

# Assess, Research, and Reframe “Benefits of Recycling”

**Client:** Washington State Department of Ecology,  
Waste 2 Resources Program



# Benefits of Recycling Focus Sheet

## Focus on the Benefits of Recycling



### Waste 2 Resources Program

February 2015

## Washington's Recycling Produces Results

Recycling in Washington continues to produce important environmental and economic benefits for our state. In 2013, more than 50 percent of the waste generated by Washington residents and businesses was recycled or diverted from landfills. While reducing the amount of waste going to landfills is important, recycling is more than a way to manage wastes – it also reduces pollution and conserves natural resources.

### Recycling saves energy and reduces greenhouse gas emissions

Using recycled materials to make new paper, plastic, glass, and metal products saves energy. Collecting, processing, and transporting recycled materials almost always uses less energy than extracting, refining, transporting, and processing raw materials. Less energy use also means fewer greenhouse gas (GHG) emissions.

In 2013, 8 million tons of material was collected for recycling in Washington. This effort:

- Saved energy equivalent to 1 billion gallons of gasoline, or more than 128 trillion British thermal units (BTUs) of energy. This is enough to power almost 1.3 million homes for a year — or nearly half the households in Washington.<sup>1</sup>
- Prevented 3.1 million tons of GHG emissions — about 905 pounds per person. That impact is similar to taking 2.4 million vehicles off the road, or stopping 61,000 railway cars of coal from being burned.

### Recycling conserves natural resources

Recycling reduces the need for mining or logging, along with their harmful environmental effects. Supplying industry with recycled materials instead of virgin resources from forests and mines conserves these scarce resources and protects wildlife habitat. In 2013, Washington recycling programs collected 8 million tons of material to supply industry with commodities such as metals, plastics, paper, glass, wood, and construction and demolition scrap.

- Manufacturing recycled products requires, on average, 17 times less energy than manufacturing the same products from virgin materials.<sup>2</sup>
- By recycling nearly 1.4 million tons of scrap metal in 2013, Washington avoided mining and processing 1.75 million tons of iron ore, 700,000 tons of coal, and 28,000 tons of limestone.<sup>3</sup>
- Every ton of paper recycled saves roughly 17 trees and 7,000 gallons of water. By recycling more than 540,000 tons of paper, Washingtonians prevented the use of 9.3 million trees and 3.8 billion gallons of water.<sup>4</sup>

### Recycling lessens emissions of air and water pollutants

Recycling keeps materials out of landfills where they can contaminate groundwater and generate GHGs. It also reduces the amount of pollution entering the air and water and keeps harmful materials out of incinerators that can pollute the air and create ash residue. To make an ordinary 12-ounce beverage can, using recycled aluminum instead of raw materials reduces both energy consumption and air pollution by 95 percent.<sup>5</sup>

<sup>1</sup> Environmental Protection Agency (EPA) Waste Reduction Model (WARM): [http://www.epa.gov/climatechange/warm/warm/calculator/Warm\\_home.html](http://www.epa.gov/climatechange/warm/warm/calculator/Warm_home.html)

<sup>2</sup> University of Massachusetts Amherst: [http://www.umass.edu/water/recycling\\_benefits.shtml](http://www.umass.edu/water/recycling_benefits.shtml)

<sup>3</sup> University of Massachusetts Amherst: [http://www.umass.edu/water/recycle\\_benefits\\_benefit.shtml](http://www.umass.edu/water/recycle_benefits_benefit.shtml)

<sup>4</sup> Environmental Protection Agency (EPA), *Conserving the Benefits of Recycling*: [http://www.epa.gov/osw/conservation/tools/locap/locap/frames/Chaps\\_D.html](http://www.epa.gov/osw/conservation/tools/locap/locap/frames/Chaps_D.html)

<sup>5</sup> Chans, David D. (2012) Environmental Science. Burlington, MA: Jones & Bartlett Learning.

## Waste 2 Resources Program

February 2015

### Energy & Greenhouse Gas Savings by Recycling in Washington (2013)<sup>6</sup>

Recycled Material	Tons Recycled <sup>7</sup>	BTUs Saved (millions)	GHGs Avoided (MTCe) <sup>8</sup>
Aluminum Cans	15,636	2,397,468	39,017
Steel Cans	17,267	354,523	8,726
Glass	97,374	262,034	8,452
Plastics <sup>9</sup>	66,830	2,613,221	13,192
Corrugated Cardboard	483,864	7,557,757	473,293
Mixed Paper <sup>10</sup>	547,754	10,177,883	492,446
Wood <sup>11</sup>	534,577	3,148,650	26,834
Yard Trimmings	869,175	95,138	-20,266
Food Scraps	355,258	325,258	76,439
Other Organics	261,355	4,809	27,343
Mixed Metals	1,556,734	104,625,606	1,875,557
Landclearing Debris	227,729	252,153	-31,213
Carpet	4,341	96,096	2,843
Computers/Electronics	51,412	1,532,516	35,824
Construction & Demolition Debris <sup>12</sup>	2,276,218	4,229,351	70,746
Tires	47,991	1,258,602	9,756
<b>Subtotal</b>	<b>7,413,514</b>	<b>138,921,444</b>	<b>3,115,441</b>
<b>Other Recycling</b>	<b>486,276</b>		
<b>Total</b>	<b>7,899,790</b>		<b>Data not available for all material categories</b>

### More Information

Beyond Waste plan: <http://www.ecy.wa.gov/beyondwaste/>.

### Contact

Daniel Weston, 360-407-6409 or [daniel.weston@ecy.wa.gov](mailto:daniel.weston@ecy.wa.gov)

### Special accommodations:

To ask about the availability of this document in a version for the visually impaired, call the Waste 2 Resources Program at (360) 407-6900. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-633-6341.

<sup>6</sup> Washington Department of Ecology's 2013 Recycling Survey: <http://www.ecy.wa.gov/programs/swfo/soil/waterdata/>. Savings are relative to energy required and GHGs emitted during production of products using virgin materials (EPA WARM).

<sup>7</sup> For this analysis, recycling includes composting and burning for energy.

<sup>8</sup> Metric Tons Carbon Equivalent

<sup>9</sup> Includes HDPE, PVC, and mixed plastics (EPA WARM).

<sup>10</sup> Includes mixed paper, newspaper, and high-grade paper (EPA WARM).

<sup>11</sup> Includes round and recycled dimensional lumber, recycled wood and wood burned for energy recovery (EPA WARM).

<sup>12</sup> Includes fly ash, concrete/sphalt, asphalt shingles, and gypsum/byproduct (EPA WARM).

# Project Purpose

1. Determine how the focus sheet is being used by the primary “influencers” identified by Ecology.
2. Develop a better understanding of what economic and environmental information “influencers” find most useful.
3. Reframe the most useful information in a scientifically robust and captivating manner to more effectively communicate the benefits and impacts of recycling.
4. Design a new focus sheet based on our findings.

# Old & New Focus Sheets

## Focus on the Benefits of Recycling



Waste 2 Resources Program

February 2015

### Washington's Recycling Produces Results

Recycling in Washington continues to produce important environmental and economic benefits for our state. In 2013, more than 50 percent of the waste generated by Washington residents and businesses was recycled or diverted from landfills. While reducing the amount of waste going to landfills is important, recycling is more than a way to manage wastes – it also reduces pollution and conserves natural resources.

#### Recycling saves energy and reduces greenhouse gas emissions

Using recycled materials to make new paper, plastic, glass, and metal products saves energy. Collecting, processing, and transporting recycled materials almost always uses less energy than extracting, refining, transporting, and processing raw materials. Less energy use also means fewer greenhouse gas (GHG) emissions.

In 2013, 8 million tons of material was collected for recycling in Washington. This effort:

- Saved energy equivalent to 1 billion gallons of gasoline, or more than 128 trillion British thermal units (BTUs) of energy. This is enough to power almost 1.3 million homes for a year — or nearly half the households in Washington.<sup>1</sup>
- Prevented 3.1 million tons of GHG emissions — about 905 pounds per person. That impact is similar to taking 2.4 million vehicles off the road, or stopping 61,000 railway cars of coal from being burned.

#### Recycling conserves natural resources

Recycling reduces the need for mining or logging, along with their harmful environmental effects. Supplying industry with recycled materials instead of virgin resources and mines conserves these scarce resources and protects wildlife habitat. In 2013, Washington recycling programs collected 8 million tons of material to supply industry with commodities such as metals, plastics, paper, glass, wood, and construction and demolition scrap.

- Manufacturing recycled products requires, on average, 17 times less energy than manufacturing the same products from virgin materials.<sup>2</sup>
- By recycling nearly 1.4 million tons of scrap metal in 2013, Washington avoided mining and processing 1.75 million tons of iron ore, 700,000 tons of coal, and 28,000 tons of limestone.<sup>3</sup>
- Every ton of paper recycled saves roughly 17 trees and 7,000 gallons of water. By recycling more than 540,000 tons of paper, Washingtonians prevented the use of 9.3 million trees and 3.8 billion gallons of water.<sup>4</sup>

#### Recycling lessens emissions of air and water pollutants

Recycling keeps materials out of landfills where they can contaminate groundwater and generate GHGs. It also reduces the amount of pollution entering the air and water and keeps harmful materials out of incinerators that can pollute the air and create ash residue. To make an ordinary 12-ounce beverage can, using recycled aluminum instead of raw materials reduces both energy consumption and air pollution by 95 percent.<sup>5</sup>

<sup>1</sup> Environmental Protection Agency (EPA) Waste Reduction Model (WARM) [http://epa.gov/climatechange/warm/warmcalc/warm\\_home.html](http://epa.gov/climatechange/warm/warmcalc/warm_home.html)

<sup>2</sup> University of Massachusetts, Amherst [http://www.umass.edu/cycle/recycling\\_benefits.shtml](http://www.umass.edu/cycle/recycling_benefits.shtml)

<sup>3</sup> University of Massachusetts, Amherst [http://www.umass.edu/cycle/recycling\\_benefits.shtml](http://www.umass.edu/cycle/recycling_benefits.shtml)

<sup>4</sup> Environmental Protection Agency (EPA), Consumption of the Benefits of Recycling <http://www.epa.gov/osw/consumers/tools/so2cogp/benefits/>

<sup>5</sup> Chiras, Daniel D. (2012) Environmental Science. Burlington, MA: Jones & Bartlett Learning

Publication Number: 11 07 007

1

Please reuse and recycle



## Focus on Curbside Recycling

Washington residents and businesses recycle 14% more than the U.S. average. Curbside recycling includes common household materials that can be processed by most recycling facilities. These materials include aluminum cans, steel cans, glass, plastics, corrugated cardboard, and mixed paper.



In 2014, Washington residents created 6.78 pounds of waste per person, per day. 47% of that waste was recycled.<sup>3</sup>



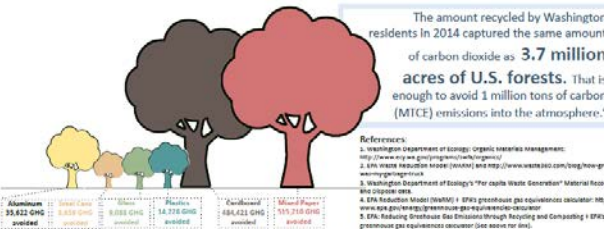
The equivalent of 133 thousand truckloads of materials were recycled by Washington Residents In 2014. That is 1.2 million tons that did not enter a landfill!<sup>1</sup>



The amount recycled by Washington residents in 2014 saved enough energy to power 600,000 households. That is 23 trillion BTUs saved!<sup>2</sup>



The amount recycled by Washington residents in 2014 captured the same amount of carbon dioxide as 3.7 million acres of U.S. forests. That is enough to avoid 1 million tons of carbon (MTCe) emissions into the atmosphere.<sup>4</sup>



References:  
<sup>1</sup> Washington Department of Ecology, Organic Materials Management: <http://www.ecy.wa.gov/programs/organic/>  
<sup>2</sup> EPA Waste Reduction Model (WARM) and <http://www.warm.epa.gov/warm-green-energy-energy-truck>  
<sup>3</sup> Washington Department of Ecology's "Per capita Waste Generation" Material Recovery Rate Update 2014  
<sup>4</sup> EPA Waste Reduction Model (WARM) - GHG greenhouse gas equivalent calculator: <http://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>  
<sup>5</sup> EPA, Reducing Greenhouse Gas Emissions Through Recycling and Composting - EPA's greenhouse gas equivalent calculator (see above for ref.)

Publication # 17-XX-XXX

To request ADA accommodation, call Ecology at 360-407-7000, Relay Service 711, or TTY 877-833-6341

# Methodology

## Literature Review

## Qualitative Interviews & Survey:

- W2R Team identified 107 “influencers” to be interviewed and surveyed regarding their use of Ecology’s metrics and focus sheets.
- Eight key influencers participated in **open-ended interviews**.
- 26 influencers responded to a **ten question online survey**.

**Analysis:** Open-ended survey responses were combined with the interview responses and aggregated in an Excel document for qualitative analysis. This allowed us to extract the key themes and compare this data with that of the interviews.

# Key Themes & Findings

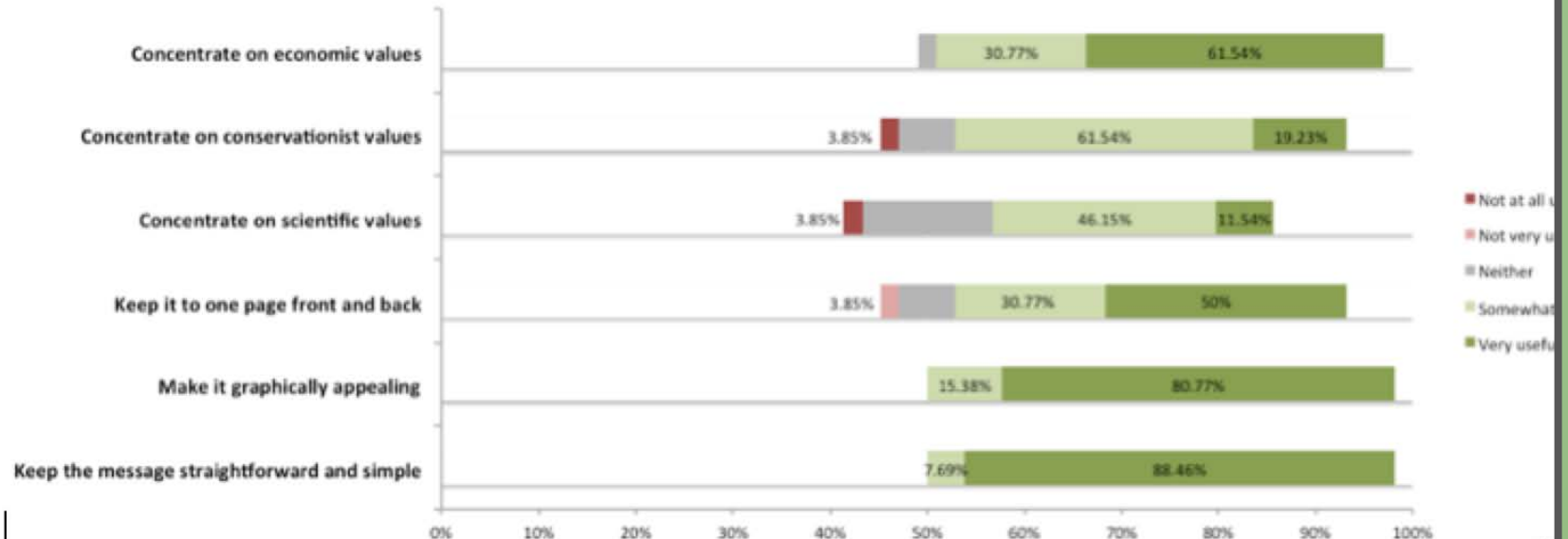
- Create a narrative about recycling & materials management
- Emphasize curbside recycling and organics
- Focus on economic values: job creation, tax revenue
- Emphasize the most-current data at regional and local level
- Data visualization: images, infographics, color
- Present hierarchies of information for diverse audiences

# Survey Findings

## Appendix D. Survey Results

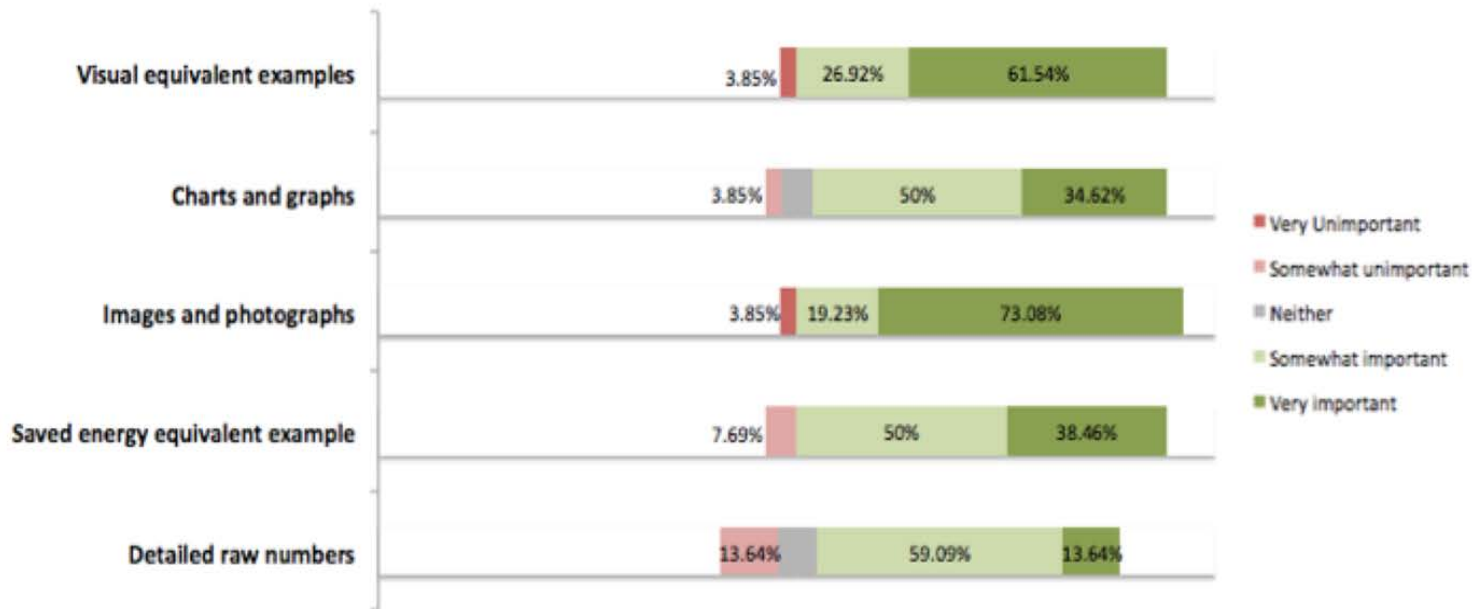
### Audience Needs

To ensure effective communication of the benefits of recycling to your audience, what is the most useful to you and your organization?



## Data Visualization Needs

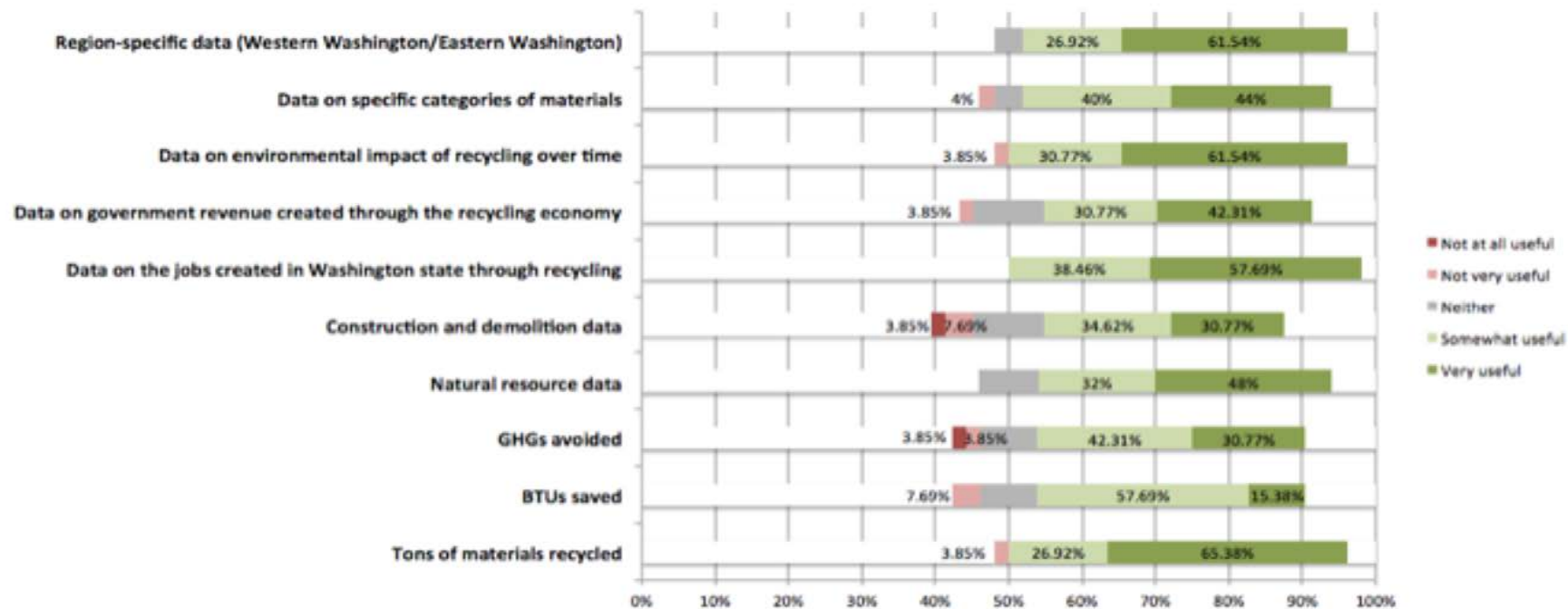
When communicating the benefits of recycling using data visualization, what is the most useful for you and your organization?





## Informational Needs

Please rate how useful the following information is/would be for your purposes



# Interview and Survey Participation

*“The focus sheets are State-wide, but if they were honed closer to home—if not by county then by region, for example, “Eastern WA”, but with the same information, it would be useful to know: “How many jobs (etc.) is this creating in our backyard?”*

Another influencer in a more rural county commented *“I definitely rely on Ecology’s statistics”* and that this information *“helped to make the case for expanded recycling programs”* in her area.

*“With a small city staff we wear many hats so yes, support is needed to effectively communicate the benefits of recycling. It's always easier to have a starting point rather than a blank page, it saves staff time and increases the likelihood of routinely getting something put into newsletters or the newspaper.”*

We *“need a suite of material that range from simple to more detailed and complex to meet inquiry needs from different levels of consumer.”*

# Create a narrative about recycling & materials

DEPARTMENT OF ECOLOGY  
State of Washington

## Environmental Benefits of Recycling

Waste 2 Resources Program June 2017

### Recycling as a tool for Sustainable Materials Management

Sustainable Materials Management looks at the full life cycle of materials from the design and manufacturing phase, through the use phase, to the end-of-life phase when the material is either disposed or recycled. The goal is to reduce negative environmental and health impacts, including climate impacts, by managing materials that through all stages of their life cycle.

Recycling is one tool for Sustainable Materials Management focused at the end of a materials life. Recycling materials not only avoids the pollution that would be generated through landfilling and incinerating materials, but also reduces the environmental burden of virgin materials extraction and manufacturing processes.

### Focus on Food Scraps and Yard Debris

This category includes wasted food, yard trimmings, and other organic materials including land clearing and agricultural debris. In 2015, 43% of residential waste created in Washington state could have been composted.<sup>1</sup>

2002

2014

The equivalent of 244 thousand truckloads of food scraps and yard debris were composted by Residents in 2014, or 2.2 million tons of material.<sup>2</sup>

The equivalent of the greenhouse gas emissions of 1.1 thousand passenger vehicles for one year were avoided from the food scraps and yard debris composted by Residents in 2014.<sup>3</sup>

Food Scraps  
Yard Trimmings and Other Organics

Food Scraps  
1,568,137 tons

Yard Trimmings and Other Organics  
1,632,816 tons

1/10

1.1 thousand passenger vehicles for one year

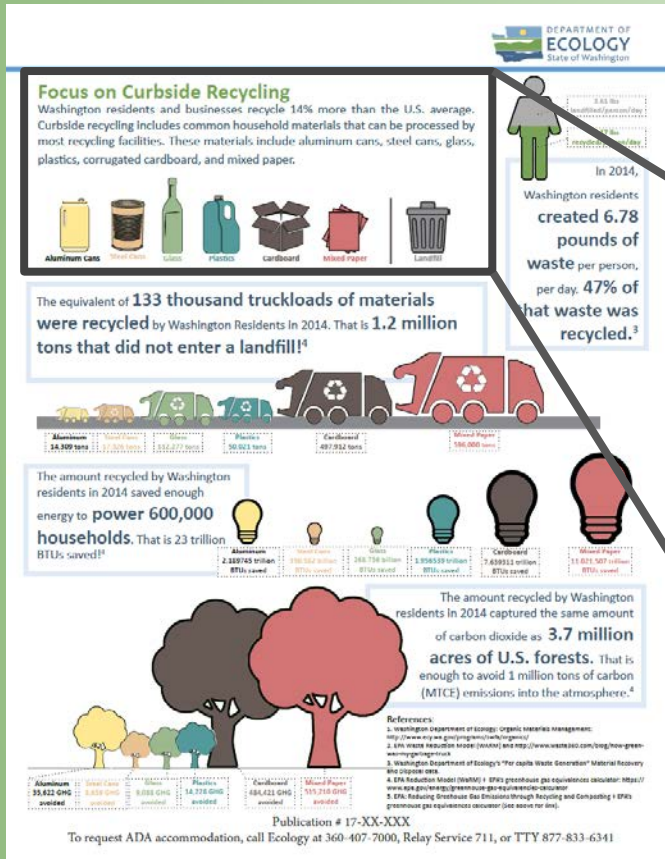
## Recycling as a tool for Sustainable Materials Management

Sustainable Materials Management looks at the full life cycle of materials from the design and manufacturing phase, through the use phase, to the end-of-life phase when the material is either disposed or recycled. The goal is to reduce negative environmental and health impacts, including climate impacts, by managing materials that through all stages of their life cycle.



Recycling is one tool for Sustainable Materials Management focused at the end of a materials life. Recycling materials not only avoids the pollution that would be generated through landfilling and incinerating materials, but also reduces the environmental burden of virgin materials extraction and manufacturing processes.

# Emphasis on curbside recycling, sorted by material



# More information on Organics



## Environmental Benefits of Recycling

Waste 2 Resources Program

June 2017

### Recycling as a tool for Sustainable Materials Management

Sustainable Materials Management looks at the full life cycle of materials from the design and manufacturing phase, through the use phase, to the end-of-life phase when the material is either disposed or recycled. The goal is to reduce negative environmental and health impacts, including climate impacts, by managing materials that through all stages of their life cycle.



Recycling is one tool for Sustainable Materials Management focused at the end of a materials life. Recycling materials not only avoids the pollution that would be generated through landfilling and incinerating materials, but also reduces the environmental burden of virgin materials extraction and manufacturing processes.

### Focus on Food Scraps and Yard Debris

This category includes wasted food, yard trimmings, and other organic materials including land clearing and agricultural debris. In 2015, 43% of residential waste created in Washington state *could have been* composted.<sup>1</sup>



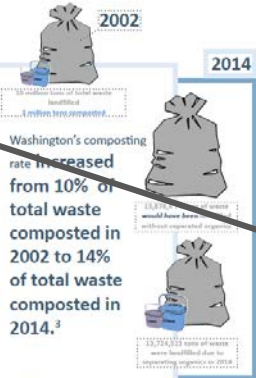
The equivalent of **244 thousand truckloads** of food scraps and yard debris were composted by Washington Residents in 2014, or 2.2 million tons of materials.<sup>2</sup>



The equivalent of the greenhouse gas emissions from **184 thousand passenger vehicles** driven for one year were avoided from the food scraps and yard debris composted by Washington Residents in 2014.<sup>3</sup>



Publication # 17-XX-XXX



43% of residential waste in Washington has the potential to be composted.<sup>4</sup>

Possible



## Focus on Food Scraps and Yard Debris

This category includes wasted food, yard trimmings, and other organic materials including land clearing and agricultural debris. In 2015, 43% of residential waste created in Washington state *could have been* composted.<sup>1</sup>



# Focus on economic values: job creation, tax revenue



## Economic Benefits of Recycling

Waste 2 Resources Program

June 2017

### Recycling as a tool for Sustainable Materials Management

Sustainable Materials Management looks at the full life cycle of materials from the design and manufacturing phase, through the use phase, to the end-of-life phase when the material is either disposed or recycled. The goal is to reduce negative environmental and health impacts, including climate impacts, by managing materials that through all stages of their life cycle.



Recycling is one tool for Sustainable Materials Management focused at the end of a materials life. Recycling materials not only avoids the pollution that would be generated through landfilling and incinerating materials, but also reduces the environmental burden of virgin materials extraction and manufacturing processes.

### Focus on the Economic Benefits of Recycling

Recycling creates jobs! Recycling jobs include waste collection, materials recovery jobs, and recyclable material merchant wholesaler jobs. Every 1000 tons of waste recycled or composted creates 29 jobs. Landfilling the same amount of material only creates 5 jobs.

1,000 tons of recycled material generates **More than \$14,000** in tax revenue.<sup>1</sup>



### Recycling Jobs in Washington in 2013



Multiply each thousand tons of materials your county recycled by 14,000 to find out how much tax revenue your county generated

### Recycling Employment Trends in Washington²



Expected in 2013-2018 employment increase

12%

Expected in 2013-2018 employment increase

182%  
2007-2013  
Employment increase



Expected in 2013-2018 employment increase

12%

Expected in 2013-2018 employment increase

21%  
2007-2013  
Employment increase

Publication # 17-XX-XXX



## Jobs Created per 1,000 tons of materials:<sup>3</sup>



References:  
 1. EPA. Recycling Economic Information (REI) Report: [https://www.epa.gov/sites/production/files/2016-10/documents/rei\\_2016\\_re\\_report.pdf](https://www.epa.gov/sites/production/files/2016-10/documents/rei_2016_re_report.pdf)  
 2. Washington State Employment Security Department: 2014 Green Economy Jobs Report - Industry and Survey Approaches: <https://reapoc.changeroads.com/whidoc/whidoc/whidoc/ESDS/ESDS/2014GreenEconomyJobsReport/2014GreenJobsReport.pdf>  
 3. More Jobs, Less Pollution: Growing the Recycling Economy in the U.S. Prepared by Tetra Institute with Sound Resource Management. (2011).

Multiply each thousand tons of materials your county recycled by the number of jobs created at each step in the recycling process to find out how many jobs your county created!

Publication # 17-XX-XXX

To request ADA accommodation, call Ecology at 360-407-7000, Relay Service 711, or TTY 877-833-6341

# Local, regional, most-current data



## Economic Benefits of Recycling

Waste 2 Resources Program

June 2017

### Recycling as a tool for Sustainable Materials Management

Sustainable Materials Management looks at the full life cycle of materials from the design and manufacturing phase, through the use phase, to the end-of-life phase when the material is either disposed or recycled. The goal is to reduce negative environmental and health impacts, including climate impacts, by managing materials that through all stages of their life cycle.



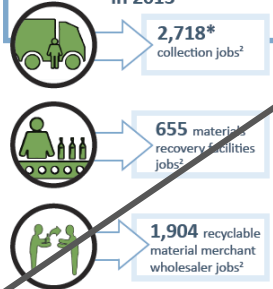
Recycling is one tool for Sustainable Materials Management focused at the end of a materials life. Recycling materials not only avoids the pollution that would be generated through landfilling and incinerating materials, but also reduces the environmental burden of virgin materials extraction and manufacturing processes.

### Focus on the Economic Benefits of Recycling

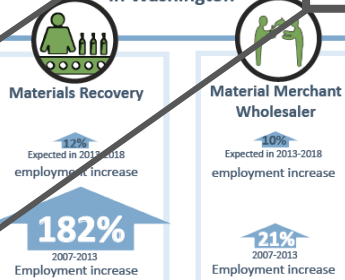
Recycling creates jobs! Recycling jobs include waste collection, materials recovery jobs, and recyclable material merchant wholesaler jobs. Every 1000 tons of waste recycled or composted creates 29 jobs. Landfilling the same amount of material only creates 5 jobs.



#### Recycling Jobs in Washington in 2013



#### Recycling Employment Trends in Washington?



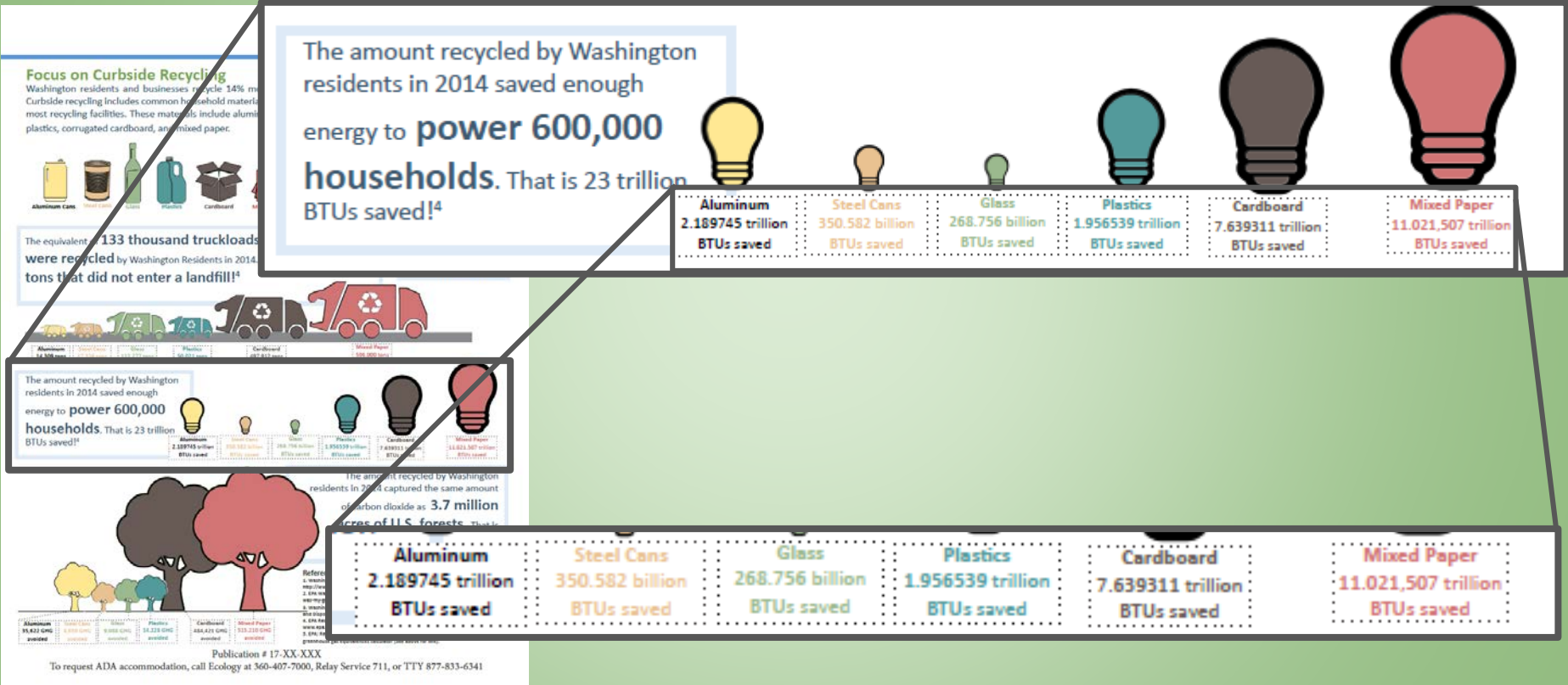
Multiply each thousand tons of materials your county recycled by the number of jobs created at each step in the recycling process to find out how many jobs your county created!

Multiply each thousand tons of materials your county recycled by 14,000 to find out how much tax revenue your county generated





# Hierarchies of information for diverse audiences



# Communication Plan

1. **Build Ecology's reputation as the go-to place to get up to date data** and statewide information.
2. **Build partnerships with industries** that can become partner outlets that help communicate compelling information.
3. Through State funding or grant administration, **provide additional funding** to municipalities to stimulate locally driven recycling efforts.

# Conclusion & Questions

- Small respondent pool
- Respondents were mostly employed by municipalities (W2R program's main customer) potentially generating a selection bias weighted toward city and county needs
- Important needs outside the range of the focus sheets this included:
  - More policy action at the legislative level
  - Need for more information and programs focused on waste reduction and reuse
  - More outreach materials focused specifically on behavior change, not just education.

*“People already have the attitude that recycling is important, but it’s confusing and that’s one of the barriers. There are obstacles to making it convenient or easy to understand.”*

