah Groundwater Conservation District.

The Program is a fully implemented, multi-resource efficiency/education program designed to facilitate installation of efficiency measures in homes and build knowledge of environmental issues. The Program yields a variety of measurable energy and water savings results using the best messengers - students. The Program delivered a proven blend of teacher-designed classroom activities with hands-on home projects to install high efficiency devices and introduce resource-conscious behavior to students and their families. Both educational studies and utility evaluations have confirmed the importance of addressing the various learning styles to maximize both learning and the adoption of new behaviors. The most critical elements of this approach are both the actual use of the new knowledge as well as the reporting function which provides a crucial reinforcement of the learning process while increasing participation and persistence. An overview of the results from the Program appears below, with greater detail in the attached report.

**Participant Satisfaction:** A significant element of a successful Program is participant satisfaction. Students, teachers and parents are all asked to evaluate the program and provide personal comments. Responses were unanimously positive and reveal a high level of parent involvement in the activities. Specifically:

- **100% of participating teachers indicated they would recommend this program to other colleagues.**
- **69% of participating students gave the program a rating of good or great.**

(A summary of responses can be found in Appendix C)



*The Program delivered a proven blend of teacher-designed classroom activities with hands-on home projects to install high efficiency devices .*



**Knowledge Gained:** Identical surveys (tests) were taken by students prior to the Program and again upon Program completion to measure knowledge gained. Scores and subject knowledge improved from **42% to 77%**.

**Audit Data Obtained:** Home audits were performed by students and their families , collecting household demographic and usage data along with program participation information.

- **78% reported that their family homes were owned.**
  - **79% reported that their water was heated by electricity.**
  - **13% reported that their home has an automatic sprinkler system.**
- (A summary of responses can be found in Appendix B)

**Measures Installed:** Students completed retrofit activities as part of the Program, and reported the measures they installed in their own homes. Specifically:

- **76% reported they installed the high efficiency showerhead.**
  - **61% reported they installed the kitchen aerator.**
- (A summary of responses can be found in Appendix B)

**Water and Energy Savings Results:** In addition to educating students and their parents, the primary program goal for utility sponsors is to generate cost effective energy and water savings. Student reporting activities not only provided the data used in savings projections, but also reinforced the learning benefits.

## Projected Resource Savings

(A list of assumptions and formulas used for these calculations can be found in Appendix A)

### Projected Annual Savings

**4,754,485** gallons of water saved  
**5,822** therms of gas saved  
**417,110** kWh electricity saved  
**4,754,485** gallons wastewater saved

### Projected Ten Year Savings

**43,291,179** gallons of water saved  
**53,010** therms of gas saved  
**3,797,927** kWh electricity saved  
**43,291,179** gallons wastewater saved

### Projected Average Annual Savings per Home

**14,811** gallons of water saved  
**18** therms of gas saved  
**1,299** kWh electricity saved  
**14,811** gallons wastewater saved

### Projected Average Ten Year Savings per Home

**134,863** gallons of water saved  
**165** therms of gas saved  
**11,832** kWh electricity saved  
**134,863** gallons wastewater saved

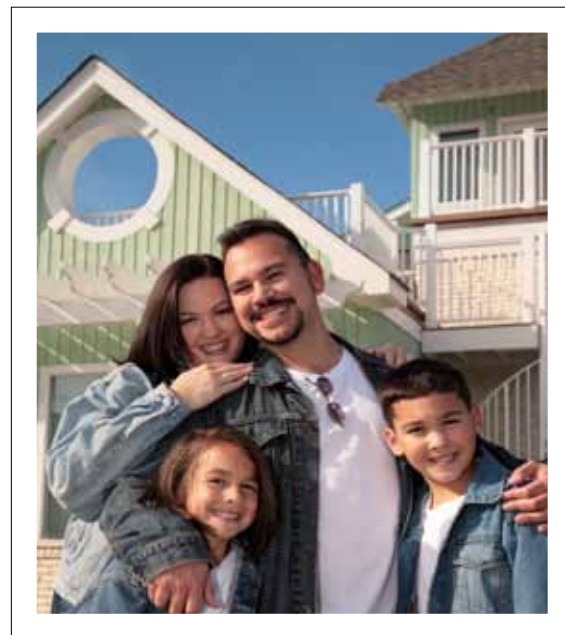


## PROGRAM OVERVIEW

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For more than fifteen years, Resource Action Programs (RAP) has designed and implemented resource efficiency and education programs – changing household energy and water use while delivering significant, measurable resource savings for program sponsors. All RAP programs feature a proven blend of innovative education, comprehensive implementation services, and hands-on activities to put new knowledge to work in students' homes.

RAP Programs serve more than 150,000 households each year through elementary school, middle school and adult programs. Our forty person staff manages the implementation process and program oversight for nearly 200 individual programs annually. Recognized nationally as a leader in water and energy efficiency education and program design, RAP has a strong reputation for providing a high level of client service to its sponsors as part of a wide range of conservation and resource efficiency solutions for municipalities, utilities, states, community agencies and corporations.



*RAP Programs serve more than 150,000 households each year through elementary school, middle school, and adult programs.*

All aspects of program design and implementation is completed from the Program Center in Modesto, California. These include graphic and web design, print production, warehousing and distribution, kit production, marketing, program tracking, data tabulation, and reporting.

The school-based WaterWise Program is fully implemented and designed to generate immediate and long-term savings by bringing interactive “real world” education home with motivated students. The Program staff identifies and enrolls students and teachers within the designated service territory. Enrolled participants receive educational materials designed to build knowledge and demonstrate simple ways to save, by not only changing habits, but also changing devices. Materials meet state and national educational standards, which allow the Program to easily fit into teachers’ existing schedules and requirements.

The Program begins with classroom discussions teaching the importance of using water and energy efficiently, followed by hands-on, creative problem solving. Next, participants take home a WaterWise Activity Kit that contains high efficiency measures. With the help of their parents, they install the measures in their home and complete a home survey. The WaterWise staff tabulates all responses, including home survey information, teacher responses, student input, parent responses, and generates a Program Summary Report. By installing, and monitoring the new efficiency measures in their own homes, students are able to measure what they learned, by actual water, energy, and monetary savings! These savings benefit both the participating student households and their communities overall.

Each participant receives classroom materials and a WaterWise Activity Kit containing efficiency measures for their homes to perform the hands-on activities. Modifications were made to select materials which incorporated Post Oak Savannah Groundwater Conservation District's logo and color scheme.

### **Each student/teacher receives:**

Student Guide

Student Workbook

Parent Introduction Letter\*

Home Audit Form

Pre & Post Surveys

Certificate of Achievement

WaterWise Activity Kit containing:

- Oxygenics® High Efficiency Showerhead\*
- Kitchen Aerator\*
- Bathroom Aerator\*
- Mini Tape Measure
- Digital Water / Air / Refrigerator / Freezer Thermometer\*
- Drip / Rain Gauge\*
- Flow Rate Test Bag
- Natural Resource Fact Chart
- Toilet Leak Detector Tablets\*
- Parent Comment Card

'GetWise' Wristbands

Interactive Program Web site

Toll-Free Telephone Support

### **Each teacher/classroom receives:**

Teacher Book

Step-by-Step Program Checklist

Lesson Plans

Program Video (VHS and DVD)

Program Evaluation

Supplemental Activities\*

Texas State Education Standards Correlation Chart

Pre/Post Survey Answer Keys

Classroom Water Poster

Self Addressed Postage Paid Envelope



\*Materials / Installation Instructions  
Provided in English and Spanish



## PROGRAM **IMPLEMENTATION**

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The 2008-2009 Post Oak Savannah Groundwater Conservation District WaterWise Program followed this comprehensive implementation schedule:

1. Identification of Texas State Education Standards & Benchmarks
2. Curriculum Development and Refinement (Completed Annually)
3. Curriculum Correlation to Texas State Education Standards & Benchmarks
4. Materials Modification to Incorporate Post Oak Savannah Groundwater Conservation District's Logo and Color Scheme
5. Incentive Program Development
6. Teacher / School Identification - with Post Oak Savannah Groundwater Conservation District Approval
7. Teacher Outreach and Program Introduction
8. Teachers Enrolled in the Program Individually
9. Implementation Dates Scheduled with Teachers
10. Program Material Delivered to Coincide with Desired Implementation Date
11. Delivery Confirmation
12. Periodic Contact to Ensure Implementation and Teacher Satisfaction
13. Program Completion Incentive Offered
14. Results Collection
15. Program Completion Incentive Delivered to Qualifying Participants
16. Thank-you Cards Sent to Participating Teachers
17. Data Analysis
18. Program Summary Report

Participating teachers are free to implement the Program to coincide with their lesson plans and class schedules. The next table is a comprehensive list of 4th-grade classrooms that participated during the 2008-2009 school year.



School	Teacher	Teachers	Students
Caldwell Intermediate	Shelly Tucker	1	40
Caldwell Intermediate	Deborah Sears	1	40
Caldwell Intermediate	Brenda Schroeder	1	40
Caldwell Intermediate	Lou Pruett	1	20
Cameron Elementary	Chris Reue	1	104
Gause Elementary	Beverly Renner	1	18
Snook Elementary	Diana Clipp	1	44
St. Paul's Lutheran Church School	Corey Moss	1	7

*Totals*  
*Total Participants*

8	313
321	

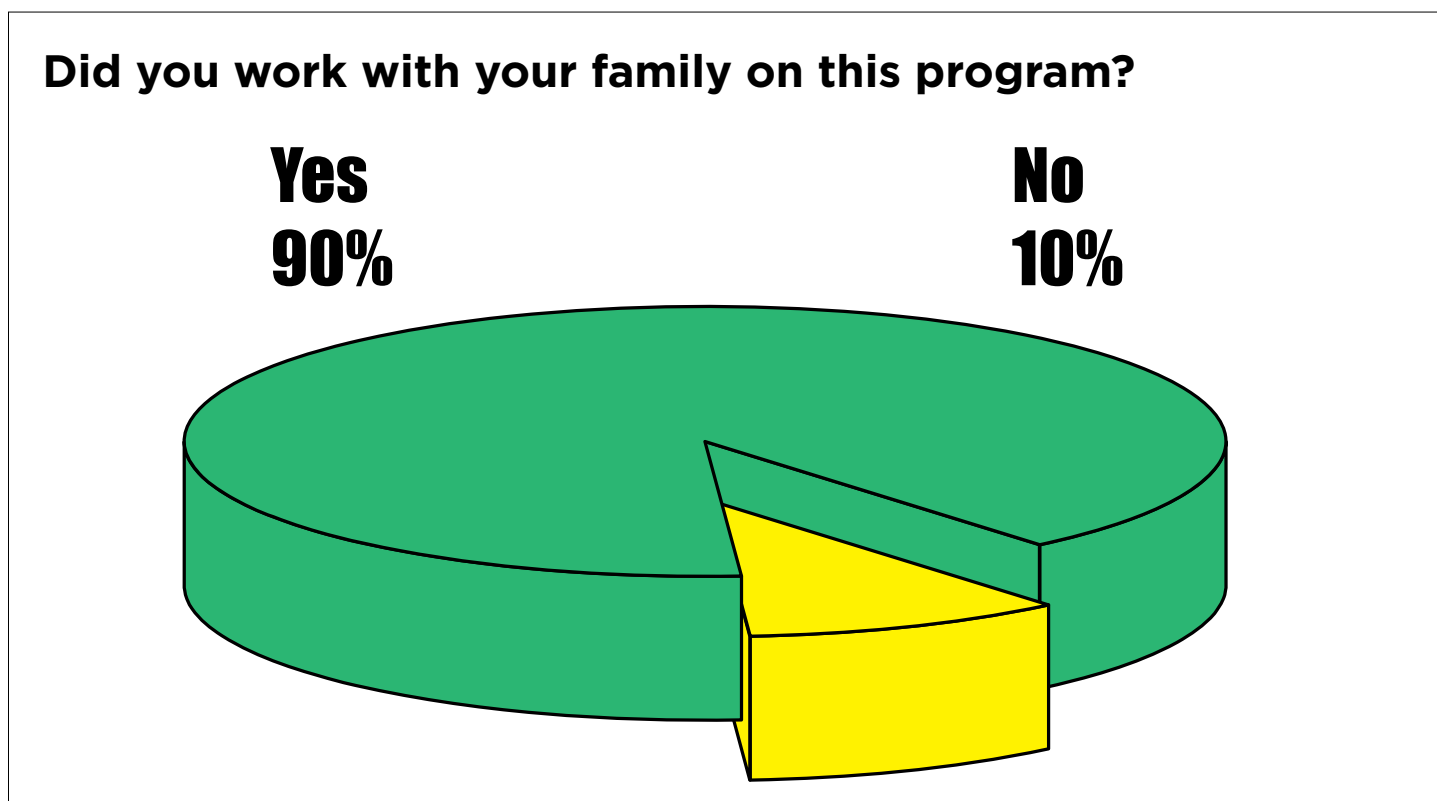


The Post Oak Savannah Groundwater Conservation District WaterWise Program has had a significant impact within the community. As illustrated below, the Program successfully educated a portion of the community about water and energy efficiency while generating resource savings through the installation of efficiency measures in homes. Home audit and installation information was collected to track savings and provide household consumption and audit data to sponsors. Program evaluations and comments were collected from teachers, students and parents. The following program elements were used to collect this data:

### **A. Home Survey and Retrofits**

Upon completion of the Program, participating families are asked to complete a home survey to assess their resource use, verify product installation, provide demographic information and measure participation rates. A few samples of questions asked are below while a complete summary of all responses is included in the appendices.

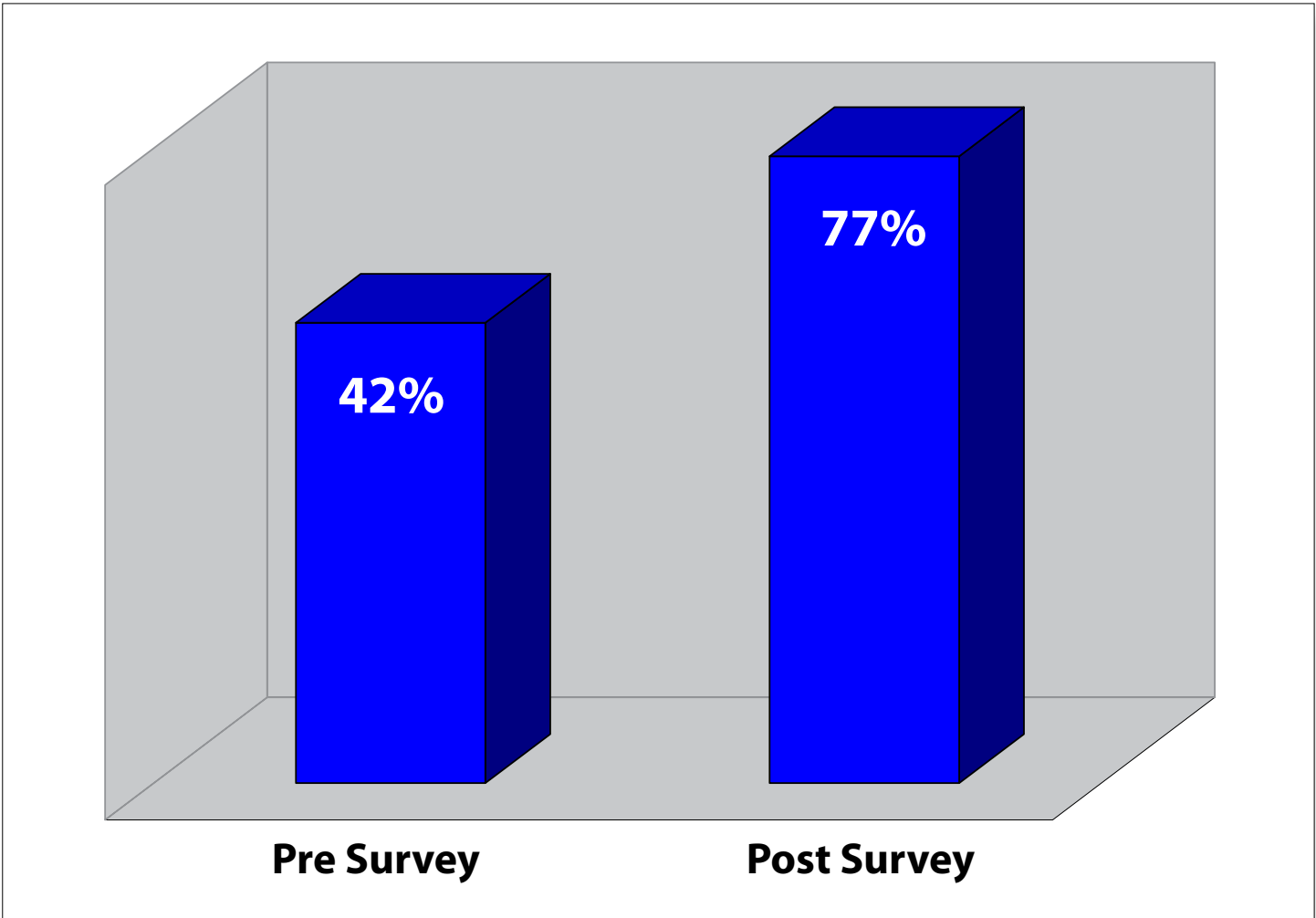
- Did you install the new high efficiency showerhead?**      **Yes - 76%**
- Did you work with your family on this program?**      **Yes - 90%**
- How is your water heated?**      **Electricity - 79%**



**B. Knowledge Gained**

Students were asked to complete a ten question survey before the Program was introduced and then again after it was completed to determine the learning impact and the knowledge gained through the Program. The average student answered **4.2** questions correctly prior to being involved in the Program and then improved to answer **7.7** questions correctly following participation.

**Scores improved from 42% to 77%**





### C. Water and Energy Savings Summary

As part of the program and working with parents or guardians, students installed resource efficiency measures in their homes. They also measured the pre-existing devices to calculate savings that they generated. Using the family habits collected from the customer survey information as the basis for this calculation, three hundred twenty one (321) households are expected to save the following resource totals. Savings from these actions and new behaviors will continue for many years to come.

## Projected Resource Savings

Number of Participants:

321

	<u>Annual</u>	<u>Lifetime</u>
Reduction from showerhead retrofit: Product Life: 10 years	3,903,750 4,780 342,475	39,037,503 gallons 47,802 therms 3,424,753 kWh
Reduction from bathroom aerator retrofit: Product Life: 5 years	361,161 442 31,685	1,805,806 gallons 2,211 therms 158,423 kWh
Reduction from kitchen aerator retrofit: Product Life: 5 years	489,574 599 42,950	2,447,870 gallons 2,997 therms 214,751 kWh
<b>TOTAL PROGRAM SAVINGS:</b>	<b>4,754,485 5,822 417,110</b>	<b>43,291,179 gallons 53,010 therms 3,797,927 kWh</b>
<b>TOTAL PROGRAM SAVINGS PER HOUSEHOLD:</b>	<b>14,811 18 1,299</b>	<b>134,863 gallons 165 therms 11,832 kWh</b>

#### **D. Program Enhancements**

In addition to increasing resource awareness and efficiency, the Program strengthens bonds between sponsors and their communities. The Program has been designed from start to finish with this in mind. Some of the steps taken to ensure our sponsors receive the greatest possible exposure are as follows:

**Promotion of Sponsor Programs:** Program materials can be used to publicize and boost enrollment in additional efficiency program opportunities. This option was not used however, WaterWise can easily promote residential programs such as toilet replacement or other programs.

**Custom Branding:** Each Resource Action Kit was labeled with the Post Oak Savannah Groundwater Conservation District logo. In addition to the Resource Action Kit, the Introduction to Parent Letter and Program Evaluation featured sponsor branding.



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## Projected Savings from Showerhead Retrofit

Average household size:	2.74 people <sup>5</sup>
Average length of use:	8.00 minutes per day <sup>6</sup>
Product life:	10.00 years <sup>2</sup>
Average showerhead has a flow rate of:	4.00 gallons per minute <sup>6</sup>
Oxygenics showerhead has flow rate of:	2.00 gallons per minute
Flow reduction:	2.00 gallons per minute

**Water:**

Average showerhead requires:	87.68 gallons per day
Retrofit showerhead requires:	43.84 gallons per day
Showerhead produces an <b>annual</b> reduction of:	16,001.60 gallons
Showerhead produces a <b>lifetime</b> reduction of:	160,016 gallons

**Gas:**

Average showerhead requires:	0.51 therms per day
Retrofit showerhead requires:	0.26 therms per day
% of water heated by gas:	<div style="border: 1px solid black; background-color: #d9ead3; padding: 2px;">21%</div> <sup>3</sup>
Showerhead produces an <b>annual</b> reduction of:	20 therms
Showerhead produces a <b>lifetime</b> reduction of:	196 therms

**Electricity:**

Average showerhead requires:	9.74 kWh per day
Retrofit showerhead requires:	4.87 kWh per day
% of water heated by electricity:	<div style="border: 1px solid black; background-color: #d9ead3; padding: 2px;">79%</div> <sup>3</sup>
Showerhead produces an <b>annual</b> reduction of:	1,404 kWh
Showerhead produces a <b>lifetime</b> reduction of:	14,038 kWh

Installation / participation rate of:	<div style="border: 1px solid black; background-color: #d9ead3; padding: 2px;">76%</div> <sup>3</sup>
Number of Participants	<div style="border: 1px solid black; background-color: #d9ead3; padding: 2px;">321</div> <sup>3</sup>

**Total reduction from showerhead retrofit:**

**Annual:** 3,903,750 gallons  
4,780 therms  
342,475 kWh

**Lifetime:** 39,037,503 gallons  
47,802 therms  
3,424,753 kWh

<sup>2</sup> Product life provided by manufacturer.

<sup>3</sup> Data reported by program participants.

<sup>5</sup>(2009, July 21). Retrieved July 21, 2009, from U.S. Census Bureau State and County Quick Facts Web site: <http://quickfacts.census.gov/qfd/states/48000.html>

<sup>6</sup>(2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.

## Projected Savings from Kitchen Aerator Retrofit

Average household size:	2.74 people <sup>5</sup>
Average length of use:	2.50 minutes per day <sup>6</sup>
Product life:	5.00 years <sup>2</sup>
Average kitchen aerator has a flow rate of:	2.50 gallons per minute <sup>6</sup>
Retrofit kitchen aerator has flow rate of:	1.50 gallons per minute
Flow reduction:	1.00 gallons per minute

### Water:

Average kitchen aerator requires:	17.13 gallons per day
Retrofit kitchen aerator requires:	10.28 gallons per day
Retrofit kitchen aerator produces an <b>annual</b> reduction of:	2,500 gallons
Retrofit kitchen aerator produces a <b>lifetime</b> reduction of:	12,501 gallons

### Gas:

Average kitchen aerator requires:	0.10 therms per day
Retrofit kitchen aerator requires:	0.06 therms per day
% of water heated by gas:	21% <sup>3</sup>
Retrofit kitchen aerator produces an <b>annual</b> reduction of:	3 therms
Retrofit kitchen aerator produces a <b>lifetime</b> reduction of:	15 therms

### Electricity:

Average kitchen aerator requires:	1.90 kWh per day
Retrofit kitchen aerator requires:	1.14 kWh per day
% of water heated by electricity:	79% <sup>3</sup>
Retrofit kitchen aerator produces an <b>annual</b> reduction of:	219 kWh
Retrofit kitchen aerator produces a <b>lifetime</b> reduction of:	1097 kWh

Installation / participation rate of:	61% <sup>3</sup>
Number of Participants	321 <sup>3</sup>

### Total reduction from kitchen aerator retrofit:

<b>Annual:</b>	489,574 gallons
	599 therms
	42,950 kWh
<b>Lifetime:</b>	2,447,870 gallons
	2,997 therms
	214,751 kWh

<sup>2</sup> Product life provided by manufacturer.

<sup>3</sup> Data reported by program participants.

<sup>5</sup>(2009, July 21). Retrieved July 21, 2009, from U.S. Census Bureau State and County Quick Facts Web site: <http://quickfacts.census.gov/qfd/states/48000.html>

<sup>6</sup>(2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.



## Projected Savings from Bathroom Aerator Retrofit

Average household size:	2.74 people <sup>5</sup>
Average length of use:	2.50 minutes per day <sup>6</sup>
Product life:	5.00 years <sup>2</sup>
Average bathroom aerator has a flow rate of:	2.00 gallons per minute <sup>6</sup>
Retrofit bathroom aerator has flow rate of:	1.00 gallons per minute
Flow reduction:	1.00 gallons per minute

**Water:**

Average bathroom aerator requires:	13.70 gallons per day
Retrofit bathroom aerator requires:	6.85 gallons per day
Retrofit bathroom aerator produces an <b>annual</b> reduction of:	2,500 gallons
Retrofit bathroom aerator produces a <b>lifetime</b> reduction of:	12,501 gallons

**Gas:**

Average bathroom aerator requires:	0.08 therms per day
Retrofit bathroom aerator requires:	0.04 therms per day
% of water heated by gas:	21% <sup>3</sup>
Retrofit bathroom aerator produces an <b>annual</b> reduction of:	3 therms
Retrofit bathroom aerator produces a <b>lifetime</b> reduction of:	15 therms

**Electricity:**

Average bathroom aerator requires:	1.52 kWh per day
Retrofit bathroom aerator requires:	0.76 kWh per day
% of water heated by electricity:	79% <sup>3</sup>
Retrofit bathroom aerator produces an <b>annual</b> reduction of:	219 kWh
Retrofit bathroom aerator produces a <b>lifetime</b> reduction of:	1097 kWh

Installation / participation rate of:	45% <sup>3</sup>
Number of Participants	321 <sup>3</sup>

**Total reduction from bathroom aerator retrofit:**

<b>Annual:</b>		361,161 gallons
		442 therms
		31,685 kWh
<b>Lifetime:</b>		1,805,806 gallons
		2,211 therms
		158,423 kWh

<sup>2</sup> Product life provided by manufacturer.

<sup>3</sup> Data reported by program participants.

<sup>5</sup>(2009, July 21). Retrieved July 21, 2009, from U.S. Census Bureau State and County Quick Facts Web site: <http://quickfacts.census.gov/qfd/states/48000.html>

<sup>6</sup>(2001). In Southern California Edison Evaluation of 2000-2001 School Programs Ridge & Associates.

## Home Survey and Retrofit Data

### Section I - Home Check-up

<b>1 What type of home do you live in?</b>	
Single family home	84%
Multifamily (2-4 units)	9%
Multifamily (5-20 units)	6%
Multifamily (21+ units)	1%
<b>2 Was your home built before 1992?</b>	
Yes	51%
No	49%
<b>3 Is your home owned or rented?</b>	
Owned	78%
Rented	22%
<b>4 Does your home have an automatic sprinkler system?</b>	
Yes	13%
No	87%
<b>5 How many kids live in your home (age 0-17)?</b>	
1	12%
2	43%
3	23%
4	16%
5+	6%
<b>6 How many adults live in your home (age 18+)?</b>	
1	13%
2	69%
3	17%
4	1%
5+	0%
<b>7 Does your home have a dishwasher?</b>	
Yes	65%
No	35%
<b>8 How many half bathrooms are in your home?</b>	
0	67%
1	22%
2	11%
3	0%
4	0%



**9** How many full bathrooms are in your home?

1	29%
2	56%
3	13%
4	2%
5+	0%

**10** How many toilets are in your home?

1	26%
2	56%
3	14%
4	3%
5+	1%

**11** How is your water heated?

Natural Gas	21%
Electricity	79%

## Section II - Home Activities

**1** Did you install the new High Efficiency Showerhead?

Yes	76%
No	24%

**2** What is the flow rate of your old showerhead?

0 - 1.0 gpm	12%
1.1 - 1.5 gpm	49%
1.6 - 2.0 gpm	12%
2.1 - 2.5 gpm	12%
2.6 - 3.0 gpm	5%
3.1+ gpm	10%

**3** What is the flow rate of your new showerhead?

0 - 1.0 gpm	13%
1.1 - 1.5 gpm	36%
1.6 - 2.0 gpm	51%

**4** Was your toilet leaking?

Yes	16%
No	84%

**5** Did you install the Bathroom Aerator?

Yes	45%
No	55%

**6** What is the flow rate of your old bathroom faucet?

0 - 1.0 gpm	13%
1.1 - 1.5 gpm	43%
1.6 - 2.0 gpm	16%
2.1 - 2.5 gpm	12%
2.6 - 3.0 gpm	9%
3.1+ gpm	7%

**7** Did you install the Kitchen Aerator?

Yes	61%
No	39%



**8** What is the flow rate of your old kitchen aerator?

0 - 1.0 gpm	3%
1.1 - 1.5 gpm	52%
1.6 - 2.0 gpm	19%
2.1 - 2.5 gpm	19%
2.6 - 3.0 gpm	4%
3.1+ gpm	3%

**9** How many faucets are leaking?

0	88%
1	8%
2	4%
3	0%
4+	0%

**10** Did you work with your family on this program?

Yes	90%
No	10%

**11** Did you change the way you water outdoors?

Yes	65%
No	35%

**12** Have you and your family changed the way you use water?

Yes	89%
No	11%

**13** How would you rate the WaterWise™ program?

Great	47%
Pretty good	22%
Okay	29%
Not so good	2%

## Teacher Evaluation Data

<b>1</b> The materials were attractive and easy to use.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>2</b> The materials and activities were well received by students.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>3</b> The materials were clearly written and well organized.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>4</b> The conservation technologies were easy for students to use.	
Strongly Agree	0%
Agree	100%
Disagree	0%
Strongly Disagree	0%
<b>5</b> Students indicated that their parents supported the program.	
Strongly Agree	50%
Agree	50%
Disagree	0%
Strongly Disagree	0%
<b>6</b> If you had the opportunity, would you conduct this program again?	
Yes	100%
No	0%
<b>7</b> Would you recommend this program to other colleagues?	
Yes	100%
No	0%





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