Solid Waste in Washington State

23rd Annual Status Report

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State of Washington

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Solid Waste in Washington State

Twenty-Third Annual Status Report

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Updating the State Solid and Hazardous Waste Plan (Moving Washington Beyond Waste and Toxics)

Chapter 70.95 RCW, Solid Waste Management – Reduction and Recycling, directs Ecology to develop a solid waste management plan as a guide to carry out a state coordinated solid waste management program (*RCW 70.95.260*). Ecology developed the first state plan in 1972, and revised it in 1980 and 1991. In 2004 Ecology issued the current State Solid and Hazardous Waste Plan.

Washington is required to review and update the state plan regularly. The first update was completed in October 2009. In fall 2013, we began working on the next state plan update. As a first step in this process, before we drafted any content we contacted stakeholders including local governments, waste and recycling companies, environmental organizations, other state agencies, and others to get their ideas on how to make the plan most useful and seek advice about the update process.

We used the many comments we received to write the first draft, which was issued for public review and comment in August and September 2014. Ecology is now using those comments to craft a second draft, which will receive more review and input before the plan update is complete in spring 2015.

Goals for the update include increased focus on the current waste management system and the diversity that exists across the state, while maintaining the state plan vision to reduce and eliminate most waste and toxics, using any remaining wastes as resources.

See Chapter 2 for more details. To be kept informed on the plan update process, join the listserv (http://listserv.wa.gov/cgi-bin/wa?A0=WA-STATE-WASTE-PLAN) and visit the plan update website (www.ecy.wa.gov/wasteplan).

Regulatory Changes in Washington

Solid Waste Handling Standards Rule Update

In November 2013, the W2R Program formally announced it would update *Chapter 173-350 WAC – Solid Waste Handling Standards*. Sections of the rule pertaining to organics management (220, 225, and 250) were adopted in spring 2013 following a process that began in 2009. In 2010, an update of the whole chapter was put on hold under former Governor Christine

Gregoire's Executive Order restricting agency rule making. Only the organics sections moved forward. The new update will focus on the remaining sections of the rule. Ecology is not proposing further amendments to the organics sections at this time.

Ecology will revisit issue papers and summaries developed previously, and renew efforts to work with stakeholders. Initial priorities include updating definitions, clarifying criteria for inert waste classification and when earthen material/soil is a solid waste, and streamlining recordkeeping and reporting requirements. In this general update, Ecology will address other issues that may result in substantive changes, as well as clarifications and corrections to language in the chapter not expected to change the overall effect of the rule.

Local health authorities (LHA) adopt ordinances that meet or exceed state program requirements, and have the lead for implementing the requirements of state solid waste rules through local permitting processes. Solid waste management is largely a partnership between public agencies and the private sector. Operators are a mixture of public (mainly public works departments) and private (haulers, recyclers, disposers) interests.

Ecology will solicit and evaluate recommendations of ad hoc committees comprised of internal staff and stakeholder representatives, and solicit feedback through both informal and formal public processes. Ecology will involve stakeholders by keeping them informed using various communications tools established for this purpose. Ecology will also use e-mail, newspaper notices, notices to trade journals, a website with rule update information, notices on the agency public events calendar, notices sent through the WACTrack ListServ, and informal and formal stakeholder meetings and hearings. We will periodically brief the Waste 2 Resources Advisory Committee and statewide environmental health directors.

At this early stage it is difficult to project dates with great confidence. Following is a proposed timeline:

Rule-making announcement (CR-101 filing)	November 6, 2013
Informal Public Meetings	September 2015
Proposed rule available for public comment (CR-102 filing)	June 2016
Final rule adoption (CR-103 filing)	November 2016
Rule effective date	December 2016

Encouraging Producer Responsibility in Washington

E-Cycle Washington – a Success Story

E-Cycle Washington, the state's electronic product recycling program, has been in operation for six years. In 2014 more than 44 million pounds of TVs, computers, monitors, e-readers, and portable DVD players were collected for recycling. In the six-year life of the program, more than 250 million pounds of these devices were prevented from going to landfills where the toxic materials they contain like lead, cadmium, and polybrominated flame retardants could eventually be released to the environment. Ecology estimates that 22.5 million pounds of lead alone have been recycled through the program instead of going into landfills.

E-Cycle Washington is the state's first manufacturer funded product stewardship program and its success is nationally recognized. There are 25 states that have types of e-cycle laws and Washington is consistently one of the highest performers.

In 2014, Washington consumers recycled 6.3 pounds of electronics per person in the state. This high per capita rate is made possible in part by the convenient statewide collection network of more than 340 free drop-off sites for used electronics. More than half of these sites are reuse oriented charitable organizations that put thousands of the fully functional electronics they receive through E-Cycle Washington back into use through the secondary market. See *Chapter 2 - Partnering for the Environment* for more details about the E-Cycle Washington Program.

Due to the strong public demand for recycling opportunities for more electronic products, Ecology is working on legislation to expand the scope of products covered by the E-Cycle Washington Program. The legislation proposes to add computer keyboards and mice; external hard drives; printers; video game consoles; video cassette recorders/players (VCRs); digital video recorders (DVRs); and digital video disc players (DVDs).

Mercury-Containing Lights Product Stewardship Program

The 2010 Legislature adopted *Chapter 70.275 RCW*, *Mercury-Containing Lights - Proper Disposal*. The law requires producers of mercury-containing lights sold in or into Washington State for sale at retail to fully finance and participate in a take-back program. Ecology formally proposed rules for the new stewardship program in June 2012 and held public hearings in August. Ecology's Director adopted the new rules on November 16, 2012. The rules became effective on December 17, 2012.

The industry proposed new legislation for the 2014 Legislative Session to eliminate the state contracted program and allow for producer funding options to include an environmental handling charge applied to each bulb sold at retail. The Legislature approved EHSB 2246 and the Governor signed it in March 2014 so the program could be implemented on January 1, 2015. *Chapter 70.275 RCW* was updated in June 2014 with the new legislation in EHSB 2246.

LightRecycle Washington is the mercury-containing lights product stewardship program "brand." The LightRecycle Washington Program will be operational on January 1, 2015.

The program's status will be regularly updated on Ecology's website. Additional information is available at:

- LightRecycle Washington website: http://www.lightrecyclewa.org/
- Ecology website: http://www.ecy.wa.gov/programs/swfa/mercurylights/
- Ecology publication: https://fortress.wa.gov/ecy/publications/publications/1207064.pdf

Chapter 2: Partnering for the Environment

Building strong partnerships underlies the success of Ecology's Waste 2 Resources (W2R) Program. The W2R Program encourages effective partnerships with businesses, local governments, community organizations, other state agencies, the agricultural community, and industry groups across the state. By working together, groups can offer their unique perspectives and resources to move toward an economically, environmentally vibrant future in Washington.

Time to Update the State Solid and Hazardous Waste Plan (Moving Washington Beyond Waste and Toxics) – *Partner Participation Needed!*

Chapter 70.95 RCW, *Solid Waste Management – Reduction and Recycling*, directs Ecology to develop a solid waste management plan as a guide to carry out a state coordinated solid waste management program (RCW 70.95.260). Ecology developed the first state plan in 1972, and revised it in 1980 and 1991. In 2004, Ecology issued the current combined State Solid and Hazardous Waste Plan, the Beyond Waste Plan. The vision and goals were developed with the input of numerous stakeholders and partners. The first five-year update was completed in October 2009, which made minor changes. Ecology is now working on the next five-year update, which we will complete in 2015.

The Beyond Waste Vision

We can transition to society where wastes are viewed as inefficient and most wastes and toxic substances have been eliminated. This will contribute to environmental, economic, and social vitality.

Our goals with this plan update are to represent the statewide system in all of its diversity, make the plan more user friendly, and stay on track to achieve the vision of reducing waste and toxics, while safely managing what waste remains. Not only is reducing wastes and toxics the top priority of our waste management statutes, but it is also the smartest, cheapest, and healthiest approach to waste management.

Ecology began the update process in fall 2013. Before we put pen to paper, we met with more than 30 groups and received additional comments through the use of an online survey tool from about 50 respondents, totaling more than 100 pages of comments. Ecology used these comments to help write a first draft, which received stakeholder review and input in August and September 2014. We then used those comments to help write a second draft, which will be out for public review in early 2015. Ecology anticipates completing the final plan update by mid-2015.

While the state plan is keeping the Beyond Waste vision, it is incorporating sustainable materials management. The goal of sustainable materials management is to reduce negative environmental and health impacts (including climate impacts) by managing materials that become waste through all stages of their life cycle. In 2004, the U.S. Environmental Protection Agency (EPA) adopted a framework for sustainable materials management, to address "the movement of materials through the economy and the environment from extraction to end of life.[1]"

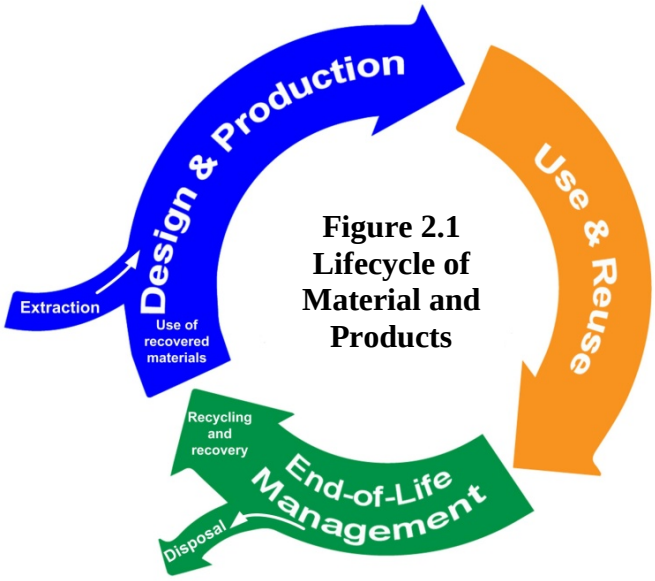


Figure 2.1 Lifecycle of Material and Products

The 2035 Beyond Waste Vision is in line with the sustainable materials management direction EPA has asked states to adopt. According to EPA, this approach to managing materials is essential to conserving our natural resources to meet both today's needs and those of future generations. Figure 2.1 depicts the sustainable materials management cycle as adapted by Oregon's Department of Environmental Quality, and further adapted by Ecology.

The sustainable materials management approach focuses on waste prevention as a way to reduce environmental and health impacts of materials, including climate impacts, while strengthening the economy. This approach emphasizes the importance of looking at the full lifecycle of materials: the design and manufacturing phase, the use phase, and the end-of-life phase when the material becomes waste. We need to identify more sustainable ways to design products that use less energy, water, and toxics. The adverse environmental impacts of extraction, production, and use are far greater than those associated with disposal when the product becomes a waste.

In this plan update, we have also altered the plan structure from that found in the 2004 and 2009 versions of the State Solid and Hazardous Waste Plan (the Beyond Waste Plan). The new structure contains five main sections:

- Managing Hazardous Waste and Materials *(includes MRW).*
- Managing Solid Wastes and Materials *(includes building materials).*
- Reducing Impacts of Materials and Products *(includes some MRW, building materials).*
- Measuring Progress.
- Providing Outreach and Information.

[1] Sustainable Materials Management: The Road Ahead, U.S. Environmental Protection Agency, June 2009.

With the materials management approach and this new structure, we can better address end-of-life issues or the current system, while also looking up the cycle to use and design to find ways to reduce waste and toxics. This approach is consistent with the state waste management hierarchy.
To stay informed about the plan update, join the listserv at http://listserv.wa.gov/cgi-bin/wa?A0=WA-STATE-WASTE-PLAN and visit the website at www.ecy.wa.gov/wasteplan.

Implementation of the State Solid and Hazardous Waste Plan (Beyond Waste Plan)

Meanwhile, work on the current State Plan continues. The W2R Program implements many aspects of the solid waste portion of the State Plan, and coordinates with the Hazardous Waste and Toxics Reduction (HWTR) Program on other portions of the plan. While legislative funding restrictions preventing Ecology's work on some plan elements were removed as of June 30, 2013, the W2R Program is still working under budgetary and staffing cuts that considerably reduce its work capacity.

Why Beyond Waste?
Avoiding wastes and the use of toxic chemicals is the smartest, cheapest and healthiest approach to waste management.

As part of the plan update, we did a status report on implementation of the 2009 Plan. A summary of the work Ecology and our partners were able to accomplish is found in Table 2.1 below. Of the 93 milestones in the 2009 plan, progress was made on 59 (63%), with five of those completed and significant or some progress made on 54 milestones. Little to no progress was made on the other 34 milestones (37%).

Table 2.1
Progress on the 2009 State Solid & Hazardous Waste Plan Milestones

Plan Section	Number of Milestones	Completed	Significant or Some Progress	Little or No Progress
Industries Initiative	17	0	9	8
Small Volume Hazardous Materials and Waste Initiative	15	0	7	8
Organics Initiative	13	0	8	5
Green Building Initiative	11	0	8	3
Measuring Progress Initiative	7	2	4	1
Hazardous Waste Issues	11	2	9	0
Solid Waste Issues	19	1	9	9
Totals	**93**	**5**	**54**	**34**

More about the work we have done on implementing the plan can be found in the other Partnering for the environment sections. Also, see the Beyond Waste Status Report, May 2014, or the Summary Status Report.

Partnering for the Environment by Reducing Small-Volume Hazardous Materials and Wastes (Moderate Risk Waste)

Because of their pervasiveness and potential harm, reducing small-volume hazardous materials and wastes is a primary initiative in the State Solid and Hazardous Waste Plan. The goal of the initiative is to eliminate risks associated with products containing hazardous substances commonly used in households and in relatively small quantities by businesses. The state classifies this type of hazardous waste as moderate risk waste (MRW). For more information, see Chapter 5.

Historically, MRW programs have focused on developing infrastructure to collect and dispose of household hazardous waste and conditionally exempt small quantity generator waste (CESQG), with the goal of protecting human health and the environment. While several counties recently initiated new facility development, a majority of programs focus on operational issues, such as adapting to an evolving waste stream and securing necessary funding.

Ecology conducts many activities to ensure the proper management of MRW. Regional staff review and support implementation of local solid and hazardous waste plans. They provide technical assistance on regulatory compliance to local solid waste and health departments and facilities. They also administer grant programs that support MRW activities at the local level.

Collecting, processing, and providing disposition for MRW is expensive. Ecology, in partnership with local governments, has been exploring product stewardship and extended producer responsibility as a way to ease the financial burden of managing these wastes.

"Product stewardship" directs all those involved in the design, production, sale, and use of a product to take responsibility for minimizing the product's impact to human health and the natural environment throughout the entire life of the product. Extended producer responsibility is a mandatory type of product stewardship (often legislated) that at a minimum includes the requirement that producers take responsibility for establishing and financing a system to recover their products at their end of life.

Not only does product stewardship and extended producer responsibility shift the burden of end-of-life management from local governments to product manufacturers, it increases recycling of products, which reduces waste and conserves resources. Ultimately these programs can lead to product redesign, eliminating the use of toxic substances, or making a product more recyclable.

Ecology is currently responsible for implementing two extended producer responsibility laws: E-Cycle Washington for electronics and a program for mercury containing lights. In the 2014 Legislative Session, the paint industry brought forth legislation to create product stewardship programs for their product. Although it failed, the paint bill is expected to be reintroduced in 2015.

We have become increasingly aware of the risk to human health and the environment when people *use* products containing toxic substances, not just when they dispose of them. Ecology is engaged in activities to eliminate use of toxic substances in products, making products "greener," thereby preventing the generation of small volume hazardous wastes in the first place. More information on these activities can be found in the Reducing Toxic Threats section of this chapter.

Reducing risks from MRW goes beyond safe handling and disposal. It is optimizing reuse and recycling. Ultimately, it is eliminating use of toxics in products and increasing use of safer products and services.

Partnering for the Environment and Public Health by Reducing Toxic Threats

Reducing threats caused by historical and ongoing releases of toxic chemicals is the rationale behind many of Ecology's successful regulatory programs. But we are finding that cleaning up or managing these releases is not enough. These approaches are expensive and usually leave some contamination behind. More important, these regulatory programs focus on point sources, leaving non-point sources largely unaddressed.

New research is increasingly finding that timing of exposure matters as much as the dose, and that during certain very vulnerable times during development, very low levels of some types of toxic chemicals can cause serious harm.

Reducing toxic threats by preventing uses or releases in the first place is the smartest, cheapest, and healthiest approach. Increasing Ecology's investment in prevention strategies is the focus of Ecology's Reducing Toxic Threats (RTT) priority initiative, and a fundamental principle of the State Solid and Hazardous Waste Plan (Beyond Waste).

This RTT initiative, building on work already done at Ecology, is aimed at fostering development of prevention approaches to avert exposures to toxic chemicals, and avoid future costs that come when toxic chemicals find their way into people and the environment. The Legislature has passed a number of laws to limit certain chemicals in consumer products such as lead in wheel weights, Bisphenol A in baby bottles, and mercury in many products.

Another law impacting this work is the Children's Safe Products Act (CSPA) passed in 2008. Intended to address the challenge of insufficient data on how and where chemicals of concern are used, CSPA requires manufacturers to disclose their use of certain chemicals in children's products.

With resources at a premium, it will be increasingly important to keep expenses low and build on positive results achieved by Washington, as well as other jurisdictions. Ecology continues to work with several other states to develop ways to share data, influence federal policy reform, and establish a more standardized approach to identifying safer alternatives for toxic chemicals still in use.

Prevention strategies are not without their challenges, including:

- *Insufficient data.* Information on the presence of toxic chemicals in products is often not available. Information on toxicity is also often not available. Without this data it is difficult to evaluate risk.

- *Understanding how to consider lifecycle impacts*. Back-end consequences such as public health impacts or environmental cleanup costs are usually not factored into front-end design decisions. As a result, these costs are often disproportionately born by the taxpayer.

- *Lack of incentives and assistance to reduce toxics use*. Using fewer toxic chemicals in products is the surest way to avoid exposures and costly cleanups, but there are not enough incentives and assistance to do so.

- *Inadequate protections at the federal level*. Washington needs to continue to act because of the absence of an effective national system to provide consistent protections from toxic chemicals.

Ecology developed a work plan to address these challenges and focus our limited resources. The work plan includes the following elements:

- Implement the CSPA, including product testing and enforcement of the law and rules.

- Apply the newly completed Alternatives Assessment Guide to identify alternatives to copper based boat paint. This work will allow us to compare the three decision frameworks in the Guide and provide information needed for the agency to comply with *RCW 70.300 - Recreational Water Vessels - Antifouling Paints.*

- Continue to focus on persistent, bioaccumulative, and toxic chemicals (PBTs), and implement the PBT rule. Explore how the PBT program might be accelerated or expanded.

- Identify priority chemicals of concern.

- Implement key recommendations of the Puget Sound Action Agenda to reduce impacts of toxics in Puget Sound.

- Work with the Governor's Office to develop a more comprehensive approach to reduce the use of priority toxic chemicals.

Significant Accomplishments in the Last 12 Months to Reduce Toxic Threats

Children's Safe Products Act

Staff continues to reach out to manufacturers of children's products to assist in compliance. Agency compliance activities consist of purchasing and testing products. Ecology has issued a number of notices of correction to manufacturers when discrepancies between the reported information and the agency's results have occurred. A database for product testing results is now up and running. This database has a public interface, and also helps us track our compliance activities under the CSPA, as well as the Toxics in Packaging Law (RCW 70.95G), Brake Friction Materials (RCW 70.285), and PBDEs (RCW 70.76). The 2014 Legislature provided ongoing funding for product testing into the future and a cross-program team was created to manage this effort.

Toxics Loading Study

Ecology's Toxics Loading Study and the Toxics Assessment Report are complete. They were released to the public on November 4, 2011. The Assessment Report found that the polluted surface runoff from urban areas is the most significant source of toxic chemicals to Puget Sound.

The study addressed 17 indicator toxic chemicals in 9 different pathways for 4 different land uses. The study identified key sources of toxics including roofing materials, creosote treated wood, wood smoke, vehicle exhaust, petroleum drips and leaks, and urban pesticide usage. Actions to reduce these sources are underway.

Ecology received a federal grant from EPA's National Estuary Program to implement key toxic reduction actions to reduce the impact of toxic chemicals in Puget Sound.

Significant accomplishments include:

- Creation of Northwest Green Chemistry (NWGC). This nonprofit is now established and work is underway to secure funding to ensure the mission comes to fruition. NWGC is envisioned as a public-private partnership, catalyst, and central point-of-contact to bring together businesses, higher education, government, and nonprofit organizations to facilitate green chemistry applied research, development, demonstration, education, and technology transfer. The goal is to identify, fund, and conduct research projects that will help reduce toxics loadings of high priority chemicals in storm water and Puget Sound.

- Grants awarded to the Washington State Department of Natural Resources and Pierce County Public Works to remove creosote pilings, a significant source of PAHs in the Sound.

- Grants awarded to the Puget Sound Clean Air Agency (PSCAA) to enhance efforts to reduce wood smoke, which is a serious human health hazard and another significant source of PAHs to Puget Sound.

- Expansion of the local source control program to additional jurisdictions. The local source control program provides technical assistance to small businesses to reduce the use of toxic chemicals and prevent polluted runoff from entering Puget Sound. New funding supports distribution of spill kits and installation of secondary containment at small businesses.

- Creation of a landscaper certification program to promote sustainable land care, including reducing the use of pesticides, fertilizers, and air-polluting equipment. Cascadia Consulting Group developed this certification program in conjunction with state agencies, local governments, academia, nonprofits, and representatives from the landscape industry. The program is now in place and 58 landscaping professionals are certified.

Chemical Action Plans (CAP) for PBTs

Work also continues to implement the lead, PBDE, PAH and mercury CAPs. A CAP to address PCBs will be published by the end of 2014. We have requested funding to implement key recommendations in this CAP.

Next steps include beginning a CAP for perfluorinated compounds (PFCs) and updating the PBT rule.

Safer Alternatives & Green Chemistry

Preventing problems caused by toxic chemicals and reducing their use depends on transitioning to less harmful alternatives. Ecology led an eight state effort to develop more standardized approaches to identifying safer alternatives to toxic chemicals to ensure when toxic chemicals are phased out, they are replaced with better substitutes.

The Alternatives Assessment Guide was published by the Interstate Chemicals Clearinghouse (IC2) in December 2013. Ecology is working with stakeholders to establish how this guidance should be applied in Washington. In 2015 we will apply the Guide to the problem of copper-based boat paints. Sale of such paints is banned in Washington beginning in 2018 (RCW 70.300). This law also requires Ecology to "study how antifouling paints affect marine organisms and water quality." EPA has already evaluated a number of non-copper based alternatives for both cost and performance. Ecology will supplement this data with information on hazard and exposure, and identify safer alternatives to copper-based boat paint. This data set is sufficient to also allow the agency to compare the three frameworks defined in the Guide.

Partnering for the Environment through Washington's Electronic Product Recycling Law

In January 2007, Ecology began implementing *Chapter 70.95N RCW, Electronic Product Recycling*, by registering manufacturers of desktop computers, portable computers, computer monitors, and televisions into the Electronic Product Recycling Program (now known as the E-Cycle Washington Program).[2] As of January 1, 2007, to legally sell these products in or into the state of Washington, manufacturers were required to:

- ✓ Register annually with Ecology and pay a program administration fee.
- ✓ Label their products with their brand.
- ✓ Participate in a plan to provide services for collection, transportation, processing and recycling these electronic products at the end of their useful life.

Manufacturers are automatically members of the Washington Materials Management and Financing Authority (WMMFA). As of January 1, 2009, they were required to participate in the Standard Plan for recycling electronic products. As of 2010, if a manufacturer or a group of manufacturers meet certain requirements, they can opt out of the Standard Plan and form an independent recycling plan with Ecology's approval.

The Standard Plan (the default recycling plan) is managed by the WMMFA Board of Directors, comprised of 11 large and small computer and television manufacturers. The Board of Directors will prepare, submit, and implement the Standard Plan for recycling electronic products covered by the law.

Through the first six years of program operations (2009-14), all manufacturers participated in the Standard Plan administered by WMMFA. Independent manufacturer plans were proposed in 2009 and 2010, but Ecology could not approve them due to insufficient collection networks.

Since January 1, 2009, households, charities, school districts, small businesses, and small governments have been able to drop off electronic products covered by this law for recycling at no charge.

[2] *Chapter 173-900 WAC, Electronic Product Recycling Program* specifies requirements of this program for manufacturers, collectors, transporters and processors of electronic products covered by the law (see http://www.ecy.wa.gov/pubs/0707042.pdf).

E-Cycle Washington Program Accomplishments

Highlights

- In 2009, the first year of operation, the E-Cycle Washington Program exceeded all predictions by recycling *38.5 million pounds* of TVs, monitors, and computers. Now in its sixth year, E-Cycle Washington collections have continued to grow.

Table 2.2
E-Cycle Washington Collections 2009-14

	Pounds Collected (Millions)
2009	38.5
2010	39.5
2011	42.2
2012	43.5
2013	45.2
2014	44.1 (est.)

- In mid-2011, the E-Cycle Washington Program achieved the ***100 million pound*** milestone for electronics recycled. In 2011, Ecology also expanded the scope of products covered by the program to include tablet computers and electronic book readers, also known as e-readers.

- In 2014, the E-Cycle Washington Program topped the **one-quarter billion** (250 million) pound mark.

- Washington is a national leader in recycling electronics with a 6.3 lbs/capita average in 2014.

- 340 collection sites and services have been established across the state. Drop-off sites and services are available in every county and city with a population of 10,000 or more.

- Seven processors (recyclers) of electronic products have undergone the required compliance audit to prove they will meet the performance standards and have registered to provide recycling services for the E-Cycle Washington Program.

- The E-Cycle Washington Program is not just about recycling. Charitable organizations acting as collection sites have reported that over the first six years of participation in the program, approximately 204,000 working units received through the E-Cycle Washington Program were sold for reuse.

E-Cycle Washington Website

The website developed for the Electronic Product Recycling Program continues to provide up-to-date, detailed information for all affected parties on registration requirements, fees, public involvement opportunities, and more (see http://www.ecyclewashington.org).

Public Information and Education Campaign

A public information and education campaign was launched in 2008. A program name, logo, and easily identifiable web address were developed through a stakeholder workgroup. A toolkit full of information was also developed and distributed to local governments to help them promote the E-Cycle Washington Program. A similar toolkit and public outreach materials were made available for electronics retailers.

Public education materials prepared by Ecology and WMMFA continue to be distributed at events and fairs, and through mailings. In addition, promotions for E-Cycle Washington have appeared in various publications (several in Spanish) and online advertisements, as inserts in utility bills, on buses and ferries, and on billboards on Interstate 5 and many other locations throughout the state.

Ecology continues to work with retailers of electronics, encouraging them to provide consumers with information about the E-Cycle Washington Program when new electronics are purchased. WMMFA sponsors radio and TV ads across the state to inform the public about the free program for electronics recycling.

Stakeholder Concerns

Due to the strong public demand for recycling opportunities for more electronic products, Ecology is working on legislation to expand the scope of products covered by the E-Cycle Washington Program. The legislation proposes to add computer keyboards and mice; external hard drives; printers; video game consoles; video cassette recorders/players (VCRs); digital video recorders (DVRs); and digital video disc players (DVDs).

Partnering for the Environment through Mercury-Containing Lights Product Stewardship

The mercury-containing lights law (Chapter 70.275 RCW) requires a fully financed producer product stewardship program for the collection, transportation, and recycling of mercury-containing lights. Mercury-containing lights are important to safely collect and recycle for the following reasons:

- Mercury is a toxic metal that accumulates in our bodies and the environment.
- When mercury-containing lights are broken, mercury is released into the environment.

- Use of mercury-containing lights is increasing, because they are energy efficient.

- A safe way to collect and recycle these lights is needed.

The program passed some milestones this year:

- The industry proposed new legislation for the 2014 Legislative Session to eliminate the state contracted program and allow for producer funding options to include an environmental handling charge applied to each bulb sold at retail. The Legislature approved EHSB 2246 and the Governor signed it in March 2014. Chapter 70.275 RCW was updated in June 2014 with the new legislation in ESHB 2246.

- PCA Product Stewardship Inc. (PCA) was chosen by industry to implement the Program. Ecology will have oversight and enforcement responsibilities.

- Ecology approved the LightRecycle Washington Mercury-Containing Lights Product Stewardship Program Plan in December 2014 (see http://www.ecy.wa.gov/programs/swfa/mercurylights/). The plan identified 96 collection sites around the state that will collect all products and 62 sites that will collect CFLs only. The collection network will continue to add sites in 2015.

- The program will start on January 1, 2015.

Mercury-Containing Lights Product Stewardship Program

Ecology approved the *Program Plan* for the Washington State Mercury-Containing Lights Product Stewardship Program (see www.ecy.wa.gov/programs/swfa/mercurylights/).

The Plan establishes a "comprehensive, safe, and convenient collection system" in Washington that may include retail locations, existing residential curbside and mail-back collection systems. The program will accept end-of-life mercury-containing lights from single-family and multi-family household generators, and persons (including businesses) that deliver no more than 10 mercury-containing lights per day to retail and HHW registered collectors and 15 lights per day to residential curbside collection programs. This program will reduce the improper disposal of spent mercury lighting, which releases mercury that threatens human health and the environment.

The Plan estimates collection and recycling of nearly one million mercury-containing lights during the first year of operation. Results of program operation will be reported to Ecology each year by June 1. Those annual reports will be posted online at www.ecy.wa.gov/programs/swfa/mercurylights/ .

Program Operator

The LightRecycle Washington Program will be managed and operated by PCA Product Stewardship Inc. (PCA). PCA specializes in the management and recycling of mercury-containing lights and tubes. EcoLights is the only licensed "final destination" lamp recycler in Washington and the largest in the Pacific Northwest. Peter Thermos is the Program Manager for LightRecycle Washington (peter@LightRecycleWA.org, www.lightrecyclewa.org).

Collection Service

The LightRecycle Washington Program will use a network of permanent, year-round locations for the collection of program products. There will be no charge to drop off up to 10 lights per day. Any organization interested in joining the program to provide collection service should contact Peter Thermos.

Collection sites will include retailers, recycling organizations, and businesses (both nonprofit and for profit); local government Household Hazardous Waste (HHW) or Moderate Risk Waste (MRW) collectors; local government recycling centers; solid waste curbside programs; transfer stations; and other associations or businesses interested in participating in the program, including any other locations which currently collect mercury containing lights. The list of collection sites will be provided on the LightRecycle Washington website (http://www.lightrecyclewa.org/).

Program Startup

The LightRecycle Washington Program will be operational on January 1, 2015. For updates related to this program, please see www.ecy.wa.gov/programs/swfa/mercurylights/.

Where to Recycle Lights Today

Washington State law (RCW 70.275.080) prohibits the disposal of mercury-containing lights by any Washington State resident, businesses, or entity, effective January 1, 2015. Mercury-containing lights must be recycled. See the following information to locate a collection site near you:

- LightRecycle Washington: LightRecycle Washington website. The network includes locations for recycling CFLs, linear tubes, and HID lights throughout Washington State.

- Department of Ecology: 1-800-RECYCLE database, fluorescent lights are listed under the Household Hazardous Waste category.

- Puget Sound Energy (PSE): PSE maintains a network of participating locations that collect Compact Fluorescent Lights (CFLs) at no charge.

- Take it Back Network: This group of retailers, repair shops, nonprofit organizations, waste management professionals, and recyclers offers options for recycling certain products that should not be disposed of in the trash. The network includes locations recycling CFLs, linear, and HID lights in Snohomish, King, and Pierce counties.

- Earth911.com: Nationwide database for a variety of recyclable materials.

- Ecology website: http://www.ecy.wa.gov/programs/swfa/mercurylights/.

- Ecology publication: https://fortress.wa.gov/ecy/publications/publications/1207064.pdf.

Partnering for the Environment through Environmentally Preferable Purchasing (EPP)

Environmentally preferable products and services are those that have a less or reduced harmful effect on human health and the environment, when compared to competing products or services that serve the same purpose. Each year, state and local governments in Washington have the opportunity to leverage more than $4 billion in purchasing power to buy products and services that:

✓ Reduce greenhouse gases.

✓ Conserve energy and water.

✓ Reduce the amount of toxics in products and promote safer chemical alternatives.

✓ Decrease waste and unsustainable packaging materials.

✓ Maximize the use of recycled content materials.

✓ Support markets for green products and green jobs.

✓ Reduce maintenance and disposal costs, increase product life, and result in fewer health and safety claims.

The state's Solid and Hazardous Waste Plan (Beyond Waste) encourages state government to increase purchases of environmentally preferable goods and services. Ecology's environmentally preferable purchasing (EPP) team includes staff from the W2R and Hazardous Waste and Toxics Reduction (HWTR) programs, Ecology's Purchasing Office, and the agency Operations Manager. The team helps state agencies meet Beyond Waste EPP goals.

Ecology provides technical assistance to local governments and businesses that want to establish or expand their EPP programs. By promoting safer products and services, EPP supports Ecology's key initiatives on reducing toxic threats, saving Puget Sound, and facing climate change.

Laws and Directives

The 2014 Legislature passed Chapter 135, Agency Purchasing and Procurement – Polychlorinated Biphenyls (PCBs) 6086-S . The bill states that the Department of Enterprise Services (DES) must establish a purchasing and procurement policy that provides a preference for products and products in packaging that do not contain polychlorinated biphenyls. Unless it is not technically feasible or cost effective, no state agency may purchase products or products in packaging containing PCBs above the practical quantification limit.

Governor Inslee's Clean Water Initiative to update water quality standards and reduce toxic threats includes PCBs as a key chemical of concern. Ecology has drafted a chemical action plan identifying PCB sources in the state and recommending ways to reduce exposures. Items tested in the study include paper products, paints and colorants, caulking, printer ink, and some product packaging. Tests of 68 consumer products confirmed that polychlorinated biphenyls (PCBs) are present in commonly used items. Full details, including a complete product listing, are available in a report on Ecology's website. DES has requested Ecology's expertise in determining how to implement the new PCBs in state purchasing legislation.

Governor Inslee's Clean Water Policy Brief included a section directing DES to work with Ecology to provide recommendations that ensure state purchasing practices require safer products when available. See 2014 Clean Water Policy Brief.

State government is also directed through Executive Orders 02-03 and 5-01 to lead by example in environmentally preferable purchasing. Agencies are directed to:

- ✓ Increase purchases of environmentally preferable products to help expand markets.
- ✓ Reduce energy use.
- ✓ Reduce greenhouse gas emissions.
- ✓ Reduce water use.
- ✓ Institute green building practices.

Paper Conservation Program

In 2009, the Washington State Legislature passed into state law *Chapter 70.95.725, Paper conservation program* and *Chapter 43.19A.022, Recycled content paper for printers and copiers – Purchasing Priority*. The legislation requires state agencies to:

- ✓ Purchase 100 percent recycled content, white cut sheet bond paper for use in printers and copiers.
- ✓ Develop and implement a paper conservation program to reduce use of printing and copy paper by 30 percent of current use.

- ✓ Develop and implement a paper recycling program, with the goal of recycling 100 percent of all copy and printing paper in all buildings with 25 employees or more.

The legislation has been in effect since July 2010.

Outreach to State Agencies and Local Governments

State agencies and local governments buy goods and services through state contracts, agency contracts, and cooperative purchasing programs. Ecology provides training and technical assistance to purchasing, facilities, and sustainability staff at government agencies to help them identify and purchase EPP products. In 2014, the EPP Team responded to more than 30 technical assistance requests from state agencies, local governments, businesses, and other entities.

In 2014, Ecology participated in the Government Purchasing for Climate Protection Workgroup of the EPA West Coast Climate and Materials Management Forum. As discussed in EPA's Opportunities to Reduce Greenhouse Gas Emissions through Materials and Land Management Practices, the full lifecycle emissions associated with waste, materials, and products contributed 42 percent to the U.S. greenhouse gas inventory in 2006. These impacts are much larger than recognized by most conventional greenhouse gas inventories. Ecology participated in drafting a web-based toolkit to be published in 2015 that offers strategies and resources for local governments to reduce greenhouse gas emissions through climate-friendly procurement.

Ecology's Buy Green, Save Green website highlights how local and state governments are saving money by purchasing green products (see http://www.ecy.wa.gov/programs/swfa/epp/. The website offers the following updated information:

- ✓ How to save money while purchasing greener electronic products, cleaning products, landscape management products, and services; lighting; office products; paint; and vehicles and automotive products.

- ✓ The *Who is Buying Green* section offers highlights of local, state, and federal agencies that are creating EPP policies, writing Annual EPP Reports, and offering guidance on how to buy green. If your agency wants to be included on this webpage, please contact Tina Simcich at tina.simcich@ecy.wa.gov.

- ✓ How to identify rigorous environmental performance levels using standards and certification programs.

- ✓ EPP related laws and directives in Washington State.

- ✓ Resource guides on starting an EPP program, life-cycle assessment, and green meetings.

If you are interested in keeping up to date with developments in green purchasing, join Ecology's Green Purchasing listserv at http://www.ecy.wa.gov/programs/swfa/epp/.

Promoting Strong Product Standards and Certification Programs

Standards and certification programs are important tools to encourage design of products and services with positive environmental attributes. Standards establish specific human health, environmental, and social criteria by which products can be measured and compared.

Certifications or "eco-labels" are awarded to products that meet the environmental standard. This makes it much easier for purchasers to "green" their contracts, as the standard can be incorporated in bid documents in just a few sentences.

Ecology promotes reliable standards and certification organizations that:

- Address product lifecycle stages from raw materials extraction, to manufacturing, to end-of-life.
- Are independent of ties to product manufacturers.
- Require onsite testing and verification by an independent laboratory or certifying organization.
- Use a broad-based stakeholder consensus process (typically involving manufacturers, users, government, non-profit organizations, and academia) or other rigorous process to develop standards.
- Provide transparency on their organizational structure, funding, and standards development process.
- Periodically review standards to stay current with new technology and emerging information about human health, environmental, and social impacts.

By leveraging a significant portion of the state's buying power, independent third-party standards encourage design of products and services with positive environmental and human health attributes.

EPP at Ecology

Ecology has been a leader in implementing EPP in its own operations for much of its 40-year history. In 2009, Ecology updated Policy 13-04 on EPP to align with agency priorities on climate change, reducing toxic threats, and resource conservation. The EPP policy applies to development of agency grants and contracts. Ecology's actions will also help address the Governor's mandate that Ecology lead the way in moving state government to carbon neutrality.

In 2014, Ecology staff collaborated to script and film a YouTube video on "The Benefits of a Reuse Center" (see https://www.youtube.com/watch?feature=player_embedded&v=tAPHRE9W-Zo). The video showcases the very successful reuse center at Ecology's Lacey Headquarters Building, which staff uses to reuse office supplies and avoid the impacts, both fiscal and environmental, of new purchases.

Partnering for the Environment through Recycling and Beneficial Use of Organic Materials

With an overarching goal to turn organic wastes into resources, the State Plan's Organics Initiative promotes a close-loop organics management system where markets for organic-based products are robust, and businesses thrive by creating new products from wasted organic materials. Through partnerships with other agencies and organizations, the vision for a close-loop organics management system is becoming clearer.

Waste to Fuels Technology

In 2006, the Washington State Legislature directed Ecology to form a partnership with Washington State University (WSU) called "*Waste to Fuels Technology.*"

> *"The Department will form a partnership with Washington State University to conduct research on markets, products, and bioenergy potential. Specific activities will include beginning a pilot project to convert solid waste to biogas through anaerobic digestion and to complete a biomass inventory. The project will include economic and technical assessments to help the public sector and private business complete bioenergy projects*."

Ecology supports developing the science and engineering for a municipal organics food and green waste digester. We continue to provide support in the form of an extension and outreach effort to commercial the anaerobic digester industry. We also continue working on research to produce transportation fuels, green gasoline, and bioethanol, while producing extremely stable carbon "biochar" for improving soil productivity through pyrolysis.

Last year we reported on the results of several focused research and outreach activities that included the ability to recover fertilizers from anaerobic digesters, that the simple acids and phenols produced during pyrolysis may be produced as feedstock for methane production anaerobic digestion, as well as the assessment of biochar's capacity to capture nitrogen and phosphorous from liquids (such as compost pad runoff), and development of computer code to model thermochemical reduction processes. Last biennium our WSU extension and outreach efforts included a comprehensive package of assistance to the organics industry including technical assistance on project design, products, and economic viability for anaerobic digestion.

We have continued that work this biennium by conducting focused research and providing design assistance to planned facilities that include food waste co-digestion with dairy manure, compost, and commercial gasifiers. Commercial enterprises have reported they are pleased to receive independent, third-party assistance from this WSU outreach activity supported through our partnership.

Biorefinery Technologies

The W2R Program has strategically invested in the Center for Sustaining Agriculture and Natural Resources (CSANR) to support research that will aid in commercialization of "second-generation"

organics processing technologies, such as high solids anaerobic digestion and pyrolysis, which can better manage materials that can be problematic for composting (e.g. food scraps), while also enabling recovery of energy and improved capture and recycling of carbon and nutrients.

A combination of *anaerobic digestion* and *composting* is best served for individualized treatment of both wet and dry material streams that are biologically digestible. Importantly, the two are complimentary both in the respective material streams they effectively treat, and also in that the residual solids from anaerobic digestion are suitable for further processing via composting, with the combined action of the two technologies showing potential for overall improvements in emissions, odors, and carbon recycling.

Equally important is that auxiliary *nutrient recovery* technology will allow the facility to more efficiently utilize its water resources, significantly reducing freshwater inputs for recycles of treated effluents, now without fear of nutrient overloading and inhibition.

A fourth emerging technology, *pyrolysis*, has great promise for augmenting the capability of organics recycling facilities to treat particularly challenging and recalcitrant dry materials such as construction and demolition wood debris, land clearing waste, and wood chips from nearby mill operations. These highly lignocellulosic and dry materials are suitable for pyrolytic treatment, which can produce a combination of either heat/char or fuel/char, depending upon emerging markets.

Note that during the pyrolytic process, a notable fraction of the biomass is converted to an aqueous short-chain carbon stream that is perfect for anaerobic digestion and additional renewable energy production. Meanwhile, the char can serve as both a carbon sequestering media and a nutrient absorber, allowing for additional nutrient recovery and export off of the facility. Finally, *various gas cleaning* and *fuel upgrade technologies* can convert the primary focus of heat and power production to liquid fuels, which are likely to have greater economic value in the future.

2013-15 Biennium Focus

In this biennium, we have four major goals.

- First, after several years of successful research working toward finalizing a vision for a second-generation bio-refinery focused on regional organics recycling, the W2R funding program to WSU CSANR needs more clarity in defining research priorities for future biennia. The first task for this biennium will be to *conduct a comprehensive research needs assessment.* We will use the results to prioritize ongoing research efforts in future biennia that directly address critical industry and community needs. WSU staff are leading this project through a survey and followup. We will provide the results of that survey in a final report.

- The second goal is to complete collaborative research across the WSU engineering team to finalize details for the "vision" of a second-generation organic bio-refinery. In past biennia, research focused on proof of concept laboratory research. While a few tasks in the past scope of work will continue targeted laboratory evaluations, we propose a final, concerted effort to *conduct a detailed build-out of the bio-refinery concept and assess its capabilities.*

- Third, past biennia have demonstrated the value of targeted extension and technology support efforts to support emergence of commercially viable next generation, sustainable organics processing, and management. To that end, a third focus has been targeted to *support development and delivery of publications (articles and research reports, multimedia products, technical support for industry and agency partners, and conducting presentations to industry and community groups).*

- Fourth, the WSU W2R team believes it is important to commit some continued efforts to *applied proof of concept research aimed at verifying new science/engineering methods to reduce cost, improve performance, or prove integrations between technologies and systems within the bio-refinery platform.* Four focused projects on proof of concept laboratory experiments are underway that could enhance the technical and economic performance of the bio-refinery platform.

We look forward to providing a thorough report on the results of these projects next year.

Partnering with State Governments to Build Strong Markets for Recycled Organic Materials

Increasing Access to Compost Markets

Composting effectively turns wasted organic materials into a valuable product. However, if markets are weak, the finished product may become a burden rather than a boon to compost facilities. We continue to work with state government to suggest changes to compost specifications and purchases made by government agencies. Several fact sheets are available on Ecology's Compost and Healthy Soil web page under the "Tools" section. The fact sheets (including one on Buying and Using Compost) increase awareness of the benefits of using compost.

Building Support for Healthy Soils

Maintaining and building healthy soils creates opportunities for sequestering carbon, protecting Washington waters, and increasing food security. Several fact sheets are available on Ecology's Compost and Healthy Soil web page under the "Tools" section. The fact sheets (including one on Building Healthy Soil) increase awareness of the benefits of healthy soil**.**

Partnering with the Washington Organic Recycling Council (WORC) to Promote Beyond Waste Goals

Improving Compliance and Product Quality at Compost Facilities

WORC is a nonprofit association dedicated to support and promote all aspects of organic recycling. Members include compost facility owners and operators, local and state government representatives, and others with an interest in organic materials management.

Since 1995, WORC has offered Compost Facility Operator Training (CFOT). This training is an approved training as required by our state composting rule (WAC 173-350-220). It provides an invaluable opportunity for students and instructors to learn and share ideas on proper operation and regulation of compost facilities in Washington. Students from around the region and beyond gather for one week of lecture and hands-on training at the Washington State University (WSU) Puyallup Research Station. More than 600 students have completed CFOT. Instructors consist of Ecology and WSU staff, compost engineers/consultants, and compost facility operators.

The 2014 training was held October 20-24 with 41 students, 5 core instructors, and 18 guest presenters/panelists. Since it is the only training of its kind in the state and surrounding area, it attracted students from Washington, Oregon, Montana, and Hawaii. The training included lectures, panels, fieldwork, and field trips. Presentations covered odor control, facility design, soil biology, and more. In addition to classroom lessons, students received hands-on experience building their own compost piles and evaluating pre-built piles. They learned safe, effective ways to make compost from a multitude of feedstocks.

Students learned current compost science. This included how to make and manage compost piles. They learned how to blend incoming feedstocks to create the correct moisture levels, carbon to nitrogen ratios, and porosity; and how to manage compost piles to maintain aerobic conditions and produce a high-quality finished product. They also learned how to sample, market, and use compost.

Tours included Silver Springs Organics (Tenino), the Compost Factory (Puyallup) and the JBLM Compost Facility. In the classroom, students learned from experts on three panels (compost operators, compost end-users, and regulators). These tours and panels provided students with the opportunity to learn directly from people responsible for making and using quality compost.

Student learning was measured by comparing the quiz on day one, with the final day. The average score went from failing to passing and improved by 47 percent. The more comprehensive final exam consisted of 46 questions with an average score of 88 percent. Almost all students (39 out of 41) received a passing score on the exam and received a certificate of achievement. Upon successful completion of this training, students are eligible for continuing education credits (CEUs), including 2.9 CEUs toward Ecology's Wastewater Operator Certification Program.

CFOT Instructor Craig Cogger and JBLM Compost facility tour

Commercial Sector Role in Reaching a Closed-Loop Organics Recycling System

Commercial composting is one of the key elements in the closed-loop organics recycling system. Compost facilities that process organic materials must use well-trained staff to produce a consistent, high-quality product. At the same time, commercial composters must operate their facilities to ensure they protect human health and the environment.

Washington State's law on solid waste handling, recovery and recycling is Chapter 70.95 RCW, Solid Waste Management – Reduction and Recycling. It was created to prevent land, air, and water pollution, and conserve the natural, economic, and energy resources of the state. Chapter 173-350 WAC, Solid Waste Handling Standards, was written to implement the law and contains specific requirements for organics and other solid waste management.

For information on Washington State's composting rule (WAC 173-350-220), see http://www.ecy.wa.gov/programs/swfa/organics/law.html

In 2013, Washington State had 44 composting facilities operating with a solid waste handling permit or conditional exemption for a solid waste permit (same amount as 2012). However, when including biosolids regulated composting facilities, the total is **59 composting facilities**. This amount is seven fewer facilities that reported than 2012. This decrease is in part due to the compost rule revision (March 2013). As a result of the revision, some composters became exempt from needing a solid waste permit. And some of those exempt facilities that previously submitted annual reports (with feedstock and finished compost amounts) were not required to submit reports due to their exemption.
The 59 composting facilities that were required to report composted **1,215,195 tons** of material in 2013. This was up from 1,211,805 tons in 2012. Table 2.3 highlights the variety of materials composted.

We observed significant changes in feedstock amounts (in tons) when comparing 2013 to 2012 reports. Mixed yard/food waste had the largest increase (>69k increase). Other increases included post-consumer food (>20k increase), pre-consumer food (>29k increase), and land clearing materials (>28k increase). **All food categories saw increases**. The total amount of mixed yard/food waste was >240k compared to >171k in 2012. Pre-consumer/post-consumer/food processing totaled >178k compared to >132k. The largest decrease was the amount of yard debris composted (>84k decrease). Crop residues also decreased (>33k decrease).

Food was composted at 22 facilities throughout the state (up from 21 in 2012). Of these facilities, 14 accepted pre-consumer food (up from 13), 6 accepted food processing waste (down from 7), 8 accepted post-consumer food (up from 7), and 8 accepted mixed residential yard/food scraps (unchanged).

Washington State composting facilities reported 1,159,925 cubic yards of compost produced (>210k cubic yard increase). The amount of material sent as hog fuel was almost 50k tons (>5k ton decrease).

Table 2.3
Organics Recovery Comparison (Tons)

	2012	2013
Composted		
Crop residue	92,714	59,679
Yard debris with food (mixed residential)	171,005	240,539
Food, all other (pre/post/processing)	132,060	178,047
Land clearing debris	100,680	128,958
Yard waste	509,062	424,765
Wood waste, all other	51,700	46,423
Other materials composted *(other agricultural waste, biosolids, cardboard, industrial organics, manure, mortalities/animal parts)*	154,037	136,783
Total materials composted	**1,211,805**	**1,215,195**

Ecology continues to work with WSU Cooperative Extension researchers, consultants, and local governments to educate potential composters about new opportunities and their responsibility to use best practices when composting even small volumes of material. We also continue to partner with the Washington State Department of Transportation to promote compost use for erosion control and storm water management along roadways.

Partnering for the Environment through Anaerobic Digestion

State law provides an exemption from solid waste handling permitting for co-digesting dairy manure and organic waste under specific conditions (Chapter 70.95.330 RCW). Anaerobic digesters, both on and off dairies, may also operate under a solid waste handling permit if they do not meet the conditions for exemption. Both the exemption and permitting criteria are addressed in detail in the Solid Waste Handling Standards (Chapter 173-350-250 WAC). These digesters must obtain and comply with other applicable state and local permits.

Basics of Manure Management

A full-grown dairy cow generates 100 pounds of manure per day. That means the 200,000 full-grown dairy cows in Washington produce up to 20 million pounds of manure each day.

Historically, dairy cows wandered around family farm fields spreading manure (or *nutrients* as some farmers like to say), effectively fertilizing the land as they grazed. Today, dairies often confine cows in feedlots where manure is flushed into a lagoon for storage until it is used to fertilize crops. Open lagoon storage of manure creates odor issues from methane, hydrogen sulfide, and ammonia releases.

Anaerobic digesters help address manure odors, capture greenhouse gases, and recycle nutrients. Digesters also provide revenue streams for dairies in these difficult economic times. Digester use in Europe is well developed, with more than 600 manure digesters in use. The U.S. Environmental Protection Agency (EPA) estimates 200 of the 65,000 dairy farms in the U.S. use manure digesters (for more information, see the EPA's AgSTAR website at www.epa.gov/agstar/projects/index.html). The Climate Action Team Study estimated that 135 of the 500 dairies in Washington could manage manure in an anaerobic digester (dairies with more than 500 cows).

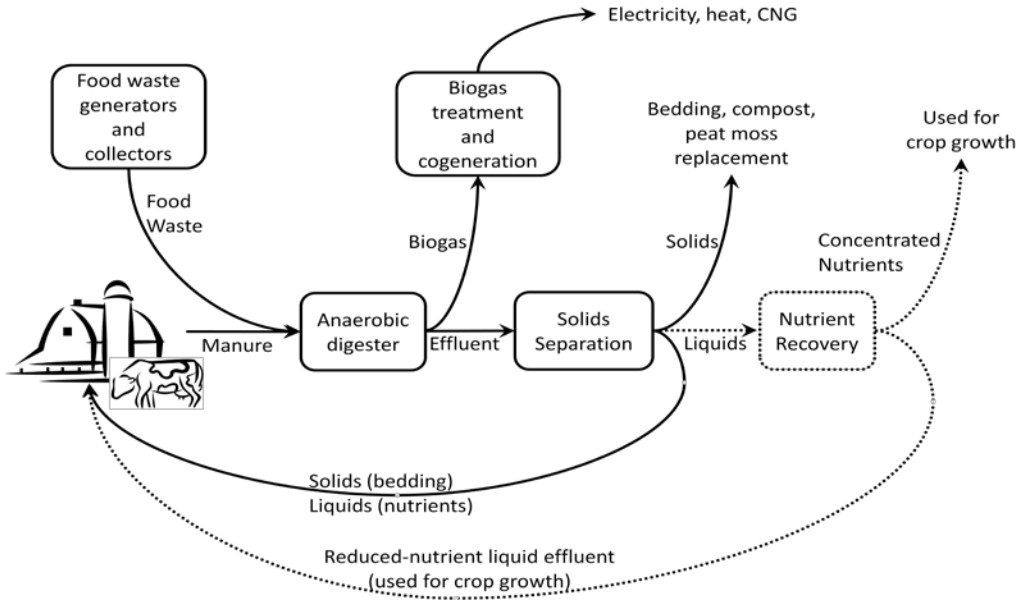
Manure digesters in Washington are either concrete structures or metal tanks built to hold manure at roughly 100°F. Dairy manure is piped or trucked to the digester, where it is often mixed with other organic materials like dairy, chicken, seafood, fruit, or food processing wastes. One of these operating digesters takes in more than 60,000 gallons of manure each day.

In the digester, anaerobic bacteria convert the manure and organics into biogas, solids, and liquids. The biogas consists mostly of methane (a greenhouse gas 20 times more potent than carbon dioxide) and carbon dioxide. Biogas pressure builds up in the digester and a pipe delivers the biogas for further processing. Biogas can be scrubbed to meet quality standards and fed into natural gas pipelines, compressed into a liquid fuel for trucks, or fed into a modified natural gas engine. Methane fuels the engine, which in turn spins an electric generator to create electricity.

Under normal dairy operations, methane is released into the atmosphere during lagoon storage of manure. Processing manure in an anaerobic digester captures much of this methane and reduces greenhouse gas emissions from dairy operations.

Waste heat from the engine can be used to keep the digester warm and can offset fuel purchases on the farm. Excess electricity can be sold back to the local utility. After digestion is complete, the output from the digester is mechanically separated into solid and liquid digestate. Solid digestate can be used to replace sawdust or sand, which the dairy would normally purchase for cow bedding, or utilized, by plant nurseries for potting soil mixes. Liquid digestate is returned to the dairy manure lagoons for storage and later used as fertilizer in much the same way as the unprocessed manure had been.

Figure 2.2
Dairy Anaerobic Digester Schematic
(Graphic Courtesy of WSDA)



Dairy Digesters in Washington

Today, a double handful of dairy farms in Washington use anaerobic digesters to put their cow manure to work generating renewable energy. Table 2.3 summarizes the energy produced by co-digesting manure and organics in the dairy digesters. The 29,324 megawatt-hours (MW-h) produced in 2012 is enough electricity to power 2,250 average homes in Washington.

The Washington State Department of Agriculture (WSDA) continues to oversee dairy manure management as required under the Dairy Nutrient Management Act (Chapter 90.64 RCW). The W2R Program and WSDA Dairy Nutrient Management Program collaborate on inspections, record reviews, and annual reports. At the end of each calendar year, digester operators report some information to W2R. Table 2.4 lists the energy produced and gallons of manure and organics digested by the permit exempted digester operations. Table 2.5 lists the active dairy digesters in Washington. Map 2.A shows where these dairy digesters are located around the state.

Table 2.4
Dairy Digesters Total Manure and Organics Processed

Calendar Year	Number of Digesters	Energy Produced (MW-h)	Manure Digested (million gallons)	Co-digested Organics (million gallons)
2009	3	7,536	44.2	9.5
2010	4	18,451	99.9	16.9
2011	6	25,311	150.6	19.7
2012	8	29,324	164.0	23.8

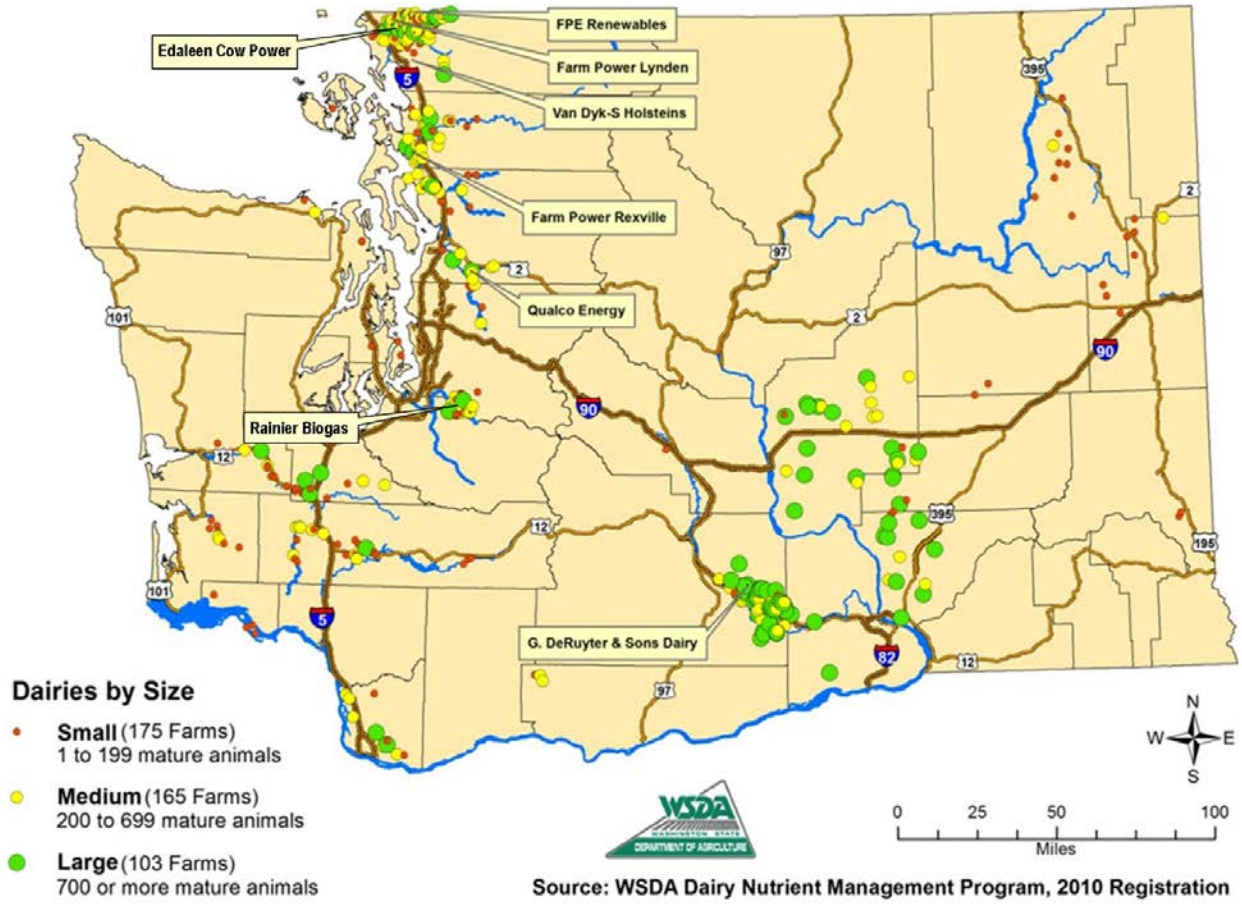
MW-h = megawatt-hours

Table 2.5
Washington Dairy Digesters

Digester	City County	Startup Year	Participating Dairies	No. Cows	Generator (kW)	Utility
FPE Renewable	Lynden Whatcom	2004	Vander Haak, Dee Bee Jersey farms	1,100	600	PSE
DeRuyter	Outlook Yakima	2006	DeRuyter & Sons	5,300	1,200	PacifiCorp
Qualco Energy	Monroe Snohomish	2008	Werkhoven	1,100	450	PSE
Farm Power Rexville	Rexville Skagit	2009	Beaver Marsh & Harmony	1,200	750	PSE
Farm Power Lynden	Lynden Whatcom	2010	MJD Farms	2,000	750	PSE
Van Dyk-S Holsteins	Lynden Whatcom	2011	Van Dyk-S Holsteins	1,000	400	PSE
Edaleen Cow Power	Lynden Whatcom	2012	Edaleen Dairy	1,700	750	PSE
Rainier Biogas	Enumclaw King	2012	Wallin; DeGroot Brothers; Ritter Dairies	1,200	1,000	PSE

PSE - Puget Sound Energy
kW – kilowatt

Map 2.A
Washington State Dairy Digesters



Partnering for the Environment through Beyond Waste Performance Indicators (aka Measuring Progress Initiative)

The State Solid and Hazardous Waste Plan (Beyond Waste) is a 30-year plan with a clear and simple vision: Eliminate wastes whenever we can and use the remaining wastes as resources. The goal of the Measuring Progress Initiative is to help Ecology and its partners develop and use a long-term performance measurement system that shows progress toward the overall vision, as well as individual initiatives and actions of the Plan.

How Are We Doing on Achieving the Vision?

Ecology's W2R and HWTR programs work together to update and improve a series of indicators that track progress toward Beyond Waste goals. We are continuously improving our measures of Washington's success at reducing use of toxic substances, and the generation of solid and hazardous wastes. Ecology is also addressing the broader themes of the State Plan by developing and maintaining indicators that show how our progress toward these goals relates to economic, environmental, and social vitality.

The Beyond Waste Progress Report (http://www.ecy.wa.gov/beyondwaste/bwprog_front.html) was first published in 2007 with eight indicators. 2014 marks the seventh update of the report, which now contains 22 indicators (7 main indicators and 15 alternate views), case studies for each initiative, targets for solid and hazardous waste, a greenhouse gas savings counter, and more.

The indicators track progress toward the Beyond Waste Plan initiatives - industries, green building, organics recycling, and small-volume hazardous wastes, as well as progress toward overall goals of reducing waste and toxics.

The report was restructured based on past evaluations with input from staff and stakeholders. Ecology continues to implement the changes as possible. The report now contains primary and related indicators for each State Plan initiative. Ecology now updates the individual indicators when data is available, rather than waiting for a yearly update of the entire report. 2014 marks the third year of this page-by-page type of update.

Some changes that Ecology implemented in 2014 or are currently under development include:

- More charts and comparisons providing context, such as per capita data and case studies.
- Indicator climate change connections highlighted.
- Consumer Environmental Index (CEI) enhanced.
- Enhanced use of clickable links on the website, including additional links to outside data for comparison and benchmarking.

We continue to monitor trends related to implementation of the State Plan in the indicators. We have established baselines to gauge progress. The indicators show that we are making significant progress in some key areas. Although the overall recycling/diversion rate dipped from 2011 to 2012, the 5-year trend shows a significant increase; we are also collecting more electronics and organic materials for recycling (Figures 2.3 and 2.4).

Figure 2.3

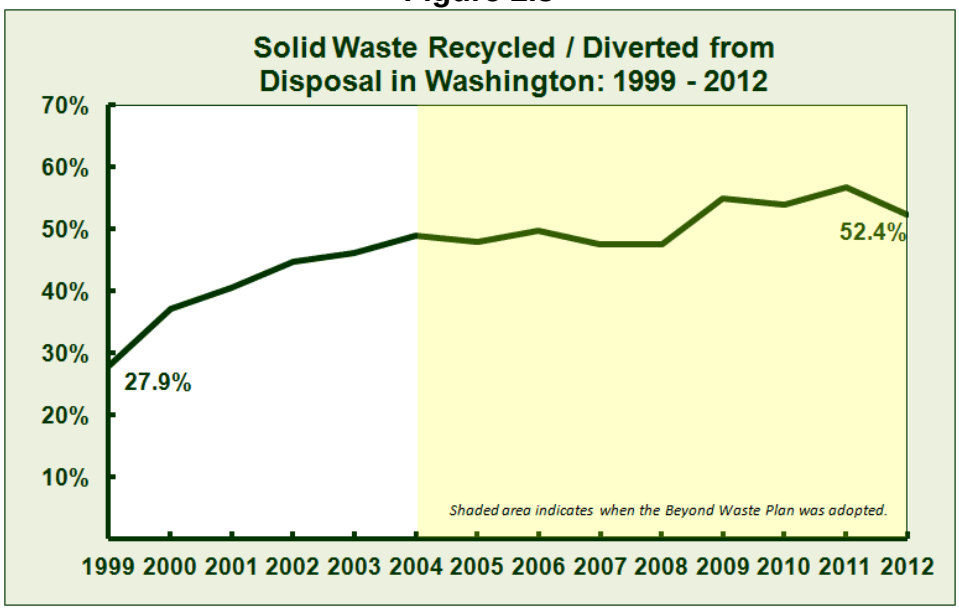
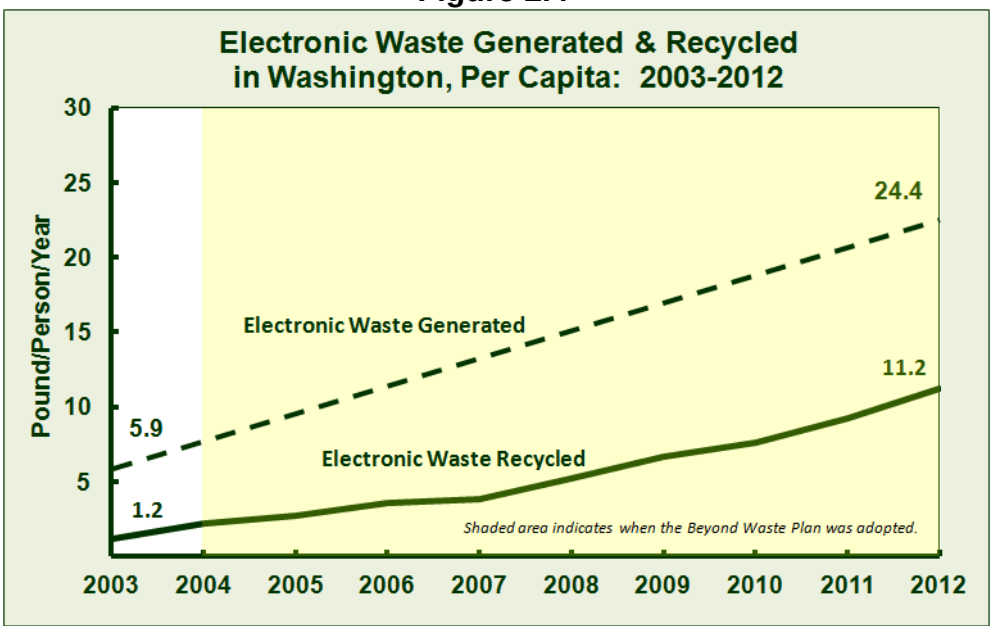
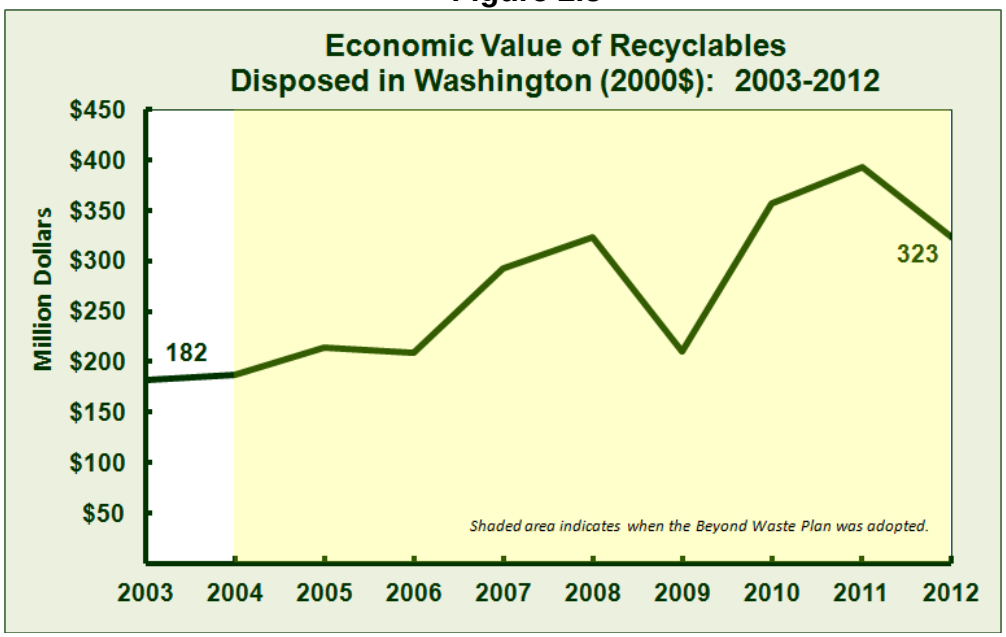


Figure 2.4



Some trends are disappointing. Despite our recycling efforts, in 2012 we disposed of recyclables worth $323 million in landfills (Figure 2.5).

Figure 2.5



Good news includes the index for toxic release risks from manufacturers is declining and we are creating less solid waste per dollar spent.

To see the full Progress Report, including detailed information about each indicator, see http://www.ecy.wa.gov/beyondwaste/bwprog_front.html.

Partnering for the Environment through Waste Tire Prevention

Waste tires removed from Kitsap County in 2012

An environment free of waste tires is important to the public health of all Washington citizens. Piles of waste tires harbor mosquitoes, snakes, and other vermin. West Nile Virus, transmitted by mosquitoes, threatens health. Tire piles also present a dangerous fire hazard. Many tire piles exist for a significant length of time. Ecology has been working with public entities to clean up unauthorized dumpsites and prevent further waste accumulation.

Waste Tire Removal Account (WTRA) funding, created in 2006, is used to prevent and remove illegal tire piles. Funds in this account come from a $1 fee added to new replacement tires sold in Washington. Since 2010, Ecology receives a biennial budget of $1 million from the WTRA. These funds are used for agency costs and waste tire projects around the state.

Table 2.6 details the use of Waste Tire Removal Account funds from 2007 through summer 2013. Efforts funded from 2007-10 focused on removal of more than 175 unauthorized waste tire piles around the state. In 2010, the Waste Tire Removal account funding for Ecology was reduced to $1 million per

biennium. Since 2011, the funds concentrate on removal of tire piles and amnesty efforts. Tire amnesty events generally consist of scheduled dates in a community when residents can drop off tires at no charge.

Table 2.6
Waste Tire Cleanups

Year	Tons of Tires	Dollars
2007	32,671	$4,300,079
2008	8,112	$1,882,295
2009	11,608	$2,617,249
2010	3,161	$762,019
2011	352	$112,415
2012	1,900	$476,661
2013	1,720	$314,458
2014	2,225	$498,282
TOTAL	**61,749**	**10,963,458**

Partnering for the Environment through Financial Assistance

Grants to Local Governments - Coordinated Prevention Grants

Coordinated Prevention Grants (CPG) have been historically funded by the Local Toxics Control Account (LTCA). Local governments use their CPG funds to implement their solid and hazardous waste programs. Current budget concerns in the state are putting pressure on all fund sources. One of our key initiatives over the next year will be to preserve dedicated accounts for solid waste management in Washington State.

Ecology administers the CPG Program through WAC 173-312, following the intent of the Model Toxics Control Act (Chapter 70.105D RCW) to:

- Fund local government projects that reduce contamination of the environment.
- Provide funding assistance to local governments for local solid and hazardous waste planning and for carrying out grant-eligible projects in those plans.
- Encourage local responsibility for solid and hazardous waste management.
- Promote regional solutions and cooperation between governments.

LTCA revenue is from the Hazardous Substance Tax (HST), a tax on the first possession of hazardous substances in the state. Ecology divides projected revenues to LTCA available each biennium for CPG into two portions: 80 percent for Solid and Hazardous Waste Planning and Implementation Grants, and 20 percent for Solid Waste Enforcement Grants. Solid Waste Enforcement Grants fund inspections and administrative expenses necessary to enforce state and local solid waste regulations pursuant to Chapter 70.95 RCW.

Eligibility

Eligible applicants for CPG grants include:

- Local planning authorities.
- Agencies designated as lead implementation agencies for Local Comprehensive Solid Waste Management Plans.
- Jurisdictional health departments (JHDs).

Ecology allocates available funds on a county-by-county basis, using a base amount for each county plus a per capita amount. Cities that are independent planning authorities and coordinate with counties are eligible to ask for and may receive funding up to the per capita allocation for their city. The availability and amount of funding depends upon legislative appropriations to the LTCA.

Grant Cycles

The CPG Program awards funds in two grant cycles: regular and offset.

Regular Cycle

Ecology allocates regular cycle funds based on the 80 percent allocation for Solid and Hazardous Waste Planning and Implementation grants, and 20 percent for Solid Waste Enforcement grants. CPG funds are distributed to recipients requesting their full or partial allocation in the regular cycle.

Offset Cycle

Funds for the offset cycle come from funds that no one requests in the regular cycle (unrequested funds), and from funds granted, but unspent during the regular cycle (unspent funds). Funds can also come from any special legislative appropriation. Ecology awards offset cycle funds through a competitive process.

2013-15 Biennial Grant Cycle

Regular Cycle - Allocation

CPG ran a two year grant cycle (July 2013 – July 2015). CPG received an allocation of $28.2 million. Based on recipient input, Ecology chose to move CPG to a two-year grant cycle that aligns with the state biennial budget starting with the 2013-15 Biennium.

Offset Cycle - Allocation

Ecology awarded funding for 31 grants totaling $1.2 million in the Offset Cycle which ran from July 1, 2014, and ends June 30, 2015 to Washington counties, cities, and health authorities.

2013-15 Twenty Four Month Grant

Regular Cycle

For the 2013-15 regular cycle, CPG drafted agreements based on a 24-month period (July 2013 –July 2015). Ecology aligned the agreements with the biennial calendar (July to June).

The Legislature allocated $28.2 million to the CPG Program for the 2013-15 Biennium. Ecology provided regular cycle funding to help local governments carry out their solid and hazardous waste management plans including recycling, household hazardous waste collection, and solid waste enforcement. Grants awarded from these funds began July 1, 2013. These grants also fund organics composting and conversion, green building, moderate risk waste practices, waste reduction and recycling, and commercial outreach. Ecology awarded 123 grants to Washington counties, cities, and health agencies totaling $28.2 million during the regular cycle.

2013-15 Regular Cycle Highlights

Expansion of Rural Recycling programs - Okanogan County continued to support local recycling by processing materials and supported local school program education. The county also conducted education and outreach for the residents which included:

- Management of the county recycling web page.
- Participation in the county fair booth.
- Advertisements in the local newspaper and radio station.

Household Hazardous Waste Collection - Adams County continued to operate and maintain household hazardous waste drop-off events. These were held each spring at the county transfer station. Adams County referred to their Solid Waste Management Plan to identify what items to collect at their event.

Recycling Outreach - The City of Bothell partnered with the City of Woodinville to hold an environmental education event named "Sustainamania." This public event ran each spring to educate the public on environmental programs and services available to them. The recipient publicized the event through social media, banner ads, and the city website.

Organics - Thurston County planned a food waste prevention campaign. They planned for phases of technical assistance, education, and outreach. The plan targeted residents, businesses, and schools. Over the two-year grant period, Thurston County:

- Scoped the media campaign.
- Activated a media blitz.
- Completed the hands-on education approach.
- Conducted eight school or community workshops.

Every household received media messages that increased awareness and provided them with tools to reduce their waste.

Offset Cycle

Unrequested funds from the 2013-15 Regular Cycle fund the competitive Offset Cycle. Ecology awarded Offset Cycle grants of approximately $1.2 million on July 1, 2014 that continue through June 30, 2015.

Implementation - City of Yakima Pilot Curbside Recycling Project entailed in Yakima County conducting a curbside collection pilot that targeted 600 households. The county:

- Assessed participation.
- Looked at set out rates of customers.
- Collected refuse and recyclable tonnages.
- Conducted composition tests.

The county included findings in a rate proposal showing the cost of a three stream collection system. .

Local Government Efforts Implementing the State Plan Using CPG Funds

Local governments are carrying out programs that support the State Solid and Hazardous Waste Plan vision.

Waste Reduction and Recycling

Local governments provide residential and commercial recycling, technical help to businesses, recycling collection events, education programs, onsite waste audits, and recycling drop-off locations. These activities help support the vision of the State Solid and Hazardous Waste Plan and increase Washington's recycling rate.

Hazardous Waste

Local governments help businesses and residents reduce and properly dispose of hazardous waste by building and maintaining hazardous waste collection facilities and conducting special collection events. Local governments also help small businesses with technical matters, promote use of less toxic products, and work with others to find solutions for problem wastes such as electronics and mercury.

Solid and Hazardous Waste Planning

Local governments work in cooperation with public officials, local solid waste advisory committees, and the public to develop plans for their communities. These plans outline effective approaches to reduce their solid and hazardous wastes and safely manage the wastes that remain.

Solid Waste Enforcement

Local governments enforce the solid waste laws and local ordinances. They enforce them by permitting and inspecting facilities; responding to complaints about illegal dumping and improper waste handling or storage; and issuing citations.

To view details of completed projects funded by grants, visit the Solid Waste Information Clearinghouse at https://fortress.wa.gov/ecy/swicpublic/. Select "Projects" from the top blue bar. Scroll down and search by ensuring the checkbox for "CPG Funding" is selected, and enter the following dates in the "Dates Project Active" fields: 7/1/2013 to 6/30/2015. Scroll down and click "Search." You will notice there are also many other ways to search for projects from this page.

CPG Offset Cycle Improvements Using the CPG Workgroup

The W2R Program has formed a CPG Workgroup comprised of one SWI grant recipient and one SWE grant recipient from each of Ecology's four regions across the state to represent CPG recipients. In addition to reviewing and commenting on the 2013-15 CPG Guidelines, the Workgroup examined the competitive CPG Offset Cycle grant program and made recommendations for process improvements. In

particular, the workgroup worked on setting priorities for the types of projects to fund and on scoring criteria for evaluating the applications submitted. The CPG Workgroup will be consulted in the future as other issues and projects are identified where stakeholder input is needed.

CPG to Join the Grants and Loans Program to Participate in the New Ecology Administration of Grants and Loans (EAGL) Process

EAGL is a comprehensive web-based grant and loan management system that allows Ecology's grant and loan clients to complete grant applications, submit payment requests with progress reports, submit closeout reports, and request amendments online. The system provides a streamlined application and reporting process for both external clients and Ecology staff. In addition, as a paperless system, both natural resources and shipping costs are saved. CPG recipients in the 2015 Regular Cycle will apply online with the EAGL system.

Grants to Citizens - Public Participation Grants (PPG)

Purpose

Washington's *Chapter 170.105D RCW, Hazardous Waste Cleanup - Model Toxics Control Act* provides for a PPG Program. PPGs provide funding to citizen groups and not-for-profit public interest organizations. These grants encourage public involvement in monitoring cleanup of contaminated sites and pollution prevention through waste reduction/elimination. A PPG can fund up to $120,000 for a two-year project and there is no requirement for matching funds. There are two types of PPG Projects:

1. *Contaminated Site Projects* encourage public involvement in investigation and cleanup of contaminated sites. Examples include:

    - Conducting public walking tours of the Anacortes Bay Wide cleanup site.
    - Developing a school curriculum regarding the Hanford cleanup site and its history.
    - Providing health advisories to ethnic communities regarding Spokane River contamination.

2. *Waste Management Projects* encourage public involvement to eliminate or reduce waste. Examples include:

    - Providing information on recycling and sustainability to low-income communities.
    - Introducing biochar technology and its applications to rural communities.
    - Educational campaigns to keep toxic materials out of Puget Sound.

Fiscal Year 2014

The PPG Program started the 2013-15 funding cycle. The PPG Program received $3.53 million for the 2013-15 Biennium. The funding allowed PPG to award 22 contaminated site grants and 20 waste management grants. Sixteen of the twenty-two contaminated site grants were awarded to 2011-13 grant recipients. New cleanup sites covered by PPG include Lake Washington, Magnuson Park, Bellingham Bay, March Point Landfill, and the Boeing Fabrication Plant (Auburn).

Fiscal Year 2015

The application period for the 2015-17 PPG funding cycle opened in November 2014. 2015-17 PPGs will be selected before the end of Fiscal Year 2015. Ecology anticipates that the PPG program will receive $3.9 million for the 2015-17 Biennium.

Table 2.7
PPG Projects for 2013-15

Organization	County	Purpose	Funding Awarded
Contaminated Site Grants			
Friends of Skagit Beaches	Skagit	Provide public education and outreach regarding the Anacortes Bay Wide cleanup.	$116,000
Hanford Challenge	Statewide	Improve and expand understanding of Hanford issues, and provide meaningful public engagement.	$120,000
Institute for Neurotoxicology and Neurological Disorders (INND)	King and Snohomish	Identify sources of potentially unhealthful toxics and odor from large-scale compost operations.	$70,000
Columbia Riverkeeper	Statewide	Provide public education and outreach regarding the Hanford cleanup.	$120,000
Washington Physicians for Social Responsibility	Statewide	Statewide public education about Hanford in order to promote public participation in Hanford cleanup decision making.	$120,000
Citizens for a Healthy Bay	Pierce	Engage the public in protecting the health of Commencement Bay through education.	$78,000
Georgetown Crime Prevention and Community Council	King	Provide public education and outreach regarding the Phillips Services Georgetown cleanup site.	$50,000
Olympic Environmental Council	Clallam	Engage and educate the public regarding the Rayonier Mill and Port Angeles Harbor cleanup and restoration.	$88,000
The Lands Council	Spokane, Stevens, and Lincoln	Involve ethnically diverse members of the public on Spokane River cleanup and restoration.	$55,000
Heart of America NW Research Center	Statewide	Provide information and citizen participation opportunities focused on	$110,000 $115,000

Organization	County	Purpose	Funding Awarded
(HOANWRC)		the cleanup of Hanford. Grants cover two separate Hanford sites.	
Brackett's Landing Foundation	Snohomish	Encourage community involvement in cleanup decisions at the UNOCAL/Chevron site.	$49,000
Duwamish River Cleanup Coalition	King	Provide education and outreach regarding the Duwamish River cleanup.	$120,000
Futurewise	Snohomish	Provide education and outreach regarding the Port Gardner Bay cleanup to community members.	$100,000
Lake Roosevelt Forum	Lincoln, Stevens, Ferry, and Grant	Improve community engagement and understanding of Lake Roosevelt RI/FS.	$46,000
HOANWRC	Statewide	Provide education and outreach regarding the US Ecology-Hanford cleanup site.	$75,000
HOANWRC	King	Provide education and outreach regarding the Lake Washington and Magnuson Park cleanup sites.	$80,000
RE Sources for Sustainable Communities	Whatcom, Skagit	Provide education and outreach regarding the March Point Landfill and Bellingham Bay cleanup sites.	$76,000
Futurewise	King	Provide education and outreach to Algona residents regarding the Boeing Fabrication Plant cleanup site.	$120,000
HanfordLearning.Org	Statewide	Develop classroom curriculum on the Hanford cleanup site.	$108,000
Waste Management Grants			
Spokane River Forum	Spokane, Stevens, Lincoln	Spokane River waste and toxics reduction education and outreach.	$51,000
INND	Statewide	Northwest Children's Environmental Health Forum.	$30,000
Spokane Neighborhood Action Partners	Spokane	Living green sustainability education and outreach.	$80,000
Sustainable Obtainable Solutions	Okanogan, Ferry, Stevens, Pend Oreille	Introduce biochar technology and applications to rural communities.	$115,000
Nisqually River Foundation	Thurston, Pierce, Lewis	Storm water runoff pollution education.	$88,000
Environmental Coalition of South Seattle	Snohomish	Small business pollution prevention education and outreach.	$65,000
Port Townsend Marine	Jefferson	Toxics reduction in storm water runoff	$90,000

Organization	County	Purpose	Funding Awarded
Science Society		educational displays.	
Sustainable Resources INW	Statewide	Create a byproduct synergy network of industries and institutions.	$108,000
YMCA of Greater Seattle	King, Snohomish	Earth Service Corp.	$60,000
Zero Waste Washington	King	Neighborhood lending library for durable products.	$84,000
Zero Waste Washington	King	Child car seat recycling program.	$53,000
Facing the Future	Statewide	Hanford student educational curriculum.	$94,980
Yakima Valley Habitat for Humanity	Yakima	Increase contractor participation in Habitat for Humanity stores.	$80,000
Seattle Tilth Association	King	Household waste reduction education and outreach.	$100,500
Network for Business Innovation and Sustainability	Statewide	Byproduct synergy education and outreach.	$114,000
YMCA of Pierce and Kitsap Counties	Pierce, Kitsap	Puget Sound outdoor education program.	$110,000
Habitat for Humanity-Seattle	King	Green building education and outreach.	$109,500
Puget Soundkeeper Alliance	Statewide	Marina pollution prevention education.	$60,000
Just Health Action	King	Environmental Justice education.	$40,000
Salish Sea Expeditions	Puget Sound	Sound & Source education program.	$60,000
Pacific NW Pollution Prevention Resource Center	King, Snohomish	Auto shop waste reduction education and outreach.	$54,000
Puget Creek Restoration Society	Pierce, King	Puget Sound storm water pollution education.	$55,000
Total for 2013-15 Biennium			**$3,528,584**

Partnering for the Environment through Local Planning

Local solid waste planning is the cornerstone of solid waste management in Washington State. The Legislature asks counties and cities to make sound decisions about solid waste handling based on approved and "current" comprehensive solid waste management plans *(RCW 70.95.110(1)).*

Comprehensive plans detail all solid waste handling facilities within a county. The plans estimate the long-range needs for solid waste facilities over a 20-year period. The state intended these plans to guide a county as it lays the foundation for its solid waste system. Since 1989, the state has required counties and cities to provide detailed information on waste reduction strategies and recycling programs, along with schedules to carry out the programs. They are to maintain the plans in "current condition."

In 1985, the Legislature amended the *Hazardous Waste Management Act, Chapter 70.105 RCW* to require local governments, or a combination of neighboring local governments to prepare plans to manage moderate risk waste (MRW). By 1991, all local governments submitted local hazardous waste plans. Every local hazardous waste plan includes parts on MRW public education, MRW enforcement, household hazardous waste (HHW) collection and technical and disposal assistance to conditionally exempt small quantity generators (CESQGs).

In 1991, the Legislature enacted the *Used Oil Recycling Act, Chapter 70.95I RCW*, which required local governments to amend their hazardous waste plans to include used motor oil from households.

Since their hazardous waste plans were completed, some counties have revised them. Some have combined their solid waste and hazardous waste plans. One recommendation of the State Solid and Hazardous Waste Plan (Beyond Waste) is to fully implement local hazardous waste plans.

In 2010, Ecology updated the *Guidelines for the Development of Local Solid Waste Plans and Plan Revisions* and the *Guidelines for Developing and Updating Local Hazardous Waste Plans.* Both documents and other planning information are available at http://www.ecy.wa.gov/programs/swfa/localplan.html.

Ecology is currently in the process of updating the *Guidelines for the Development of Local Solid Waste Plans and Plan Revisions* to clarify city responsibilities for independent planning, encouraging electronic submittal of local plans, improving the five-year review, and revising as necessary. Draft guidelines will be out for review in spring 2015.

Ecology provides technical assistance to local governments as they prepare and carry out their plans, and also approves them. Coordinated Prevention Grants (CPG), discussed earlier in this chapter, provide funds for both planning and implementation programs. Table 2.8 lists the current status of local solid waste plans and hazardous waste plans for each county, and one city (Seattle) that does individual plans.

Table 2.8
Current Status of Solid & Hazardous Waste Plans
in Washington as of December 2013

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
Adams	2005	50% WR/R by 2012.	1992	No	Comprehensive Solid Waste Management Plan (CSWMP) updated April 2005.
Asotin	2011	No specific number mentioned.	1993	No	Approved April 2011.
Benton	2007	50% by 2020.	1991	Yes	Ecology is awaiting the submission of the final draft of Benton County's 2014 CSWMP.
Chelan	2007	25% recycling rate by 2010. 5% reduction from the current waste stream by 2010.	1990	Yes	The review process for Chelan County's new CSWMP began in the third quarter of 2014.
Clallam	2014	40% diversion goal	2014	Yes	
Clark	2008	50% recycling rate.	2008	Yes	A preliminary draft plan expected in December 2015.
Columbia	2003	20% WR/R.	1991	No	CSWMP revision. Ecology has commented. . Final plan expected in February 2015.
Cowlitz	2012	50% recycling rate.	2012	Yes	SW and HW plans approved in 2012.
Douglas	2010	10% residential recycling, 10% commercial recycling, and 20% public sector recycling by 2015.	2010	Yes	The review for Benton County's new 2015 CSWMP began second quarter 2014.
Ferry	2011	30% recycling by 2015.	2011	Yes	Plan completed and approved 2011.
Franklin	2011	References state goals, but doesn't commit to a number of their own.	2011	Yes	Plan approved March 2011.
Garfield	2008	No specific number commitment.	1992	No	CSWMP approved September 2008.
Grant	2008	40% in five years.	1992	No	Part of a combined Grant-Adams-Lincoln Counties MRW plan that hasn't been followed for a decade or longer. Administrative amendments to recycling chapter in process in October 2014.

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
Grays Harbor	2013	Reduce waste by 5% through recycling.	2013	Yes	Plan approved in 2013.
Island	2008	Assist the state in achieving its goal of 50%.	2008	Yes	Updated combined plan is currently under Ecology review. Final approval expected fall 2014.
Jefferson	2008	50% recycling and diversion .	1991	No	Preliminary draft plan expected in 2015.
King	2002	50% residential by 2006. 43% nonresidential by 2006.	2010	No	CSWMP draft update went out for public comment on October 8, 2009. The preliminary draft was submitted to Ecology on April 1, 2011. The CSWMP is currently with the Executive's Office; however, due to potential changes in the transfer system plan, it may need another update before submitting a final to Ecology. Because the city of Seattle and King County have independent CSWMPs, the HW plan remains independent. The HW plan was approved July 2010.
King - Seattle	2013	Overall recycling rate by 2015: 60%. Overall recycling rate by 2022: 70%.	2010	No	Because the city of Seattle and King County have independent CSWMPs, the HW plan remains independent and is administered by the Local Hazardous Waste Management Program. The HW plan was approved July 2010. The final CSWMP update was approved June 2013.
Kitsap	2011	Supports the state goal of reaching 50% recycling.	2011	Yes	The final combined CSWMP/HWMP update was approved June 2011.
Kittitas	2012	Countywide recycling rate of 50%. Supports the state goal of reaching 50% recycling.	1991	Yes	Final CSWMP approved July 2012.
Klickitat	2013	Countywide recycling and diversion goal of 50%.	2000	Yes	Final CSWMP approved April 2013.

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
Lewis	2008	Increase recycling.	2008	Yes	A preliminary draft plan is expected in 2015.
Lincoln	2011	Commits to assisting the state to meet its 50% goal.	2011	Yes	Plan approved March 2011.
Mason	2007	Increase recycling.	2011 by amendment	Yes	A preliminary draft plan expected in 2015.
Okanogan	2012	Supports the state goal of reaching 50% recycling.	2006	Yes	Final CSWMP approved October 2012.
Pacific	2006	Increase the recycling rate by 50 tons.	1990 – 2000 Operations Plan	Yes	A preliminary draft plan is expected in 2015.
Pend Oreille	2011	References state goal without committing to a number of their own.	2011	Yes	Plan approved January 2011.
Pierce	2008	75% recycling and diversion rate.	1990	No	A preliminary draft plan expected in 2015.
San Juan	2012	50% recycling rate by 2018.	2012	Yes	
**San Juan - Town of Friday Harbor	2014	Support the state's recycling goal of 50%.	2014	Yes	
Skagit	2005 (amended 2008)	50% diversion.	1992	No	Has just started update process for CSWMP. No plans to update HW plan.
Skamania	2015	50% recycling rate.	2015	Yes	
Snohomish	2013	Supports the state goal of reaching 50% recycling.	1993	Yes	The final combined CSWMP/HWMP update was and approved November 2013.
Spokane	2011	Commits only to working toward state goal of 50%. Currently at 46%.	1993	Yes	Current plan approved April 2011. The regional system described in this plan terminated November 2014. Final draft of new plan currently making the rounds for adoption by county and participating municipalities. Final draft submission expected in February 2015
**Spokane - City of Cheney	2014	No specific percentage commitment.	2014	Yes	Plan approved July 29, 2014
**Spokane - Liberty Lake	Pending (late 2014-early 2015)	No specific percentage commitment.	Pending (late 2014-early 2015	No	Preliminary draft currently under Ecology review.

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
**Spokane - City of Spokane Valley	Pending (late 2014-early 2015)	Don't know yet.	June 1990	Yes	Preliminary draft of combined plan expected to be submitted to Ecology by end of October 2014.
Stevens	2006	36% WR/R by 2012.	1993	No	Plan revision is in final draft and being circulated to municipalities for adoption. Expected by early 2015.
Thurston	2013	Increase recycling rate by 5%.	2014	No	SW plan approved in 2013. HW plan approved in 2014.
Wahkiakum	2015	20% recycling rate.	2015	No	A final combined SW and HW plan expected in 2015.
Walla Walla	1994	50% diversion by 2023.	1991	Yes	City of Walla Walla administers a county-wide plan under an interlocal agreement. Combined plan preliminary review by Ecology completed. Awaiting final draft with responses and resolutions of adoption. Expect approval by end of 2014.
Whatcom	2010	50% diversion.	2010	Yes	New combined SW-HW plan approved 2010, but dated 2008. Plan update underway as of mid-2014.
Whitman	2012	No recommendation.	2012	Yes	Plan approved July 2012.
Yakima	2010	Support the state's recycling goal of 50%.	2010	Yes	2015 CSWMP plan review started Q1 2014.

*Combined plans approved prior to 2010 are not considered full revisions of the Local Hazardous Waste Management Plan (LHWP). New planning guidelines were published in 2010 that define a clear process for incorporating LHWPs into Comprehensive Solid Waste Management Plans. Combined plans approved after 2010 are required to meet the planning requirements prescribed in 70.105 RCW & 70.95I RCW. All other combined plans prior to 2010 were only approved in accordance with the solid waste planning requirements prescribed in 70.95 RCW, thus are not official LHWP updates.

**City has independent plan.

Outreach, Assistance, and Information Sharing

Washington State Solid Waste Information Clearinghouse

In 2004-06, a committee of several local government staff worked with Ecology to plan and develop the information sharing website. The Information Clearinghouse allows Coordinated Prevention Grant (CPG) recipients to report work accomplished online and share project information, lessons learned, and materials produced (posters, reports, videos, etc.) with anyone who has Internet access. Access to each

other's work gives all local governments the opportunity to strengthen and coordinate their programs. The system can also collect basic information about county and city programs.

The main audience for this site is local government solid and hazardous waste and health department staff. The Information Clearinghouse includes:

- State Profile.
- County and City Profiles.
- Local Projects.
- Outreach Materials & Other Resources.

The year 2014 marked the fourth anniversary the completed site was operational (https://fortress.wa.gov/ecy/swicpublic/). As of October 2014, the site had 252 registered users and contained 1,356 posted (publicly viewable) projects, 1,493 posted resources, 271 solid waste staff contacts, and 107 health department staff contacts.

The challenge of getting the local city and county profiles populated with data remains. This relies on a partnership between Ecology and local governments, as each is responsible for updating various pieces of the profiles.

In the coming year, Ecology will coordinate with statewide city and county planners to ensure the Clearinghouse contains the most up-to-date version of their existing solid waste plans. Ecology will also assess the training and readiness of stakeholders to use the Information Clearinghouse and determine if users need additional training. The W2R Program Data Team will integrate the Clearinghouse with other data collection, storage, and analysis systems used throughout the program. Ecology will also consider migration of other grant programs into the Clearinghouse to increase resource availability.

Landfill and Incinerator Operator Certification Programs

Washington State law requires solid waste landfills and incinerators to have certified operators onsite at all times (*Chapter 70.95D RCW, Solid Waste Incinerator and Landfill Operators*). The Legislature created the Landfill and Incinerator Operator Certification program in 1989 through the *Waste Not Washington Act.* To carry out the law, the state adopted a rule in June 1991 (*Chapter 173-300 WAC, Certification of Operators of Solid Waste Incinerators and Landfill Facilities*).

The requirement to have certified operators onsite at all times applies to the following types of facilities:

- Municipal solid waste landfills.
- Inert landfills.
- Limited purpose landfills.
- All incinerators that burn solid waste.

The law also requires that any person officially inspecting these solid waste facilities be a certified operator.

Originally, Ecology developed the course curriculum and administered the tests. Because of staff and budget reductions, in February 2004 Ecology reached an agreement with the Solid Waste Association of North America (SWANA) to conduct training, testing, continuing education, recertification, and program administration for landfill certification. SWANA annually provides Ecology with a list of currently certified persons. The incinerator certification program continues to be Ecology's responsibility.

In 2013, Washington had 164 active operator/inspector landfill certifications (down from 173 in 2012). We also had 76 active operator/inspector incinerator certifications (up from 68 in 2012).

One of the concerns with the current certification program is the focus on national issues and regulations. There is no specific focus on Washington requirements. The SWANA curriculum focuses on topic areas such as landfill siting and surveying that do not add to compliance or environmental protection.

There are also issues with cost and travel restrictions for local governments with increasing budget restrictions. For some it would be beneficial to obtain certification for operators and inspectors without traveling or taking a test.

Also, many landfill operators do not have the math skills to pass a SWANA test, even though they are quite capable of safely operating a landfill and compliant with applicable rules. There has been interest in developing a different program for certification.

Ecology, health districts, and counties will work, as time and resources allow, to develop their own curriculum and program, and offer training and testing. This would give an alternate path to operators and inspectors to obtain certification and meet requirements of our rule.

Recycling Information Line

The W2R Program operates a statewide website and toll-free information line to help citizens find ways to reduce waste and recycle. While many local governments operate information lines in their own areas, the statewide information line continues to serve as the primary waste reduction resource site for most Washingtonians.

Ecology's 1-800-RECYCLE hotline provides callers with information on general recycling locations, specialized recycling opportunities (including one-time collection events), and targeted waste streams like mercury-containing items. The E-Cycle Washington (electronics recycling) Program continues to use the information line for guiding the public to local electronics recycling locations.

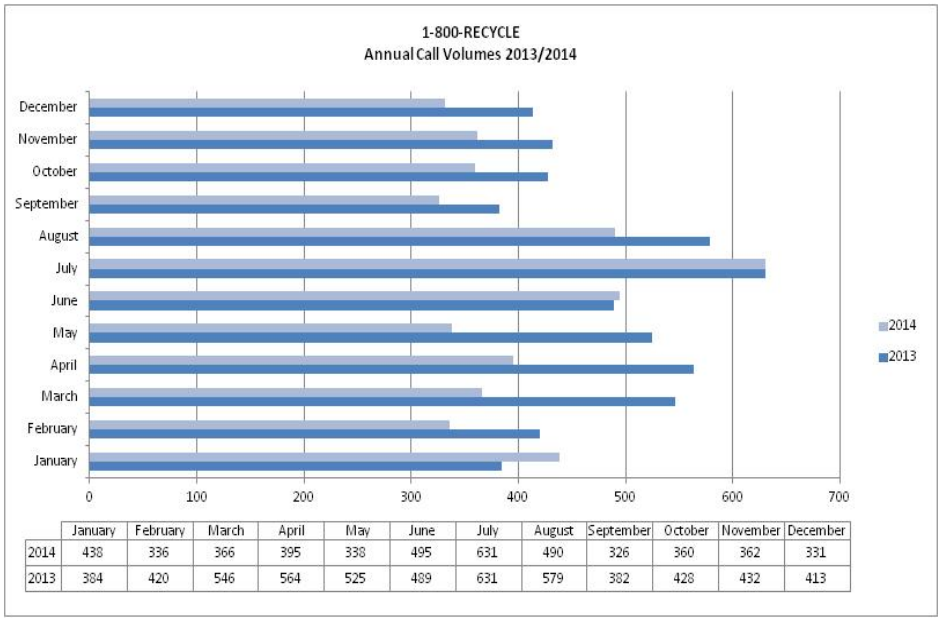
The hotline is currently coordinating with the new Mercury Lights Program to assist the public in finding convenient drop-off locations for their mercury lights. The hotline is also a source for locations to recycle wood stoves for programs that Ecology's Air Quality Program implements.

Hotline operators use a database to direct callers to locations for safe disposal of household hazardous waste and recycling facilities across the state. The database provides information on a wide variety of recyclable materials, including:

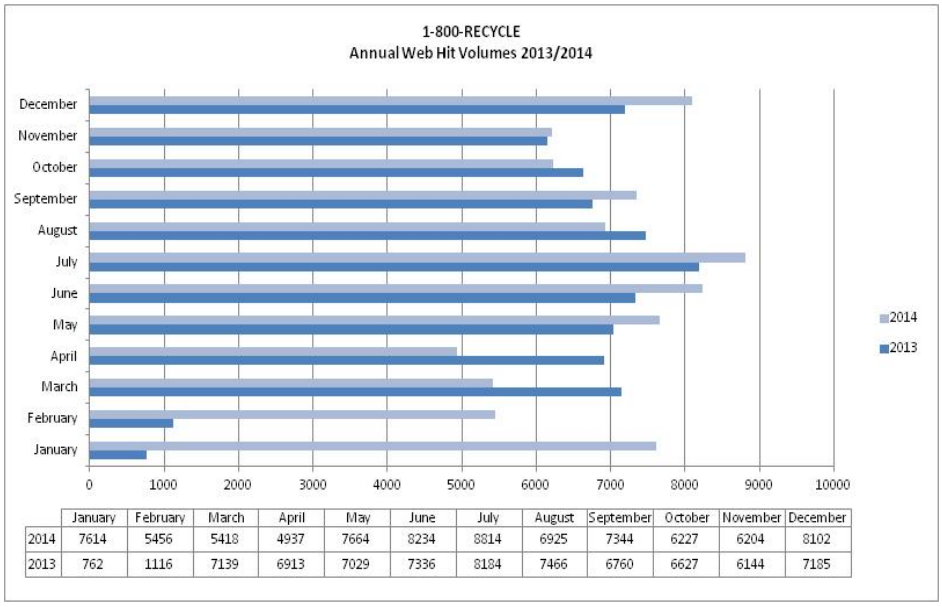
- Construction, demolition, and land clearing debris.
- Used motor oil.
- Electronics.
- Pharmaceuticals.

The database also lists companies that offer commercial pickup for business recycling and residential curbside haulers.

The majority of the public receives recycling information by searching the database on the 1-800-RECYCLE website at http://1800recycle.wa.gov. The amount of traffic on the website has remained steady since the last year, and hotline staff has invested resources in improving the website's functionality. One key improvement is a recent update that allows searches by zip code, which helps callers find more convenient recycling locations. Online users will soon be able to see the results in map or list views.



	January	February	March	April	May	June	July	August	September	October	November	December
2014	438	336	366	395	338	495	631	490	326	360	362	331
2013	384	420	546	564	525	489	631	579	382	428	432	413



	January	February	March	April	May	June	July	August	September	October	November	December
2014	7614	5456	5418	4937	7664	8234	8814	6925	7344	6227	6204	8102
2013	762	1116	7139	6913	7029	7336	8184	7466	6760	6627	6144	7185

Ecology staff maintains the database by routinely analyzing recyclers' websites and recording changes. Hotline staff will occasionally contact recyclers to determine commodities handled, location (or areas served), and hours of operation. The website also provides links to other online databases and material exchanges, along with local government and recycling organization websites.

The 1-800-RECYCLE website includes a web page developed for kids of all ages. The Kids Page at http://www.ecy.wa.gov/programs/swfa/kidspage/ has clever links to other environmental education sites and fun environmental games to play. It also has interesting trivia facts on different recyclable materials.

You can now visit 1-800-RECYCLE on Facebook at https://www.facebook.com/1800recycle.wa.gov. We are using social media to increase contact with recyclers and more effectively communicate with the Washington population.

Chapter 3: Statewide Litter Prevention & Cleanup Programs

Chapter 70.93 RCW, *the Waste Reduction, Recycling, and Model Litter Control Act*, assigns Ecology lead agency status to manage statewide litter programs. Since 2009, work on litter control and litter prevention activities has been significantly reduced due to budgetary constraints. For the 2013-15 Biennium, the Legislature diverted more than 50 percent of the Waste Reduction, Recycling and Litter Control Account (WRRLCA) to State Parks and Recreation Commisstion (Parks). Available funds for litter pickup efforts are reduced. Funding for litter pickup for this biennium is being directed to the Department of Corrections (DOC), Department of Natural Resources (DNR), and Ecology (EYC) only. Other impacts to the litter program include:

- No funds to carry out the litter prevention campaign.
- No funds to conduct the statewide litter survey.
- No staff for the Litter Hotline to respond to citizen complaints about litter.
- No staff or funds to fulfill public requests for litter and secured loads materials.
- No funds for litter efforts by the departments of Fish and Wildlife (WDFW) or Transportation (WSDOT).

With the continued reduced funding, Ecology put forward the following efforts in litter control and pickup:

- Helped coordinate litter pickup activities. Managed allocations from the WRRLCA for other state agencies.
- Deployed 48 summer Ecology Youth Corps (EYC) litter cleanup crews statewide. Most of these crews worked between 15 and 18 days. Also deployed six Ecology median crews in spring and fall and one median crew in summer.
- Administered the Community Litter Cleanup Program (CLCP).
- Maintained productive partnerships with other state agencies and local governments.

Litter Prevention Campaign

There was no funding or staff to implement a comprehensive prevention campaign in 2013 or early 2014. There is no funding or staff to support a prevention campaign for the 2013-15 Biennium.

Secured Load Materials and Website

There was no secured loads campaign in 2013 or early 2014 other than the enforcement activity described below. There is no funding for a secured loads campaign in 2013-15. The litter website is still operational, but we have informed readers that many of the activities described on the website are currently suspended.

Enforcement Activities

The last time Ecology supported litter emphasis patrols was in May 2011 when, WSP conducted litter enforcement patrols along the I-5 corridor and in Spokane. The 2011 effort lasted four weeks, with law enforcement officers logging approximately 650 hours, making 534 litter educational contacts which resulted in 112 litter citations.

There are no plans for a litter emphasis patrol in the 2013-15 Biennium.

Litter Hotline Program

The Litter Hotline is a toll-free phone line (1-866-LITTER-1) for the public to report littering incidents they witness, such as a person throwing something out the window of a vehicle or an item falling from an unsecured load.

Because of the budget reduction to WRRLCA, starting in July 2011 Ecology suspended answering the hotline. The hotline now has a recorded message for callers:

> *"Thank you for calling the 1-866-LITTER-1 reporting line. Due to state budget cuts, we are now unable to accept reports on witnessed littering events. We hope that this service might be restored in the future, but for now it has been suspended. If this is an emergency regarding a dangerous unsecured load, please hang up and dial 911. And thank you for doing your part to keep Washington clean."*

Ecology is no longer sending letters to litter violators. Ecology's "Litter and It Will Hurt" signs remain on the state's highways as a visual reminder to the public to not litter. The litter hotline still receives between 200 and 250 calls per month due to these signs being up.

Litter Program Fund Allocation

The Legislature cut the 2011-13 WRRLCA budget by $10 million and suspended the 20/30/50 allocation requirements for Fiscal Year 2011-13. In the 2013-15 budget, $11.7 million was swept from the account to Parks for maintenance and operations of state parks. The 20/30/50 allocation parameters were restored.

WRRLCA supports a variety of programs. The fund's 20/30/50 allocation is as follows:

- $1.82 million to Local Government Funding Programs.
- $2.74 million to Ecology Waste Reduction & Recycling Activities.
- $4.56 million to Ecology and other State Agency Litter Cleanup & Prevention Activities.

Continued funding cuts will result in more litter created and less litter picked up. Some specific results of the cuts include:

- Ecology worked at a reduced level of effort with our summer EYC.
- Ecology suspended most of the Litter and it will Hurt campaign. Only the roadway signs and an edited Ecology-hosted website remain to inform state residents about littering. We no longer answer the litter hotline, and there is no way for the public to report littering incidents.
- WSP still enforces state litter laws, but there are no Ecology funded emphasis patrols for the upcoming biennium that focus on litter violations and secured loads.
- Ecology reduced funding to DNR and DOC, and cut funding completely to WSDOT, WDFW, and Parks (for litter pickup).

Ecology Youth Corps

2013 marked the 38th year of operation for the EYC. The EYC website at www.ecy.wa.gov/programs/swfa/eyc/index.html includes regional hiring information, applications, and photos of the EYC in action.

RCW 70.93.020 requires creation of "*jobs for employment of youth in litter cleanup and related activities.*" The EYC operates two types of crews: youth and median. Youth crews operate in the summer months (June - August). Most median crew activity occurs in the spring and fall, with reduced median crew activity in the summer.

Youth crews consist of members 14-17 years old. They mostly clean shoulder areas and interchanges of major state routes and interstates. In 2013, received 3,119 applications and hired 293 youth. Youth crews typically work two four-week summer sessions with a complete turnover of crews occurring mid-summer. However in recent years we have run some crews at three weeks each to stretch our dollars and provide more youth job experience.

During the 2013 EYC crew season, litter on state highways was collected in the following counties:

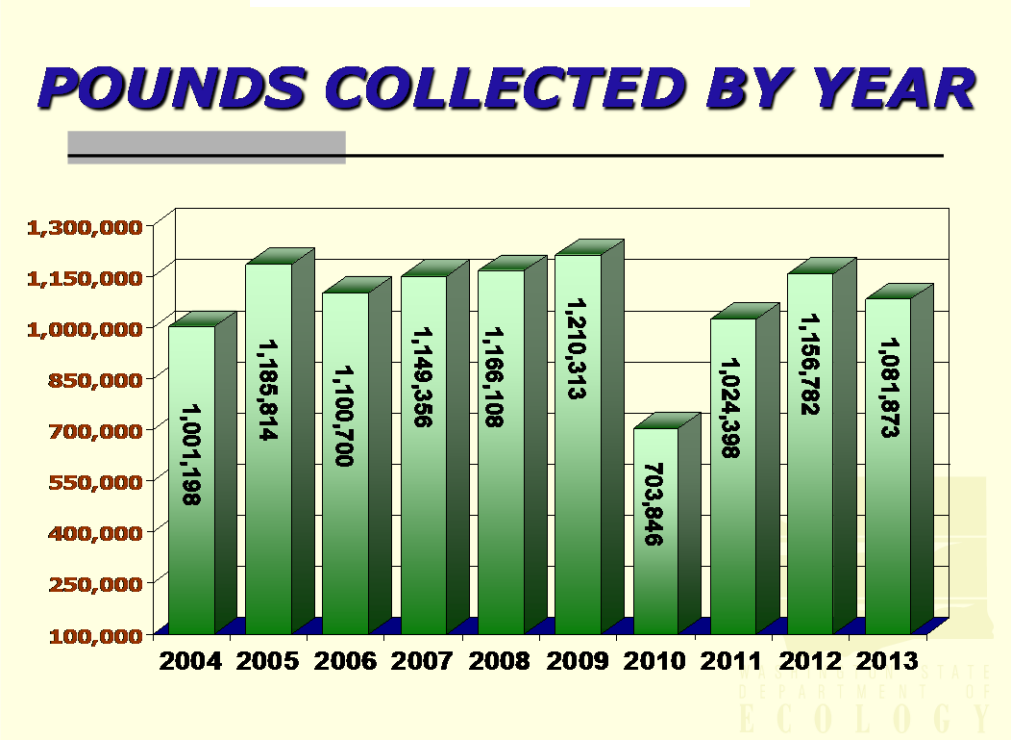
- ✓ Central Region (CRO): Benton, Kittitas, Klickitat, and Yakima.
- ✓ Eastern Region (ERO): Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla and Whitman.
- ✓ Northwest Region (NWRO): Island, Kitsap, King, San Juan, Skagit, Snohomish, and Whatcom.
- ✓ Southwest Region (SWRO): Clark, Cowlitz, Grays Harbor, Lewis, Mason, Pierce, and Thurston.

The most recent totals for the EYC program are for the 2013 crew season.

Table 3.1
Ecology Youth Corps Program Outputs

	Jan - Dec 2013
Total Hours Worked (Supervisor + Crew)	64,875
Total Pounds Collected (Litter + Illegal Dump + Recycled)	1,081,874
Miles	5,957
Acres	608
Number of Illegal Dumps Cleaned	192

Figure 3.1



Litter Survey

Ecology did not conduct the 2008-09 Litter Survey because of budget cuts, and there was no funding for it in 2011 or 2012. Because of the continued budget reduction to WRRLCA for 2013-15, there is still no funding to conduct the survey. Information on previous litter studies is available on the litter webpage at http://www.ecy.wa.gov/programs/swfa/litter/public.html#a1.

Community Litter Cleanup Program

In 1998, Ecology created the Community Litter Cleanup Program (CLCP) with the goal of providing financial assistance to local governments to combat litter and illegal dumps on roadways and other public land. CLCP contracts are written on a biennial schedule (two-year period from July-June). The contracts are a key component of statewide litter and illegal dump cleanup programs.

Most local governments participating in CLCP use in-custody (jail) or community service crews to do litter cleanup work. The use of these crews provides significant savings to local jails and returns labor value to communities that participate. Several jurisdictions also use volunteer groups to assist in cleanup and or educational efforts.

Table 3.2 highlights the work accomplished through CLCP for 2013.

Table 3.2
Community Litter Cleanup Program Outputs

	Jan - Dec 2013
Total Hours Worked (Supervisor + Crew)	91,072
Total Pounds Collected (Litter + Illegal Dump + Recycled)	2,005,513
Miles	15,984
Acres	827
Number of Illegal Dumps Cleaned	3,045

CLCP has $1.824 million available for the 2013-15 Biennium, about $1.1 million less than fully funded years.

Litter Cleanup by Other State Agencies

Because of Legislative reductions to WRRLCA for 2011-13, state agencies saw a decrease in funding from previous years. Additional budget reductions to WRRLCA for 2013-15 have further impacted state agency litter pickup budgets. WDFW and WSDOT were eliminated from the budget. Parks received no monies for litter cleanup activities, but as previously noted received more than 50 percent of all WRRLCA dollars for Parks operations and maintenance.

DNR was reduced to $200,000. DOC was reduced by $200,000 to $420,000. Table 3.3 shows the budget for three biennia.

Table 3.3
Ecology Interagency Agreements for Litter Activities
July 1, 2009 – June 30, 2015

	2009-11 Biennium	2011-13 Biennium	2013-15 Biennium
Department of Corrections	$620,000	$620,000	$420,000
Department of Fish and Wildlife	$ 20,000	$0	$0
Department of Natural Resources	$415,000	$320,000	$200,000
Department of Transportation	$ 85,000	$ 0	$0
Parks and Recreation Commission	$ 40,000	$ 0	$0
Total	$1,180,000	$940,000	$620,000

Parks and Recreation Commission

Because of the continuing budget reductions to WRRLCA for 2013-15, Parks again is not receiving funding for litter pickup for the biennium.

Department of Fish and Wildlife

Because of the continuing budget reductions to WRRLCA for 2013-15, WDFW again is not receiving funding for litter pickup for the biennium.

Department of Corrections

DOC receives funding from Ecology to run community based correctional litter crews on state roads, state lands, and in local communities. The funds support crews in Seattle, Tacoma, Monroe, Wenatchee, Ellensburg, Yakima, the Tri-Cities, Moses Lake, Spokane, and Everett. For the 2013-15 Biennium, funding for DOC was reduced to $420,000 or 1,112 days. Table 3.4 summarizes DOC's litter crew activity in 2013.

Table 3.4
Department of Corrections Litter Removal Activity

	Jan - Dec 2013
Total Hours Worked (Supervisor + Crew)	28,815
Total Pounds Collected (Litter + Illegal Dump + Recycled)	495,740
Miles	1,705
Acres	27
Number of Illegal Dumps Cleaned	3

Department of Natural Resources

DNR Camps Program, in partnership with DOC, puts offender crews to work on state lands. As Table 3.5 illustrates, this program has considerable impact on litter cleanup and illegally dumped materials in state-owned forests. Table 3.5 summarizes DNR crew activity in 2013.

Table 3.5
Department of Natural Resources Litter Removal Activity

	Jan - Dec 2013
Total Hours Worked (Supervisor + Crew)	14,025
Total Pounds Collected (Litter + Illegal Dump + Recycled)	190,375
Miles	1,076
Acres	219
Number of Illegal Dumps Cleaned	454

Because of the budget reduction to WRRLCA for 2013-15, DNR's funding was further reduced to $200,000.

Department of Transportation

WSDOT is responsible for picking up litter along state roads, including bags of litter collected by Adopt-a-Highway groups, EYC, and DOC.

In 2013, WSDOT crews removed and disposed of 3,038 tons of litter from state roadways (roughly six million pounds).

Because of the budget reduction to WRRLCA for 2013-15, WSDOT did not receive any funding for litter pickup for the biennium.

Looking Ahead

The 2013-15 Biennium is as challenging as 2009-11 and 2011-13. Coordination of litter pickup efforts by the various state agencies needs to continue to be strong to achieve the greatest efficiencies. We will continue to evaluate all programs for the best return on the money and effort spent.

Chapter 4: Solid Waste Generation, Disposal & Recycling in Washington State

Preventing wastes in the first place, rather than managing them at the end of the pipe, is key to carrying out the State Solid and Hazardous Waste Plan (Beyond Waste). Recognizing we will continue to generate some wastes, the Plan calls for valuing these materials as resources and moving them into closed-loop recycling systems, or diverting them for other uses instead of disposing them.

To measure progress toward Beyond Waste goals, a record of the amount and types of waste generated is necessary. To determine the amount of waste generated in Washington State each year, Ecology uses the total amount of materials disposed, plus the amount of materials recycled and diverted from disposal. The way we calculate this number is changing as we gain more understanding of the waste stream and get better information on how wastes are managed.

The total amount of waste generated each year increased from 1999 - 2005. After steady decreases from 2006-09, the amount generated has fluctuated with increases in 2010 and 2013 and decreases in 2011 and 2012. However, the amount generated in 2013 remains below the amount generated in 2005.

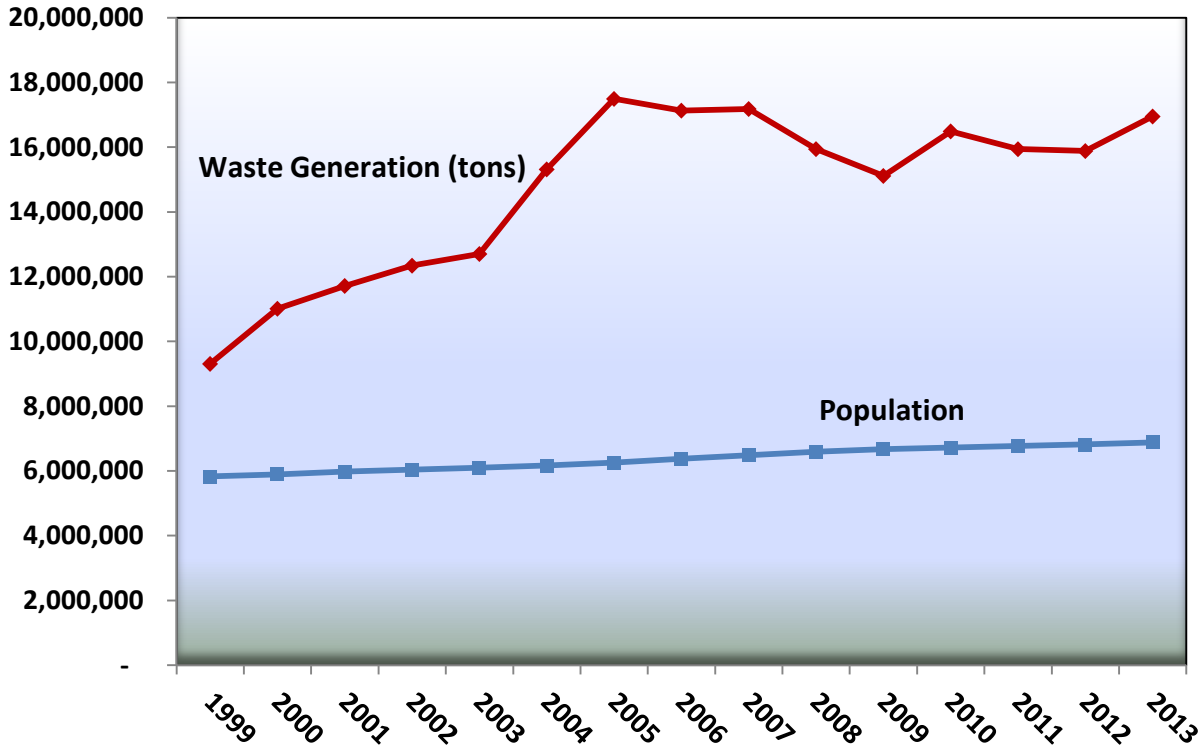
Washington State's population has continued to grow since Ecology began to track disposal and recycling. Population growth rates in Washington have averaged 1.7 percent per year from 1988 to 2013, with the total population increasing more than 2.4 million during that period.[1]

With an increase in population often comes an increase in waste generation, and this was the case in Washington in the past. However, more recently overall waste generation has decreased, falling by more than a half a million tons since 2005 (see Figure 4.1).

Since 1999, when Ecology began measuring the disposed solid waste stream by tracking annual report data from disposal facilities such as landfills and incinerators, the amount of waste generated per person has grown at an average annual rate of 2.8 percent. That number dropped to 1.3 percent growth over the last decade and has actually fallen by 1.8 percent annually since 2006.

[1] Population figures from Office of Financial Management at http://www.ofm.wa.gov/

Figure 4.1
Solid Waste Generation and Population Growth in Washington



Determining the Amount of Waste Generated

Total waste generation is determined by adding the amount of waste disposed to the amount of material recycled and diverted from disposal. It is easy to see why materials sent to landfills and incinerators are considered waste, but materials separated for recycling or other useful activities are also part of our total waste generation. These materials enter the stream of discarded materials that will not be used again in their original form, hence the term "waste," even though they will be put to better uses than landfilling.

Ecology is currently measuring six types of final disposal and waste management:

1. Disposal in regulated landfills.

2. Combustion of mixed municipal solid waste (MSW) in regulated incinerators.

3. Combustion of source separated material (burning for energy) in regulated industrial incinerators.

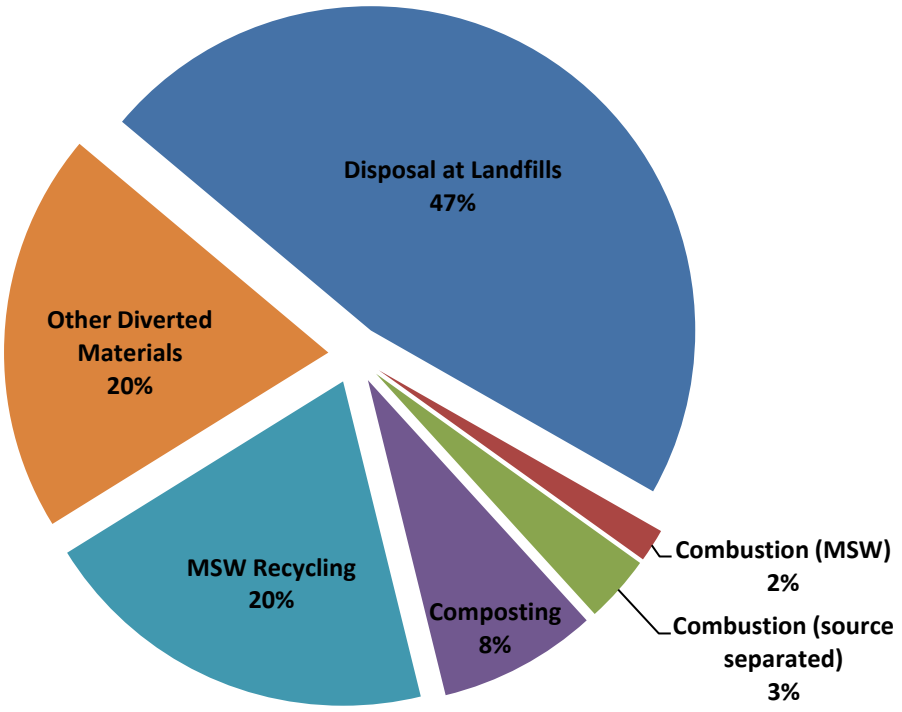
4. Composting in regulated facilities.

5. Recycling (transforming material into the same or other products – MSW only) in regulated and non-regulated facilities.

6. Other Diversion (includes recycling of non-MSW materials and reuse) in regulated and non-regulated facilities.

Figure 4.2 shows a breakdown of the statewide waste management methods in 2013.

Figure 4.2
Waste Management Methods 2013



Some material types have one unique final use, such as aluminum cans that are recycled back into more aluminum cans. However, there is often more than one final use for a material reported as recycled or diverted, depending on market shifts and demand. For example, some wood collected for recycling may be used to make composite lumber, some may be composted, and some burned for energy recovery.

In 2006, Ecology began asking for a more detailed breakdown of these uses for all materials reported. Data quality is improving as recyclers develop systems to track this type of information.

For many years, the largest measured part of Washington's waste generation number was the disposed waste stream. This number increased over the long-term, but has decreased in recent

years. The overall long-term increase could be occurring for several reasons. In some cases, we are simply throwing away more. Because of reporting requirements adopted in 2003 in *Chapter 173-350 WAC, Solid Waste Handling Standards*, we are getting more details from facility annual reports on wastes we dispose. We are also getting information on waste disposal in other states (for example, waste tires generated in Washington that are disposed in Oregon and some other states).

We currently include all materials disposed in landfills that may not have been reported as waste materials in the past. Examples are clean soil and rock, which are not defined as solid waste by our regulations, but disposed as waste or used as alternative daily cover at a landfill. Another example is All Shredder Residue (ASR), also known as "auto fluff." This material, counted as disposed by Ecology's disposal reports, may be used as alternative daily cover depending on the landfill permit.

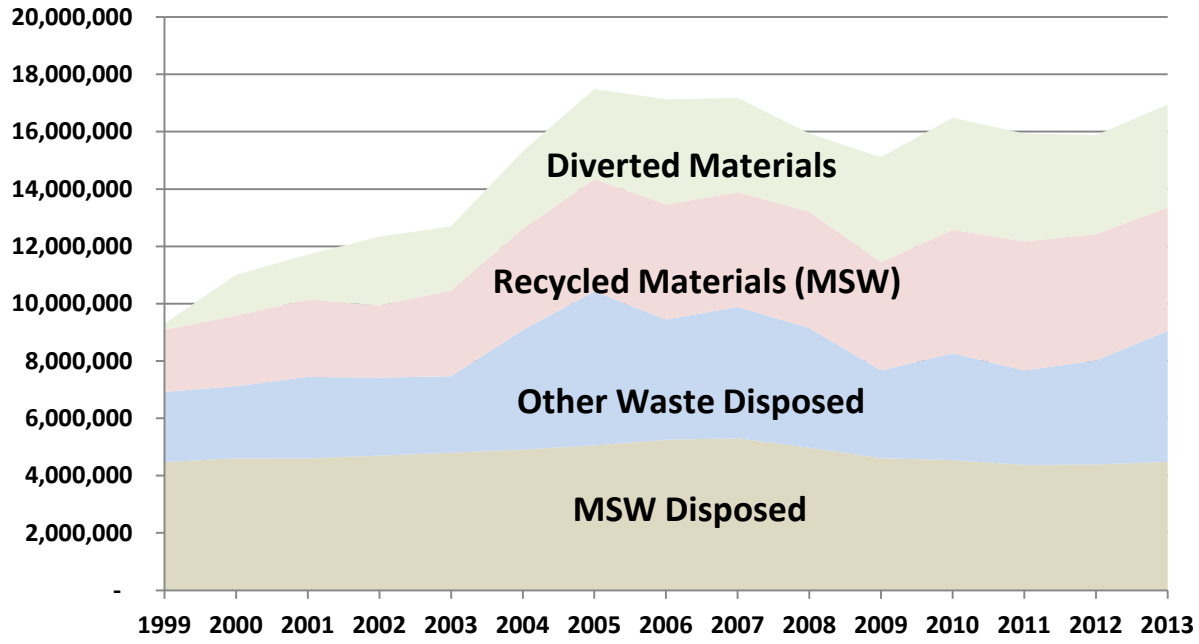
The other measured part of Washington's waste generation number is comprised of materials recycled and diverted from disposal. The reported list of materials included as recycling and diversion has increased over time. Since 1986, Ecology has largely followed EPA guidance when defining municipal solid waste recycling.

In 1999, along with MSW recycling, sometimes referred to as traditional recycling, we started tracking other materials diverted from disposal. We now track materials reported as diverted from the waste stream, but outside the state's definition of municipal or traditional recycling. This expanded measure of recycling that we call waste diversion includes recyclables such as construction and demolition debris, materials burned for energy recovery, and reused materials. As more types of materials are diverted from disposal, the list of items will increase.

We are continuing to increase our efforts to get better reporting from recyclers and those who divert waste from disposal. Due to Ecology tracking additional materials, and improved reporting from recyclers, as well as actual increases in recycling and diversion, the total tonnage reported has increased over time. In 2005, the total annual waste generation in Washington reached a maximum of 17,494,320 tons, decreased through the recession to 15,114,973 tons, increased to 16,491,355 tons in 2010, decreased in 2011 and 2012 to 15,883,806 tons, and then increased to 16,951,501 tons in 2013.

Figure 4.3 shows the categories of solid waste tracked by Ecology under the broad categories of municipal solid waste (MSW) disposed, other waste types disposed, MSW recycled, and solid waste diverted from disposal (such as recycled construction and demolition materials).

Figure 4.3
Total Solid Waste Generation in Washington (Tons)



Per Capita Waste Generation

In addition to looking at the overall picture of total waste generation, it is important to evaluate the amount of waste we produce in Washington on an individual basis or per capita. That means the amount of waste generated by each person each day.

The recycling rate in the MSW Section looks at the municipal portion of the waste stream, or waste generated in households and businesses. It includes such items as durable and nondurable goods, containers, packaging, food waste, and yard debris. It does not include industrial waste; inert debris; asbestos; biosolids; contaminated soils; or construction, demolition, and land clearing debris. MSW or materials in the first category are sometimes called traditional recycling. Materials in the second category diverted from disposal and combined with the traditional materials make up the diversion rate.

Per capita numbers from for the MSW stream are shown in Table 4.1. Residents and businesses in the state generated 6.99 pounds MSW per person per day in 2013. 3.57 pounds were disposed and 3.42 pounds were recovered for recycling. For per capita MSW numbers for 1986 – 2013, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Table 4.1
Municipal Solid Waste Disposed, Recycled & Generated
(Pounds/Person per Day)

Per Capita MSW Only	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
MSW Disposed	4.37	4.43	4.52	4.48	4.14	3.79	3.71	3.54	3.53	3.57
MSW Recycled	3.14	3.43	3.46	3.38	3.38	3.10	3.51	3.64	3.55	3.42
MSW Generated	7.51	7.86	7.97	7.86	7.52	6.89	7.22	7.19	7.08	6.99

MSW is only a portion of the waste produced in the state. Waste is also generated during activities such as manufacturing, construction projects, demolition, and environmental cleanup.

To determine the total waste generation, we add *all* of the materials recycled, diverted, and disposed. This includes MSW disposed and all other waste types disposed at landfills and incinerators, plus recycled and diverted materials. The result is a much higher generation number for the state – 13.49 pounds per person per day, with 6.28 pounds recycled/diverted and 7.21 pounds disposed (Table 4.2).

Table 4.2
All Solid Waste Disposed, Recycled/Diverted and Generated
(Pounds/Person per Day)

Per Capita Solid Waste	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Disposed[2]	8.07	9.14	8.12	8.36	7.64	6.31	6.74	6.22	6.45	7.21
Recycled/ Diverted	5.54	6.18	6.60	6.16	5.65	6.11	6.70	6.69	6.32	6.28
Generated	13.61	15.32	14.72	14.51	13.29	12.42	13.44	12.91	12.77	13.49

The total waste generation numbers include all waste – households, businesses, industries, and other manufacturing activities in our state. They also include wastes cleaned up from our environment, like contaminated soils from leaking gas tanks at service stations, asbestos removed from buildings that are torn down or remodeled, and contaminated soils dredged from Puget Sound. No higher or better uses of waste from environmental cleanups have been identified at this time, so they should be disposed in a landfill.

Much of the total waste stream are wastes that could be recycled or reused, or not created in the first place. These are wastes we need to focus prevention and reduction efforts on as described in the state's Solid and Hazardous Waste Plan (Beyond Waste). We want to see less waste in the categories of municipal and commercial solid waste, industrial waste, construction and demolition waste, inert waste, wood waste, other organic wastes, and tires.

2 Disposed amounts include all waste generated from Washington disposed in MSW, limited purpose, and inert landfills and incinerators, both in-state and exported.

Waste Disposed by Washington "Citizens"

As part of the annual reporting requirements of *Chapter 173-351, Criteria for Municipal Solid Waste Landfills* and *Chapter 173-350 WAC, Solid Waste Handling Standards*, all landfills and energy recovery facilities report the source, types, and amounts of waste received from their county, other counties, other states, or other countries. We also include data for what is disposed from Washington State in three municipal solid waste landfills in Oregon (Finley Butte, Wasco, and Columbia Ridge).

In 2013, a total of 9,059,940 tons were disposed. Table 4.3 shows the amounts and general types of waste disposed of since 2001 by Washington citizens[3]. Spreadsheets identifying the disposal location, type, and amount of waste for each county for 1994 - 2013 are at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

[3] "Citizens" in this chapter does not only refer only to an individual, but includes business, industry, public and private sectors - anyone who produces waste.

Table 4.3
Waste Disposed by Washington Citizens

Waste Type	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
MSW/ Commercial	4,611,406	4,703,879	4,805,202	4,917,870	5,060,502	5,258,076	5,309,296	4,978,497	4,614,045	4,548,275	4,377,843	4,396,880	4,486,592
Demolition	759,586	835,400	650,473	884,567	1,014,526	1,127,022	1,085,977	857,135	672,067	617,817	631,248	674,480	979,895
Industrial	563,249	546,299	743,042	1,356,415	1,092,305	512,277	530,835	361,017	277,691	446,521	279,215	270,862	261,345
Inert	428,789	321,451	280,358	419,115	1,337,372	1,029,559	1,402,421	1,362,143	552,682	986,335	525,016	1,050,917	1,198,015
Wood	246,754	91,697	90,303	89,905	61,918	52,833	40,579	39,926	29,449	8,822	9,726	23,828	21,200
ASH (other than SIA)	N/A	N/A	N/A	536,651	420,222	148,545	88,093	76,943	129,072	189,626	164,340	131,438	169,188
Sludge	1,473	1,762	22,835	10,171	12,458	33,490	30,432	35,682	16,550	1,985	419	480	1,252
Asbestos	10,929	11,177	15,455	18,252	21,951	29,700	103,686	11,914	12,654	12,683	13,677	11,898	11,026
Petroleum Contaminated Soils	616,725	784,703	568,681	489,385	957,788	740,341	735,773	1,057,069	786,762	766,381	582,541	741,542	933,702
Other Contaminated Soils	N/A	N/A	N/A	146,554	231,428	225,488	321,762	125,440	327,918	448,486	764,481	133,885	596,196
Tires[4]	7,752	4,919	22,226	15,212	22,446	33,698	50,704	25,541	28,834	23,275	14,156	14,866	15,690
Medical	5,255	2,417	2,498	2,624	2,651	2,899	3,998	3,013	2,983	11,618	7,064	8,252	9,398
Other	198,259	124,512	270,992	196,793	197,010	256,627	189,316	250,656	226,601	210,758	307,046	564,007	376,439
Total[5]	**7,450,177**	**7,428,216**	**7,472,065**	**9,083,516**	**10,432,576**	**9,450,554**	**9,892,871**	**9,184,975**	**7,677,306**	**8,272,583**	**7,676,711**	**8,009,780**	**9,059,940**

[4] In 2003 started adding tires that were reported disposed out-of-state.
[5] In 2001 started reporting waste disposed in all types of landfills and energy recovery facilities.

In 2013, there was an overall increase in the amount of all solid waste disposed by Washington State citizens. There were significant increases in demolition and inert waste and increases in municipal/commercial, ash (other than special incinerator ash, petroleum contaminated soils, medical waste, tires, and other contaminated soils. Decreases were seen in asbestos, industrial, wood and the other categories. An improved economy and increased building and development may have also accounted for the increased disposal in the demolition and inert waste categories.

The types of wastes reported by landfills are very general, since the waste arrives in mixed loads and often in closed containers. It is difficult to know exactly what types of materials are included. For example, municipal solid waste as reported by disposal facilities includes anything a household or business throws away. We do not know exactly how much of that waste is paper, food, cans, plastics, bottles, or other recyclable materials, or who actually produced the waste (a household or a business).

We also do not know the specific content of wastes reported as industrial or inert. It would benefit waste reduction and recycling efforts for a particular type of waste or waste producer to have more details. Rigorous sampling studies, such as a waste characterization study, provide information to estimate the content of disposed waste.

The most recent of these studies, the *2009 Washington Statewide Waste Characterization Study*, was completed in June 2010. A comprehensive analysis of the overall waste stream and the commercial, residential, and self-hauled sectors is addressed in the study at http://www.ecy.wa.gov/biblio/1007023.html.

As we continue to implement the State Solid and Hazardous Waste Plan, specific information on the contents of our waste is essential to understanding the makeup of the solid waste stream. This helps us focus efforts to eliminate and reduce specific types of wastes or materials, and to measure our progress.

Municipal Solid Waste (MSW) Generation, Recycling & Disposal

The discussion of the solid waste generation, disposal, recycling, and diversion totals in the previous section includes *all* types of waste disposed, composted materials, source-separated materials burned for energy, and non-municipal solid waste diverted from disposal or recycled. The following discussion is of the narrower subset of recycling, disposal, and generation measures that include *only the MSW stream*, or discards from households and businesses.

In 1989, the Washington State Legislature amended the *Solid Waste Management Act* (Chapter 70.95 RCW) to set a state recycling goal of 50 percent by 1995. The 50 percent rate refers to the MSW recycling rate. To determine this rate, and ensure consistency and comparability with past years, Ecology has measured a specific part of the solid waste stream since 1986. It is roughly the part of the waste stream defined as MSW by the Environmental Protection Agency.[6]

The law also states that recycling should be at least as affordable and convenient to citizens as garbage disposal. In response, local governments put various forms of recycling in place, ranging from drop boxes to curbside collection of a variety of recyclable materials.

Despite the efforts of citizens, government, and industry, the state did not reach the 50 percent goal by 1995. In 2002, the Legislature amended the law and pushed the 50 percent goal to 2007, which the state did not meet until 2011. Legislators also set a goal to establish programs to eliminate yard waste in landfills by 2012.

Although Washington did not achieve the legislative goals by the set dates, the recycling rate increased steadily as infrastructure and markets developed. In 2012, 87.4 percent of the state's population had access to curbside recycling for materials such as paper, plastic, and metals. This was an increase from 86.5 percent with access to curbside recycling in 2011, and an increase over the original 82 percent when first measured in 2000. Despite the economic recession that caused severe cutbacks to the recycling infrastructure on the local government level, citizens recycled at a higher rate than in 2010. In 2011, Washington's recycling rate grew to its highest level ever at 50.7 percent, surpassing the 50 percent goal set by the Legislature. The recycling rate fell to 50.1 percent in 2012, yet remained above the 50 percent goal for the second year in a row. The recycling rate fell again in 2013, dropping below the 50 percent goal down to 48.9 percent.

Ecology measures MSW recycling by quantifying the MSW materials recycled and dividing that by the total MSW generation (recycling plus disposal). State regulation requires landfills and incinerators to report municipal solid waste separately from other wastes, specifying county of origin, which provides a reliable data source for the denominator.

Recycling Rates for MSW

Ecology has conducted a survey every year since 1986 to measure the statewide recycling rate for MSW. Information comes from local governments, haulers, recyclers, brokers, and other handlers of materials from the recyclable portion[7] of the waste stream.

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[6] The recyclable portion of the waste stream is municipal solid waste as defined by the Environmental Protection Agency in the *Characterization of Municipal Solid Waste in The United States: 1996 Update*. This includes durable goods, nondurable goods, containers and packaging, food wastes and yard trimmings. It does not include industrial waste, inert debris, asbestos, biosolids, petroleum contaminated soils, or construction, demolition, and land clearing debris disposed at municipal solid waste landfills and incinerators.

[7] *Ibid.*

From 1986 to 1995, the measured statewide recycling rate increased from 15 percent to 39 percent. This increase was steady, with minor variations. In 1996, the rate dropped to 38 percent. The 1997 recycling rate dropped again to 33 percent because of the poor paper fiber market in Asia and a continued glut in the metals market. Table 4.4 shows MSW recycling rates for 1986 - 2013.

The poor paper and metal market trend continued in 1998, but improved enough to raise Washington's recycling rate to 35 percent. Although markets improved in 1999, the tonnage disposed increased enough to drop the recycling rate to 33 percent.

Table 4.4
MSW Recycling Rates in Washington

1986	15%
1988	28%
1989	27%
1990	34%
1991	33%
1992	35%
1993	38%
1994	38%
1995	39%
1996	38%
1997	33%
1998	35%
1999	33%
2000	35%
2001	37%
2002	35%
2003	38%
2004	42%
2005	44%
2006	43%
2007	43%
2008	45%
2009	45%
2010	49%
2011	51%
2012	50%
2013	49%

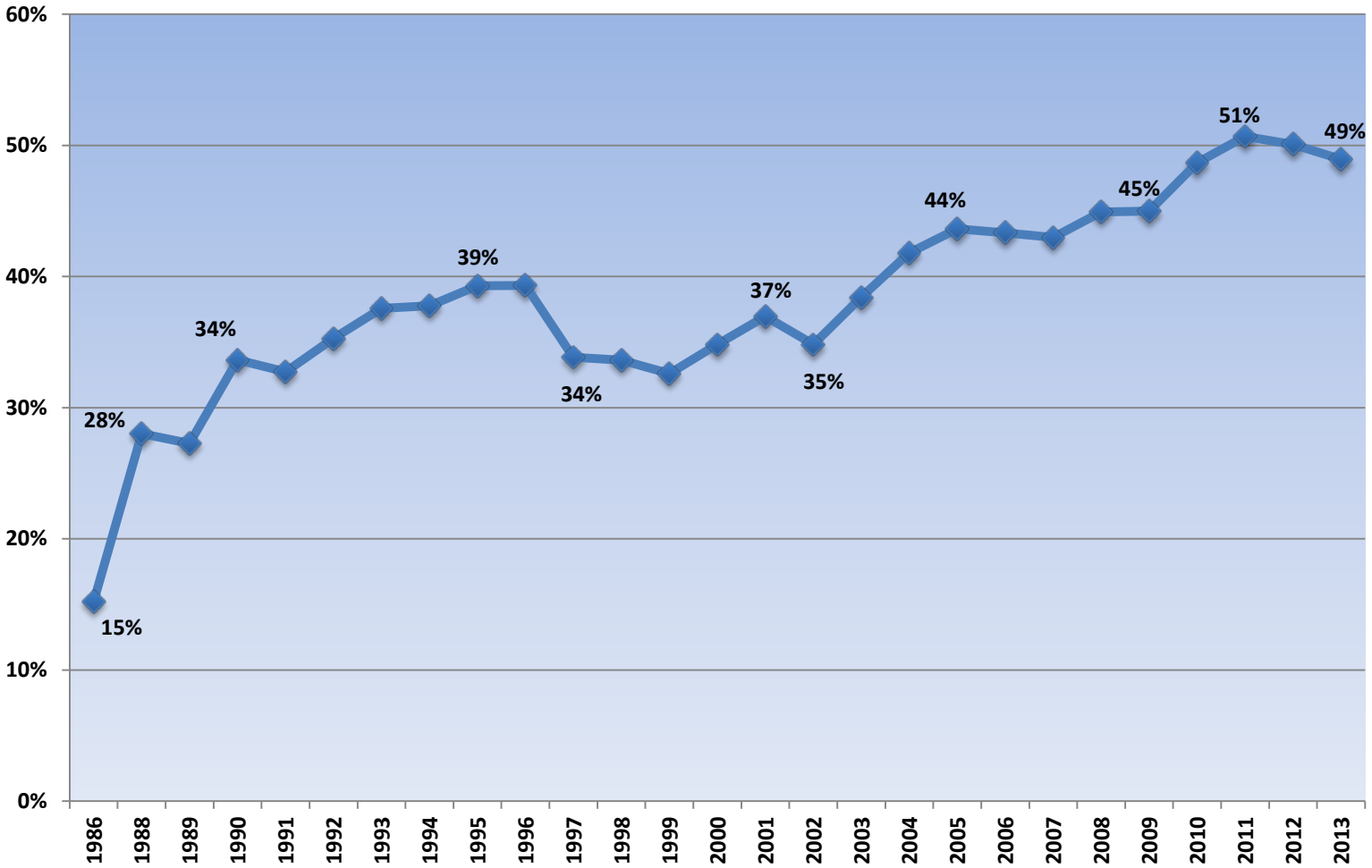
Markets continued to improve in 2000, raising the recycling rate again to 35 percent. Although markets for most materials fell in 2001, the increased activity and better reporting for key materials brought the rate to 37 percent. Drops in market conditions for paper, glass, and yard debris, combined with low reporting for food waste and a difference in how wood waste categories are calculated, brought the rate down to 35 percent for 2002.

In 2003, the reporting requirements for recycling facilities changed with *Chapter 173-350 WAC, Solid Waste Handling Standards.* These changes resulted in better reporting of recyclables. In addition, market demand for ferrous and nonferrous metals was high during 2003, which helped bring the recycling rate up to 38 percent. With the continued strong reporting of recyclables collected along with market increases for metals, paper, and yard debris, the MSW recycling rate hit 42 percent in 2004, and continued to climb to 44 percent in 2005.

In 2006, the recycling rate dropped slightly to 43 percent and remained unchanged in 2007. The economic recession that began around 2008 brought a reduced disposal rate; that and continued good recycling habits boosted the recycling rate to 45 percent in 2008, where it remained in 2009. In 2010, MSW disposal decreased again while recycling increased, bringing the recycling rate up to 49 percent. In 2011, this trend continued, resulting in a 51 percent recycling rate, the highest rate ever. MSW recycling and disposal both decreased in 2012, and the recycling rate fell slightly to 50.1 percent (see Figure 4.4). In 2013, MSW recycling decreased and MSW disposal increased causing the recycling rate to fall to 48.9 percent. Detailed data on materials recovery since 1986 is available at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

The Beyond Waste Progress Report also provides quantitative information on specific wastes such as organics, construction and demolition debris, and electronics, as well as the economic and environmental impacts of recycling. See http://www.ecy.wa.gov/beyondwaste/bwprog_front.html.

Figure 4.4
Washington State MSW Recycling Rate - 1986 to 2013



As of 2012, about 87 percent of the state's population had access to curbside recycling services, which are intended to be as convenient as disposal. Most of the people who do not have curbside services *do* have access to drop box recycling. The state's population is growing, with an additional one million people since 1999. Ecology believes newcomers, as well as longtime residents need ongoing education and advertising to learn to recycle or continue to do so.

Many curbside programs in the state are changing to comingled or single-stream (mixed) collection systems to reduce costs and increase collection of recyclables. This trend became more evident in 2003, as new sorting facilities and procedures began operation, and has continued through 2013. Some evidence suggests the convenience of not having to sort recyclables leads to more participation in recycling programs. In most cases, programs that changed to comingled collection also increased the range of materials collected; however, the act of mixing or comingling the recyclables can create a higher residual rate because of the difficulty of cleanly sorting the materials. Those residuals are then disposed.

Compared to source-separated collection programs, the comingled programs have collected about ten percent more material. The results are also mixed where end markets are concerned. While the amount by weight collected in the recycling system is staying steady, a June 2010 Ecology report indicates that a certain amount of the residential comingled recycling does not get recycled. Between 5 and 20 percent of some materials may not ultimately be recycled into new products. Such materials are either those which the market cannot recycle yet and are collected anyway, or those that do not make it through the sorting system to the appropriate market. See *Beyond the Curb – Tracking the Commingled Residential Recyclables from Southwest Washington* at http://www.ecy.wa.gov/biblio/1007009.html.

Ecology is making an effort to quantify these residuals, and determine the impact on the recycling and diversion data through annual reports from material recovery facilities and the recycling survey. Further studies are needed including sampling at recycling facilities to more accurately determine the level of contaminants in the incoming materials stream and residuals in the outgoing materials stream at recycling facilities.

Measurement Methodology

The Legislature requires Ecology to measure recycling activities each year and report the results. From 1986 until 2002, the only tool used was the annual recycling survey. Beginning in 2003, recycling facilities and intermediate solid waste handling facilities were required to submit annual reports under *Chapter 173-350 WAC, Solid Waste Handling Standards*. Annual reports for facilities are mandatory and they can be penalized for not submitting a report.

Recycling facilities, other firms involved in recycling (such as brokers), haulers, and local governments submit information about the types and quantities of recyclable materials they collected. Although the recycling survey is mandatory, there is no penalty for not returning the information, and not all businesses respond. Others respond with estimates of the amount and origin of materials. These factors offer challenges to compiling good county-specific recycling and diversion information.

To fill the gaps on reporting forms, Ecology cross-checks data through phone calls and e-mails to reporting facilities, end-users of the recyclable materials, other recycling facilities, other intermediate collectors of recyclables, and local governments. Other data sources are used to round out data gaps and check reported information, such as the data collected through E-Cycle Washington, the state's electronic waste product stewardship program. The data is also cross-checked with past years' aggregate data by material, county, and individual company.

Ecology also adjusts the collection numbers for materials that are reported as commingled. This practice began with 2009 data by applying a contamination rate based on local government sampling data. This method did not account for the residual material that is not sorted or sorted incorrectly. For the 2011 analysis, Ecology began using another method to adjust the commingled data based on data from the *Beyond the Curb* report, and other local government and industry data. Ecology estimates how much of the commingled stream is made up of incoming contaminants and residuals left by the sorting systems, and subtracts that from the total amount reported. The adjusted number is then separated by material based on the percentage of material typically found in a commingled system.

Finally, Ecology checks figures against double-counting by verifying exchange of materials between reporting entities. Companies are asked to report the destination of materials and final use on their surveys and forms. This data is verified by correspondence with the reporting facility, destination facility, and local government or industry to the extent possible. The destination data makes it possible to track materials as they move from facility to facility, allowing Ecology to remove instances where the materials are counted more than once.

Ecology bases the reliability of the results on review of draft numbers sent to local governments, comparisons to past recycling, waste characterization and disposal data, and industry and end-user information.

Both the recycling survey and the annual reporting forms are available on Ecology's website. Respondents can print and complete the forms, or download, complete electronically, and e-mail them to Ecology. Ecology maintains a solid waste facilities database as a central location for tracking recycling survey and annual report facilities, contact information, and data.

Results – 2013 MSW Recycling

To consistently compare results from year to year, Ecology includes basically the same materials it has used since 1986 to calculate the MSW recycling rate. These materials originate from the MSW stream Ecology defined when designing the recycling survey in the mid-1980s. Table 4.5 provides tonnage figures for each material that contributed to the MSW recycling rate from 2010-13.

Table 4.5
MSW Recycled Tonnage Reported
MSW Recycling Rates[8] 2010-13

Recycled Materials Reported (MSW)	2010	2011	2012	2013
Aluminum Cans	13,655	13,115	13,635	15,636
Appliances/White Goods	48,881	44,174	54,578	31,192
Batteries – Auto Lead Acid	26,986	27,297	23,356	20,641
Cardboard	471,477	542,333	520,585	483,864
Cartons	2,763	705	6,139	7,407
Container Glass	109,916	96,145	121,163	95,645
Electronics	25,569	31,148	38,237	51,412
Fats and Oils	91,050	128,511	86,864	124,761
Ferrous Metals	1,332,254	1,458,201	1,370,692	1,349,761
Fluorescent Light Bulbs	1,087	1,096	1,398	1,286
Food Scraps (post-consumer)	62,041	129,229	65,727	103,534
Gypsum	30,882	39,902	86,902	110,228
HDPE Plastics	18,824	12,475	16,864	14,862
High-Grade Paper	76,667	66,664	39,072	52,004
LDPE Plastics	16,772	27,024	23,375	18,893
Mixed Paper	287,814	280,055	293,424	293,932
Mixed Plastic	n/a	n/a	n/a	7,827
Newspaper	233,924	275,025	170,088	194,412
Nonferrous Metals	123,680	146,164	121,711	175,781
Other Recyclable Plastics	13,009	18,194	18,367	14,580
PET Plastic Bottles	15,803	16,986	18,830	29,562
Photographic Films	433	2,074	117	88
Rubber Materials	10	n/a	n/a	n/a
Steel Cans	15,060	17,975	15,306	17,267
Textiles (rags, clothing, etc.)	24,976	25,580	41,688	17,470
Tires (recycled)	26,775	25,678	25,756	20,157
Used Oil	71,725	76,612	74,114	53,914
Wood Waste	347,137	178,403	244,907	167,002
Yard Debris	537,442	608,947	656,841	616,800
Yard Debris and Food (mixed)	285,965	209,364	261,221	216,407
Total MSW Recycled	**4,312,581**	**4,499,073**	**4,410,955**	**4,298,097**
Total MSW Disposed[9]	**4,548,275**	**4,377,843**	**4,396,880**	**4,486,592**
Total MSW Generated	**8,860,856**	**8,876,917**	**8,807,835**	**8,784,689**
MSW Recycling Rate	**48.67%**	**50.68%**	**50.08%**	**48.93%**

[8] Detail may not add due to rounding.

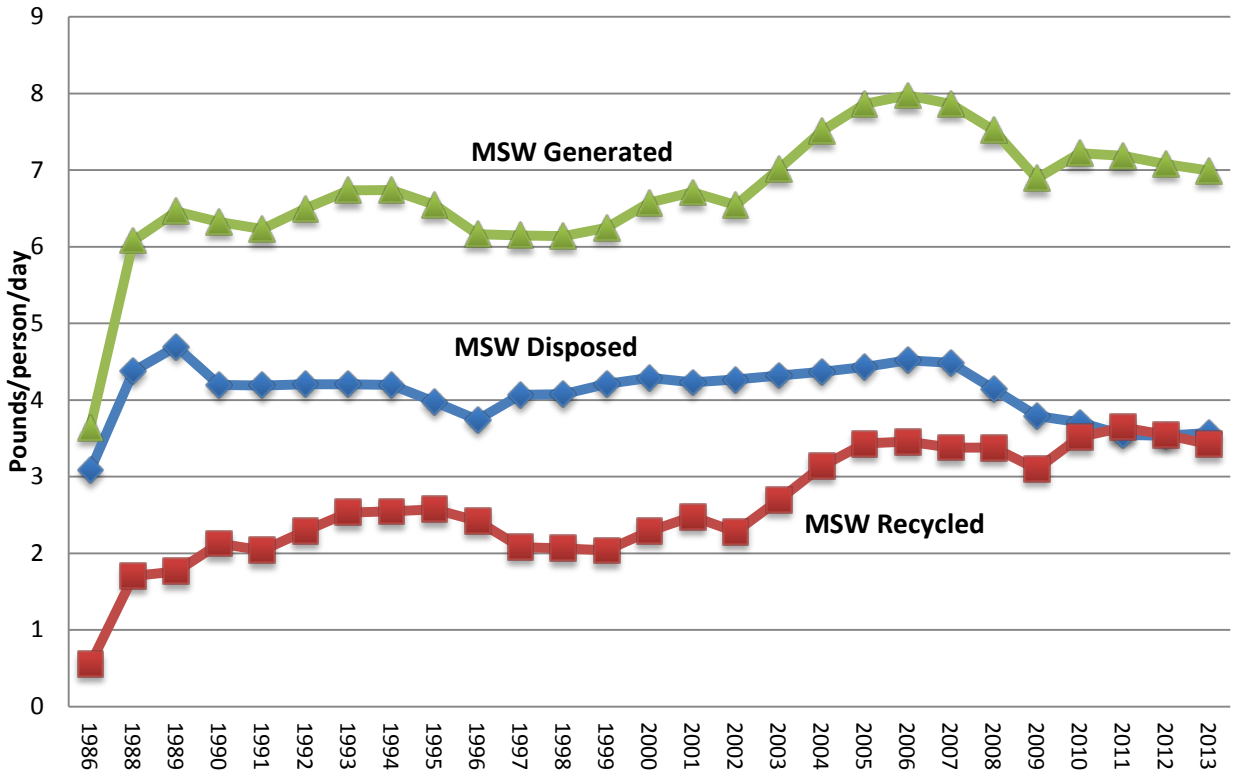
[9] The amount of MSW disposed represents only the quantity defined "recyclable portion" of the waste stream from municipal and commercial sources. It excludes the following waste types reported from landfills and incinerators: demolition, industrial, inert, wood, ash, sludge, asbestos, contaminated soils, tires, medical and other.

Individual Waste Generation for Municipal Solid Waste Stream

Each person contributes to the MSW stream by recycling and disposing of wastes from their household, school, workplace, and anywhere else solid waste is produced. The figures below represent only an average of the total contributions of all residents. Some people may contribute much more or less waste than others. Figure 4.5 shows an average of how each person in the state contributes to the MSW stream. The next section has a discussion of overall waste generation.

In 2013, each resident of the state generated 6.99 pounds of municipal solid waste per day, disposing 3.57 pounds per person. 3.42 pounds per person were recovered for recycling. In 2006, we reached an all-time high of per capita waste generation of 7.97 pounds per person per day. Since then, the waste generation has generally decreased, with only a slight increase from 2009-10 (see Table 4.6).

Figure 4.5
Pounds of MSW Disposed, Recycled & Generated Per Person/Day
1986 - 2013



Washington residents create, recycle, and dispose of about two pounds of MSW per person above the national averages. We attribute this larger disposal number to Washington's larger amount of yard and wood waste than the national average, as well as our different method of measuring ferrous metals.

Comparing per capita numbers to other states' averages provides a check for Washington's recycling numbers. Additionally, at various points in the data gathering process, Ecology asks county recycling coordinators to check their county recycling and disposal numbers for accuracy. Ecology also checks the end-use information for recovered materials provided on the recycling surveys and annual reports to verify the classification as recycling, diversion, or disposal. This way, Ecology captures and measures any new recycling and diversion that occurs.

Table 4.6
Pounds MSW Disposed, Recycled and Generated Per Person/Day[10]
2002-13

MSW Per Capita	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Disposed	4.27	4.32	4.37	4.43	4.52	4.48	4.14	3.79	3.71	3.54	3.53	3.57
Recycled	2.28	2.69	3.14	3.43	3.46	3.38	3.38	3.10	3.51	3.64	3.55	3.42
Generated	6.55	7.01	7.51	7.86	7.97	7.86	7.52	6.89	7.22	7.19	7.08	6.99

[10] See the *Per Capita Waste Generation* section for per capita numbers that include diversion and all waste types.

Waste Recycled and Diverted from Disposal

Measuring Recycling and Diversion Rates

Since 1986, Ecology has calculated a consistent recycling rate that is comparable to past years by measuring the part of the waste stream known as MSW. Since the mid-1990s, Ecology has noted very large increases of material recovery in non-MSW waste streams. Most notable are the growing industries in recycling asphalt, concrete, and other construction, demolition, and land clearing debris. The recovery of these materials for uses other than landfill disposal is called diversion.

Increasingly, Washington counties and cities have put efforts into recovering and recycling wastes that are outside the traditional MSW stream. The construction and demolition waste stream provides the best example. We are now recycling many of these materials, including asphalt, concrete, roofing material, lumber, various metals, and others. Knowledge of the non-MSW waste stream is increasing, and more materials are tracked as recyclers are discovering ways to divert this material from landfills.

Measuring diverted materials is as simple as collecting the number of tons of material diverted from landfills from the recycling and diversion facilities. Before 1999, many recycling survey respondents voluntarily listed this information on the recycling survey. In 1999 Ecology began asking recyclers to list and quantify the diverted materials on their reporting forms.

Ecology calculates a diversion rate (or recovery rate) in addition to the traditional MSW recycling rate. Calculating the diversion rate takes two steps. First, we measure non-MSW materials diverted from the waste stream along with MSW recyclables. Ecology then compares the resulting figure to total waste generation (minus a subset of landfilled materials that were not available for recycling or diversion).[11] Washington shows a diversion rate of 51 percent in 2013 (Table 4.7).

Table 4.7
Diversion Rates
1999 - 2013

Year	Diversion Rate
1999	28%
2000	37%
2001	41%
2002	45%
2003	46%
2004	49%
2005	48%
2006	50%
2007	47%
2008	47%
2009	55%
2010	54%
2011	57%
2012	52%
2013	51%

Wood waste makes up a large portion of the recovered materials stream in Washington. A major portion of recovered wood is eventually burned for energy recovery. A percentage of it is also being used in new wood and paper products, as a feedstock in composting operations, and as mulch. Although Ecology asks recycling facilities to report the final use of the material

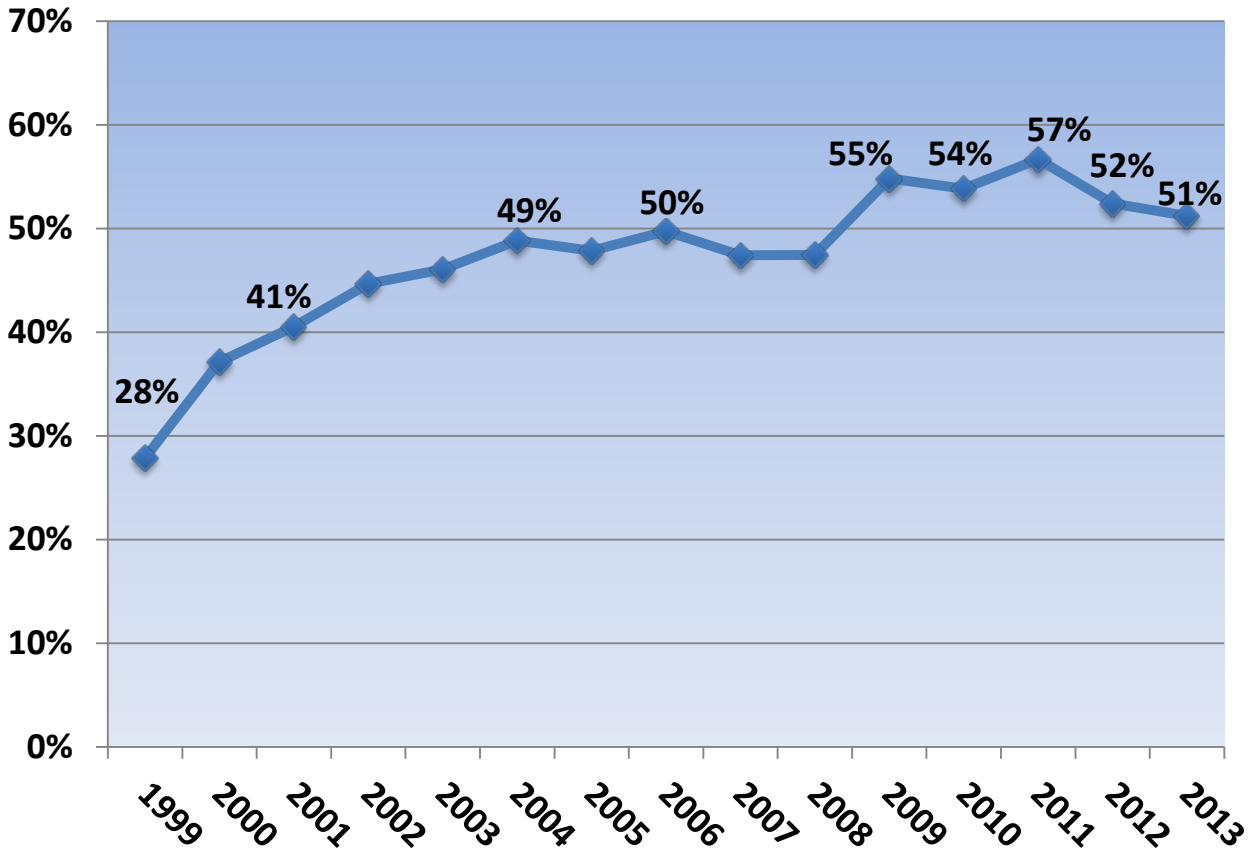
[11] Waste types used to calculate diversion include municipal, demolition, inert, industrial, wood, tires, medical and other. Excludes asbestos, sludge and contaminated soils.

(recycled, composted, burned for energy), facilities may not know the exact final use of the material. Therefore, an undetermined amount of the wood reported as recycled may actually be burned for energy recovery or used as hog fuel.

In agriculture, leftover organic materials are often composted and processed for land application as soil amendments. Ecology recognizes these and other uses of discarded material as potentially beneficial and includes them in the diversion numbers. In addition, waste materials such as manure that are processed by anaerobic digesters are counted as diverted.

Figure 4.6 shows the diversion rate in Washington since Ecology began measuring it in 1999.

Figure 4.6
Washington State Diversion Rates – 1999 to 2013[12]



We need to study the non-MSW waste stream in more detail. We lack information on the total volume of waste created, especially in the industrial sector. If a recycling facility has a solid waste permit or is conditionally exempt from permitting under *Chapter 173-350 WAC, Solid Waste Handling Standards*, they are required to report the annual quantities and county of origin

[12] Diversion rates are adjusted retroactively each year to reflect adjustments in recycling, diversion, and disposal data.

of solid waste recyclables collected or diverted from the waste stream. However, if the facility is not required to have a solid waste permit or conditional exemption from permitting, reports are voluntary, as with out-of-state facilities or recycling haulers with no fixed facility. This makes it difficult to calculate a recycling or diversion rate for many materials.

Results – 2013 Diversion

Diversion is the term used to measure more materials than the traditional MSW recycling rate. It continues to include the same materials used since 1986 to calculate the MSW recycling rate, and also includes the new materials described in the above section on Measuring Recycling and Diversion Rates; for example, construction and demolition debris and wood burned for energy recovery. Table 4.8 provides tonnage figures for each material included in the diversion rate from 2010-13.

Table 4.8
Diverted & Recycled Materials Reported (Tons); Diversion Rates

Diverted & Recycled Materials Reported	2010	2011	2012	2013
Agricultural Organics[13]	55,689	76,645	102,733	97,270
Aluminum Cans	13,655	13,115	13,635	15,636
Antifreeze	4,783	4,872	6,797	4,804
Appliances/White Goods	48,881	44,174	54,578	31,192
Ash, Sand & Dust used in Asphalt Production	20,364	-	-	-
Asphalt & Concrete	2,188,200	2,211,889	1,887,580	2,155,091
Batteries – Auto Lead Acid	26,986	27,297	23,356	20,641
Cardboard	471,477	542,333	520,585	483,864
Carpet and Pad	3,867	3,653	2,420	4,341
Cartons	2,763	705	6,139	7,407
Construction & Demolition Debris	269,603	271,716	399,209	343,523
Container Glass	109,916	96,145	121,163	95,645
Container Glass (used as aggregate)	3,212	19,966	20,116	123
Electronics	25,569	31,148	38,237	51,412
Fats and Oils[14]	91,050	128,511	86,864	124,761
Ferrous Metals	1,332,254	1,458,201	1,370,692	1,349,761
Fluorescent Light Bulbs	1,087	1,096	1,398	1,286
Food (recovered)	402	429	3,684	889
Food Processing Wastes (pre-consumer)	27,762	59,220	102,035	126,074
Food Scraps (post-consumer)[15]	62,041	129,229	65,727	103,534
Gypsum	30,882	39,902	86,902	110,228
HDPE Plastics	18,824	12,475	16,864	14,862
High-Grade Paper	76,667	66,664	39,072	52,004
Household Batteries	458	465	402	819
Industrial Batteries	1	1,620	1,582	1,806
Industrial Organics[16]	83,681	46,544	57,063	51,244
Industrial Paper	6,476	3,686	-	-
Land Clearing Debris	150,287	160,086	171,962	144,765
Land Clearing Debris for Energy Recovery	130,766	100,289	106,486	82,964
LDPE Plastics	16,772	27,024	23,375	18,893
Mattresses	-	1,213	852	668

[13] Prior to 2008, included in Other Organics category.
[14] Includes animal fat and used cooking oil collected for rendering or processing in commercial quantities. Prior to 2008, included in Food Scraps category.
[15] Prior to 2008, this category included fats and oils reported for recycling.
[16] Prior to 2008, included in Other Organics category, or classified as Wood Fiber/Industrial Paper.

Diverted & Recycled Materials Reported	2010	2011	2012	2013
Miscellaneous	57	510	589	613
Mixed Paper	287,814	280,055	293,424	293,932
Mixed Plastic	-	-	-	7,827
Newspaper	233,924	275,025	170,088	194,412
Nonferrous Metals	123,680	146,164	121,711	175,781
Oil Filters	1,775	2,229	3,544	1,781
Other Fuels (Reuse & Energy Recovery)	5	175	-	-
Other Organics[1]	145,251	149,510	126,096	112,840
Other Recyclable Plastics	13,009	18,194	18,367	14,580
Paint (Reused)	207	180	376	668
PET Plastics	15,803	16,986	18,830	21,333
Photographic Films	433	2,074	117	88
Post-Industrial & Flat Glass	2,390	1,230	3,661	1,605
Reuse (Clothing & Household)	6,164	15,050	5,455	2,593
Reuse (Construction & Demolition)	8,360	1,839	2,972	5,689
Reuse (Miscellaneous)	5,036	-	-	-
Roofing Material	14,518	15,470	13,021	10,899
Rubber Materials	10	-	-	-
Steel Cans	15,060	17,975	15,306	17,267
Textiles (Rags, Clothing, etc.)	24,976	25,580	41,688	17,470
Tires (Baled)	-	4,697	5,135	-
Tires (Burned for Energy)	18,121	10,450	10,443	19,392
Tires (Recycled)	26,775	25,678	25,756	20,157
Tires (Retread/Reuse)	10,834	7,813	7,059	8,442
Used Oil	71,725	76,612	74,114	53,914
Used Oil for Energy Recovery	2,568	2,409	3,432	11,019
Wood Waste	347,137	178,403	244,907	167,002
Wood Waste for Energy Recovery	698,615	519,075	323,474	367,574
Yard Debris	537,442	608,947	656,841	616,800
Yard Debris and Food (mixed)	285,965	209,364	261,221	216,407
Yard Debris for Energy Recovery	46,739	72,709	81,337	35,968
Total Diverted + Recycled Materials	**8,218,772**	**8,264,709**	**7,860,471**	**7,891,561**
Total Waste Disposed[1]	**7,043,048**	**6,315,653**	**7,135,530**	**7,517,763**
Total Waste Generated	**15,261,820**	**14,580,362**	**14,996,001**	**15,409,324**
Diversion Rate	**53.85%**	**56.68%**	**52.42%**	**51.21%**

Waste Diversion Benefits

Waste prevention and diversion from landfill disposal (or recycling) are important strategies to reduce greenhouse gas emissions and conserve energy. Products that enter the waste stream have energy impacts and associated greenhouse gas (GHG) emissions at each stage of their lifecycle: extraction, manufacturing, and disposal.

Decomposing waste in a landfill produces methane, a greenhouse gas more potent than carbon dioxide. Waste prevention and recycling reduce the amount of waste sent to landfills, lowering the greenhouse gases emitted during decomposition. Additionally, transporting waste to a landfill emits greenhouse gases through combustion of fossil fuels.

Fossil fuels are also used to extract and process raw materials necessary to replace those materials disposed with new products. Manufacturing products from recycled materials typically requires less energy than manufacturing from virgin materials. Waste prevention and recycling delay the need to extract some raw materials, lowering greenhouse gases emitted during extraction. Waste prevention means more efficient resource use, and making products from recycled materials requires less energy. Both result in lower greenhouse gas emissions during manufacturing.

As an additional benefit to climate change impacts, waste prevention and diversion can help store carbon. Carbon storage increases when fewer wood products are wasted and more are recycled. Carbon storage also increases when organic materials are composted and added to the soil.

Washington's measured diversion efforts for 2013 reduced greenhouse gas emissions by about 3.1 million tons (MTCE) or 905 pounds per person. The 8 million tons of material diverted from disposal in Washington in 2013 saved more than 128 trillion British thermal units of energy. This is similar to conserving one billion gallons of gasoline – enough to power 1.3 million homes for a year (nearly half the households in Washington). [17]

[17] Figures derived using EPA Waste Reduction Model (WARM), http://epa.gov/climatechange/wycd/waste/calculators/Warm_home.html; and U.S. Energy Information Administration, http://www.eia.gov/state/seds/seds-data-fuel.cfm?sid=US.

Waste Disposed in Washington State

Another way to look at waste disposed is to include all waste that goes to landfills or incinerators in the state. This includes waste brought from out-of-state, but does not include waste sent out-of-state for disposal. With all categories included, 7,522,693 tons of waste were disposed in all types of landfills and incinerators in Washington in 2013 (Table 4.9).

Table 4.9
Total Amounts of Solid Waste Disposed in Washington

Disposal Method	2005	2006	2007	2008	2009	2010	2011	2012	2013
Municipal Solid Waste Landfills	5,517,342	5,398,008	5,354,005	5,157,547	4,775,888	4,875,010	4,925,583	4,565,487	5,006,787
Incinerated Waste	335,533	326,584	312,006	297,832	277,101	288,208	263,812	265,177	255,577
Wood waste Landfills[18]	*	*	*	*	*	*	*	*	*
Inert / Demolition Landfills	1,531,642	1,231,565	1,708,445	1,261,131	693,349	966,184	791,132	1,042,558	1,291,573
Limited Purpose Landfills	1,387,934	760,088	600,928	623,063	624,575	738,952	644,431	717,787	968,756
Total	**8,772,451**	**7,716,245**	**7,975,444**	**7,339,573**	**6,370,913**	**6,868,354**	**6,624,958**	**6,591,009**	**7,522,693**

Municipal Solid Waste Landfills

Amount of Waste Disposed of in Municipal Solid Waste Landfills

In 2013, 14 municipal solid waste landfills accepted waste totaling 5,006,787 tons.[19] Of the 14 landfills, 11 were publicly owned and 3 privately owned.

Table 4.10 shows the relationship of waste disposal to public/private ownership. As the table illustrates, 1,449,292 tons of solid waste disposed went to publicly owned facilities (29 percent), with the remaining 3,557,495 tons going to private facilities (71 percent).

[18] The category of wood waste landfills is no longer included under *Chapter 173-350 WAC, Solid Waste Handling Standards.*

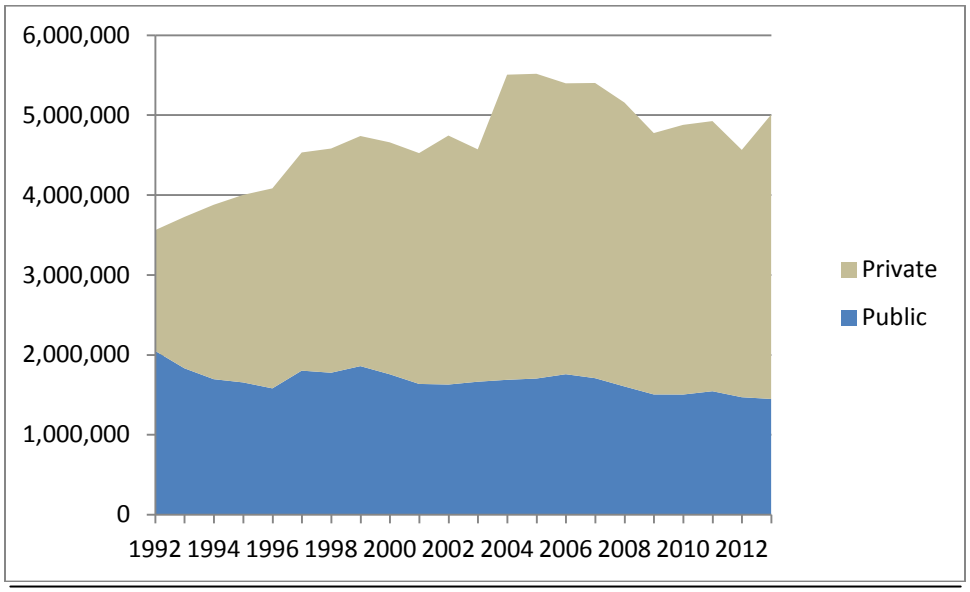
[19] Throughout this report, different disposal amounts are discussed. These numbers vary based on the types of facilities discussed, source of the waste and purpose of the discussion. For example, the recycling survey only accounts for "traditional" municipal waste in the disposed amount used to calculate the statewide recycling rate.

Table 4.10
Waste Disposed in MSW Landfills – Public/Private

Ownership	Number of MSW Landfills		Amount of Waste Disposed (Tons)		% Total Waste Disposed	
	1991	2013	1991	2013	1991	2013
Public	36	11	2,696,885	1,449,292	69	29
Private	9	3	1,192,207	3,557,495	31	71
Total	**45**	**14**	**3,889,092**	**5,006,787**	**100**	**100**

The amount of waste disposed in MSW landfills shows movement from the publicly owned facilities to those owned by the private sector (Figure 4.7). The trend has continued since 1991, when the state first started tracking this type of information. The amount of waste disposed in the private facilities has increased from 31 percent since 1991 to 71 percent in 2013. The private Roosevelt Regional Landfill in Klickitat County and LRI 304th Street Landfill in Pierce County account for the majority of this increase.

Figure 4.7
Comparison of Waste Disposed in Public and Private MSW Landfills (Tons)



Types of Waste Disposed in Municipal Solid Waste Landfills

Traditionally, many people think of the waste going into MSW landfills as being mostly household waste.[20] Annual facility reports show a much wider variety of waste is disposed in MSW landfills. These wastes need to be considered in terms of remaining available capacity. All landfills reported disposing types of solid waste other than MSW. Demolition, industrial, inert, sludge, asbestos, tires, auto fluff, petroleum-contaminated soils (PCS), and other contaminated soils were the major waste streams.

Most landfills report in only a few categories. This makes knowing exact amounts of specific waste types difficult. For amounts and types of waste individual MSW landfills reported in 2013, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/. Table 4.11 shows changes in waste, types and amounts disposed in MSW landfills from 2004-2013.

[20] "Household waste" as defined in *Chapter 173-351 WAC, Criteria for Municipal Solid Waste Landfills*, means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds and day-use recreation areas).

Table 4.11
Waste Types Reported Disposed in MSW Landfills (Tons)

Waste Types	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Municipal / Commercial[21]	3,598,760	3,631,873	3,787,080	3,847,352	3,637,010	3,435,505	3,383,984	3,261,582	3,282,962	3,403,743
Demolition Waste	366,087	541,945	551,572	532,409	363,343	260,500	254,453	307,815	320,939	364,476
Industrial Waste	1,034,615	624,958	182,661	131,167	130,929	115,390	164,755	102,842	99,569	117,372
Inert Waste	1,705	15,780	15,842	22,491	11,055	6,387	6,672	7,903	4,668	3,635
Commercial Waste[22]	-	-	-	-	-	-	-	-	-	
Wood	25,576	9,896	4,462	71	18	424	206	574	676	332
Ash (other than SPI)	3,444	2,857	2,432	3,959	2,102	1,096	1,907	1,663	1,629	1,838
Sewage Sludge	10,172	12,476	21,303	6,703	7,892	15,732	2,455	2,033	2,544	3,092
Asbestos	12,086	7,943	5,633	5,379	4,308	4,975	4,996	6,574	7,570	5,156
Petroleum Contaminated Soils	279,982	320,283	455,964	326,019	693,719	515,567	476,368	426,085	283,212	485,734
Other Contaminated Soils	49,454	212,692	224,608	295,930	119,711	232,673	391,868	74,568	91,059	352,256
Tires	7,462	6,942	8,525	11,797	13,162	8,151	9,750	6,413	6,201	5,447
Medical	2,565	2,576	2,721	2,805	2,932	2,907	12,109	8,726	10,484	11,801
Other [23]	114,204	127,121	135,206	167,933	171,366	176,581	168,720	718,805	453,972	251,906
Total	**5,506,112**	**5,577,342**	**5,398,008**	**5,354,005**	**5,157,547**	**4,775,887**	**4,878,241**	**4,925,583**	**4,565,487**	**5,006,787**

[21] Some facilities include demolition, industrial, inert, commercial and other small amounts of waste types in the MSW total.
[22] In 2004, the municipal and commercial categories were combined.
[23] Some of the "other" types of waste reported include auto fluff, special waste, vactor waste, street sweepings, and catchment basin and detention pond sediments.

Future Capacity at Municipal Solid Waste Landfills

Fourteen MSW landfills are operating in Washington State. Ecology determined the amount of remaining capacity for them by asking them to report remaining permitted capacity, as well as the expected closure date. In April 2014, the facilities estimated about 312 million tons, or about 62 years of capacity at the current disposal rate, an increase from 2013.

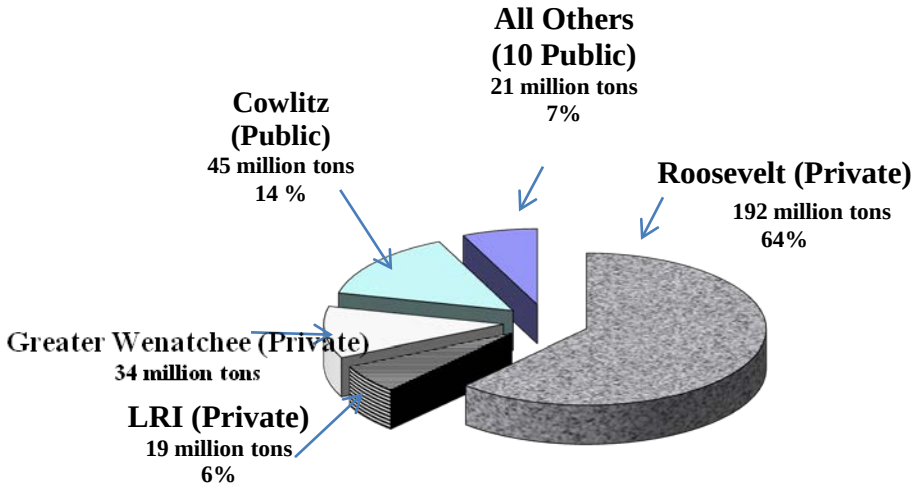
Changes in permit conditions, construction of new landfill cells, and changing volumes affect remaining capacity. Of the 14 currently operating landfills, 11 have more than 10 years of remaining permitted capacity. Capacity numbers in 2014 indicated more than 98 percent of remaining capacity was at landfills with more than 10 years before closure.

Eleven of the 14 operating MSW landfills are publicly owned, with about 21 percent of the remaining capacity (66 million tons). About 79 percent of the remaining permitted capacity (245 million tons) is at the three privately owned facilities, compared to 73 percent in 1993.

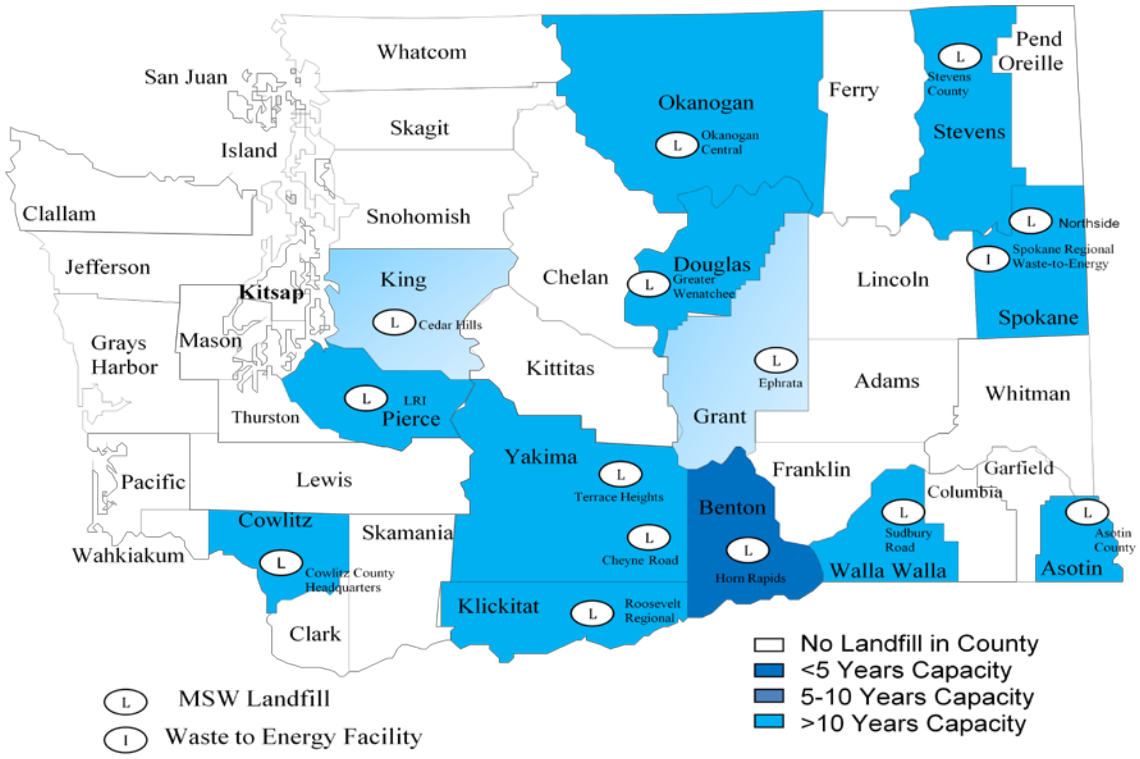
Cowlitz County closed their municipal solid waste landfill in late 2013. The county purchased the Headquarters Road Limited Purpose Landfill from Weyerhaeuser and has brought the landfill into compliance with *Chapter 173-351 WAC, Criteria for Municipal Solid Waste Landfill Standards*. It has been permitted as a municipal solid waste landfill and began accepting MSW waste this year. This facility has increased the available capacity for public landfills in the state.

The majority of the capacity, 61.5 percent of the total statewide capacity, is at the privately owned Roosevelt Regional Landfill in Klickitat County. Two other private landfills have the next largest remaining capacity: Greater Wenatchee (11 percent) and LRI in Pierce County (6 percent). Cowlitz County, owned by the county, has 14 percent of the remaining capacity. The other 10 publicly owned landfills have 7.5 percent of the remaining statewide capacity (see Figure 4.8). Map 4.A shows the locations and remaining years of capacity of MSW landfills.

Figure 4.8
2013 Remaining Permitted Capacity at MSW Landfills



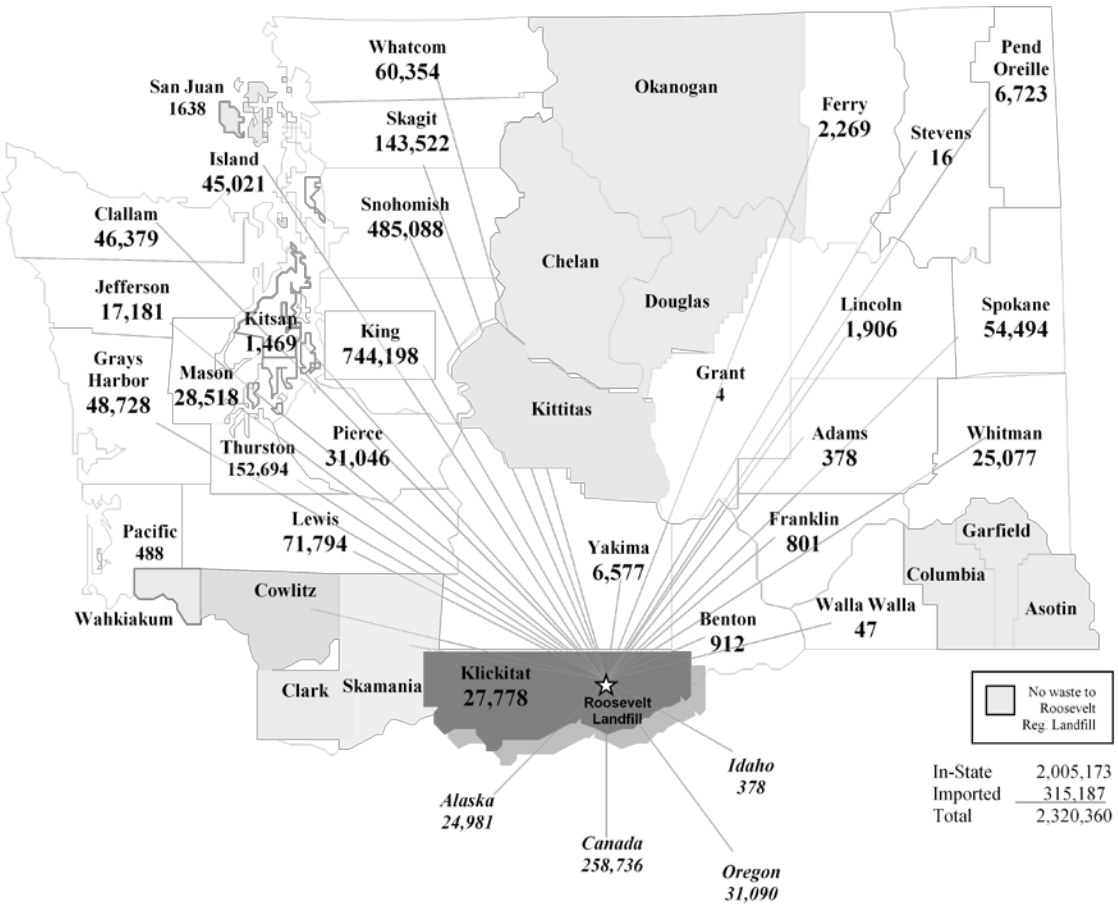
Map 4.A
Location of MSW Landfills & Energy Recovery Facilities and Remaining Capacity (as of April 2014)



Besides the amount of remaining capacity, availability of that capacity needs to be considered. The Roosevelt Regional Landfill accepts waste from a wide variety of locations (see Map 4.B). In 2013, the facility received some type of solid waste from 27 counties in Washington, including the majority of the solid waste from 16 counties. They also received waste from Alaska, Oregon, Idaho, and British Columbia.

For counties that do not have landfills, Roosevelt or the Oregon landfills have become their disposal option. Other landfills in the state accept the majority of waste from the county where they operate. To reserve capacity for local citizen needs, some are also using regional facilities for some of their non-municipal waste disposal needs.

Map 4.B
2013 Solid Waste to Roosevelt Landfill (in Tons)



Ecology bases its 62-year estimate of total remaining permitted capacity on the amount of waste disposed in MSW landfills in 2013. This amount will vary depending on waste reduction and recycling activities, population growth or decline, and the economy. Other contributing factors include the impact of waste imported into the state for disposal, or a shift to in-state disposal of waste currently exported. Cleanup activities, such as dredging contaminated sediments from Puget Sound, will add large volumes to the disposal totals.

Waste-to-Energy/Incineration

The Spokane Regional Waste-to-Energy Facility burned 255,577 tons of solid waste. It is the only incinerator in the state that burns municipal solid waste.

MSW Landfill Disposal vs. Incineration

Table 4.12 compares the amount of solid waste disposed in MSW landfills, and waste-to-energy facilities and incinerators in 2013.
In 1991, 98 percent of waste was disposed in MSW landfills and 2 percent was incinerated. Twelve percent occurred in 1995, the highest percentage of incinerated waste in the state.

Table 4.12
Waste Disposed in MSW Landfills and Incinerators in 2013

Facility Type	Tons	Percent
MSW Landfills	5,006,787	95%
Incinerators	255,577	5%
Total	**5,262,364**	**100%**

In 2013, about five percent of the waste stream was incinerated. The amount of waste incinerated will likely remain fairly stable, with only one operating MSW energy-recovery facility and no new facilities planned. See Map 4.A for the locations of MSW landfills and energy-recovery facilities in Washington.

Waste Disposed in Other Types of Landfills

Ash Monofill

Waste-to-energy facilities that generate more than 12 tons per day of MSW must dispose of their ash in a properly constructed ash monofill. *Chapter 173-350 WAC, Solid Waste Handling Standards*, and *Chapter 173-306 WAC, Special Incinerator Ash Management Standards* now regulate these facilities. In 2013, the Spokane Waste-to-Energy Recovery facility, the only facility of this type in the state, sent 72,510 tons of special incinerator ash to the ash monofill at the Roosevelt Regional Landfill in Klickitat County.

Inert Landfills and Limited Purpose Landfills

In addition to MSW landfills, two other types of landfills currently exist in the state: inert landfills and limited purpose landfills. These are regulated under *Chapter 173-350 WAC, Solid Waste Handling Standards*, which took effect in February 2003. The former wood waste landfill and inert/demolition landfill types no longer exist. Inert waste is now narrowly defined for disposal in an *inert* landfill. Demolition waste is no longer accepted at inert landfills. Landfills accepting demolition or wood waste need to be either limited purpose or MSW landfills. The limited purpose landfill permitted under the new rule has increased design and monitoring requirements. The annual reporting forms for the inert landfills and limited purpose landfills under *Chapter 173-350 WAC* added more categories of waste

For a more consistent look at inert landfills over time, some waste categories were combined for Table 4.13.

Table 4.13
Waste Types and Amounts Disposed at Inert Landfills (in Tons)[24]

Waste Types	2005	2006	2007	2008	2009	2010	2011	2012	2013
Demolition	39,701	89,595	89,457	-	-	-	-	-	-
Industrial	-	-	2,150	1,940	799	945	1930	399	-
Inert	944,153	973,855	1,324,663	1,250,973	604,196	929,578	574,291	1,024,930	1,172,486
Wood	402	610	-	-	-	-	-	-	-
Asbestos	-	-	-	-	-	-	-	-	-
Ash (other than SPI)	7,989	7,497	7,052	7,680	6,320	5,311	5,029	6,038	-
PCS	215,286	91,399	277,812	-	-	-	-	-	-
Contaminated soils (other)	-	-	-	-	81,074	28,363	136,586	10,266	118,000
Tires	-	-	-	-	-	-	-	-	-
Other	324,110	68,609	7,311	538	960	1,951	1,296	915	1,087
Total Tons	**1,531,641**	**1,231,565**	**1,708,445**	**1,261,131**	**693,349**	**966,148**	**791,132**	**1,042,558**	**1,291,573**

[24] Chapter 173.350 WAC defines inert waste and limits the types of materials disposed in 'inert' landfills. These landfills were formerly permitted as inert/demolition landfills and accepted a wider variety of material. Some landfills reporting under this category are transitioning to a limited purpose permit or will be closing.

Table 4.14 shows waste types disposed in Limited Purpose Landfills.

Table 4.14
Waste Types and Amounts Disposed at Limited Purpose Landfills (in Tons)

Waste Types	2005	2006	2007	2008	2009	2010	2011	2012	2013
Demolition	220,076	215,543	245,604	255,098	254,824	221,043	222,163	260,328	449,104
Industrial	420,285	257,297	173,992	149,978	113,636	157,960	124,392	133,513	-
Inert	53,597	39,928	48,784	100,115	27,335	43,322	25,259	21,092	23,248
Wood	21,494	19,629	11,702	18,210	11,608	8,823	9,373	23,325	20,900
Ash (other than SPI)	409,376	138,616	77,082	65,117	121,329	180,620	155,923	122,178	20,900
Sludge	-	-	460	460	460	-	-	-	-
Asbestos	1,624	1,420	1,374	1,614	2,313	2,357	1,544	2,038	1,694
PCS	224,064	32,836	20,656	11,398	75,275	96,639	31,390	130,494	157,762
Soils (uncont.)	13,706	29,006	-	-	-	9,327	53,419	-	-
Tires	690	423	65	35	122	30	128	97	141
Other	23,022	25,390	21,210	21,038	17,673	18,830	20,840	24,721	35,161
Total Tons	**1,387,934**	**760,088**	**600,928**	**623,063**	**624,575**	**738,952**	**644,431**	**717,787**	**968,756**

Movement of Solid Waste for Disposal

Movement of Waste Between Counties

All landfills and incinerators report the source, types, and amounts of waste they receive from outside their counties. Six of the 14 active MSW landfills reported receiving solid waste from other counties in 2013.

Some MSW movement was because of closer proximity to a neighboring county's landfill. This was especially true for smaller landfills that received MSW from other counties without their own landfills. Some of the waste from other counties was non-municipal waste such as petroleum contaminated soils, demolition debris, and asbestos.

With closure of many local landfills, Roosevelt Regional Landfill in Klickitat County and Oregon's regional landfills have become the chosen disposal options. The Roosevelt Regional Landfill received some type of solid waste from 27 of the 39 Washington counties and also from out-of-state and out-of-country (see Map 4.B).

For many counties that still have operating MSW landfills, Roosevelt Regional Landfill or Columbia Ridge Landfill in Oregon have become options to dispose of some of their non-municipal waste, thus saving local landfill capacity for future need. Sixteen of the 27 counties rely on Roosevelt for the majority of their MSW disposal.

Nine counties and the city of Seattle send the majority of their MSW to Oregon facilities (WASCO, Finley Buttes, and Columbia Ridge). Much of the waste that goes to the Columbia Ridge Landfill in Oregon is waste other than MSW.

You can find spreadsheets that identify the disposal location, type, and amount of waste for each county for 2013 (and previous years) at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Waste Imported and Exported for Disposal

Landfills and incinerators also report the source, types, and amounts of waste received from out-of-state or out-of-country. In 2013, a total of 437,169 tons of solid waste, about 8 percent of the waste disposed and incinerated in Washington, was imported from outside the state's boundaries for disposal at MSW landfills and energy recovery facilities. Waste was received from Alaska, Idaho, Oregon and British Columbia with a very small amount from Montana and California.

A larger amount of solid waste was exported from Washington to Oregon for disposal. In 2013, a total of 1,960,612 tons of waste created in Washington were disposed of in Oregon landfills. Table 4.15 compares the waste amounts and types exported and imported.

Table 4.15
Comparison of Imported to Exported
Waste for all Solid Waste Facilities

Type of Waste	Imported		Exported	
	1991	2013	1993	2013
Municipal Solid Waste	24,475	287,270	710,515	1,114,434
Demolition	1,412	37,851	2,245	204,167
Industrial	-	16,861	864	46,048
Inert	208	1,980	-	625
Wood waste	36		-	76
Ash (other than SIA)	-		-	1,390
Sludge	-	1,862	-	23
Asbestos	-	365	1,623	4,542
Petroleum Contaminated Soils	-	71,990	22,308	362,305
Other Contaminated Soils	-	59	-	125,999
Tires	-	4,019	-	208
Medical Waste	-	3,366	-	963
Other	-	11,546	18,512	99,832
Total	**26,131**	**437,169**	**756,067**	**1,960,612**

Major exporters of their MSW in Washington included the city of Seattle and Adams, Benton, Clark, Columbia, Franklin, Kitsap, Pacific, San Juan and Skamania, along with portions of Clallam, Pierce, Snohomish, Walla Walla, and Whatcom counties. Small amounts of non-municipal solid waste were also exported from several counties.

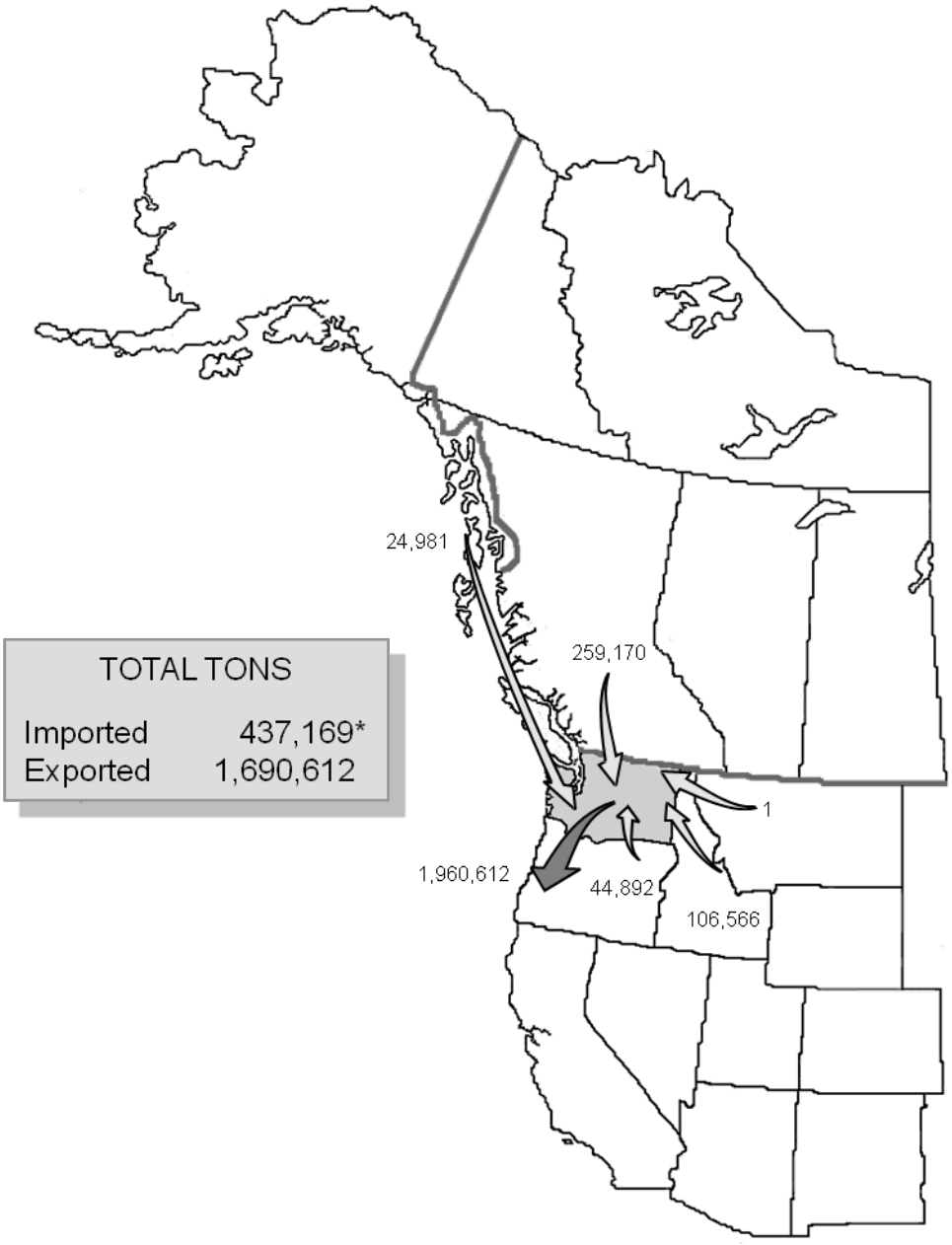
For the county details of waste types, amounts and final disposal locations and for imported and exported totals, see http://www.ecy.wa.gov/programs/swfa.solidwastedata/ .

Trends in Interstate Waste Movement for Washington

The first significant movement of waste across Washington State boundaries started in 1991. In mid-1991, the city of Seattle started long-hauling waste to the Columbia Ridge Landfill in Arlington, Oregon. In late 1991, the Roosevelt Regional Landfill began operating in Klickitat County, Washington, accepting waste from British Columbia, Idaho and California.

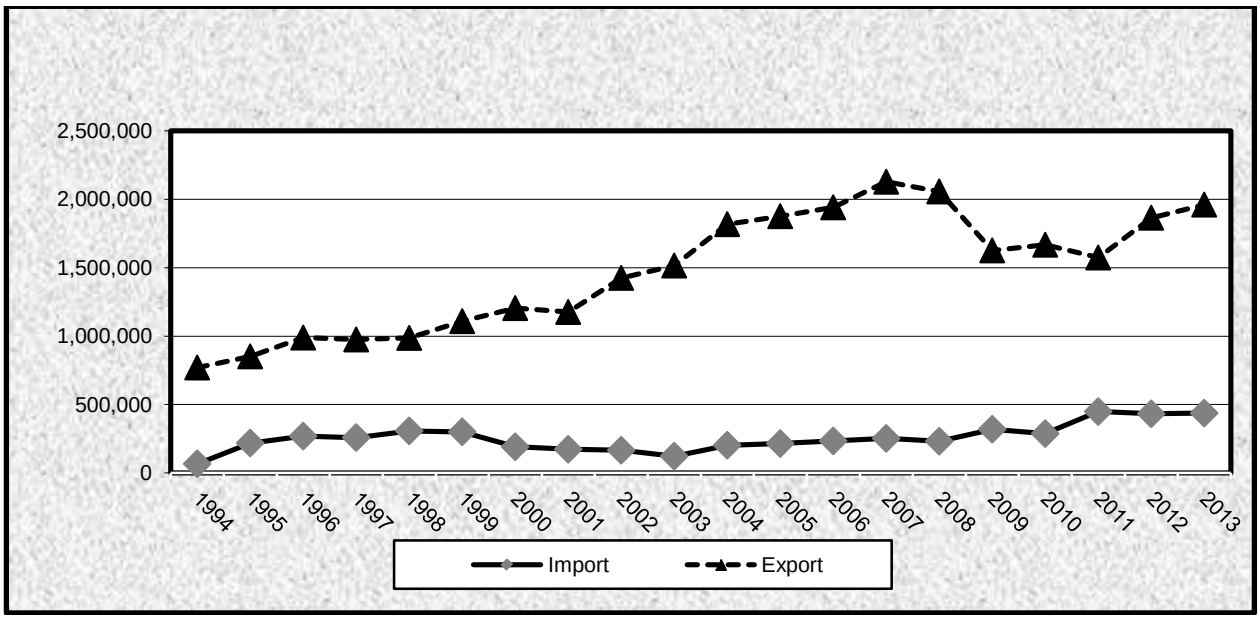
Map 4.C identifies the sources and amounts of waste that were imported and exported in 2013.

Map 4.C
Imported and Exported Waste (2013)

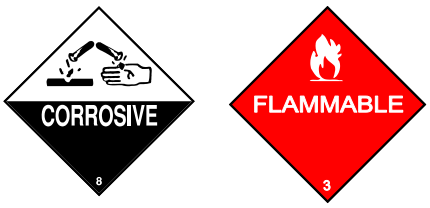


As shown in Figure 4.9, Washington exports have been much higher than imports since 1991. In 2013, about four times as much waste was exported to Oregon's landfills (Columbia Ridge, Wasco, and Finley Buttes) as what was imported to Washington for incineration or disposal.

Figure 4.9
Trend of Imported/Exported Solid Waste



Chapter 5: Moderate Risk Waste Management



The term "moderate risk waste" (MRW) was created by revisions to Washington State's 1986 Hazardous Waste Management Act (RCW 70.105). MRW is a combination of household hazardous waste (HHW) and conditionally exempt small quantity generator (CESQG) waste. HHW is waste created in the home, while CESQG is small quantities of business or non-household waste. Both HHW and CESQG waste are exempt from state hazardous waste regulations.

- The total MRW collected in 2013 was about 23.6 million pounds.
- The average amount of HHW disposed of per participant was 67.4 pounds, and per capita was 1.95 pounds.
- A little more than 3 percent of Washington residents used a fixed facility or collection event to remove hazardous waste from their households, about 7.4 percent of all households.
- Counties that publicly collected the most CESQG waste per capita were Lewis, Whatcom, Yakima, Jefferson, and Kitsap.
- Counties that collected the most used oil per capita were Garfield, Stevens, Columbia, Wahkiakum, Skamania, and Lincoln.
- Approximately 88 percent of all MRW collected was recycled, reused, or used for energy recovery.

MRW collections started in the early 1980s primarily as HHW-only events, also known as "roundups" or collection events. These events usually happened once or twice a year.

In the late 1980s, permanent collection facilities now known as fixed facilities began to replace collection events to fulfill the need for year-round collection. Over time, local collection programs have further developed with the addition of mobile units and satellite facilities to supplement fixed facilities. These efforts resulted in a larger number of customers served, decreased costs, and increased reuse and recycling of MRW.

Please note the data in this chapter is only a portion of the MRW waste stream. The MRW data presented here is reported through local governments, with a few private companies also reporting because they have a solid waste permit issued by the appropriate local authority. Chapter 4 includes additional statewide data.

Funding

RCW 70.105.235 authorizes Ecology to provide financial assistance through grants to locals for preparing, updating, and implementing local Hazardous Waste Plans, which detail local MRW

programs. Ecology uses the Coordinated Prevention Grants Program (CPG) to provide funding to local governments for these purposes. CPG is funded by the Local Toxics Control Account (LTCA).[1] CPG funding requires a 25 percent match from local agencies.

All local governments in the state of Washington have completed Hazardous Waste (HW) Plans. See Chapter 2 for the status of plans in each county. Every local HW plan must address:

- ✓ HHW collection.
- ✓ Household and public education.
- ✓ Small business technical assistance.
- ✓ Small business collection assistance.
- ✓ Enforcement.
- ✓ Used oil collection and education.

Accuracy of Data Collection

Ecology created and circulates a standard reporting form to all MRW programs. However, the reported data can vary depending on a program's collection process, and how data is reported and interpreted. All programs must provide an individual MRW report. However, some programs do not meet this obligation, which can create gaps in the data.

2013 Data

Chapter 173-350 WAC, Solid Waste Handling Standards, requires local programs to submit MRW report forms annually. Annual reports are required to be submitted by April 1 for the previous calendar year collections. Information received from local programs through MRW annual reports provides Ecology with data on MRW infrastructure, collection trends, costs, waste types received at collection events and fixed facilities, and disposition of wastes collected. Ecology translates this data into the information contained in this chapter, and designs it to be specifically useful to those who operate or work in MRW programs in Washington State.

This year's report focuses on 2013 data with some comparisons to data published in previous years' reports. In an effort to provide useful information for individual programs, data is provided in categories by county size.

In 2013, Chelan, Douglas, San Juan, and Skamania Counties did not report any HHW collections. Private collectors or used oil collection programs provided the numbers shown in this report for these counties. Due to budget constraints, some counties have decided to reduce hours of operations at their fixed facilities, or have discontinued or reduced collection events.

[1] Authorized by RCW 82.21.030 (Chapter 82.21 RCW, Hazardous substance tax -- Model toxics control act).

Permanent fixed facilities now service most of the state. In 2013, Benton, Chelan, Douglas, Ferry, Garfield, San Juan, Skamania, and Wahkiakum counties did not have fixed facilities. Garfield residents can use the facility in Asotin County and Cowlitz County conducts a mobile event in Wahkiakum County. Benton, Chelan, Douglas, Ferry, San Juan, and Skamania counties normally conduct collection events, though some of these counties were unable to do so in 2013.

In past reports, Ferry County was shown to have a fixed facility, but the facility is more properly categorized as a limited MRW Facility. Benton County had a permanent fixed facility until about mid-2010 when the facility was destroyed by a fire.

Collection services for CESQGs have leveled off statewide. In 2013, 17 fixed facilities serviced CESQGs, and 1 county provided a collection event for CESQGs.

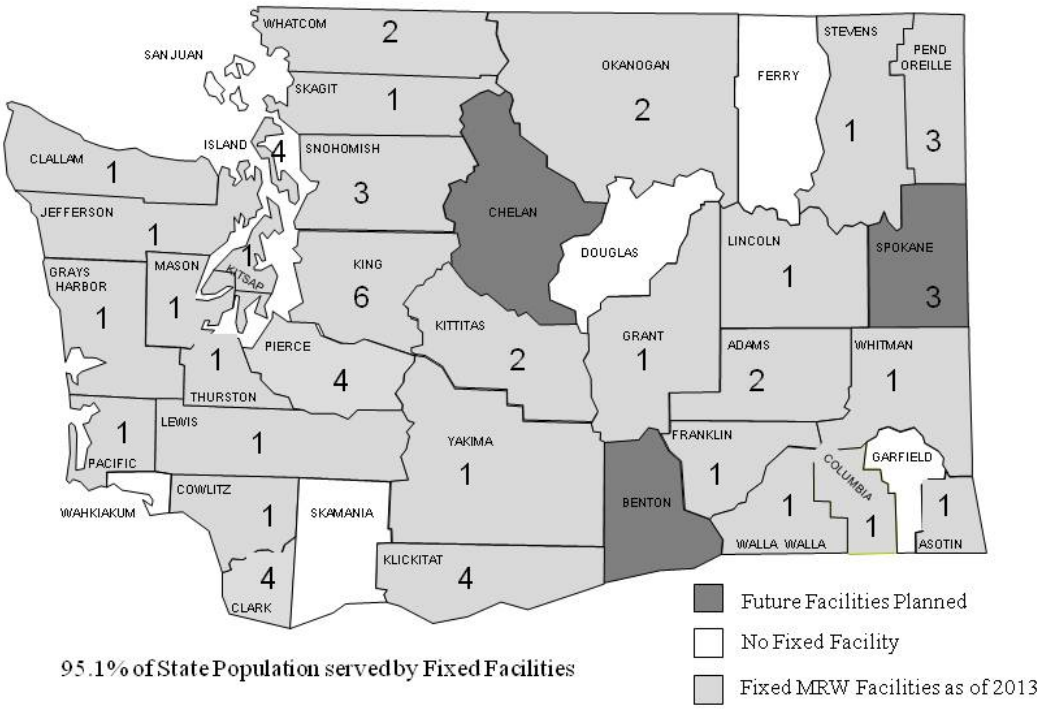
Table 5.1 shows the estimated population (based on data provided by the Office of Financial Management) by size of individual counties. In Washington State there are 42 programs that manage MRW. These programs include all 39 counties.

Table 5.1
Individual County Population by Size (2013)

< 50 K		50 K – 100 K		> 100 K	
Garfield	2,250	Walla Walla	59,500	Cowlitz	103,300
Wahkiakum	4,020	Mason	61,800	Skagit	118,600
Columbia	4,100	Clallam	72,350	Benton	183,400
Ferry	7,650	Grays Harbor	73,200	Whatcom	205,800
Lincoln	10,675	Chelan	73,600	Yakima	247,250
Skamania	11,300	Lewis	76,200	Kitsap	254,000
Pend Oreille	13,150	Island	79,700	Thurston	260,100
San Juan	16,000	Franklin	84,800	Clark	435,500
Adams	19,200	Grant	91,800	Spokane	480,000
Klickitat	20,700	**50 K – 100 K Total**	**672,950**	Snohomish	730,500
Pacific	21,000			Pierce	814,500
Asotin	21,800			King	1,981,900
Jefferson	30,275			**> 100K Total**	**5,814,850**
Douglas	39,280				
Okanogan	41,500				
Kittitas	41,900				
Stevens	43,800				
Whitman	46,000				
< 50K Total	**394,600**			**State Total**	**6,882,400**

Map 5.A shows which counties have permanent fixed facilities, the number of fixed facilities in each county, and which counties are likely to develop a permanent fixed facility in the future. Six of the fixed facilities represented on the map are owned and operated by private companies, either managing their own wastes from multiple facilities at one consolidation point or only servicing CESQG customers.

Map 5.A
58 MRW Facilities as of 2013



MRW Collected

As shown in Table 5.2, Washington programs collected approximately12.7 million pounds of HHW, 7.2 million pounds of used oil (UO) and 3.7 million pounds of CESQG waste, for a total of approximately 23.6 million pounds of MRW during 2013.

Table 5.2
Total Pounds per Waste Category 2004-13

Collection Year	HHW lbs (no UO)	Used Oil lbs	CESQG lbs	Total MRW lbs
2004	15.3M	12.4M	2.4M	30.1M
2005	14.7M	11.3M	6.3M	32.3M
2006	15.2M	10.0M	7.1M	32.3M
2007	14.9M	9.7M	7.6M	32.2M
2008	14,163,842	8,606,794	8,336,030	31,106,666
2009	12,257,316	8,916,633	4,867,334	26,041,283
2010	11,572,466	9,218,395	5,387,903	26,178,764
2011	10,965,429	7,857,614	4,977,625	23,800,668
2012	11,303,293	7,417,694	4,424,536	23,145,523
2013	12,722,719	7,196,140	3,768763	23,687,622

Collection by Waste Category and Type

As shown in Table 5.3, the waste types of MRW collected most in 2013 were non-contaminated used oil, latex paint, antifreeze, oil-based paint, paint related material, and CRTs. These totals include used oil and antifreeze collected at all collection sites. These six specific waste types accounted for approximately 70 percent of the estimated 23.6 million pounds of MRW collected in 2013.

Table 5.3
Six Most MRW Waste Types Collected in 2013

Waste Type	Total Lbs.
Non-Contaminated Used Oil	7,196,140
Latex Paint	2,636,596
Antifreeze	2,556,989
Oil-based Paint	1,469,516
Paint Related Material	1,482,442
CRT's	1,093,987
Total	**16,435,670**

Table 5.4 provides summary information on total pounds of MRW collected from HHW and CESQG (publicly and privately collected) categories by waste types. Some waste type categories were changed and a few new ones added to the annual report form beginning in 2007.

Table 5.4
Total Pounds of MRW Collected by Waste Category in 2013

Waste Type	HHW	CESQG	Total
Acids	149,212	17,023	166,235
Acids (Aerosol Cans)	138	0	138
Aerosols (Consumer Commodities)	162,761	18,835	181,596
Antifreeze	557,033	1,999,956	2,556,989
Bases	206,500	28,279	234,779
Bases, Aerosols	122	1	123
Batteries (Auto Lead Acid)	630,405	6,661	637,066
Batteries (Small Lead Acid)	14,086	7,065	21,151
Batteries (Dry Cell)	335,088	15,741	350,829
Batteries (Nicad/NIMH/Lithium)	50,570	10,558	61,128
CFCs	5,511	63	5,574
Chlorinated Solvents	1,889	265	2,154
Compressed Gas Cylinders	655	875	1,530
CRT's	1,091,867	2,120	1,093,987
Cyanide Solutions	31	27	58
Dioxins	0	0	0
Electronics	1,009,778	17,097	1,026,875
Fire Extinguishers	16,358	2,080	18,438
Flammable Solids	20,106	30,840	50,946
Flammable Liquids	759,554	188,192	947,746
Flammable Liquids, Aerosols	180	0	180
Flammable Liquids Poison	146,070	17,984	164,054
Flammable Liquid Poison, Aerosols	57,654	99	57,753
Flammable Gas (Butane/Propane)	130,611	621	131,232
Flammable Gas Poison	2,900	63	2,963
Flammable Gas Poison, Aerosols	44,722	537	45,259
Latex Paint	2,579,262	57,334	2,636,596
Latex Paint, Contaminated	207,492	30,854	238,346
Mercury Compounds (Dental Amalgam)	576	13,085	13,661

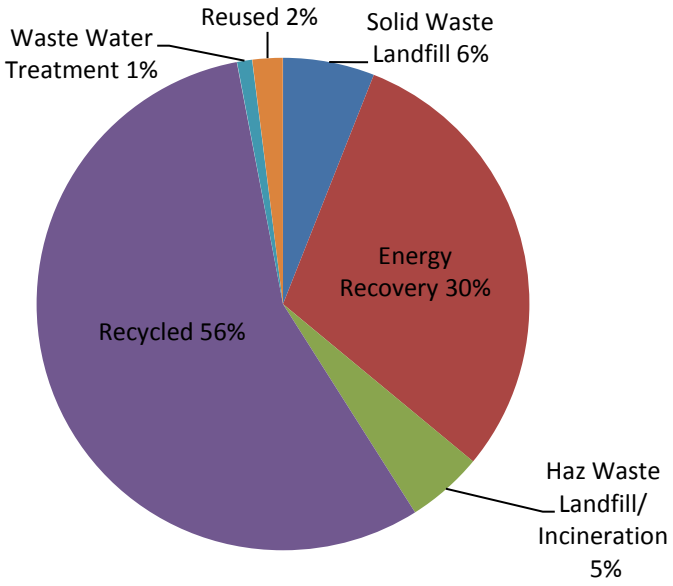
Waste Type	HHW	CESQG	Total
Mercury Containing Batteries (Button, etc)	53	1	54
Mercury Devices (Monometers, Barometers, etc.)	149	85	234
Mercury (Fluorescent Lamps & CFLs)	679,039	123,931	802,970
Mercury (Pure Elemental)	496	128	624
Mercury (Switches & Relays)	2	197	199
Mercury (Thermostats/Thermometers)	931	264	1,195
Nitrate Fertilizer	10,939	295	11,234
Non-PCB Containing Light Ballasts	6,387	4,728	11,115
Non-Regulated Liquids	56,236	87,645	143,881
Non-Regulated Solids	177,775	342,018	519,793
Oil-Based Paint	1,319,682	149,834	1,469,516
Oil-Based Paint, Contaminated	85,790	8,916	94,706
Oil Contaminated (oily H2O, oil w/PCB's, etc.)	31,366	72,725	104,091
Oil Filters	146,465	2,684	149,149
Oil Filters Crushed	3,287	0	3,287
Oil Non-Contaminated	7,112,220	83,920	7,196,140
Oil Stained Rags, Absorbent Pads, etc.	7,839	4,688	12,527
Organic Peroxides	677	127	804
Other Dangerous Waste	64,704	244,663	309,367
Oxidizers	28,088	3,776	31,864
Paint Related Materials	1,242,518	239,924	1,482,442
PCB Containing Light Ballasts	17,426	6,927	24,353
Pesticide/Poison Liquid	352,135	13,945	366,080
Pesticide/Poison Solid	212,531	20,747	233,278
Photo/Silver Fixer	284	12,500	12,784
Reactives	2,565	99	2,664
Tar and/or Adhesives	15,416	1,773	17,189
Used Cooking Oil	38,688	8	38,696
MRW TOTAL	**19,794,819**	**3,892,803**	**23,687,622**

* These totals do not match the HHW and CESQG totals in Table 5.2 because these contain used oil, which was separated out in Table 5.2. Also, in past reports most of the used oil was included with the CESQG totals. It is impossible to know if used oil collected at facilities such as Jiffy Lube is HHW or CESQG. However, it seems more reasonable that most of it is HHW rather than CESQG. Therefore, since 2008 it has been included with the HHW total in Table 5.4 instead of the CESQG total as in the past. Note: In 2013 MRW programs recycled 486,625 pounds of materials such as propane tanks, cardboard, paint cans, etc. This number is not included in any of the data in the above table or elsewhere in this chapter. It is noted here because it is a waste stream that MRW programs must deal with. The majority of MRW programs manage these recyclables appropriately.

Disposition of MRW Waste

The disposition of MRW collected is generally well managed. Most MRW is recycled or used for energy recovery. Very little of the MRW collected is safe for solid waste disposal. Five percent of all MRW is disposed at a hazardous waste landfill or incinerator. Figure 5.1 shows final disposition of MRW between recycled, reused, energy recovery, hazardous waste landfill or incineration, solid waste landfill, and disposal through a wastewater treatment plant.

Figure 5.1
2013 MRW Final Disposition



MRW Data

Table 5.5 shows various data by county. HHW data is based on fixed facility and collection event information, but does not include HHW collected at limited MRW sites, such as used oil sites as participation numbers are not tracked at these sites. The last column of this table represents all MRW collected in that county, including privately collected CESGQ wastes, used oil, antifreeze, and oil filters collected at used oil sites. This information can be used to evaluate efficiencies within each county by comparing percentage of participants per housing units and costs, and HHW pounds per participant.

Housing units are the number of households in each county. This data is used instead of per capita because participants typically represent a household.

Table 5.5
Various HHW Data by County

County	Housing Units	HHW Participants	% Participant / Housing Units	HHW Cost / Participant	HHW lbs / Participant	HHW Total lbs	HHW, SQG, & Used Oil From Limited Sites Total lbs
Adams^	6,380	0	0%	$0	0.00	1,132	3,798
Asotin	9,937	1,600	16.1%	$69.96	143.6	229,794	237,169
Benton	71,955	1,449	2%	$118.25	143.6	208,022	267,173
Chelan^^	35,938	0	0%	$0	0.00	0	77,370
Clallam	36,135	601	1.7%	$160.00	76.0	45,655	171,267
Clark	170,752	16,089	9.4%	$46.80	245.6	3,951,821	5,276,650
Columbia^	2,158	0	0%	$0	0	28,883	29,933
Cowlitz	43,814	2,144	4.9%	$61.36	360.0	771,600	1,068,065
Douglas^^	16,299	0	0%	$0	0	0	7,793
Ferry	4,462	14	.3%	$135.71	11.3	158	3,664
Franklin	26,207	291	1.1%	$26.24	23.8	6,935	430,554
Garfield	1,232	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	19,125
Grant	36,028	346	1%	$150.31	133.1	46,047	58,005
Grays Harbor	35,516	1,792	5%	$138.13	81.6	146,254	291,830
Island	40,700	1,828	4.5%	$106.10	143.1	261,500	429,128
Jefferson	18,034	1,024	5.7%	$79.03	114.3	117,047	129,360
King	869,835	74,462	8.6%	$47.92	44.7	3,329,436	5,858,902
Kitsap	108,449	8,405	7.8%	$90.65	84.5	710,424	1,136,965
Kittitas	22,440	320	1.4%	$241.04	146.5	46,876	147,987
Klickitat	10,060	8,425	83.7%	$3.07	12.1	101,861	109,662
Lewis	34,482	1,087	3.2%	$129.77	275.9	299,891	393,527
Lincoln	5,864	360	6.1%	$31.91	116.7	42,013	78,473
Mason	32,905	453	1.4%	$57.28	23.3	10,550	41,144
Okanogan	22,501	406	1.8%	$159.67	73.2	29,700	61,372
Pacific	15,651	201	1.3%	$153.15	53.9	10,830	51,599
Pend Oreille	8,025	2,044	25.5%	$34.47	53.3	108,891	110,511
Pierce	331,861	10,958	3.3%	$61.80	60.1	658,516	1,179,738
San Juan*	13,576	0	0%	$0	0.00	0	0
Skagit	52,218	3,790	7.3%	$47.68	30.2	114,330	277,367
Skamania^^	5,747	0	0%	$0	0	0	39,942
Snohomish	293,586	10,494	3.6%	$66.87	65.6	687,918	2,069,913
Spokane	205,488	9,630	4.7%	$33.04	55.1	530,740	1,186,255
Stevens	21,347	158	.7%	$242.66	351.0	55,456	239,891
Thurston	111,809	14,751	13.2%	$22.66	13.4	197,143	536,234

County	Housing Units	HHW Participants	% Participant / Housing Units	HHW Cost / Participant	HHW lbs / Participant	HHW Total lbs	HHW, SQG, & Used Oil From Limited Sites Total lbs
Wahkiakum	2,099	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	14,280
Walla Walla	23,996	1,765	7.4%	$46.77	56.1	98,934	102,131
Whatcom	92,363	8,171	8.8%	$37.54	35.0	285,352	464,248
Whitman	19,574	871	4.4%	$66.02	33.2	28,933	66,749
Yakima	86,885	15,363	17.7%	$17.88	17.9	274,762	1,019,848
STATEWIDE	**2,946,308**	**199,292**	**6.8%**	**$48.51**	**67.4**	**13,437,404**	**23,687,622**

* These counties did not report in 2013 and any total pounds shown represents the amount private companies collected from CESQG's in those jurisdictions.
^^ These counties scaled back operations in 2013 and any HHW pounds reported represent those collected at limited MRW sites and any CESQG amounts reported are from private companies.
^ These counties did not report participation and/or cost information numbers in 2013

Household Hazardous Waste (HHW)

Participants per Housing Unit

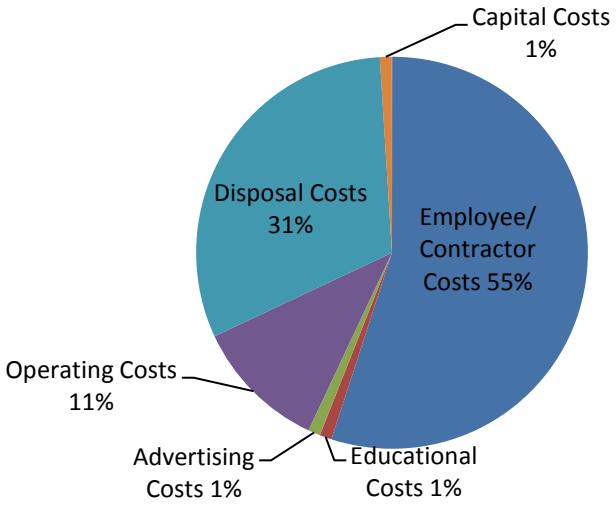
Counties that exhibit ten percent or higher of participants per housing unit provide excellent public education to encourage use of facilities or events, have very convenient locations for their collection facilities, or both.

Cost per Participant and Overall HHW Cost Breakdown

This statistic is hard to compare because of the many variables in program costs. Some programs record every cost, whether direct or indirect. Others record only the disposal and basic operation costs.

Larger counties have the advantage of efficiency in scale, both in quantities received and in disposition options. Also, there are differences in service levels of the basic program, accounting differences, and errors. However, this data does provide an idea of what is possible and an incentive to contact those counties that seem to operate efficiently. According to annual reports submitted to Ecology, HHW programs spent just over $9.6 million in 2013 statewide (does not include CESQG costs). Figure 5.2 shows the overall breakdown of HHW costs reported to Ecology.

Figure 5.2
2013 HHW Cost Breakdown



HHW Pounds per Participant and per Capita

The average pounds collected statewide per participant for HHW was 67.4. Table 5.6 shows the top five counties with the highest collections of HHW in pounds per capita (not participant as is shown above in Table 5.5) for 2011-2013. Statewide, HHW pounds per capita collected was 1.95 pounds.

Table 5.6
High Collections of HHW (No Used Oil Sites)
Pounds per Capita by County in 2011-13

HHW 2011		
County	**Size**	**Lbs**
Pend Oreille	<50K	7.30
Asotin	<50K	6.65
Island	50-100K	6.32
Lincoln	<50K	4.84
Clark	>100K	4.80

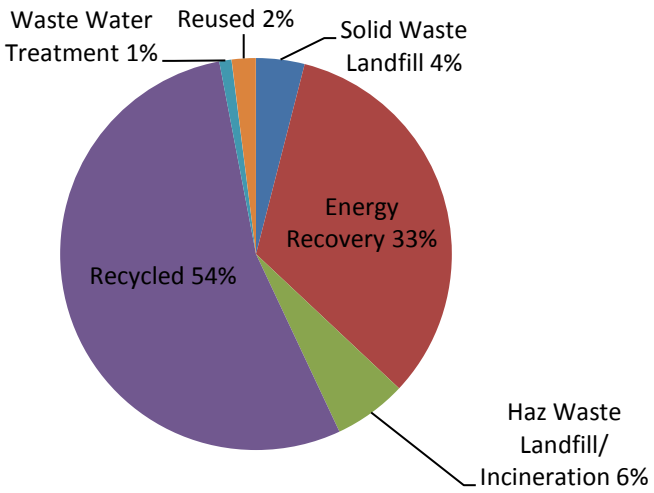
HHW 2012		
County	**Size**	**Lbs**
Cowlitz	>100K	7.75
Asotin	<50K	6.98
Island	50-100K	6.12
Clark	>100K	6.00
Klickitat	<50K	5.20

HHW 2013		
County	**Size**	**Lbs**
Asotin	<50K	10.5
Clark	>100K	9.07
Pend Oreille	<50K	8.28
Cowlitz	>100K	7.47
Columbia	<50K	7.04

HHW Disposition

Figure 5.3 shows the final disposition of all HHW collected throughout Washington State in 2013.

Figure 5.3
2013 HHW Final Disposition



Conditionally Exempt Small Quantity Generator (CESQG)

Eighteen local government MRW programs collected CESQG wastes in 2013. This number is down from 2009 when there were 22 programs providing collection service to CESQGs. Some programs have decided to discontinue CESQG collection service, while others have had to suspend their CESQG collections temporarily. The City of Tacoma* (Pierce County) offers CESQGs collection assistance for fluorescent lights only. Following are the counties that sponsored CESQG waste collections in 2013:

Asotin	King	Pierce*
Cowlitz	Kitsap	Skagit
Grant	Kittitas	Snohomish
Grays Harbor	Lewis	Thurston
Island	Okanogan	Whatcom
Jefferson	Pacific	Yakima

The top five counties that publicly collected the most CESQG waste per capita in 2013 were:

- Lewis
- Whatcom
- Yakima
- Jefferson
- Kitsap

Table 5.7 shows the total amount of CESQG waste collected publicly and privately in each county. When we take into account both public and private collection numbers, the top five counties for CESQG collections per capita in 2013 were:

- Franklin
- Clark
- Lewis
- Whatcom
- Yakima

Table 5.7
2013 Washington State Public and Private CESQG Collections in Pounds by County

County	Publicly Collected CESGQ Waste	Publicly Collected CESQG Waste /Capita	Privately Collected CESGQ Waste	Total CESQG Waste Collected	Total CESQG Waste Collected/Capita
Adams	0	0	2,666	2,666	.14
Asotin	5,927	.27	1,448	7,375	.34
Benton	0	0	7,635	7,635	.04
Chelan	0	0	10,425	10,425	.14
Clallam	0	0	9,472	9,472	.13
Clark	0	0	1,251,233	1,251,233	2.87
Columbia	0	0	1,050	1,050	.26
Cowlitz	10,497	.10	5,974	16,471	.16
Douglas	0	0	7,793	7,793	.20
Ferry	0	0	113	113	.02
Franklin	0	0	423,619	423,619	5.0
Garfield	0	0	225	225	.10
Grant	655	.01	11,303	11,958	.13
Grays Harbor	19,033	.26	1,827	20,860	.29
Island	9,279	.12	2,389	11,668	.15
Jefferson	11,060	.37	1,253	12,313	.41
King	106,729	.05	809,072	915,801	.46
Kitsap	79,202	.31	11,078	90,280	.36
Kittitas	2,914	.07	2,415	5,329	.13
Klickitat	0	0	68	68	.01
Lewis	48,249	.63	7,462	55,711	.73
Lincoln	0	0	3,113	3,113	.29
Mason	0	0	2,522	2,522	.04
Okanogan	1,826	.04	4,508	6,334	.15
Pacific	729	.04	3,484	4,213	.20
Pend Oreille	0	0	1,620	1,620	.12
Pierce*	4,360	.01	286,803	291,163	.36
San Juan	0	0	0	0	0
Skagit	15,598	.13	15,889	31,487	.27
Skamania	0	0	142	142	.01
Snohomish	103,662	.14	46,651	150,313	.21
Spokane	0	0	207,455	207,455	.43
Stevens	0	0	2,047	2,047	.05
Thurston	32,516	.13	21,930	54,446	.21
Wahkiakum	0	0	0	0	0
Walla Walla	0	0	3,197	3,197	.05
Whatcom	101,812	.50	21,017	122,829	.60
Whitman	0	0	17,308	17,308	.38
Yakima	117,976	.48	14,123	132,099	.53
Statewide Totals	**672,024**	**.10**	**3,220,779**	**3,892,803**	**.56**

* City of Tacoma's CESQG program collects fluorescent lighting only.

Table 5.8 shows the total amount of CESQG waste collected publicly and privately by waste type. Excluding the "Other DW" category, the top five CESQG waste types collected in 2013 were:

- Antifreeze
- Non-Regulated Solids
- Paint Related Materials
- Flammable Liquids
- Paint – Oil Base

Table 5.8
Washington State Public and Private CESQG Collections for 2013 in Pounds by Waste Type

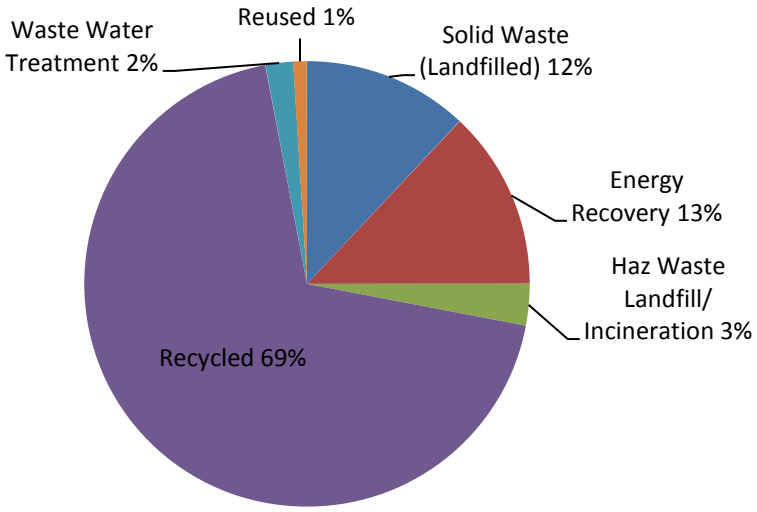
Waste Type	Public Collections	Private Collections	Totals
Antifreeze	14,496	1,985,460	1,999,956
Non-Regulated Solids	2,953	338,900	341,853
Other DW	9,356	228,519	237,875
Paint Related Materials	28,043	186,590	214,633
Flammable Liquids	94,345	85,944	180,289
Paint - Oil Base	125,614	22,992	148,606
Used Oil - Non-Contaminated	38,476	91,707	130,183
Mercury Collections	108,136	15,311	123,447
Used Oil-Cont. (oily water, etc)	16,166	54,680	70,846
Paint – Latex	54,840	1,994	56,834
Non-Regulated Liquids	28,646	2,600	31,246
Flammable Solids	5,326	25,335	30,661
Pesticides - Poison/Solids	14,842	5,835	20,677
Bases	15,935	3,844	19,779
Paint - Latex Contaminated	19,312	387	19,699
Aerosols - Consumer Commodities	3,763	14,532	18,295
Flammable Liquid Poison	8,936	9,048	17,984
Electronics	920	15,500	16,420
Acids	14,323	1,699	16,022
Batteries - Alkaline/Carbon	5,930	8,609	14,539
Pesticides - Poison/Liquid	9,793	2,640	12,433
Batteries-Nicad/Lithium	3,182	6,636	9,818
Paint - Oil Base –Contaminated	8,916	0	8,916
Batteries - Small Lead Acid	2,512	4,553	7,065
PCB Containing Light Ballasts	6,275	639	6,914
Photo/Silver Fixer	6,503	0	6,503
Batteries – Auto Lead Acid	4,013	1,896	5,909
Non-PCB Containing Light Ballasts	4,688	0	4,688
Oxidizers	2,769	806	3,575
Oil Filters	2,684	0	2,684
Fire Extinguishers	2,000	0	2000
Tar/Adhesives	1,773	0	1,773
Compressed Gas Cylinders	780	0	780
Flammable Butane/Propane	501	120	621
Flammable Gas Poison – Aerosols	537	0	537
Nitrate Fertilizer	295	0	295
Chlorinated Solvents	265	0	265
Organic Peroxides	108	8	116
Flammable Liquid Poison – Aerosols	81	18	99
Reactives	73	26	99
Flammable Gas Poison	63	0	63
Cyanide Solutions	27	0	27
Used Cooking Oil	8	0	8
Bases - Aerosols	1	0	1
Totals	**672,024**	**3,117,697**	**3,789,721**

CESQG Disposition

Eight-two percent of all CESQG waste collected in 2013 was either recycled or used for energy recovery. See Figure 5.4 for the complete disposition breakdown of CESQG wastes in 2013. There are a couple differences between final disposition of HHW and CESQG wastes worth noting:

- 33 percent of HHW was sent for energy recovery versus 13 percent of CESQG wastes.
- More CESQG waste is disposed via a solid waste landfill (12%) compared to only 4% of HHW.

Figure 5.4
2013 CESQG Final Disposition



Collection/Mobile Events

Table 5.9 represents the number of collection/mobile events held statewide from 2011-13.

The amount of waste collected through these types of events was just under 2.0 million pounds in 2013, which is approximately 8.5 percent of all MRW collected in 2013. The Waste Mobile in King County conducted 73 mobile events, including a weekly event at the Auburn Supermall that collected a little more than 1 million pounds of MRW in 2013.

Table 5.9
2011-13 Collection/Mobile Event Collection Amounts

Type of Event	Number of Events			Pounds Collected		
	2011	2012	2013	2011	2012	2013
Mobile	73	80	73	1,130,122	1,217,135	1,125,529
Collection	47	69	76	876,410	637,664	870,670
Totals:	**120**	**149**	**149**	**2,006,532**	**1,854,799**	**1,996,199**

Used Oil Sites

In 2013, facilities and collection sites reported collecting a total of 7,196,140 pounds of used oil. Used oil collection peaked statewide (12.4 million pounds) in 2004 and has mostly steadily declined over the years. Used oil collections need to be continually monitored. There are more cars on the road than ever, so one would expect this category to keep increasing. The recent trend to change oil every 5,000 miles compared to 3,000 miles and less do-it-yourself oil changers may be impacting this category. Table 5.10 shows the six counties with the highest collections in pounds per capita by county size for 2011-13.

Table 5.10
Used Oil High Collection Counties - Pounds per Capita by County Size
Collected at Facilities and Used Oil Collection Sites 2011-13

Used Oil Sites - 2011			Used Oil Sites - 2012			Used Oil Sites – 2013		
County	Size	Lbs	County	Size	Lbs	County	Size	Lbs
Garfield	<50K	8.0	Garfield	<50K	8.0	Garfield	<50K	8.4
Stevens	<50K	4.2	Stevens	<50K	4.3	Stevens	<50K	4.1
Skamania	<50K	4.0	Columbia	<50K	3.2	Columbia	<50K	3.6
Columbia	<50K	3.4	Asotin	<50K	3.1	Wahkiakum	<50K	3.5
Lincoln	<50K	3.3	Cowlitz	50K-100K	2.5	Skamania	<50K	3.4
Wahkiakum	<50K	3.1	Lincoln	<50K	2.4	Lincoln	<50K	3.1

Statewide Level of Service

The Washington State Office of Financial Management reported that as of 2013, Washington State had an estimated 2,946,308 housing units[2]. MRW Annual Reports revealed there were 199,292 participants who used the services of either an MRW collection event or MRW fixed

[2]This information was downloaded from http://ww.ofm.wa.gov/

facility. The actual number of households served is larger, because most used oil sites do not record or report numbers of participants. The actual number of households served is also larger, because some participants counted at events or by facilities bring HHW from multiple households.

One way to estimate the approximate number of households served is to add ten percent to the participant values. This method gives an estimate of 219,221 participants served in 2013. This number represents 7.4 percent of all households in Washington State. Table 5.11 shows the percent of participants served statewide since 2002.

Table 5.11
Percent of Participants Served Statewide

Year	Percent Participants Served	Year	Percent Participants Served
2002	6.8	2008	8.7
2003	8.9	2009	8.3
2004	8.9	2010	7.9
2005	9.0	2011	7.8
2006	8.6	2012	6.9
2007	9.1	2013	7.4

Trends in Collection

The majority of counties in Washington State have at least one fixed facility. Collection events can be a useful strategy to supplement collection services for residents inconveniently located from fixed facilities.

Overall, MRW collections leveled off between 2005 and 2007. 2008-12 saw a significant reduction in the amount of MRW collected, with the biggest drops in 2009 and 2011. This is likely due to local policies of no longer collecting latex paint, a decrease in CESQG antifreeze collections by private companies, and the overall state of the economy.

Product Stewardship

Some other methods of managing MRW are gaining wider acceptance in Washington State and across the country. Product stewardship efforts have resulted in the statewide electronics and mercury lights recycling programs. Paint and rechargeable battery legislation was introduced in the 2012 Legislative Session and brought back again in the 2013 Legislative Session. Paint was introduced again in 2014.

It remains to be seen what role MRW facilities will play in the future as product stewardship becomes more widespread. Will MRW facilities continue to collect products, but be reimbursed by industry for management of their products, or will MRW facilities choose to let industry find alternative locations and personnel to manage their programs?