

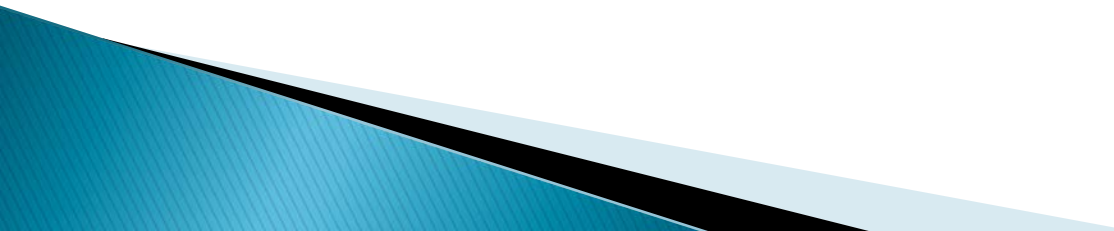
# Effectiveness Performance Measure for HHW Collection Programs

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**Special Waste Associates**

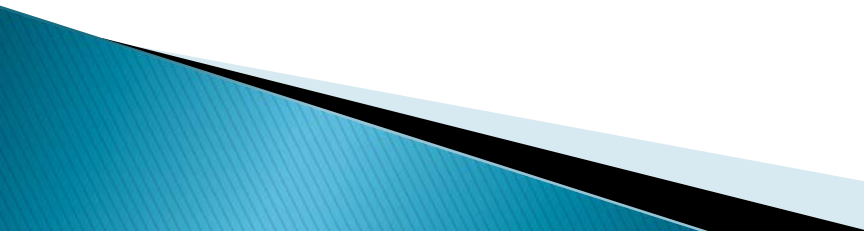
CA 2015 Used Oil/HHW Training & Conference  
**Session 5, Is Your HHW Program Convenient?**  
April 9, 2015, Universal City



# Convenience is subjective

- ▶ How convenient is convenient?
  - ▶ Not well defined and agreed upon between policy-makers or individuals
  - ▶ How many days per year is good enough?
  - ▶ How many locations per 100k population is truly convenient?
  - ▶ Difficult to determine what is good enough.
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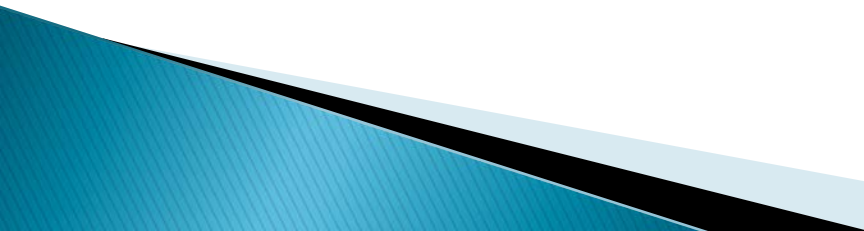
# “Effectiveness” implies a universal metric to be measured

- ▶ Removes subjectivity from consideration.
  - ▶ If done well and agreed to...
    - Provides tangible goals, and
    - Measures progress over time for a community, and
    - Compares between programs serving different demographics
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# Typical Solid Waste Program Evaluation Criteria Don't Fit HHW

- ▶ Traditional Recyclables are a large proportion of MSW stream and relatively easy to measure daily, weekly, and annually, e.g.:
  - Recycling Programs: set out rates, pounds recycled per customer, % of waste diversion, tons diverted per year
  - Composting programs can use same criteria
- ▶ Most other solid wastes can be evaluated with similar evaluation criteria, but NOT HHW

# Issues in Evaluating HHW

- ▶ A household can easily store many years of HHW
  - ▶ HHW is often generated because of an “event”
    - Spring cleaning, death in the family, major remodeling project or maintenance
    - Change of residence
  - ▶ These generation events are typically not weekly, monthly or even annually, often multi-year
  - ▶ Therefore, the appropriate performance measurement criteria must be based on a longer timeframe, a number of years
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# Ideas for basis of HHW evaluations

- ▶ Total of all hazardous products sold
  - Doesn't indicate how much product was used vs. waste
  - Expensive retail sales data, may change over time
- ▶ Statistically significant survey of HHW in homes
  - Very expensive, subjective regarding what may or may not be used prior to declared a waste by the homeowner
  - Need to have a well defined definition of HHW and MSDS' and other sources of HW would be challenging
- ▶ Develop an estimate of the average age of all HHW generated. Needs to be:
  - broadly representative of HHW generation
  - consistently purchased product that often becomes HHW

# What products might have data to represent the average age of HHW?

- ▶ Most household cleaners, pesticides, used oil do not have dates of manufacture to easily determine their age.
- ▶ Architectural paint is an exception –
  - Manufacturers have been required to date stamp their consumer paints due to VOC rules of the clean air act for many years, and many did so previously for Q.C.
  - Paints are a traditional HHW and one of the largest proportions of HHW
  - Paints might be representative of the average age of all HHW, but it certainly represents the 30–55% of the HHW that is paint. It might be a good HHW proxy.

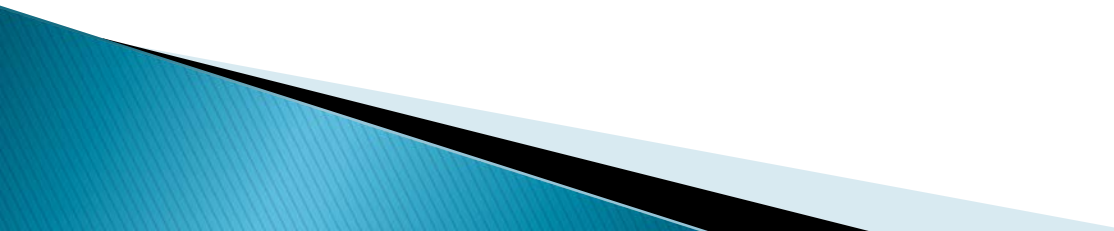
# Statewide Paint Estimates as Proportion of HHW

- ▶ From the Paint Product Stewardship Initiative

State	Paint as % of HHW
California	34 - 43%
Iowa	33%
Washington	43.6%
Wisconsin	30.9 - 56%



# National Paint Product Stewardship

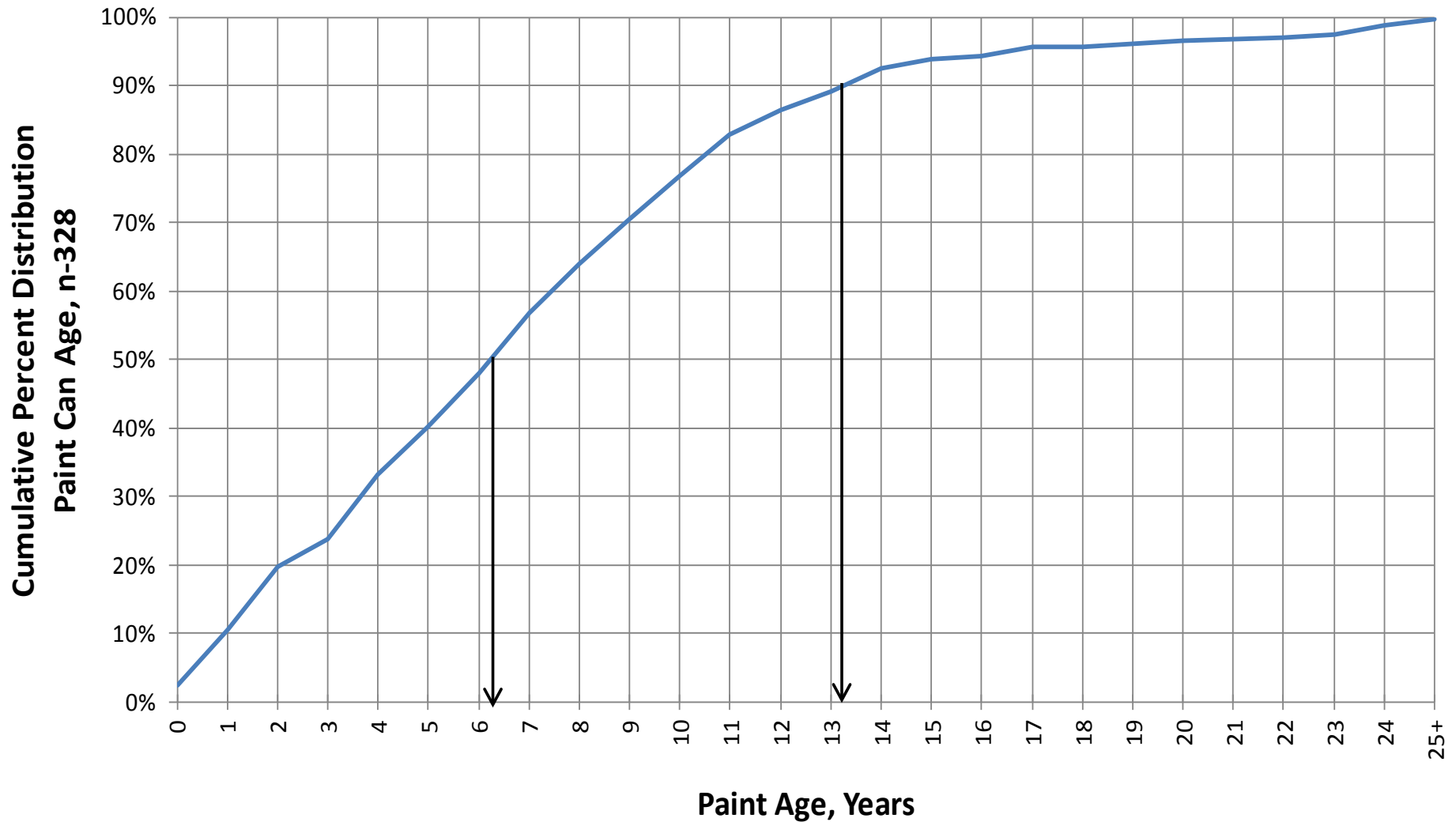
- ▶ Performed a study of the age of paint delivered to five community HHW programs
  - ▶ Hundreds of paint cans provided useable date codes.
  - ▶ An age of paint profile was developed
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# Age of HHW Paint Profile

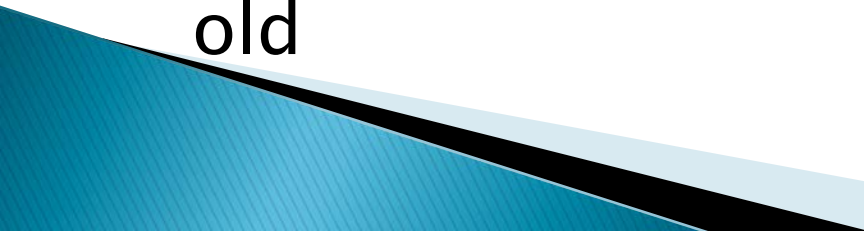
Paint Age, Yrs	Percentage of Paint Cans		Paint Age, Yrs	Percentage of Paint Cans
0	2.4		13	2.7
1	8.2		14	3.4
2	9.1		15	1.2
3	4.0		16	0.6
4	9.5		17	1.2
5	7.0		18	0
6	7.9		19	0.6
7	8.8		20	0.3
8	7.0		21	0.3
9	6.7		22	0.3
10	6.1		23	0.3
11	6.1		24	1.5
12	3.7		25+	0.9

# Graphed Paint Age Profile

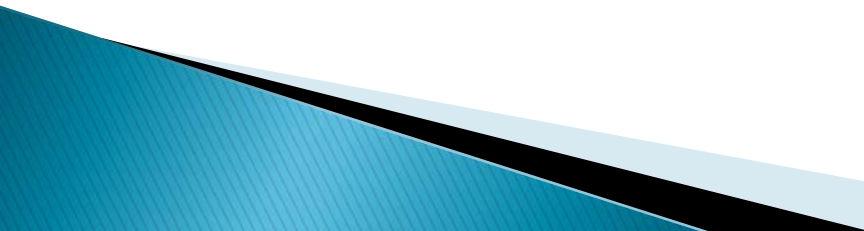
## HHW Paint Age Cumulative Percentage



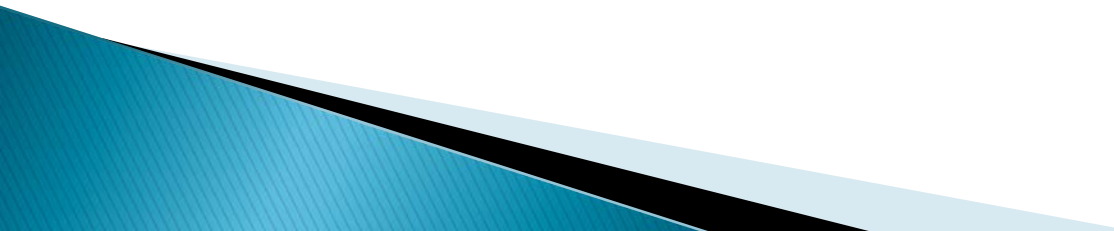
# Statistical Results

- ▶ Average age of HHW paint is 7.4 years old, this can be considered the periodicity of the disposal cycle
  - ▶ Greater than 50% of paint is seven years old or less
  - ▶ Greater than 90% of paint is younger than 14 years old
  - ▶ Less than 1% of HHW paints are over 25 years old
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# Calculation Assumptions

- ▶ Assume HHW paint age is generally representative of the age of all HHW
  - ▶ Use the average age of HHW paint to represent the average age of all HHW
  - ▶ Assume the avg. age of HHW is a good estimate for the frequency of all HHW delivered
  - ▶ Assume negligible effect of multiple-house loads due to offset from customers delivering HHW more than once per year
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# Calculation Method

- ▶ Use the annual participation rate of households in a services area in conjunction with the assumed average HHW age to calculate the annual “effectiveness” of any HHW collection program
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# National HHW Participation Rates

- ▶ In a national 2005 study of 25 HHW programs in the US it was found that the annual participation rate ranged between 2% to 24% of households in the program service territory, with a median of 7%.

From: "Comparison of Household Hazardous Waste Programs", Portland Regional Environmental Management (Portland Metro) by Cascadia Consulting Group, Fall 2005, p. 14

# CA Specific Examples

- ▶ A similar study of seven selected California HHW programs in 2007 found annual participation rate between 2.1% and 13.1%.
  - ▶ This variability is not only program/jurisdiction specific but varies by location within jurisdictional boundaries.
  - ▶ Sonoma County, showed that for the entire county the participation rate was 8.3%
  - ▶ However in three areas within the county the participation rate varied between 4% to 69%.
  - ▶ The area of 69% participation rate was in the area surrounding the permanent collection facility and the outlying areas saw a steep drop in participating households who were served only by occasional collection events
- Sonoma HHW Program Benchmarking and Program Evaluation Study, Sweetser & Associates and Special Waste Associates, January 2007, accessed at: [http://www.recyclenow.org/pdf/reports/sonoma\\_hhw\\_assessment\\_final\\_2007.pdf](http://www.recyclenow.org/pdf/reports/sonoma_hhw_assessment_final_2007.pdf).



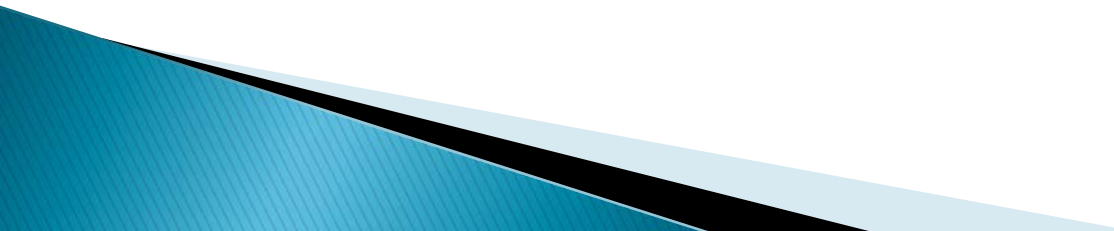
# Using Participation Rates in Collection Effectiveness

- ▶ Assuming that an average HHW program can often achieve 7% annual household participation rates in the service area, multiply that by the estimated 7.4 years disposal cycle of HHW to arrive at an estimated effectiveness of 51.8% HHW participation rate for the disposal cycle.

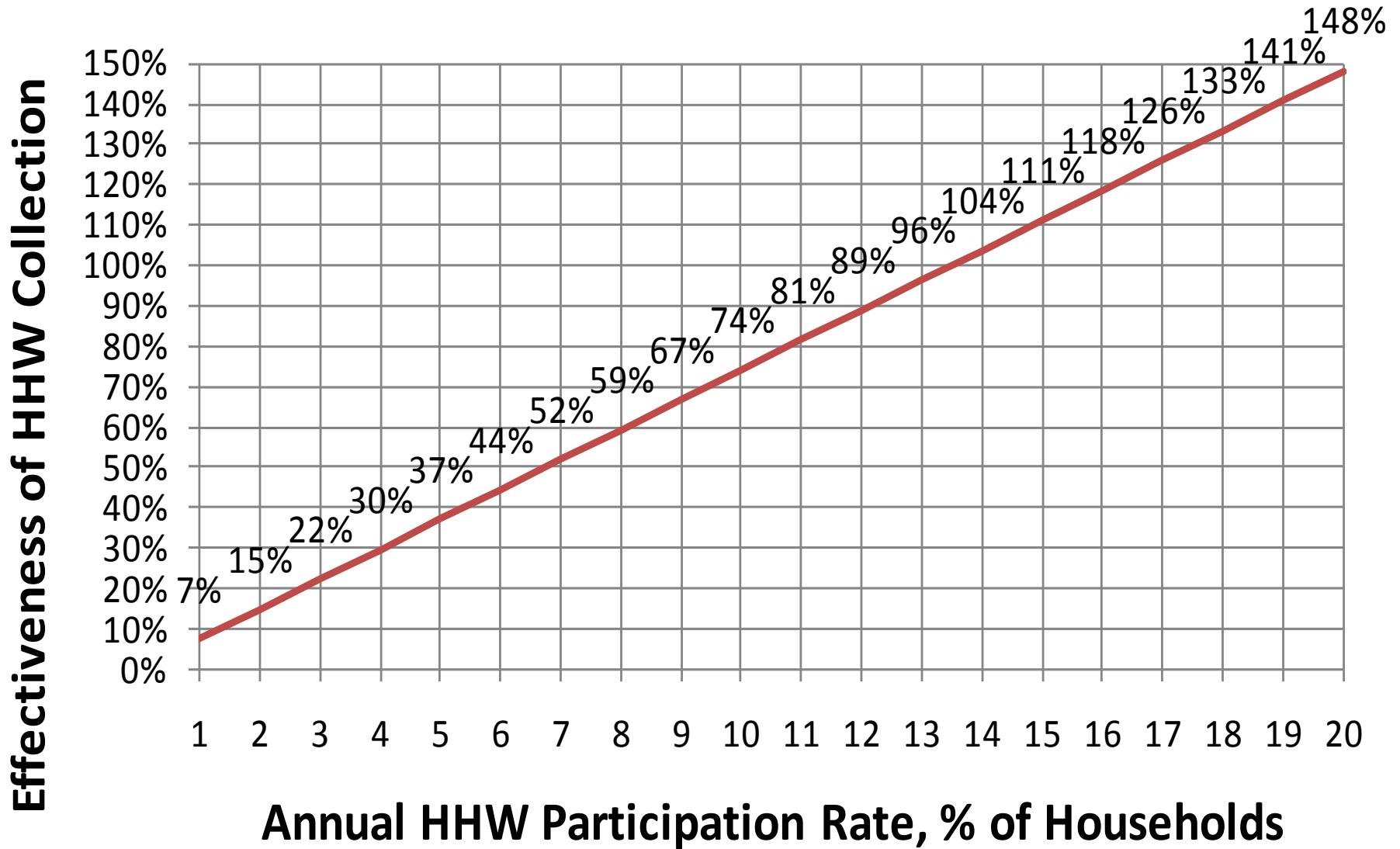
# Proposed Effectiveness Calculation

- ▶ **Formula:**  $PPR\% \times 7.4 = HHW_{\text{Eff.}}\%$
- ▶ **Where:**
  - **PPR%** is the Annual Participation Rate for the service area in a year
  - **7.4** is the assumed disposal cycle for HHW, in years
  - **HHW<sub>Eff.</sub>%** is the Estimated Percent Effectiveness of the HHW collection program in a year
- ▶ **HHW Effectiveness calculation example:**  
 $7.0\% \text{ (avg. ann. participation)} \times 7.4 = 51.8\%$

# Practical Use of Proposed Formula

- ▶ Using a constant multiplier and the higher end of participation rates can estimate effectiveness over 100%
  - ▶ At about 14% annual participation rates you will calculate about 100% effectiveness
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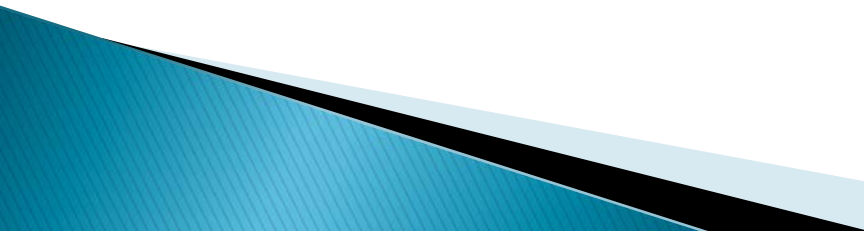
# HHW Collection Effectiveness



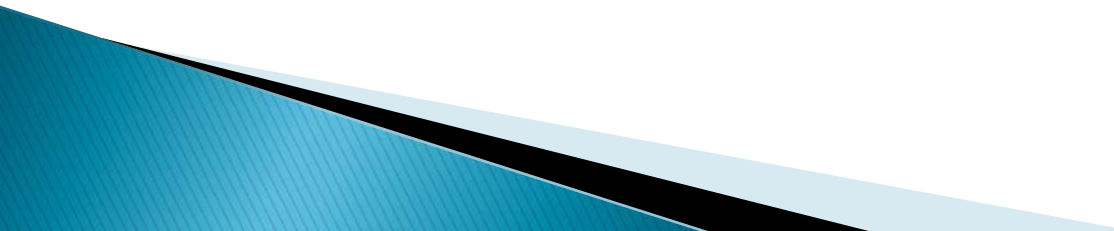
# Some CA 2009 HHW Collection Program Examples

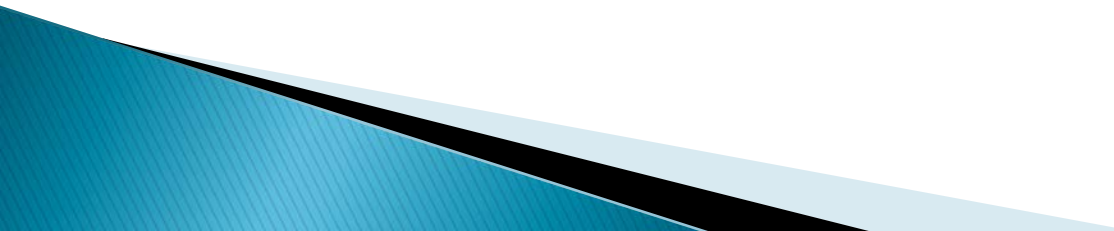
Jurisdiction	Percent Participation	Est. Effectiveness
San Mateo County	2.7%	20%
San Francisco	3.4%	25%
San Bernardino	7.5%	55%
Santa Cruz County	11.5%	85%
Central Contra Costa Sanitary District	14.4%	107%

# Possible Reasons for $>100\%$ Effectiveness Estimates

- ▶ Increasing new customers  $\Rightarrow$  temporary increase in participation
  - ▶ Actual average age of HHW non-paint is older than average HHW paints
  - ▶ Customers bring in HHW more frequently than the average age of their HHW
- 

# Advantages of this HHW Collection Effectiveness Criteria

- ▶ Does not rely on difficult to estimate HHW generation or disposal rates
  - ▶ Does not rely on methods that are not applicable to the generation patterns peculiar to HHW
  - ▶ Simple calculation based on existing participation ratios which are easy to accurately measure
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- ▶ Allows comparisons between programs independent of demographics
  - ▶ Allows tracking progress over time for the same collection program
  - ▶ Provides a reasonable/rational goal or end point, 14% annual participation
- 



# Thank you very much!

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