

# Chapter 15

## WASTE MONITORING AND PERFORMANCE MEASUREMENT

This chapter explores what data is needed to measure the effectiveness of the County's waste reduction, recycling and waste diversion programs.

Primary reasons to monitor recycling and waste generation data:

- Assisting with planning and decision-making;
- Setting waste reduction, recycling or diversion, objectives and targets;
- Identifying waste generation and recycling trends;
- Determining the viability and capacity of existing solid waste recycling and disposal facilities;
- Evaluating economic impacts (current and future years) of the solid waste management system.

In order to improve programs, performance data must be accurately measured and used consistently. Targets are intended to measure progress towards the end result. For example, the end results of an effective solid waste reduction program are to reduce the amount of materials generated, landfilled, and to reduce toxicity. Table 15-1 shows the county's targets.

**Table 15-1 Clark County Solid Waste Program 5-Year Targets**

**Increase the recycling rate to 55 % and the diversion rate to 70% by 2020:**

- Reducing per person per day landfilled volumes (pounds) by 5%
- Reducing per person per day amounts of waste generation by 5 pounds

*Note: 2012 Baseline.*

The following types of data are tracked to measure a program's effectiveness:

- Waste recycling and diversion rates;
- Waste generation;
- Pounds per household per month collected through residential curbside recycling programs; and,
- Waste Stream Analysis Data.

### Assessment of Conditions

In 1989, the statewide recycling rate was 27% and Washington State's legislature originally established a statewide recycling goal of 50 percent which was updated in 2002 as a goal to be reached in 2007. The state recycling rate reached 49% in 2010 and for 2011, the 50% goal was finally reached. The statewide diversion rate for 2012 is 50.1%. For the County during 2012, the 50% recycling goal was achieved.

#### Why should we be concerned about waste composition?

To reduce and manage waste effectively, we need to know what is in the waste stream. This changes over time as the economy changes, new products and packaging are created, and societal behavior changes. It is essential that we have current data on the waste stream so that we can make good waste management decisions, lowering our environmental and economic costs.

*- Washington Department of Ecology*

# Waste Recycling and Diversion Rates

The recycling rate is the percentage of all waste generated by residents and businesses that is re-manufactured and made into new products. Calculating the recycling rate is complicated. It involves collecting garbage and recycling data from a variety of measurable sources. Only those materials re-manufactured into new products are considered to be recycled, according to guidelines established by the Environmental Protection Agency (EPA). The following section shows the calculation of the Clark County waste recycling rate.

## Equation For Calculating the Waste Recycling Rate

|                      |                     |
|----------------------|---------------------|
| MSW Recycling Rate = | Total MSW Recycled  |
|                      | Total MSW Generated |

*Note:*

*Total MSW Generated = Total tons Recycled + Total tons Recovered + Total tons Disposed*  
*MSW = Municipal Solid Waste (does not include industrial, special and demolition wastes)*

$$\text{Recycling Rate (2012) } 53.9\% = \frac{359,169 \text{ tons}}{359,169 \text{ tons} + 75,110 \text{ tons} + 231,487 \text{ tons}}$$

The diversion rate is the percentage of all waste generated by residents and businesses that is recycled and recovered (not made into new products). Examples of waste recovery include: wood and yard wastes, motor oil and hazardous wastes and tires that are burned for fuel, concrete, asphalt and rubble that are crushed and used as aggregate rock substitute; and rendering.

## Equation For Calculating the Waste Diversion Rate

|                      |  |
|----------------------|--|
| MSW Diversion Rate = | Total MSW Recycled + Total MSW Recovered |
|                      | Total MSW Generated                      |

*Note:*

*Total MSW Generated = Total tons Recycled + Total tons Recovered + Total tons Disposed*  
*MSW = Municipal Solid Waste (does not include industrial, special and demolition wastes)*  
*Some on-site or home diversion practices have not been included in the diversion calculation (i.e. backyard composting, grasscycling, vermicomposting).*

$$\text{Diversion Rate (2012) } 65.2\% = \frac{359,169 \text{ tons} + 75,110 \text{ tons}}{359,169 \text{ tons} + 75,110 \text{ tons} + 231,487 \text{ tons}}$$

**Table 15-2 Annual Recycling and Waste Diversion Rates**

| Year | Recycling Rate <sup>1</sup> | Waste Diversion Rate <sup>2</sup> |
|------|-----------------------------|-----------------------------------|
| 2000 | 31%                         | 52%                               |
| 2001 | 30%                         | 43%                               |
| 2002 | 30%                         | 43%                               |
| 2003 | 36%                         | 48%                               |
| 2004 | 37%                         | 52%                               |
| 2005 | 38%                         | 55%                               |
| 2006 | 36%                         | 56%                               |
| 2007 | 41%                         | 56%                               |
| 2008 | 44%                         | 53%                               |
| 2009 | 46%                         | 56%                               |
| 2010 | 49%                         | 57%                               |
| 2011 | 50%                         | 64%                               |
| 2012 | 54%                         | 65%                               |

Source: Clark County Solid Waste Program

1 Recycling Rate is percentage of waste generated that is re-manufactured into new products.

2 Diversion Rate is percentage of waste generated that is remanufactured into new products and recovered (not made into new products).

Tracking non-residential tonnage (one component included in the above calculations) is challenging, and the following issues must be considered when working with the data:

- non-residential programs are not subject to contractual reporting requirements;
- non-residential waste diversion and recycling is driven by the competitive free market and data is considered proprietary information; and,
- commercial tonnages are often under-reported; some recyclables are transported out of the county and some recycling merely goes unreported, as in the case of retail/wholesale corrugated shipments that go directly back to distributors and unknown recyclers.

The City of Vancouver’s Recycling Ordinance, VMC Chapter 5.62, establishes licensing procedures for all commercial recyclers operating within the City of Vancouver through which collectors report annual tons collected both in the City and outside the city within Clark County. County solid waste staff work with Vancouver solid waste staff and access state data to determine commercial recycling tonnage estimates within the City of Vancouver and Clark County.



## Waste Generation

While Washingtonians and Clark County residents are recycling more, we are also generating more waste. We live in a throwaway society but we can, as stated by Washington State's *Beyond Waste Plan*, "transition to a society that views wastes as inefficient uses of resources and believes that most wastes can be eliminated. Eliminating wastes will contribute to environmental, economic and social vitality."

Table 15-3 shows Clark County's pounds of waste per capita generated per day.

**Table 15-3 Waste Generation in Clark County**

| Year | Tons Landfilled | Tons Recycled | Tons Recovered | Population | Pounds Per Capita Disposed Per Day | Pounds Per Capita Recycled Per Day | Pounds Per Capita | Pounds Per Capita Generated Per Day |
|------|-----------------|---------------|----------------|------------|------------------------------------|------------------------------------|-------------------|-------------------------------------|
| 2003 | 235,176         | 161,295       | 57,192         | 379,577    | 3.39                               | 2.33                               | 0.83              | 6.55                                |
| 2004 | 251,275         | 195,451       | 81,049         | 383,300    | 3.59                               | 2.79                               | 1.16              | 7.54                                |
| 2005 | 265,691         | 224,099       | 95,487         | 391,500    | 3.72                               | 3.14                               | 1.34              | 8.19                                |
| 2006 | 277,529         | 225,930       | 126,560        | 403,500    | 3.77                               | 3.07                               | 1.72              | 8.56                                |
| 2007 | 273,619         | 256,105       | 89,300         | 415,000    | 3.61                               | 3.38                               | 1.18              | 8.17                                |
| 2008 | 254,467         | 234,245       | 47,941         | 424,200    | 3.29                               | 2.87                               | 1.02              | 7.17                                |
| 2009 | 231,759         | 241,814       | 52,322         | 432,999    | 2.93                               | 3.06                               | 0.66              | 6.66                                |
| 2010 | 227,868         | 261,052       | 42,599         | 425,363    | 2.88                               | 3.44                               | 0.41              | 6.74                                |
| 2011 | 228,718         | 315,918       | 84,166         | 428,000    | 2.93                               | 4.04                               | 1.06              | 8.05                                |
| 2012 | 231,487         | 359,169       | 75,110         | 431,250    | 2.94                               | 4.56                               | 0.95              | 8.46                                |

## Pounds Recycled Per Household Per Month

The County measures residential curbside recycling programs by tracking the number of pounds of curbside recyclables collected per household per month. Table 15-4 shows pounds per household per month of recyclables collected in Clark County and the cities who contract separately with Waste Connections for curbside recycling services.

**Table 15-4 Pounds of Materials Recycled Per Single Family Household Per Month**

| Year | Urban County | Rural County | Vancouver | Camas | Washougal | Ridgefield |
|------|--------------|--------------|-----------|-------|-----------|------------|
| 2003 | 65           | 77           | 56        | 58    | 60        | n/a        |
| 2004 | 68           | 73           | 66        | 60    | 60        | n/a        |
| 2005 | 65           | 73           | 59        | 55    | 53        | n/a        |
| 2006 | 59           | 70           | 56        | 54    | 49        | 66         |
| 2007 | 56           | 66           | 53        | 55    | 49        | 57         |
| 2008 | 53           | 64           | 51        | 55    | 47        | 49         |
| 2009 | 56           | 63           | 44        | 53    | 47        | 47         |
| 2010 | 58           | 65           | 51        | 53    | 60        | 45         |
| 2011 | 58           | 64           | 51        | 54    | 60        | 44         |
| 2012 | 58           | 59           | 51        | 63    | 61        | 39         |
| 2013 | 55           | 58           | 50        | 53    | 58        | 33         |

## Waste Stream Analysis Data

Clark County regularly conducts a waste stream analysis to determine the make-up of the waste that is delivered to the transfer stations for disposal. The most recent waste composition study was done during 2012 (Appendix I). Table 15-5 shows that the county's waste stream still contains significant amounts of potentially recyclable products including: paper, food waste, construction/demolition waste, plastics and metals.

When considered together, yard debris, food wastes and wood waste represent the largest quantity of potentially divertable material – 32.5 percent – still being disposed in the county's waste stream. At 8.4 percent, recyclable paper is second. The volume of wood and other construction waste is another large component of the waste stream. Due to the proximity to Portland, additional amounts of construction demolition wastes are taken outside of the Clark County Solid Waste System for disposal and/or recovery. This information is difficult to track.

It is important to also note that although the percentage of hazardous/special waste in the overall waste stream is small (0.22%), the environmental impact of improper disposal of over a million pounds of this material is great. A detailed analysis of hazardous waste is presented in Chapter 11 on Moderate Risk Waste.

One objective of the waste stream analysis is to provide reliable baseline data that will assist the County in evaluating the effectiveness of existing and future waste reduction, recycling and recovery programs. In addition, monitoring helps determine the actual recycling and waste reduction rate in Clark County. Waste stream analyses have been conducted for 1993, 1996, 1999, 2003, 2008 and 2012.

**Table 15-5 Waste Stream Analysis Data (What's Still Being Thrown Away)** (Note: most recent data on left)

| Category                | 2012         | 2008         | 2003         | 1999         | 1995          | 1993          |
|-------------------------|--------------|--------------|--------------|--------------|---------------|---------------|
| <b>Paper</b>            | <b>14.6%</b> | <b>18.3%</b> | <b>19.2%</b> | <b>21.8%</b> | <b>23.3 %</b> | <b>26.1 %</b> |
| Newspaper               | 0.6%         | 1.0%         | 1.6%         | 2.1%         | 2.0%          | 1.8%          |
| Cardboard               | 3.1%         | 4.7%         | 4.0%         | 4.7%         | 5.3%          | 4.7%          |
| Mixed Waste Paper       | 4.5%         | 6.1%         | 7.0%         | 6.4%         | 8.0%          | 8.8%          |
| All Other Paper         | 6.4%         | 6.5%         | 6.6%         | 8.6%         | 8.0%          | 10.8%         |
| <b>Plastic</b>          | <b>13.7%</b> | <b>13.2%</b> | <b>11.5%</b> | <b>12.9%</b> | <b>11.6%</b>  | <b>10.4%</b>  |
| <b>Metal</b>            | <b>6.0%</b>  | <b>6.8%</b>  | <b>7.1%</b>  | <b>7.2%</b>  | <b>6.6%</b>   | <b>6.1%</b>   |
| Aluminum Cans           | 0.3%         | 0.3%         | 0.3%         | 0.4%         | 0.4%          | 0.4%          |
| Ferrous Materials       | 1.4%         | 2.8%         | 3.1%         | 2.1%         | 2.4%          | 2.1%          |
| Non-Ferrous Metals      | 0.5%         | 0.3%         | 0.2%         | 0.2%         | 0.3%          | 0.2%          |
| All Other Metals        | 3.8%         | 3.4%         | 3.5%         | 4.5%         | 3.5%          | 3.4%          |
| <b>Organic</b>          | <b>22.7%</b> | <b>17.7%</b> | <b>19.1%</b> | <b>17.8%</b> | <b>16.0%</b>  | <b>17.9%</b>  |
| Food Scraps             | 20.4%        | 16.3%        | 15.3%        | 14.5%        | 11.9%         | 12.1%         |
| Yard Debris             | 2.3%         | 1.5%         | 3.8%         | 3.3%         | 4.1%          | 5.8%          |
| <b>Glass</b>            | <b>2.5%</b>  | <b>2.8%</b>  | <b>3.2%</b>  | <b>3.2%</b>  | <b>2.7%</b>   | <b>2.7%</b>   |
| Clear Bottles           | 0.9%         | 1.1%         | 1.5%         | 1.5%         | 1.4%          | 1.4%          |
| Brown Bottles           | 0.5%         | 0.5%         | 0.7%         | 0.7%         | 0.4%          | 0.4%          |
| Green Bottles           | 0.4%         | 0.3%         | 0.4%         | 0.4%         | 0.4%          | 0.3%          |
| Non-Recyclable Glass    | 0.8%         | 0.9%         | 0.5%         | 0.5%         | 0.5%          | 0.6%          |
| <b>Wood, CD</b>         | <b>19.2%</b> | <b>15.1%</b> | <b>18.2%</b> | <b>15.9%</b> | <b>18.3%</b>  | <b>18.9%</b>  |
| Wood                    | 9.8%         | 9.7%         | 10.4%        | 8.5%         | 9.4%          | 10.5%         |
| Construction/Demolition | 9.4%         | 5.4%         | 7.8%         | 7.4%         | 8.9%          | 8.4%          |
| <b>Remaining Waste</b>  | <b>21.3%</b> | <b>26.1%</b> | <b>21.7%</b> | <b>21.2%</b> | <b>21.5%</b>  | <b>17.9%</b>  |

# Recommendations

1. **Track program data for goals and objectives** to measure against established baselines to evaluate performance. (15-4 to 15-5)
2. **Work with Columbia Resource Company and Waste Connections Inc.** to improve garbage and recycling data management and tracking. (15-4)
3. **Conduct waste characterization studies at the transfer stations** to monitor the impact of waste reduction and recycling programs and to identify potential changes to the solid waste program, and to gather self-haul data. (15-5)
4. **Maintain and regularly update** a master electronic Solid Waste data report. (See Appendix J).

*End of Chapter 15*