Solid Waste in Washington State

21st Annual Status Report

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State of Washington

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Solid Waste in Washington State

Twenty-First Annual Status Report

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Budget

Impacts to Ecology's Waste 2 Resources Program from the Waste Reduction, Recycling and Litter Control Account Reductions and Proviso Language for Fiscal Year 2012-13

In July 2011, the Washington Department of Ecology's (Ecology) funding from the Waste Reduction, Recycling, and Litter Control Account (WRRLCA) was reduced by $7 million. Proviso language placed limitations on how the Waste 2 Resources Program (W2R) can spend the remaining funds:

> *"(5) The department may not spend waste reduction, recycling, and litter control account funds to support the following activities: The beyond waste plan, work on national solid waste recycling issues, work on construction and demolition recycling and green building alternatives, education programs including the green schools initiative, and management of the 1-800-recycle hotline and database on school awards. Waste reduction, recycling, and litter account control funds must be prioritized to support litter pickup using correctional crews, regulatory programs, and technical assistance to local governments."*

The W2R Program suspended or reduced activities to meet requirements of the proviso. The $7 million fund reductions in WRRLCA also resulted in suspension of several additional activities and redirection of existing staff work. Some of this work was also suspended in Fiscal Year 2010-11 because of that biennium's $4 million reduction in WRRLCA. See *Solid Waste in Washington State 20th Annual Status Report, Publication #11-07-039,* for additional details.

In July 2012, an additional $1.7 million reduction and restrictions on work using WRRLCA funds were imposed on Ecology. Ecology was required to only fund litter collection programs from the account. One-time savings were achieved by eliminating waste reduction and recycling programs eligible for funding under RCW 70.93.180(1)(c) projects, which included the following:

- Waste to fuels technology research partnership with universities.
- Legislative policy support.
- Solid waste regulatory reform evaluation process.
- Solid Waste Financing Study.

- Technical assistance for organics reduction, as well as recycling and composting programs to local government and the private sector.

- Work with businesses to reduce the use of toxic substances and reduce solid waste.

- Evaluation of beneficial use for solid wastes.

- Compost facility compliance.

Funding was restored for organics and composting work using the State Toxics Control Account on a one-time basis. This funding allowed for the continued work evaluating odor issues at composting facilities as discussed below.

Waste 2 Resources Advisory Committee's Priorities for WRRLCA 30% Funding

Chapter 70.93 RCW, *Waste Reduction, Recycling, and Model Litter Control Act,* set up WRRLCA and specified its use as:

> *(a) Fifty percent to the Department of Ecology, for use by the departments of ecology, natural resources, revenue, transportation, and corrections, and the parks and recreation commission, for use in litter collection programs,*
>
> *(b) Twenty percent to the department for local government funding programs for waste reduction, litter control, and recycling activities by cities and*
>
> *(c) Thirty percent to the department of ecology for waste reduction and recycling efforts.*

With the continued funding reductions and restrictions for the use of the WRRLCA 30% imposed on Ecology to undertake waste reduction and recycling, the W2R Program decided to work with the Waste 2 Resources Advisory Committee (W2RAC) to help find agreement on priorities for activities we should pursue with that funding. W2RAC, which is composed of a broad cross-section of solid waste stakeholders, provides input to Ecology on solid waste issues.

In June 2012, the W2R Program requested help from the Governor's Office of Regulatory Assistance (ORA) to facilitate three W2RAC meetings. In addition to three regularly scheduled W2RAC meetings in July, September, and November to discuss this issue, there was also some preliminary work done, and a webinar and conference call were held.

Initially the group was asked to define the success of this venture. Answers included an increased understanding; an open, honest, and representative process; finding some agreement; and forestalling future provisos. The group was also asked about what important issues they wanted to cover. They included waste reduction and recycling; waste facilities; litter; funding and reducing costs; and understanding the bigger picture. Values regarding waste reduction and

recycling activities were also identified. Common themes included sustainability*;* protecting and sustaining the environment; matching recycling levels to markets*;* having fair and effective programs; spending money prudently and reliably; and advancement of the state's waste management hierarchy.

Information was provided on funding for waste reducing and recycling programs. Additional information was requested on activities funded, state statutes, and other sources of funds. A webinar was held for discussion.

At the last meeting of this effort, the committee used a multi-vote approach to prioritize activities to be supported by WRRLCA 30% funds. The multi-vote approach allowed up to three votes per activity, out of a total of 15 votes per person by each representative or alternate (but not both). Ecology and the Washington Utility & Transportation Commission staff did not vote. Committee members who could not attend were also offered an opportunity to vote following the meeting. Table 1.1 shows the prioritized results of the voting.

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Table 1.1
W2RAC Priorities for WRRLCA 30% Funds. [1]

Activities	Total Votes
Increasing & Improving Recycling	
• Technical Assistance to Locals and Businesses	28
• Information Clearinghouse	11
• Commingled Recycling Study	20
• Mapping Recycling Facilities	4
• Packaging	18
• Product-specific Programs	21
• Transporting Recyclables	25
• 1-800-RECYCLE Hotline	7
• School Recycling Awards	2
Organics Management	
• Composting Education & Training	11
• Technical Assistance to Locals & Businesses	24
• Anaerobic Digestion	10
• Backyard Composting	2
• Natural Yard Care	5

Activities	Total Votes
• Beneficial Use Determination	2
• Food Waste Prevention	15
• Facility Compliance	19
• Organic Waste to Resources/Fuels Research	5
Construction & Demolition (Green Building)	
• Building Material Reuse & Recycling	28
• Sustainable Building Materials	6
• Education & Technical Assistance	5
Moderate Risk Waste	
• Reduction, Recycling, Safe Handling	20
• Environmentally Preferred Purchasing	13
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1. The table includes votes tallied on November 20, 2012 plus votes cast following the meeting by four committee members who could not attend.
2. In the Lacey meeting room, the "state solid waste planning" activity was confused as a heading, so people did not vote for it initially. This confusion was resolved and a hand-vote was taken, allowing only one vote per person supporting the activity.

Although W2RAC did not reach full consensus on what waste reduction and recycling activities they would all support through the prioritization activity, they did achieve a level of understanding on how strongly or weakly the group supports the different activities. This provided valuable input to the W2R Program, which now has a clear record of activities viewed as most important, as well as dissenting opinions. It was recognized that the W2R Program will make ultimate funding decisions, and that W2RAC's input will figure strongly in those decisions. All meeting materials regarding the activities prioritization process are available at http://www.ecy.wa.gov/programs/swfa/w2rac/ .

Evaluating Compost Facility Emissions

In 2011, nearly 50 compost facilities were operating in Washington State with a solid waste handling permit or conditional exemption from permitting. The types of materials composted in centralized facilities in the state are diverse, but the bulk of materials are yard debris, yard debris mixed with food waste, and food waste. In 2011, the total of materials processed by composting in Washington State was nearly 1.1 million tons.

According to the 2009 Department of Ecology Statewide Waste Characterization, there are about 1.36 million tons of organic waste in the residential waste stream that are going to disposal, and another 519,000 tons of organic waste being disposed from the commercial sector. More organic materials are still going toward disposal statewide than are managed in the composting system.

Currently the estimated capacity for handling residential and commercial compostables is 1.3 million tons. There is not a lot of cushion between the amount of material composted and the capacity of the system to compost. And permitted capacity is an elusive number, since most compost facilities are permitted for an annual capacity, and the real restriction on the capacity of a facility to compost is how much they can handle during peak generation months. The system may well be at peak capacity now.

Odor, compost quality, and composting capacity are three issues currently shaping the environment of compost in Washington State. As cities and counties press to divert more organics from the waste stream, and as a more diverse array of compostable materials have been added to the collection truck, these issues have risen to prominence. There is a strong need for greater investment in facilities to increase capacity to process organics to prevent overwhelming the current system and forcing diverted materials to go to landfills.

Odor complaints are an ongoing problem for compost facilities. All compost facilities have odors that may be delivered with incoming feed stocks or created by handling materials and liquids onsite. Generally, the compost facilities that get the most attention are those located in urban areas, yet nuisance odors that travel offsite are regulated equally at facilities across the state.

The W2R Program is studying the primary sources of the makeup of compost gas emissions. In 2011, Ecology sampled compost odors at an east- and a west-side compost facility. The 2011 results showed little consistency among compost gas emissions and that more information is needed.

Ecology prepared a draft report of the 2011 sampling events, but decided to collect more data before finalizing the report. Ecology's compost odor study is ongoing and has the following goals:

- Develop a list of common compost odors and compounds from various types of compost facilities in Washington State.

- Develop a screening method so facilities can monitor their odors.

- Find out if compost odors are toxic.

The W2R Program has acquired the equipment and ability to sample compost emissions and measure the flow rate. The compost emission sampling method is approved by the U.S. Environmental Protection Agency. Ecology has sampled emissions at a basic green waste, static windrow compost facility. Ecology plans to sample emissions at other compost facilities. Staff will report on the compost emission sampling and results in fall 2013.

Ecology awarded a grant to the Institute of Neurotoxicology and Neurological Disorder (INND) to inform the public about odors and composting. INND hosted several meetings for the communities located adjacent to two compost facilities. Puget Sound Clean Air Agency and Ecology staff fielded questions and provided updates on compost odor issues.

Regulatory Changes in Washington

Solid Waste Handling Standards Rule Update

In May 2009, the W2R Program began the process of updating Chapter 173-350 WAC, *Solid Waste Handling Standards*. This rule sets minimum functional performance standards for the proper handling and disposal of solid waste originating from residences, commercial, agricultural and industrial operations, and other sources. The rule had not been updated since 2005 and some requirements are outdated.

In 2010, the update process was put on hold due to a moratorium declared in an Executive Order issued by Governor Gregoire. In March 2011, after considering input from stakeholders, Ecology's Director determined that we would proceed with revisions to elements of the rule relating to organics management. Information about the revised rule can be found at http://www.ecy.wa.gov/programs/swfa/rules/rule350.html.

Ecology formally proposed revisions to Chapter 173-350 WAC in September 2012 and held public hearings in late October. Many stakeholders in the regulated community responded with concerns about various aspects of the proposed rule. Ecology evaluated all comments received, and carried out a sampling effort to assess the probability of compliance with proposed new standards for physical contaminants. Ecology's Director adopted the revisions to Chapter 173-350 WAC on March 25, 2013. The rule will become effective on April 25, 2013. The final rule:

- Improves environmental performance of large-scale composters by adding requirements that include, but are not limited to:

    - Requiring facilities to plan for response to odor complaints.
    - Addressing facility capacity and throughput.
    - Requiring training for facility personnel.
    - Requiring representative sampling.

  - Addressing site management in product storage areas.
  - Requiring facilities to address the control of agricultural pests.

- Helps protect long term markets for compost products by improving compost quality.

- Allows for new, innovative methods of handling organic materials, including permit exemptions.

- Encourages development of small facilities through expansion of conditional permit exemptions.

- Adopts permit exemptions for qualified anaerobic digesters as required by Chapter 70.95 RCW.

- Describes permit requirements for non-exempt digesters.

Ecology will provide training on implementation of the new rule requirements in mid-2013.

Criteria for Municipal Solid Waste Landfills Rule Update

Amendments to Chapter 173-351 WAC, *Criteria for Municipal Solid Waste Landfills*, were ongoing at the time Governor Gregoire issued her Executive Order that suspended rulemaking. In 2011, Ecology's Director determined that rulemaking would continue. Ecology formally proposed revisions to Chapter 173-351 in May 2012, and held public hearings in June. After reviewing stakeholder comments, the Ecology adopted revisions on November 7, 2012. The new rules became effective on December 9, 2012. Rule changes include:

- Adoption of new federal regulations which allow for issuance of Research, Development, and Demonstration (RD&D) permits.

- Elimination of equivalent and arid liner designs, and greater flexibility for alternate liner designs consistent with federal regulations.

- Elimination of arid closure cover design criteria.

- Adoption of new post-closure care period standards, which are based on potential risk to human and environmental receptors.

- Addition of a requirement to file an environmental covenant at closure in accordance with Chapter 64.70 RCW, *Uniform Environmental Covenants Act.*

- Inclusion of prevailing wage law provisions for financial assurance for closure.

- Changing dissolved metals groundwater monitoring parameters to total metals.

- General housekeeping issues such as clarification of definitions, formatting changes, and ensuring the rule is consistent with Chapter 173-350 WAC, *Solid Waste Handling Standards.*

Ecology was partially authorized to implement federal rules in 40 CFR Part 258 under the previous state rule. These revisions will allow Ecology to seek full authorization.

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 to establish a product stewardship program for residential lighting.

Ecology formally proposed rules for the new stewardship program in June 2012 and held public hearings in August. After evaluation of stakeholder comments, Ecology's Director adopted the new rules on November 16, 2012. The rules became effective on December 17, 2012. The new rules establish:

- Responsibilities of producers, wholesalers, retailers, distributors, and electric utilities to safely manage mercury-containing lights sold in or into Washington State.

- Program requirements, such as developing a product stewardship plan, outreach and education efforts, and annual reporting requirements.

- Requirements for collecting, transporting, processing, and recycling mercury-containing lights.

- How producers will fully fund the product stewardship program.

- Other requirements necessary to implement the program, such as definitions and enforcement.

The Light-cycle Washington Program was not operational on January 1, 2013. A lawsuit about funding the program was filed against the rule and delayed implementation of the program. The industry is proposing legislation for the 2014 Legislative Session to eliminate the state contracted program and allow for producer funding options to include using an "eco fee." If the Legislature approves the changes, the lawsuit will no longer be necessary and the program can be implemented.

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

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

Children's Safe Products Reporting Rule

The Department of Ecology has begun work on amendments to Chapter 173-334 WAC, *Children's Safe Products - Reporting Rule*. Under this chapter, manufacturers of children's products must report on the presence of certain chemicals in children's products.

Ecology initiated this rule making in a response to a petition for rule making to add Tris (1,3-dichloro-2-propyl) phosphate (TDCPP) (CAS # 13674-87-8) to the list of Chemicals of High Concern to Children (CHCCs). The information in the petition provided evidence that this chemical meets the criteria in WAC 173-334-070 for inclusion in the CHCC list. The Washington Department of Health also confirmed that TDCPP meets the toxicity and exposure criteria to be included on the CHCC list.

Ecology plans to release proposed revisions in May 2013 and hold public hearings in June. If adopted, the earliest date the rule will become effective is August 2013. The first reports required under the new rule would be due in August 2014.

Chapter 2: Partnering for the Environment

Building strong partnerships underlies the success of Ecology's Waste 2 Resources (W2R) Program. The W2R Program has worked hard to cultivate 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.

The State Solid Waste Plan (Beyond Waste) – Partners and Progress

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, Beyond Waste. The first five-year update was completed in October 2009. The vision and goals were developed with the input of numerous stakeholders and partners.

Beyond Waste involves a shift from managing wastes and toxics to preventing them from generation in the first place. The goal is for any wastes that cannot be eliminated to become resources for closed-loop recycling systems.

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.

The plan focuses on hazardous materials and wastes, organic materials, and green building practices. The plan also addresses current solid and hazardous waste management systems.

Implementation of the State Solid Waste Plan

The W2R Program implements many aspects of the solid waste portion of the state plan, and coordinates with the Hazardous Waste and Toxics Reduction Program on other portions of the plan. The 2011 and 2012 Legislatures reduced W2R's funding from the Waste Reduction, Recycling, and Litter Control Account (WRRLCA), and added proviso language that placed limitations on how we can spend the remaining funds. Because of this, Ecology is limited on directly coordinating and implementing portions of the Beyond Waste Plan for this biennium (ending June 30, 2013).

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

Ecology cannot implement the state plan alone -- the vision and goals were developed with stakeholders and partners. We rely on the work of our partners, many who are continuing the work.

Prior to the funding reductions and proviso restrictions effective on July 1, 2011, and additional provisos effective early in 2012, Ecology was implementing many aspects of the state plan (Beyond Waste). Many activities were suspended this biennium as discussed in other portions of this report. Some of the work we were able to accomplish is listed below each initiative.

- **Reducing Small Volume Hazardous Materials and Wastes**
  - Rules and a program plan were developed for the upcoming mercury lights product stewardship program scheduled to begin in January 2013.
  - Support for Environmentally Preferable Purchasing (EPP) was included in legislation for the state purchasing agency. Implementation guidance is being drafted. An updated website is now available at http://www.ecy.wa.gov/programs/swfa/epp/.
  - Once again, the paint industry worked with staff and other Washington stakeholders to bring paint product stewardship legislation to Washington in 2012 with plans to resubmit in 2013. Additional product stewardship bills introduced by others in the 2012 Legislative Session included carpet and rechargeable batteries.
  - The E-Cycle Washington product stewardship program continues to collect and recycle an increasing number of computers and televisions.
- **Increasing Recycling of Organic Materials**
  - Rules were completed to improve closed loop organics recycling.
  - Held another popular, successful compost operator training course.
  - Continued research efforts on alternative uses for organic materials, but at a reduced rate due to budget cuts.
- **Making Green Building Practices Mainstream**
  - This initiative is now focused on construction and demolition debris, and toxic building products. However, the number of certified green buildings continues to increase, and the first Living Building constructed in Washington State is almost complete.
  - We hired staff in the northwest region to focus on enforcement of transportation of construction and demolition debris recycling.

- **Current Issues with Solid Waste**

  - The southwest region recycling group developed best management practices for curbside recycling. A workgroup was started in the northwest region.

  - Staff continued to participate in a variety of discussions on packaging.

  - Grants were provided to local governments to advance waste reduction such as food waste prevention, as well as increased recycling.

- **Measuring Progress on the State Plan (Beyond Waste)**

  - Updated and improved the Beyond Waste Progress Report, which provides important performance measures for our program, local government, industry, and others.

  - The Progress Report is available at http://www.ecy.wa.gov/beyondwaste/bwprog_front.html.

The work of our partners is vital to the success of the state solid waste plan. The plan provides direction for much of the work of our program. It also provides direction for local governments' solid waste planning and programs, and others involved in the many aspects of solid waste management.

Ecology will continue to work with our partners to meet regulatory requirements and funding obligations. More information on the state solid waste plan is available at www.ecy.wa.gov/beyondwaste/.

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 2012 Legislative Session, both the small rechargeable battery and paint industry brought forth legislation to create product stewardship programs for their products. Both bills failed, but are expected to be reintroduced in 2013.

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 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. 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, 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 Children's Safe Products Act (CSPA), including product testing and enforcement of the law and rules.

- Work collaboratively with other states to develop consistent approaches to alternatives assessment.

- Continue to focus on persistent, bioaccumulative, and toxic chemicals (PBTs), and implementing the PBT rule.

- Continue to develop and implement strategies to reduce diesel emissions and wood smoke.

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

Significant Accomplishments in the Last 12 Months to Reduce Toxic Threats

Children's Safe Products Act

As required by Chapter 173-344 WAC, *the Children's Safe Product Reporting Rule*, in August 2012 the largest manufacturers began reporting their use of the 66 chemicals of high concern for children (CHCC) in products. The first round of reporting required the largest manufacturers to report CHCCs in products designed for children under three years of age, or products designed to be placed in the mouth or rubbed on the skin. The list can be found in the rule, as well as on Ecology's CSPA website at Children's Safe Product Act web page. Ecology will use this data to determine whether additional programs or strategies are needed to protect children. The next reporting deadline is February 28, 2013. The largest manufacturers must report on their use of CHCCs in products such as clothing that are intended to be in contact with children's skin.

Ecology developed an online database to make reporting easier for manufacturers. It also makes the data easier to evaluate. The database is working well, with some technical assistance needed, mostly with the initial registration process and for foreign manufacturers who struggle with a language barrier.

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.

Projects include:

- A grant award to the Washington Department of Natural Resources to remove creosote pilings, a significant source of PAHs in the Sound.

- Another grant award was made 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.

- Expanding 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.

- Enforcing current product bans. Work is underway to purchase and test products that are regulated under various product bans and the Children's Safe Products Act.

- Working with a small group of stakeholders to develop new potential strategies to reduce sources of toxics. This group is tasked with identifying both systems approaches to the way we currently regulate and manage toxics and short-term projects that should be tackled now. Final recommendations from this group are expected in early 2013.

- Collaborating with manufacturers of roofing materials to better understand how roofing materials contribute toxic chemicals to Puget Sound. The Puget Sound Toxics Loading Assessment identified roofing as a significant source of copper, zinc, phthalates, and other contaminants.

- Developing a landscaper certification program to promote sustainable land care, including reducing the use of pesticides, fertilizers, and air-polluting equipment. The agency awarded a contract to Cascadia Consulting Group to develop this certification program in conjunction with state agencies, local governments, academia, non-profits, and representatives from the landscape industry. The program is expected to be in place by late 2014.

- The Puget Sound Toxics Loading Assessment found that urban pesticide use was a leading source of copper. The Washington State Department of Agriculture (WSDA) is conducting a survey of homeowners and pesticide applicators to better estimate typical residential urban pesticide use. Results will drive future education and outreach efforts.

- Seattle Public Utilities and Ecology are coordinating hands-on workshops addressing vehicle leaks in and around Seattle. At the workshops, participants learn how to detect oil and other fluid leaks, identify the sources of the leaks, repair minor leaks, clean up spills, and properly dispose of auto fluids.

Chemical Action Plans for PBTs

The process of developing a Chemical Action Plan (CAP) for polycyclic aromatic hydrocarbons (PAH) began in 2010 and will be completed in late 2012. The CAP identified the most significant sources as wood smoke, vehicles (emissions, tire wear, and drips and leaks), and creosote pilings. Work is currently underway to address these sources.

Work also continues to implement the lead, PBDE, and mercury CAPs. In future years, we planned to develop a chemical action plan to address perfluorooctane sulfonates (PFOS). However, due to the rising number problems with PCBs, particularly for the Toxics Cleanup Program and the Water Quality Program, we decided to first complete a CAP on PCBs.

Safer Alternatives & Green Chemistry

Preventing problems caused by toxic chemicals and reducing their use depends on transitioning to less harmful alternatives. Ecology is working with other states 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 guidance is expected to be completed in early 2013.

Ecology, in partnership with Boeing, Washington State University, and others, developed a green chemistry roadmap to create solutions to address the problems posed by chemicals used in products today. A Request for Proposals was issued to fund the startup costs for creation of a self-sustaining Green Chemistry Center. Proposals must be submitted in February 2013, and we expect the award to be made in spring 2013.

TSCA Reform

Washington continues to provide leadership to states interested in reform of federal toxics policy. Ecology is working with a contractor through funding provided by the Bullitt Foundation to create a consistent, coordinated state voice in federal policy reform efforts. The final product for this work is expected by the end of 2012. Ecology continues to coordinate states' response to Senator Lautenberg's TSCA reform bill. We also continue to work with the Environmental Council of the States in support of TSCA reform and petitions to EPA to support better, more protective regulation of chemicals such as PCBs.

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).[1] 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.

[1] *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).

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 four years of program operations (2009-12), 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.

E-Cycle Washington Program Accomplishments

Highlights

- In 2009, the first year of operation, the program exceeded all predictions by recycling *38.5 million pounds* of TVs, monitors, and computers.

- Now in its fourth year, E-Cycle Washington collections have continued to grow.

Table 2.1
E-Cycle Washington Collections 2009-12

	Pounds Collected (Millions)
2009	38.5
2010	39.5
2011	42.2
2012	43.0 (Estimated)

- 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.

- Washington is a national leader in recycling electronics with a 6.2 lbs/capita average in 2011.

- More than 330 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 four years of participation in the program, approximately 118,000 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, in online advertisements, as inserts in utility bills, on buses, and an I-5 billboard.

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

Ecology is not aware of any stakeholder concerns at this time, although interest continues to grow around the idea of further expansion of the scope of products covered to include computer peripherals and other electronics.

Partnering for the Environment through Mercury-Containing Lights Product Stewardship

The mercury-containing lights law (Chapter 70.275 RCW) requires a producer-financed 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 several significant milestones in 2012:

- Mercury-containing light producers provided funds that Ecology used to hire a contractor to develop the program plan and establish program infrastructure.
- Nearly 200 collection sites around the state have expressed interest in participating in the program.
- Ecology approved the Mercury-Containing Lights Product Stewardship Standard Plan in November 2012.
- The Mercury-Containing Lights Product Stewardship Rule became effective in December 2012 (Chapter 173-910 WAC).

Mercury-Containing Lights Product Stewardship Program

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

The Standard Plan establishes a "comprehensive, safe, and convenient collection system" in Washington that may include 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 15 mercury-containing lights to registered collectors during a 90-day period. This program will reduce the improper disposal of spent mercury lighting which releases mercury that threatens human health and the environment.

The Standard 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 Light-cycle Washington Program will be managed and operated by EcoLights Northwest LLC (EcoLights). EcoLights specializes in 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. The program manager for EcoLights is Mike O'Donnell (mikeo@ecolights.com, www.walights.org).

Collection Service

The Light-cycle Washington Program will use a network of permanent year-round locations for the collection of program products. There will be no charge imposed to drop off up to 15 lights in any 90-day period. Any organization interested in joining the program to provide collection service should contact Mike O'Donnell.

Collection sites will include retailers, recycling organizations and businesses (both non-profit and for profit), local government Household Hazardous Waste (HHW) or Moderate Risk Waste (MRW) collectors, local government recycling centers, solid waste hauler 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 Light-cycle Washington website (www.walights.org).

Program Startup

The Light-cycle Washington Program was not operational on January 1, 2013. We anticipate the program will start operations later in 2013. Program status will be regularly updated on the Ecology website.

More information about the program is available online:

- Light-cycle Washington website www.walights.org
- 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. 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 2012 Legislature passed House Bill 2452 to consolidate state procurement laws under the Department of Enterprise Services. The legislation is designed to make the procurement process more transparent, competitive, and efficient. Most of the changes will take effect on January 1, 2013.

The bill states that when agencies are determining the lowest responsive and responsible bidder, they may consider best value criteria, including whether the bid considers human health and environmental impacts. This bill gives stronger standing to agencies in soliciting bids that include green products. Ecology participated in developing guidelines for implementation of this section of the bill.

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 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 2012, the EPP Team responded to more than 50 technical assistance requests from state agencies, local governments, businesses, and other entities.

During 2012, Ecology launched a new Buy Green, Save Green website that 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 updated information on:

- ✓ 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 offering 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.

In 2012, the West Coast Environmentally Preferable Purchasing Collaborative, of which Ecology is a founding member, launched a highly successful webinar series. The group offered five webinars on topics ranging from Safer Disinfectants to Fluorescent Lighting. To learn more, contact Tina Simcich at tina.simcich@ecy.wa.gov.

Ecology's Green Purchasing listserv provides another route of communication with interested stakeholders. To join the listserv, visit the EPP website 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 Environmentally Preferable Purchasing to align with agency priorities on climate change, reducing toxic threats, and resource conservation. Ecology's actions will also help address the Governor's mandate that Ecology lead the way in moving state government to carbon neutrality.

The EPP policy applies to development of agency grants and contracts. In 2011, the Public Participation Grant (PPG) Program incorporated green office and sustainability elements into the 2011-13 PPG Guidelines, PPG application, and grant scoring process. All PPG grants scored in 2011 were partially scored on the potential recipient's description of their green office and sustainability efforts.

Ecology also applied the EPP policy to the Coordinated Prevention Grant (CPG) Program for local governments. EPP language was approved and included in the 2012-13 CPG agreement template. An EPP category was added to the Solid Waste Information Clearinghouse as part of final performance analyses (FPAs) so that recipients can include narrative information on their EPP efforts. EPP project ideas were included into the 2012-13 CPG guidelines.

Ecology also developed sample EPP language that agency planners can recommend to local governments to be included in their hazardous waste and solid waste plans.

In 2011, Ecology offered training on green office products and the new EPP policy to agency purchasing coordinators and other purchasing staff. The training promoted reuse of office supplies, and explained how to identify and purchase green office products.

During the training, purchasing coordinators explained that when they get a purchase request from staff, they visit the Reuse Center at the Ecology Headquarters before placing an order. Frequently they find the item in the Reuse Center and avoid the cost of a new one.

Reuse Center at Ecology Headquarters

This also saves the cost of the procurement process and avoids many environmental impacts of new items. Since the Reuse Center is located in the shipping and receiving warehouse, warehouse staff does not have to maintain a separate reuse area.

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*."

Waste to Fuels Technology projects have focused on balanced approaches for recovering fuels from organic solid wastes. Ecology continues to support science and engineering for a municipal organics food and green waste high solids anaerobic digester (HSAD). Where composting alone has been the only process to recover most food and green waste, HSAD provides a more specific solution for the high strength food and green waste processing. The addition of an HSAD with nutrient recovery would significantly reduce odors, and produce both energy and fertilizers.

We now provide extension and outreach support for commercial development of an anaerobic digestion industry. And, we continued work on pyrolysis this year to produce heat and power, or transportation fuels such as green gasoline and bioethanol. The solid byproduct "biochar" has numerous applications in pollutant remediation and cleanup, storm water treatment, replacing vermiculite in potting mixtures and improving soils, establishing vegetation on disturbed soils such as road right of ways, and sequestering carbon.

Anaerobic Digestion and Co-Digestion

Food and green waste are biologically highly degradable sources of nutrients, energy, and odors. Food waste "rotting" (decomposition) occurs rapidly. What does this have to do with fuels? "Everything," say Dr. Craig Frear and Dr. Shulin Chen, research and extension engineers at WSU Center for Sustaining Agriculture and Natural Resources, and Biological Systems Engineering Department.

Why is it important for Ecology to support this world class research? Because research and extension efforts on contentious local challenges in organic food and green waste recycling such as odors from composting provide a new means for solving these issues in the state. This results in reduced odors,

increasing organic industry approval and local business opportunities. It also creates business opportunities nationally and globally. Research and development in a stepwise manner drives innovation, commercial enterprise, and green job creation.

A real commercial success story is unfolding in Washington with the W2R Program's support in partnership with WSU (directed by legislation mentioned above). The dairy anaerobic digester industry in Washington has gone from zero to ten operating digesters since 2004, with multiple additional facilities in planning or construction. Some key concepts supported this industry development and expansion:

- Methane production from dairy waste can be doubled by co-digesting small percentages of municipal solid food waste; sugary liquids such as out-of-date soda, fruit juice, and solids; fats, oils, and grease; and bio-oil filter solids, among other resources.

- This energy boost and the supporting understanding of how to mix these materials were researched by Chen and Frear at WSU under the WSU Ecology partnership.

- Food and green waste can be digested on their own. A municipal digester has been built in Vancouver BC by Harvest Power, Inc., and at least one municipal digester is in the planning phase at a compost facility in Washington. This work has been supported by the extension and outreach efforts of WSU CSANR staff.

- WSU completed a literature review of odor problems from compost facilities around the globe. Odors can result from decomposition of numerous feedstocks, but primarily from high-energy, biologically reactive feedstocks such as food and green waste. Composting these high energy wastes is challenging, and current best management practices can actually increase odor generation. Successful odor control from current composting processes requires expensive changes in management and odor control technology.

- Proper handling of these materials through a digester can greatly reduce and control odors. The stinking, acidic liquefied waste in typical food collection systems can be directly fed to an anaerobic digester, thus limiting atmospheric exposure and odor releases occurring on the tipping floor, and during compost preparation.

- Methane produced from digestion can be used for powering an electrical generator, for heat, or used most cost effectively as fuel in transportation fleets offsetting diesel fuel. New engines are being produced by major manufacturers that are certified for methane.

- Digesting food and green waste results in an abundance of ammonia and phosphorous in the liquids in the digester. While ammonia can toxify the digester for microbial growth and activity, WSU scientists have patented a means of separating these nutrients, and also buffering the pH of the effluent, thus making the water reusable in the process, decreasing water demand and creating saleable fertilizer as a commodity.

These outcomes make a digester an extremely useful technology working in a bio-refinery concept in a compost facility. Our partnership with WSU has been instrumental in assisting the advance of these applications. WSU scientists are conducting or supporting pre-feasibility and feasibility studies, business pro-forma analysis, and conceptual designs for a number of projects that will receive municipal food waste or similar feedstocks. The projects that have received support from WSU extension and outreach are listed in Table 2.2.

Table 2.2
Anaerobic Digester Projects Supported by
WSU CSANR Staff through Ecology Partnership Contract

Project	Location	Feedstock	Capacity (KW/MW)
Cherry Valley Dairy	Carnation	Co-Digestion	Thermal use
EdAleen Cow Power	Lynden	Co-Digestion	750 KW
Farm Power NW	Rexville	Co-Digestion	750 KW
Farm Power NW	Lynden	Co-Digestion	750 KW
George Deruyter & Sons Dairy	Outlook	Dairy manure	1200 KW
Qualco	Monroe	Co-Digestion	450 KW
Rainier Biogas (aka Farm Power NW)	Enumclaw	C-Digestion	1000 KW
Vander Haak Dairy[1]	Lynden	Co-Digestion	600 KW
VanDyk-S Holsteins	Lynden	Dairy manure	400 KW
WISErg	Snoqualmie	Retail Food Waste	Liquid fertilizer
Pacificlean[2]	Elk Heights	MSW/Food & Green Waste	
Pacificlean[2]	Spokane	MSW/Food Waste	

[1] See **advancing-anaerobic-digestion-technology-for-new-applications.html** for an example of the comprehensive outreach from WSU extension scientists.
[2] Development support for design concept and feasibility.

Pyrolytic Production of Fuels and Biochar

Biochar is one of the very few measures that can cost-effectively sequester greenhouse gases. A set of four literature review reports are complete that lay the framework for developing a flexible pyrolysis design capable of running as a slow or fast pyrolysis reactor. There are existing literature reviews of historical charcoal production. However, prior to review by WSU scientists, there was no comprehensive review of the pyrolysis process from the beginning materials sources through end of

process oil condensation and biochar. WSU researchers had earlier completed a review of historic reactor design called *Methods for Producing Biochar and Advanced Biofuels in Washington State Part 1: Literature Review of Pyrolysis Reactors, Ecology Publication Number 11-07-017, Garcia-Perez M., T. Lewis, C. E. Kruger.* This is the first of a series of reports exploring the use of biomass thermochemical conversion technologies to produce energy, fuels, and industrial chemicals and sequester carbon in biochar. The report conducts a comprehensive review of historical pyrolysis reactors and technologies. The second through fourth parts of the literature review series on the pyrolysis process are now complete:

- *Part 2: Literature Review of the Biomass Supply Chain and Preprocessing Technologies, (From Field to Pyrolysis Reactor).* This report reviews biomass sources, collection, and pretreatment. See http://www.ecy.wa.gov/biblio/1207033.html.

- *Part 3: Literature Review of Technologies for Product Collection and Refining*. The report describes technologies and methods for bio-oil products recovery and characterization, bio-char activation, bio-oil refining strategies, and regulatory issues related with deployment of pyrolysis technologies. See http://www.ecy.wa.gov/biblio/1207034.html.

- *Part 4: Literature Review of Sustainability Goals, Business Models, and Economic Analyses*. This report focuses on the criteria that need to be followed to integrate these technologies into sustainable business models. The last report presents sustainability criteria and several business models that could be used to build sustainable enterprises based on biomass pyrolysis technologies. See http://www.ecy.wa.gov/biblio/1207035.html.

These documents were well received, and have been referenced and posted on several websites including the International Biochar Initiative, and Pacific Biomass.org. Authors report that R&D technologists were aware of the ongoing WSU report development and requesting these new reports to add to existing references on uses of biochar for a more comprehensive coverage of the subject.

A swell of private business and public interest in biochar is rapidly growing. Industry efforts are growing by leaps and bounds in biochar for many reasons:

- Private businesses, NGOs, and public entities across the Pacific Northwest see biochar as an extraordinary opportunity for utilizing woody biomass that is typically not reclaimed or recycled, and much of it is disposed or burned.

- Private business are seeking an opportunity to build a sustainable biochar business.

- Active citizens are recognizing the need to address carbon sequestration from the abundant biomass resources. Biochar production by individuals and companies is a means to achieve that.

- Resource managers are beginning to see the uses of biomass resources to improve soils, use less water and maintain fertilizer in the soil root zone, and support organic production.

- Public agencies support these efforts to meet numerous programmatic objectives. These may include reducing waste; reusing and recycling materials locally; controlling odors in compost; cleaning of contamination in storm water and in soils; and supporting business development and job growth, which keeps local dollars in circulation with a local multiplier for jobs and business development.

Staff assisted the industry in several areas including:

- Developing standards for biochar characterization;
- Assessing potential for contaminants in the char;
- Providing technology review; and
- Making presentations at symposiums, conferences, and public meetings.

As a result of the developing private and agency and research interests in biochar, a report was co-authored by WSU Energy Program, WSU thermochemical scientists, and agency staff called *Biochar: Background & Early Steps to Market Development (see* publications/SummaryPages/1207067). The document outlines the current interests in the technologies for producing biochar and its uses.

At the request of the public, agencies, NGO's, and researchers, staff assisted in conducting a meeting on November 19 at the Department of Natural Resources in Olympia. Fifty-five people participated from across the Pacific Northwest states and British Columbia. People came together to discuss the benefits, uses, and challenges of developing a biochar industry in the region. Followup meetings and work continues with a planning team of about 15-20 people from private businesses, non-profits, the public, and research staff at universities and federal agencies.

The November 19 meeting resulted in the formation of a biochar networks Listserv through which meeting notes were shared. Feedback to the planning committee was very positive. Work in the future will continue to support the use of woody biomass for energy and stable carbon biochar. A followup meeting is scheduled for January 28, 2013, at the Harvesting Clean Energy Conference in Corvallis, Oregon.

Organic Waste to Resources

With staff from other agencies on the State Bioenergy Team and Northwest Environmental Business Council, and supported directly with funds to the WSU Energy Program, W2R Program staff assisted in planning and completing the third annual Washington Future Energy Conference. The conference was held in Seattle at the Washington Trade and Convention Center on November 14, 2012. The conference was preceded by the second NW Bioenergy Research Symposium. Researchers from the region gathered to present information on developments that will yield future carbon neutral fuels from biomass, among other topics.

The Washington State Department of Commerce led the conference with the W2R Program's staff support, and support from the departments of Agriculture and Natural Resources, WSU, the University of Washington, and Battelle Pacific Northwest Laboratories.

About 120 people attended the NW Bioenergy Research Symposium and 450 people attended the Seattle Future Energy Conference. Planning staff are assessing feedback, but good evaluations indicate an ongoing interest in both of the events. We are pleased with the format that featured a research symposium with the conference, but that requires substantial additional work.

In addition, WSU Energy program staff supported by Ecology funding also gave presentations at state and regional events. These included presentations at:

- The Washington Organics Recycling Conference called "*Roiled Waters – Changes in Wood Waste Demand, Standards, Specifications & Issues*." The conference was held in Ellensburg in mid-December 2011with 60 attendees.

- The 2012 International Wood Composites Symposium: Discussing Northwest Bioenergy Perspectives held in April 2012 in Seattle with 150 attendees.

- The Biocycle West Coast Conference called *Biomass & AD CHP: Lessons from the NW* held in Portland, Oregon, in April 2012 with 500 attendees.

- The US Biochar Initiative annual conference held in Sonoma, California, on the efforts of a regional team of private and public entities on biochar developments in the Pacific Northwest. The conference was held in (July 2012 with 350 attendees.

- The Association of State Research & Technology Transfer Institutions called *Bioenergy research and technology transfer efforts in the Northwest* held in Seattle in October 2012 with 40 attendees.

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. WORC members include compost facility owners and operators, local and state government representatives, and others with an interest in organic material management.

Since 1995, WORC has hosted Compost Facility Operator Training (CFOT). The training provides an invaluable opportunity for students and instructors to learn and share ideas on proper operation and regulation of compost facilities in Washington. The students from around the region (and beyond) gather for one week of lecture and hands-on training at the WSU Puyallup Research Station. More than 502 students have completed CFOT. Core instructors consist of Ecology and WSU staff, compost engineers/consultants, and compost facility operators.

The 2012 training was held October 8-12 with 37 students, 6 instructors and 19 guest presenters/panelists. Since it is the only training of its kind in the state and surrounding area, it attracted students from Washington, Alaska, Montana, Nevada, Hawaii, and Canada. 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: 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. We toured two biosolids composting facilities (JBLM and Centralia WWTP), and toured Silver Springs Organics and LRI's Compost Factory. Students also saw a classroom demo on the challenges of blending wet biosolids and dry feedstocks. In addition to our Compost Operator and Compost End User panels, we added a Regulator Panel consisting of ORCAA, Ecology, and Snohomish County Health representatives. A WSDA representative joined the End User Panel to discuss materials approved for use on organic farms.

As a result of the training, operators and regulators learned about compost operation challenges, and increasing compliance and product quality at compost facilities. Participants took a final exam and received a certificate of achievement.

WORC Compost Facility Operator Training (Photos courtesy of Dan Corum)

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 organics like yard debris and food scraps 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.

Washington State's composting regulation (WAC 173-350-220) is currently being revised. For more information, see http://www.ecy.wa.gov/programs/swfa/rules/rule350.html

In 2011, Washington had 49 compost facilities operating with a solid waste handling permit or conditional exemption for permitting (up from 47 in 2010). When biosolids regulated composting facilities are included, the total increased to 65.

Washington State compost facilities composted 1,106,228 tons of material in 2011. Table 2.3 highlights the variety of materials composted. Although Washington had more compost facilities in 2011 compared to 2010, feedstocks decreased by 56,000 tons. This decrease could be in part due to the economy. Commercial and residential customers may have chosen more cost-effective ways to manage their organic materials, or perhaps they produced less. It is also possible that feedstocks were taken to out-of-state facilities. At least one compost facility reduced the amount of feedstocks accepted in order to better manage their onsite materials.

The compost feedstock category with the largest decrease was residential mixed food and yard waste (>183k tons). The largest increase was in yard waste (>50k tons). Increases were also seen in food processing, pre-consumer food waste, post-consumer food waste, and land clearing materials composted (>76k tons).

Food waste was accepted at 19 compost facilities throughout the state (up from 17 in 2010). Of these facilities, 11 accepted pre-consumer vegetative food scraps (same as in 2010), 8 accepted food processing waste (up from 6), 9 accepted post-consumer food scraps (up from 8), and 8 accepted mixed residential yard/food scraps (down from 9).

Washington State composting facilities produced 1,174,432 cubic yards of compost. This was 272,281 cubic yards less then what was produced in 2010.

Table 2.3
Organics Recovery Comparison (tons)

	2010	2011
Composted		
Crop residue	55,662	68,971
Yard debris with food (mixed residential)	324,493	141,208
Food waste, all other	120,499	170,146
Land clearing debris	44,090	71,124
Yard waste	376,895	427,232
Wood waste, all other	46,959	55,880
Other materials composted *(other agricultural waste, biosolids, cardboard, industrial organics, manure, mortalities/animal parts)*	193,738	171,665
Total materials composted	**1,162,337**	**1,106,228**
Diverted		
Land Clearing Debris	106,197	88,962
Wood for Energy Recovery	977,881	751,364
Yard Waste for Energy Recovery	50,452	118,909
Other diverted materials	518,173	551,697
Total Diverted Materials	**1,652,703**	**1,510,932**
Total Recovery (Compost + Diverted)	**2,815,040**	**2,617,160**

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). Ecology published guidelines to help digester operators manage the additional organic materials (such as food waste) and the resulting digestate under conditions of the permit exemption (Ecology Publication 09-07-029). These digesters must obtain and comply with other applicable state and local permits. A digester that does not meet these conditions is required to obtain and comply with a solid waste handling permit from the jurisdictional health department.

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 in pastoral bliss, spreading manure (or *nutrients* as some farmers like to say), effectively fertilizing the lands 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 causes serious odor issues from methane, hydrogen sulfide and ammonia releases.

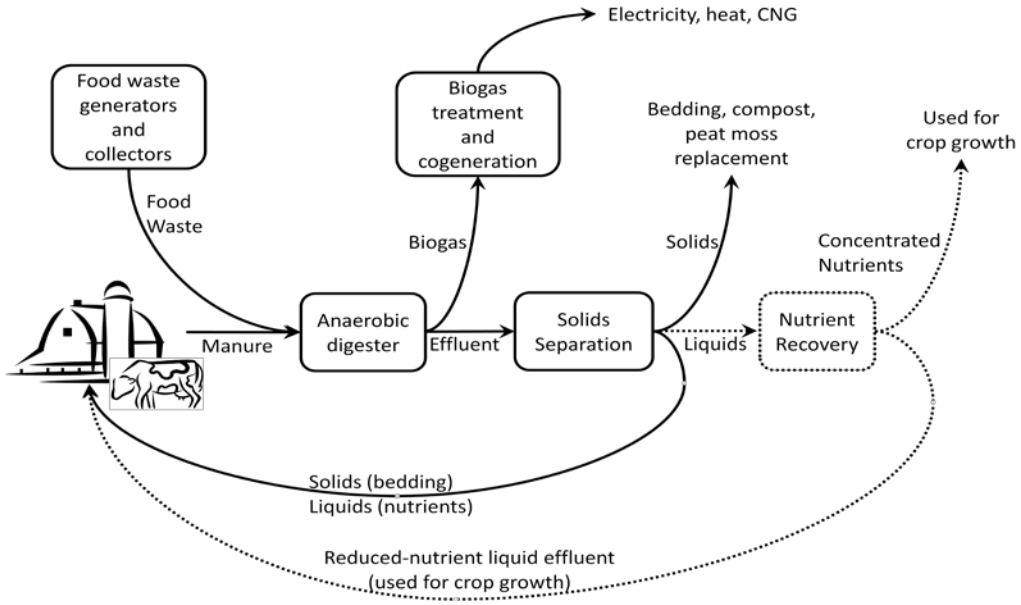
Anaerobic digesters help address manure odors, capture greenhouse gases and recycle nutrients. Digesters also provide revenue streams for dairies in these difficult economic times. Digester use in Europe is well developed with more than 600 manure digesters in use. EPA estimates 126 of the 65,000 dairy 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 this state 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 21 days of 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 or fruit processing wastes. This manure mix is continuously fed into the digester. 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 concrete digester and a pipe delivers the biogas to 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 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 21 days, 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. Liquid digestate is returned to the dairy manure lagoons for storage and later used as fertilizer. The nutrients in the liquid digestate can be used in place of synthetic fertilizer.



Dairy Digesters in Washington

Today, a handful of dairy farms in Washington use anaerobic digesters to put their cow manure to work generating renewable energy. In 2009, three manure digesters in Washington operated under the conditions of the solid waste handling permit exemption, the first year that exemption was in place.

Table 2.4 summarizes the energy produced by co-digesting manure and organics in the three operating dairy digesters. The 25,311 megawatt-hours (MW-h) produced in 2010 is enough to power 2,000 average homes in Washington.

The Washington State Department of Agriculture (WSDA) continues to oversee dairies as required under the Dairy Nutrient Management Act. The W2R Program and WSDA collaborate on inspections, record reviews and annual reports. At the end of each calendar year, operators report some information to W2R. Table 2.4 lists the power 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 2.1 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	Power 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	26,563	155.8	22.5

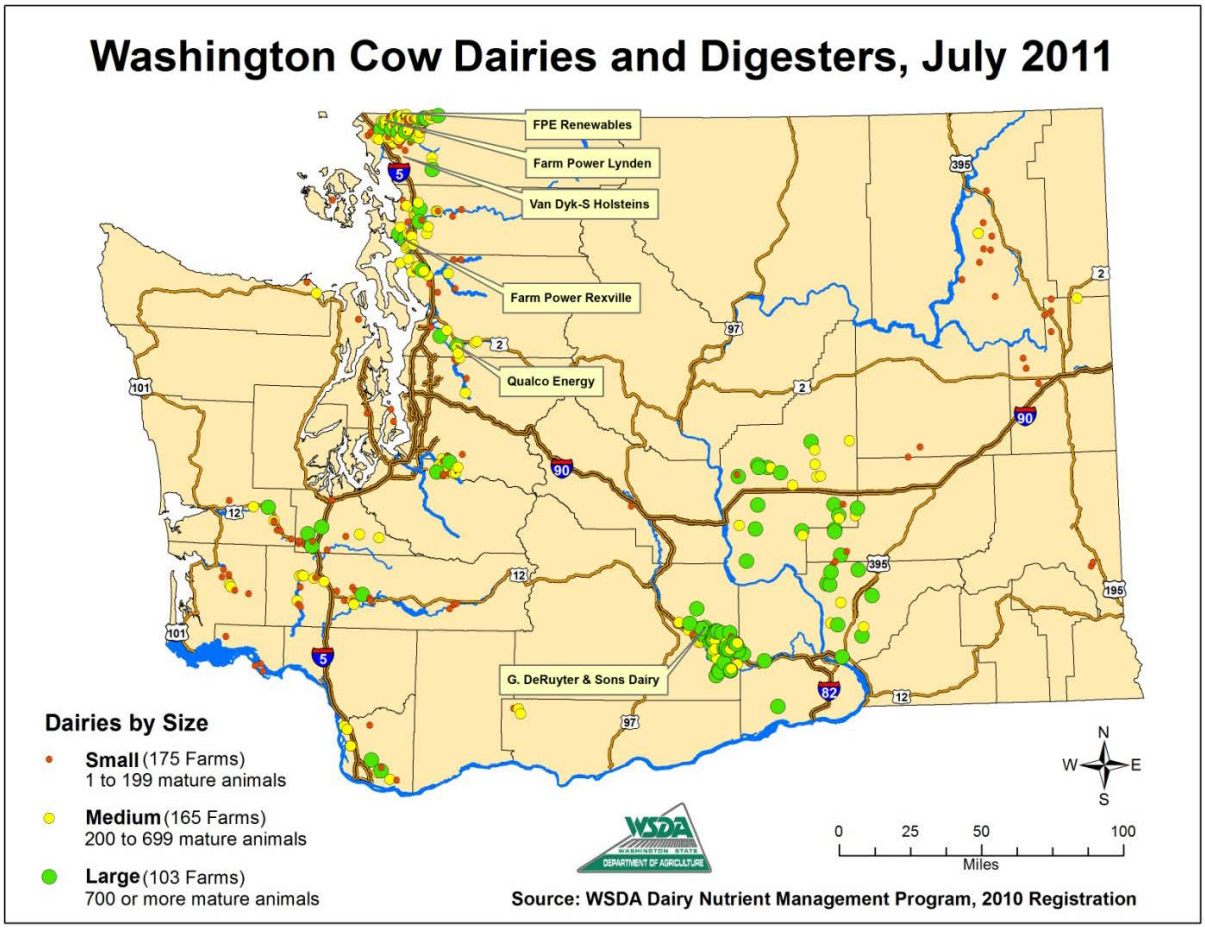
MW = megawatts
*Data for 2012 includes reports for 7 of the 8 digester facilities.

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	NR	PSE
Rainier Biogas	Enumclaw King	2012	Wallin; DeGroot Brothers; Ritter Dairies	1,200	NR	PSE

PSE - Puget Sound Energy
kW – kilowatt (1,000 kW = 1 MW)
NR – information not reported to Ecology

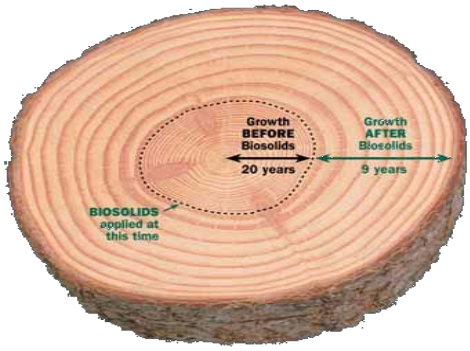
Map 2.1



Partnering for the Environment through Biosolids Recycling and Beneficial Use

Managing biosolids by recycling/beneficial use is the main choice in Washington. Ecology's biosolids program supports the state's goal and statutory preference for beneficial use of biosolids. In accordance with Chapter 70.95J RCW, *Municipal Sewage Sludge – Biosolids*, municipal sewage sludge that meets the quality standards for beneficial use is considered "biosolids" and regulated as a commodity, not solid waste. Ecology strongly encourages all producers of biosolids to pursue beneficial use.

In 2011 approximately 126,000 dry tons of biosolids were managed. Of this amount approximately 86 percent was land applied and 13 percent incinerated; less than 0.7 percent was landfilled. The following photos represent just some of the many uses of biosolids.



Use of biosolids in commercial forestry in Pierce County
(Douglas-fir growth before and after biosolids)

Use of biosolids in slope stabilization along
U.S. Highway 97A in Chelan County
(background, no biosolids; foreground, biosolids compost)

Use of biosolids in agriculture in Douglas County
(left, control; middle, commercial fertilizer; right, biosolids)

Use of biosolids in horticulture in King County
(left, control; right, biosolids compost)

Permit Program & Fees

Biosolids management is regulated through Chapter 173-308 WAC, *Biosolids Management* (the state biosolids rule), and the *General Permit for Biosolids Management* (biosolids general permit). Ecology staff, with assistance from local health jurisdictions (LHJs), oversees the state biosolids program.

The current state biosolids rule went into effect on June 24, 2007. The current Biosolids General Permit was effective August 20, 2010, and will remain in effect until August 20, 2015.

The state biosolids rule and the Biosolids General Permit govern the quality of biosolids applied to the land and practices at land application sites.

Biosolids must meet standards for pollutant limits, pathogen reduction and vector attraction reduction appropriate to the intended end use. Biosolids used where future exposures are uncontrolled (e.g. lawns, home gardens, golf courses, top soils, etc.) must meet higher standards than biosolids applied to areas where access and crop harvest restrictions can be put in place. Biosolids must also meet standards for allowable recognizable manufactured inerts similar to that for composts under the state solid waste rule.

There are about 380 facilities required to be covered under the Biosolids General Permit. The majority of facilities are publicly owned wastewater treatment plants, including those at state and federal facilities. Other types of facilities required to seek coverage under the Biosolids General Permit are:

- Privately owned treatment facilities that treat only domestic wastes.
- Certain composting facilities that use biosolids as a feedstock.
- Biosolids beneficial use facilities (land appliers who obtain a permit to reduce the permitting requirements for their clients).
- Septage management facilities (persons who treat or land apply septic tank materials).

Coverage under the General Permit is provided in two phases:

1. Provisional approval.

2. Final approval.

A facility obtains "Provisional" approval by submitting a *Notice of Intent* and a complete *Application for Coverage* as provided in the state biosolids rule and the Biosolids General Permit. Under provisional approval, a facility is authorized to carry out biosolids management activities according to the conditions of the Biosolids General Permit; conditions in any submitted plans; conditions in the state biosolids rule; and conditions in any other applicable state, local or federal regulations.

"Final" approval may be granted after a full Ecology review of the permit application and operating practices. In issuing final approval, Ecology often imposes "additional or more stringent" conditions necessary to ensure proper biosolids management and protection of human health and the environment. Any such conditions are subject to appeal.

Ecology charges a fee to permittees to support the state biosolids program. Currently, the permit fee brings in about $920,000 and supports about 6.0 FTEs committed to implementing the biosolids program at Ecology.

Delegation to Local Health Jurisdictions

Currently five local health jurisdictions (LHJs) have accepted some degree of delegation to carry out the state biosolids program. Each delegated LHJ has entered into a formal Memorandum of Agreement with Ecology. The delegated LHJs have actively taken the lead to conduct various aspects of the biosolids program within their jurisdictions. Most other LHJs provide some degree of assistance to Ecology. Funding and workload demands on staff continue to be the major reasons LHJs do not pursue delegation of the biosolids program.

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

The State Solid and Hazardous Waste Plan's (Beyond Waste) 30-year plan has a clear, simple vision: Eliminate wastes whenever we can and use the remaining wastes as resources. The goal of the fifth initiative, *Measuring Progress*, is to help Ecology and its partners make the transition to a long-term data tracking system that measures progress toward the overall vision as well as individual initiatives.

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 continually strive to improve 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 Beyond Waste by developing and maintaining measures 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. 2012 marks the fifth update of the report, which now contains 22 indicators, case studies, targets for solid and hazardous waste, a greenhouse gas savings counter, and more.

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

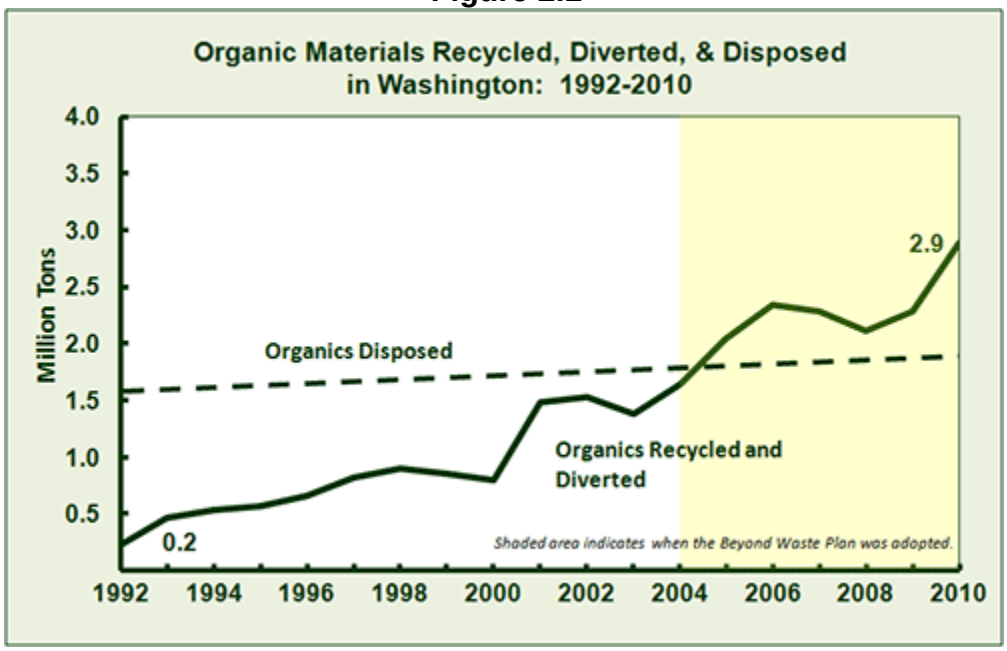
Ecology completed an evaluation of the Progress Report in 2010, and implemented recommendations from staff and stakeholders in 2011 and 2012. Because of the input from this process, the report was restructured with primary and related indicators for each Beyond Waste initiative. Also due to the evaluation recommendations, the individual indicators are now updated when data is available, rather than waiting for a once-a-year update of the entire report. 2012 marks the first year of this page-by-page type of update.

Many other recommendations from the 2010 evaluation were implemented in 2011, including:

- Emphasize the indicator's connection to the Beyond Waste plan.
- Show more charts and comparisons providing context, such as per capita data and case studies.
- Highlight the indicator's climate change connection.
- Update the Consumer Environmental Index (CEI).
- Add more new indicators.
- Enhance "clickability" on the website.

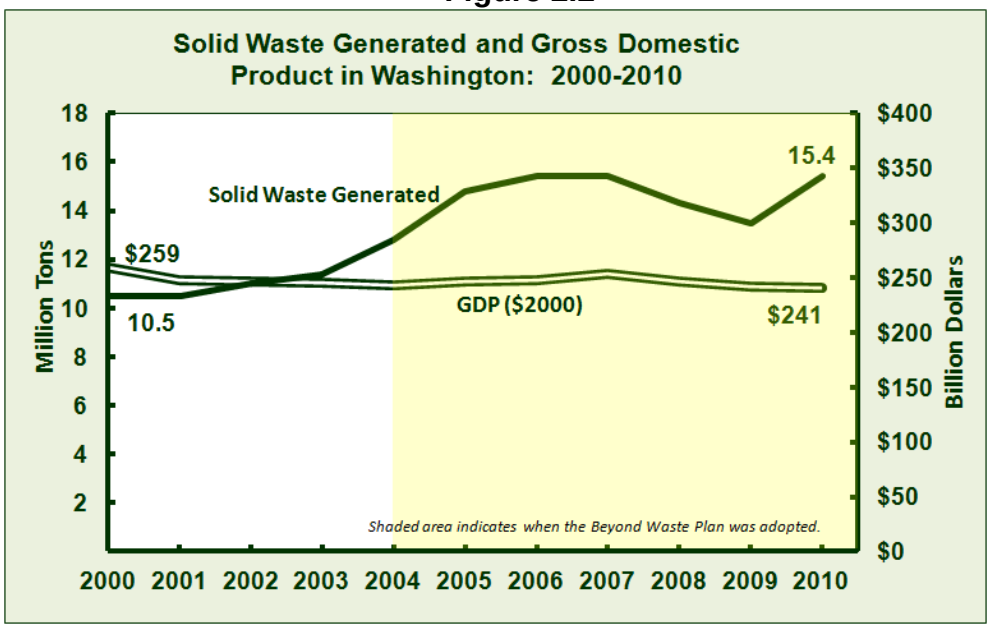
We are beginning to see some trends related to implementation of Beyond Waste in some indicators. Baselines by which we can gauge our progress have been established and we are making significant progress in some key areas. We have recycled more solid waste, electronics, and organics over the last few years (Figure 2.1).

Figure 2.1



However, some trends are disappointing. Despite our waste reduction efforts, in 2010 we continued to generate more waste per dollar of state gross domestic product (GDP) (Figure 2.2).

Figure 2.2



Good news includes we are collecting more construction and demolition debris for recycling, and green building versus conventional construction is increasing. In addition, many businesses are creating less hazardous waste per dollar earned. Progress in these areas shows how moving toward the Beyond Waste vision can help individual businesses, the economy, and the environment.

To see the full Beyond Waste 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 in Lincoln County

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 is used to prevent and remove illegal tire piles. Funds in this account come from a $1 fee charged on each new replacement tire sold in Washington. Ecology receives a biennial budget of $1 million from the WTRA. These funds are allocated to local governments for tire related efforts across the state.

Public entities were funded in 2010 and 2011 for tire related projects through interagency agreements. Those locations and types of projects are listed in Table 2.6. In 2012, Ecology established a tire contract with Tire Disposal & Recycling out of Portland Oregon. That contract provides tire removal support to local governments under the Ecology contract. Local efforts planned for this contract are listed in Table 2.7. Additional amnesty events will be scheduled for spring 2013. Ecology will continue funding waste tire projects with WTRA funding.

Table 2.6
Waste Tire Projects Completed in 2010

Public Entity	Project	2010	2011
Benton Mosquito Control	Amnesty collection	$ 24,882	$ 8,572
Clallam Code Enforcement	Amnesty collection	--	$ 17,923
Colville Confederated Tribe	Amnesty collection	$ 78,625	$ 101,900
Franklin Mosquito Control	Amnesty collection	--	$ 5,239
Grays Harbor County Health	Amnesty and enforcement	$ 3,118	$ 15,005
Jefferson County Health	Amnesty collection	$ 6,126	--
King County Solid Waste	Tire vouchers	$ 2,385	--

Public Entity	Project	2010	2011
Kitsap County Solid Waste	Amnesty collection	$ 42,556	$ 65,000
Lewis County Public Health	Tire pile removal	--	$ 27,253
Lewis County Solid Waste	Amnesty and pile removal	$ 2,996	$ 2,600
Lincoln County	Amnesty collection	--	$ 25,974
Mason County Health	Shoreline tire cleanup	$ 4,020	--
Moses Lake Irrigation District	Shoreline tire cleanup	$ 1,616	--
Pierce County Public Works	Tire pile removals	--	$ 65,719
Skagit County Public Health	Tire vouchers	$ 6,543	$ 10,000
Skamania County	Amnesty collection	$ 15,000	$ 32,234
Snohomish Solid Waste	Amnesty collection	$ 21,208	--
Spokane Tribe	Amnesty collection	$ 4,999	$ 3,645
Town of Rockford	Tire removal	--	$ 2,298
Walla Walla Comm Dev	Amnesty collection	$ 5,060	$ 13,734
Wenatchee/Chelan County	Amnesty collection	--	$ 14,033
Whitman County Public Works	Amnesty collection	$ 5,759	$ 11,261
WSU Civil Engineering	Tire shred study	$ 18,800	--
Yakama Nation	Tire removal, education	--	$ 10,638
Yakima	Tire pile removal	--	$ 15,735
TOTAL FUNDS SPENT		**$243,693**	**$448,764**

Table 2.7
Waste Tire Projects Planned for 2012-13

County/City	Effort	Contracted 2012
Asotin	Pile removal	495
Benton	Pile removal	825
Camano	Pile removal	270
Chelan	Pile removal	4,956
City of Millwood	Amnesty	2,560

County/City	Effort	Contracted 2012
Clallam	Pile removal	6,297
Clark	Pile removal	125
Duvall	Pile removal	270
Garfield	Pile removal	825
Grays Harbor	Pile removal	4,011
Kitsap	Pile removal	13,644
Kitsap	Pile removal	8,471
Lewis	Pile removal	1,604
Mason	Pile removal	8,986
Pierce	Pile removal	4,290
Sedro Woolley	Pile removal	580
Sedro Woolley	Pile removal	1,750
Snohomish	Pile removal	5,075
Snohomish	Pile removal	23,765
Spokane	Pile removal	93
Spokane Tribe	Pile removal	14,716
Spokane Tribe	Pile removal	5,550
Spokane Valley	Pile removal	155
Spokane Valley	Pile removal	310
Sultan	Pile removal	3,700
Tacoma-Pierce HD	Pile removal	731
Thurston	Pile removal	1,029
Walla Walla	Pile removal	13,216
Whatcom	Pile removal	35,882
Whitman Co	Amnesty	8,560
Yakima	Pile removal	430
TOTAL CONTRACTED		**$ 173,171**

Partnering for the Environment through Financial Assistance

Grants to Local Governments - Coordinated Prevention Grants

Coordinated Prevention Grants (CPG) are historically funded by the Local Toxics Control Account (LTCA).[2] 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 greatly reduce contamination of the environment.
- Provide funding assistance to local governments for local solid and hazardous waste planning and for carrying out some 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. Projected revenues to LTCA available each biennium for CPG are divided 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).

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

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. Funds from a special legislative appropriation may also be awarded concurrently with or be incorporated into the regular cycle. This was the case for the special legislative funds allocated for the 2011-13 Biennium.

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

Based on *WAC 173-312*, CPG ran calendar year (January - December), two-year long cycles. CPG would receive a full two-year allocation of approximately $21 million and reappropriate unspent funds at the end of the biennium to continue to fund existing agreements that crossed the biennial line. Since this required substantial funds to cross each biennial line, Ecology decided to end that practice during the 2009-11 Biennium. Unspent funds at the end of a biennium no longer cross biennial lines.

With no reappropriation authority, CPG could no longer write agreements authorizing funding for the last six months of the grant cycle. During the 2010-11 cycle, CPG's answer to this problem was "Phased" agreements. "Phased" agreements included the full 24-month scope of work and spending plans, but only authorized spending for the first 18 months. Once the 2011-13 Biennium's appropriation was authorized, agreements were amended to include funding for the last six months of the cycle. These "Phased" agreements, based on legislative appropriations over two biennia, posed challenges for budget and project planning, and increased the administrative burden for local governments and Ecology.

For the 2012-13 regular cycle, CPG drafted agreements based on an 18-month period (January 1, 2012 - June 30, 2013). Ecology then consulted with grant recipients to determine whether to continue with "Phased" calendar-year based agreements and money appropriated over two biennia, or to begin new 24-month agreements that aligned with the biennial calendar (July - June).

Grant recipients wanted the most financial security for the longest period of time. The vast majority was willing to adjust their local budget and planning processes as needed to achieve this. 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.

Awards

The Legislature allocated $24.6 million to the CPG Program for the 2011-13 Biennium. The $24.6 million included funding for the regular cycle, Alternative to Burning and Beyond Waste projects, and funding to cover the last six months (Phase 2) of the 2010-11 regular cycle projects:

- $18.8 million for the regular cycle 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 January 1, 2011.

- $2 million for Alternatives to Burning (ATB) grants to fund projects that provide alternatives to backyard burning of organics. Priority for these funds was given to urban growth areas of less than 5,000 people affected by the January 1, 2007, ban on outdoor burning; projects that develop infrastructure for an ongoing program; and projects that coordinate regionally. ATB funded projects were either incorporated into regular cycle agreements or awarded as stand-alone grants that began January 1, 2011.

- $4 million for grants to fund new organics composting and conversion, green building, and moderate risk waste initiatives described in the state's solid and hazardous waste management plan, Beyond Waste. Beyond Waste projects began January 1, 2011. CPG funded 54 projects that qualified for Beyond Waste proviso funds totaling $4 million within regular cycle agreements.

Ecology awarded 122 grants to Washington counties, cities, and health agencies totaling $19,262,321 during the regular cycle, which started January 1, 2011, and ends June 30, 2013. This included 14 ATB projects. During the offset cycle, Ecology awarded 27 grants that started July 1, 2012, and end June 30, 2013 to Washington counties, cities, and health authorities totaling $2,728,072.

Table 2.8
CPG Funds Distribution for Each Project Category

	Regular Cycle 1/1/11 – 6/30/13	Offset Cycle 7/1/12 – 6/30/13	Total
Organics	$1,794,055	$905,737	$2,699,792
Moderate Risk Waste	$8,291,178	$491,869	$8,783,047
Waste Reduction and Recycling	$5,167,721	$374,930	$5,542,651
Solid Waste Enforcement	$3,229,260	$388,453	$3,617,713
Green Building	$63,753	$394,320	$458,073
Other	$261,594	$172,763	$434,357
Alternatives to Burning	$454,760	NA	$454,760
LTCA Funds	**$19,262,321**	**$2,728,072**	**$21,990,393**

Local Government Efforts Implementing Beyond Waste Vision Using CPG Funds

Local governments are carrying out programs that support the State Solid and Hazardous Waste Plan - Beyond Waste vision. Examples of current projects are described below, highlighting efforts in Recycling of Organics, Reducing Threats from Small-Volume Hazardous Wastes, and Green Building. Local government projects that Ecology typically funds include:

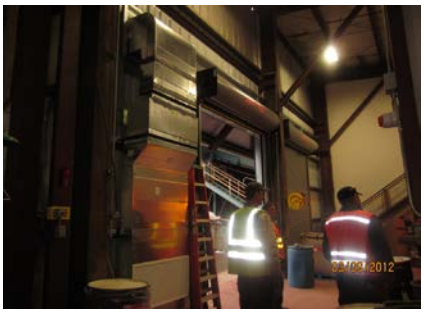
- **Organics.** Local governments are helping communities reduce waste from organic materials and reduce the health risks caused by smoke from backyard burning of yard debris. Local governments are building or expanding regional composting facilities, setting up commercial and residential food waste collection programs, and offering yard waste chipping options. They are also educating citizens and businesses on options to reduce waste. These options include food rescue programs, and home/onsite composting.

  Jefferson County Solid Waste (G1300004) used CPG funds to contract with an expert to conduct training sessions about composting with worms. This type of composting focuses on food-waste management at home. The county expects to train up to 100 residents and divert an estimated 26 tons of organics from the waste stream.

- **Green Building.** "Green Building" as defined by the U.S. Green Building Council is *". . . design and construction practices that significantly reduce or eliminate the negative impact of buildings on the environment and occupants in five broad areas: sustainable site planning; conservation of materials and resources; energy efficiency and renewable energy; safeguarding water and water efficiency; and indoor air quality."* Local governments help builders reuse materials and divert construction and demolition debris from the landfill. Local governments are also encouraging construction of high-performance "green" buildings. They educate builders and give public recognition to those who "build green."

- **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 state solid and hazardous waste plan (Beyond Waste), 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.

  Grays Harbor County Solid Waste (G1000388) used CPG funds to make MRW facility improvements including a wall enclosure and ventilation system. The wall reduced extensive dust accumulation in the facility, which impacted worker safety and interfered with materials processing.

- **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.

  Kittitas County Public Health Department (G1200233) used CPG funds to inspect and take regulatory enforcement actions to bring a moderate risk waste handling facility into compliance with regulatory requirements and acquire a solid waste handling permit. Technical assistance was provided to help correct violations and complete the permit application process.

Project Details

To view details of completed projects funded in 2010, 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 making sure the checkbox for "CPG Funding" is selected, and enter the following dates in the "Dates Project Active" fields: 1/1/2010 to 12/31/2011. Scroll down and click "Search." You will notice there are also many other ways to search for projects from this page.

CPG Administration Improvements Using the Lean Process

Lean is a production practice first developed by Toyota that considers the use of resources for any goal other than the creation of value for the end customer to be wasteful, and thus a target for elimination. The process has since been adapted for non-manufacturing situations including public sector activities.

Washington State government, under the direction of Governor Gregoire, has begun to adapt Lean thinking, tools, and techniques to improve products and services. The W2R Program chose the administration of the CPG program to begin applying the Lean process.

The extended length of time it was taking to process applications, make decisions, and issue grant offers was the first problem evaluated. Some local governments were forced to delay planning and implementing programs while waiting for grant funding. Two time intensive processes were identified for improvement or elimination:

1. Ecology used Minimum Threshold Scoring (MTS) to review and approve grant applications. This method is used for competitive grants, but CPG regular cycle funding is not awarded on a competitive basis.

2. A minimum of nine staff located in different offices throughout the state were involved in reviewing grant processing documents.

Ecology decided to stop using the MTS method because it wasn't the appropriate tool for the type of grant issued. Peer review of draft grant agreements was discontinued and simultaneous electronic (email) routing (e-routing) of documents across the state was evaluated as a replacement for mailing hard copies.

Eliminating the MTS reduced the number of processing days from 76 to 39 with no reduction in the quality of projects funded. Ecology staff redirected the time saved to offering technical assistance to help applicants improve their funded programs. Eliminating peer review of draft agreements reduced the number of draft agreement review days from 13 to 11. Combined, this represented a 48 percent reduction in the time it historically took to process an application to the point of making a grant offer.

Simultaneous e-routing across the state was tested with a representative number of grants. The document review time was reduced by an average of two days, but the test also revealed that using email for e-routing statewide had its limitations. For now, e-routing is only used at Ecology Headquarters.

The results from this test led to Ecology conducting an agency-wide Lean event in November 2012 to guide the development of the new grants and loans tracking system. The event identified ways Ecology can implement e-routing statewide to achieve more time savings along with other efficiencies. It also identified other areas where the CPG program can be improved.

In addition, the W2R Program began evaluating potential ways to reduce errors in payment requests submitted and during processing those requests. The CPG program will continue the Lean improvement process to reduce payment request errors, and will look for other potential improvements to test and implement.

CPG Offset Cycle Improvements Using the CPG Workgroup

The W2R Program is in the process of forming 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 will examine the competitive CPG Offset Cycle grant program and make recommendations for process improvements. In particular, the workgroup will work 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.

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 Beyond Waste Plan 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 provides technical assistance to local governments as they prepare and carry out their plans, and also approves them. Table 2.9 lists local solid waste plans and hazardous waste plans for each county and one city (Seattle) that do individual plans.

Table 2.9
Current Status of Solid & Hazardous Waste Plans
in Washington as of December 2012

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 14, 2011.
Benton	2007	50% by 2020	1991	Yes	Drafting for new CSWMP is underway, and a preliminary draft is anticipated to be submitted before 2013.
Chelan	2007	25% recycling rate by 2010 5% reduction from the current waste stream by 2010	1990	Yes	Drafting for new CSWMP anticipated beginning in 2013.
Clallam	2007	40% WRR long-term goal	2007	No	Preliminary SWMP Draft expected in 2013.
Clark	2008	50% WRR	2008	Yes	Drafting new CSWMP. Preliminary draft expected in 2013.
Columbia	2003	20% WR/R	1991	No	CSWMP approved. HW Plan being split from joint plan with Walla Walla and written as new standalone for Columbia County. Consultant hired, SWAC reconstituted. Preliminary plan update in process.
Cowlitz	2012	At or above 50% WRR	2012	Yes	CSWMP approved August 2012.
Douglas	2010	10% residential recycling, 10% commercial recycling, and 20% public sector recycling by 2015	2010	Yes	CSWMP approved October 2010.
Ferry	2011	30% Recycling by 2015	2011	Yes	Plan completed and approved.
Franklin	2011	References state goals but doesn't commit to a number of their own.	2011	Yes	Plan approved March 2, 2011.
Garfield	2008	No specific number commitment.	1992	No	CSWMP approved September 2008.
Grays Harbor	2013	50% WRR	2013	Yes	CSWMP approved January 2013.
Island	2008	Assist the State in achieving its goal of	2008	Yes	Plan approved April 1, 2008. Currently considering whether

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
		50%			an amendment or revision is necessary to update plan.
Jefferson	2008	50% WRR	1991	No	Considering a review of HW plan.
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. King County is currently renegotiating ILAs with cities, which has stalled the submission of their final draft. Because the city of Seattle and King County have independent CSWMPs, the HW plan remains independent. The HW plan was approved on July 8, 2010.
King - Seattle	2005	Overall recycling rate by 2015: 55% Overall recycling rate by 2020: 70%	2010	No	Latest CSWMP approved May 10, 2002. 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 on July 8, 2010. The draft update was released for public comment from October 8 - February 4, 2010. The preliminary draft was submitted to Ecology on April 1, 2011. Ecology submitted comments on the preliminary draft on August 1, 2011. The final draft will be submitted to Ecology in January of 2013.
Kitsap	2011	Supports the state goal of reaching 50% recycling.	2011	Yes	The final draft of the combined CSWMP/HWMP update was submitted on May 5, 2011 and approved by Ecology on June 14, 2011.
Kittitas	2011	Countywide recycling rate of 50%. Supports the state goal of reaching 50% recycling.	1991	Yes	Final CSWMP approved in July of 2012.
Klickitat	2000	Countywide	2000	Yes	Preliminary draft of CSWMP

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
		recycling and diversion goal of 50%.			reviewed and comments submitted October 2012. Final draft anticipated to be submitted early 2013
Lewis	2008	50% WRR	2008	Yes	Currently working on a CSWMP update.
Lincoln	2011	Commits to assisting the state to meet its 50% goal.	2011	Yes	Plan approved March 16, 2011.
Mason	2007	Mentions state goal of 50%	1991	Yes	Currently in review to update the CSWMP.
Okanogan	2012	Supports the state goal of reaching 50% recycling	2006	Yes	Final CSWMP approved October 2012.
Pacific	2006	25% WRR goal	1990 – 2000 Operations Plan	Yes	Currently working on a new CSWMP that will include a new HW plan. Preliminary draft expected in 2013.
Pend Oreille	2011	References state goal w/o committing to a number of their own.	2011	Yes	Preliminary plan approved Jan. 7, 2011.
Pierce	2008	50% WRR	1990	No	Updating a separate HW plan during 2013.
San Juan	2012	50% recycling rate by 2018	2012	Yes	
Skagit	2005 (amended 2008)	50% diversion	1992	No	Has just started update process for SW plan. No plan to update HW plan.
Skamania	2001	50% WRR long range goal	2001	Yes	Working on a draft CSWMP update for 2013.
Snohomish	2004	Supports the state goal of reaching 50% recycling.	1993	Partially	The 2001 CSWMP is intended to begin consolidation of the HW Plan to update but not replace it. The CSWMP was updated in 2004 to include replacement of two solid waste facilities and include the city of Everett under the county's solid waste system. The County began updating the joint CSWMP and HWMP in 2009. The public comment draft of the plan update was posted October 2011. The preliminary draft was submitted to Ecology on September 24, 2012. The final draft will be submitted to Ecology in January of 2013.

County	SW Plan Last Approved	WR/R Goal	HW Plan Last Approved	Combined Plans?* (Yes/No)	Comments
Spokane	2011	Commits only to working toward state goal of 50%. Currently at 46%	1993	No	Approved April 15, 2011.
Stevens	2206	36% WR/R by 2012	1993	No	Approved April 13, 2006.
Thurston	2013	Increase recycling rate by5%	1993	No	Approved February 2013.
Wahkiakum	2007	20% WRR	2001	No. See comments.	Plan to update the SWMP and to include a new HWMP in 2013.
Walla Walla	1994	40% by 2002	1991	No	Plan update process began in earnest in July 2012. Expect completion by end of CY 2013.
Whatcom	2010	50% diversion	2010	Yes	New combined SW-HW plan approved 2010, but dated 2008. Note: This new plan is to be read concurrently with the previous SW and HW plans (3 books at once). We don't allow this practice anymore.
Whatcom	1999	50% diversion	1991	No - Soon.	County currently updating CSWMP. Received draft in November 2008, and it is almost in final form. The city of Bellingham is no longer the lead on MRW, and the county has combined SW and HW plans.
Whitman	2012	No recommendation.	2012	Yes	Plan approved July 15, 2012.
Yakima	2010	Support the state's recycling goal of 50%	2010	Yes	Plan approved June 2010.

*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.

Partnering for the Environment through Outreach, Assistance and Information Sharing

Washington State Solid Waste Information Clearinghouse

The year 2012 marked the third anniversary the completed site was in use (https://fortress.wa.gov/ecy/swicpublic/). As of November 2012, the site had 238 registered users and contained 1,453 projects, 1,124 resources, 257 solid waste staff contacts, and 106 health department staff contacts.

Now that the site is fully functional, the main challenge is getting the local city and county profiles populated with data. This relies on a partnership between Ecology and local governments, as each is responsible for updating various pieces of the profiles. Ecology will put more emphasis on marketing the site in the coming year, and will continue to maintain the site to ensure it becomes the resource local governments envisioned nearly a decade ago.

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 lessons learned with anyone who has Internet access. This helps all recipients to strengthen their programs. There is a goal to also have the site contain information on Public Participation Grant (PPG) projects, as well as non-grant funded projects submitted by local governments. The system will collect and maintain information about county and city programs, and facilitate sharing tools and resources.

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.
- Calendar of Events.
- Classified Ads.

To provide feedback about the Information Clearinghouse, contact Diana Wadley, Project Coordinator, at (425) 649-7056 or Diana.Wadley@ecy.wa.gov.

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 2011, Washington had 108 active operator/inspector landfill certifications (down from 181 in 2010). And we had 76 active operator/inspector incinerator certifications (up from 68 in 2010).

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 technical 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.

Recognizing Waste Reduction and Recycling Efforts: Terry Husseman Sustainable School Award Program

Ecology's School Awards Program recognizes Washington's primary and secondary schools for developing and managing environmental education and sustainability programs. Both public and private schools are eligible to apply. Schools are selected for creative features of their programs and ability to promote sustainable behavior change by reducing waste, increasing recycling, and conserving resources. The program rewards schools for developing innovative environmental curriculum or operating successful programs that inspire a sense of environmental stewardship in students.

Because of proviso limitations and funding reductions passed by the 2011 Legislature, the W2R Program suspended the Terry Husseman Sustainable School Awards for 2012 and 2013. The funding reductions also resulted in the 2011 recipients receiving their awards through the mail instead of being honored at the traditional awards ceremony.

Recycling Information Line

The W2R Program operates a statewide, 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 a first contact for many Washingtonians.

Ecology's 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 information line is also a source for locations to recycle wood stoves for programs that Ecology's Air Quality Program implements.

Information line 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; and electronics. The information line also lists companies that offer commercial pickup for business recycling and residential curbside haulers.

The public can also receive recycling information by searching the database on the information line's website at http://1800recycle.wa.gov. It was recently updated to allow for searches by zip code, which helps callers find more convenient recycling locations.

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

The 1-800-RECYCLE website also 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.

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 2010, work on litter control and litter prevention activities was significantly reduced due to budgetary constraints. We were unable to fund a litter prevention campaign or conduct a litter survey. Funds for litter pickup efforts were reduced. With limited funding, Ecology put forward the following efforts in litter control and pickup:

- Helped coordinate reduced litter pickup activities. Managed allocations from the Waste Reduction, Recycling and Litter Control Account (WRRLCA) for other state agencies.
- Deployed 28 summer Ecology Youth Corps (EYC) litter cleanup crews statewide. Also deployed 6 Ecology median crews in spring and fall and one median crew in summer.
- Administered a reduced Community Litter Cleanup Program (CLCP).
- Maintained productive partnerships with other state agencies and local governments.

The 2011 Legislature again reduced funding to WRRLCA for the 2011-13 Biennium. Funding for litter pickup for this biennium is being directed to the Department of Corrections (DOC), Department of Natural Resources (DNR), and Ecology (EYC). 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), Transportation (WSDOT), and State Parks and Recreation Commission (Parks).

Litter Prevention Campaign

There was no funding or staff to implement a comprehensive prevention campaign in 2011 or early 2012. There is no funding or staff for a prevention campaign for the 2011-13 Biennium.

Secured Load Materials and Website

There was no secured loads campaign in 2011 or early 2012 other than the enforcement activity described below. There is no funding for a secured loads campaign in 2011-13. 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

In May 2011, 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 was no litter emphasis patrol in 2012. We are exploring conducting a reduced litter emphasis patrol in spring 2013.

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, 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 $7 million and again suspended the 20/30/50 allocation requirements for Fiscal Year 2011-13.

WRRLCA supports a variety of programs. Funds were allocated as follows:

- $2.2 million to Local Government Funding Programs.
- $3.5 million to Waste Reduction & Recycling Activities.
- $4.99 million to Litter Cleanup & Prevention.

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 Ecology Youth Corps (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 is limited Ecology funded emphasis patrols for the upcoming biennium that focus on litter violations and secured loads.
- Ecology reduced funding to DNR, and cut funding completely to WSDOT, WDFW, and Parks. Only DOC saw their funding remain the same.

Ecology Youth Corps

2012 marked the 37th year of operation for the Ecology Youth Corps (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. More than 3,400 youths from across the state apply annually for approximately 250 positions in summer 2012. Youth crews generally work two four-week summer sessions with a complete turnover of crews occurring mid-summer. In

2010, funding cuts prevented us running summer EYC crews. We were able to return to operating youth litter crews in summer 2011 and 2012, although it was still a reduced effort compared to past years.

During the 2012 EYC crew season, litter on state highways was collected in the following counties:

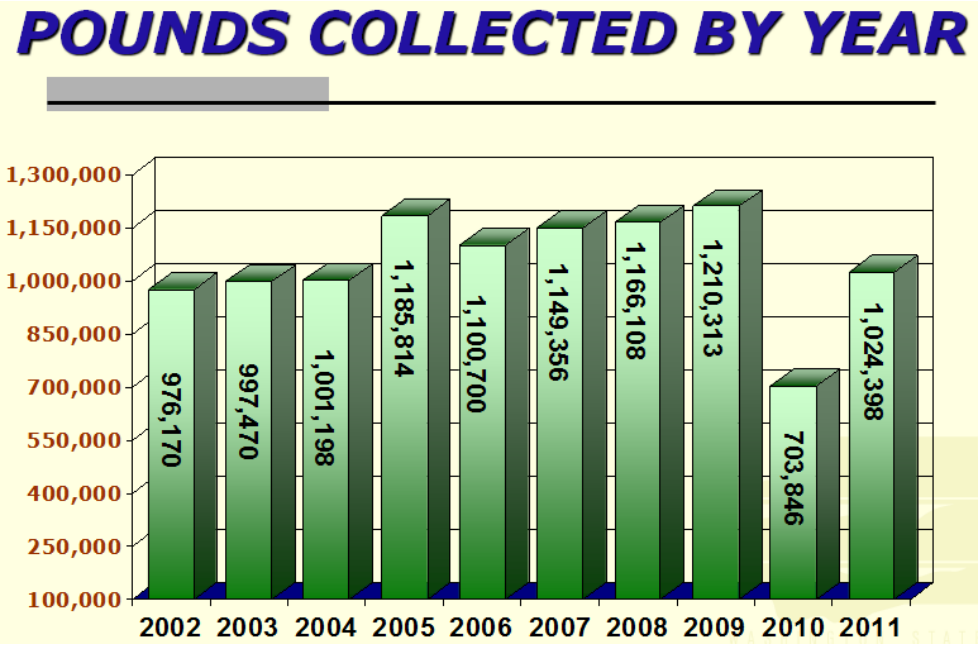
- ✓ Central Region (CRO): Benton, Kittitas, Klickitat, and Yakima.
- ✓ Eastern Region (ERO): Adams, Asotin, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla and Whitman.
- ✓ Northwest Region (NWRO): King, San Juan, Skagit, Snohomish, and Whatcom.
- ✓ Southwest Region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

The most recent totals for the EYC program are for the 2011 crew season. The comparison with 2010 is shown in Table 3.1. The inability to run summer crews in 2010 is reflected in the reduced number of pounds collected in comparison to previous years, as also shown in Figure 3.1.

Table 3.1
Ecology Youth Corps Program Outputs
2010 and 2011

	Jan-Dec 2010	Jan-Dec 2011
Total Hours Worked (Supervisor + Crew)	34,778	67,201
Total Pounds Collected (Litter + Illegal Dump + Recycled)	703,846	1,010,327
Miles	2,747	5,225
Acres	423	654
Number of Illegal Dumps Cleaned	163	223

Figure 3.1



Ecology continues to operate the EYC in partnership with WSDOT. WSDOT hires the crew supervisors, and Ecology manages all other aspects of the program. The interagency agreement covering this arrangement between Ecology and WSDOT expires in June 2013.

Litter Survey

Ecology's goal is to conduct a litter survey every five years to measure the amount and types of litter around the state. Ecology cancelled the 2008-09 Litter Survey because of budget cuts. Because of the budget reduction to WRRLCA for 2011-13, there is no funding to conduct a litter survey in 2011 or 2012. Information on previous litter studies are 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.

For the budget cycle that began in July 2009, Ecology awarded $2.685 million in CLCP funding. All 39 counties applied for and received funds. However, due to budget cuts in 2010, Ecology had to later cut the awards the counties received in half to $1.36 million.

Table 3.2 highlights the work accomplished through CLCP for 2009 and 2010. Because of the budget reductions in 2010, the numbers were significantly reduced. In 2010 there were approximately 73,000 fewer hours worked, resulting in more than 1.2 million less pounds of litter picked up.

Table 3.2
Community Litter Cleanup Program Outputs

	Jan–Dec 2010	Jan-Dec 2011
Total Hours Worked (Supervisor + Crew)	93,335	75,124
Total Pounds Collected (Litter + Illegal Dump + Recycled)	1,826,822	1,346,479
Miles	18,647	15,581
Acres	978	1,079
Number of Illegal Dumps Cleaned	2,367	2,097

The CLCP does have $2.2 million available for the 2011-13 Biennium, which is slightly less than past normal years.

Litter Cleanup by Other State Agencies

Because of Legislative reductions to the WRRLCA for 2009-11, state agencies saw a decrease in funding from previous years. Additional budget reductions to WRRLCA for 2011-13 have further impacted state agency litter pickup budgets. WDFW, WSDOT, and Parks were eliminated from the budget. DNR was reduced to $320,000. Only DOC kept their same level of funding. Table 3.3 shows the budget for three biennia.

Table 3.3
Ecology Interagency Agreements for Litter Activities
July 1, 2009 – June 30, 2011

	07-09 Biennium	09-11 Biennium	11-13 Biennium
Department of Corrections	$625,000	$620,000	$620,000
Department of Fish and Wildlife	$ 27,500	$20,000	0
Department of Natural Resources	$520,000	$415,000	$320,000
Department of Transportation	$ 88,000	$ 85,000	0
Parks and Recreation Commission	$ 75,000	$ 40,000	0
Total	$1,335,500	$1,180,000	$940,000

Parks and Recreation Commission

The Parks and Recreation Commission (Parks) traditionally uses litter funds for waste reduction and recycling efforts, as well as litter and illegal dump cleanup. Park rangers, park users, and volunteers do most litter collection. For information on Park's accomplishments, see the "Parks" section on the litter website at http://www.ecy.wa.gov/programs/swfa/litter/who.html#a7.

Because of the budget reduction to WRRLCA for 2011-13, Parks is not receiving any funding for the biennium.

Department of Fish and Wildlife

The Department of Fish and Wildlife (WDFW) receives funding through Ecology to support volunteer efforts to pick up litter through their Adopt-an-Access Program. Funds also support purchase of litterbags, signs, volunteer mileage, gloves, hats, dumpster rentals, WCC crew time, and tipping fees. Table 3.4 summarizes WDFW's litter removal efforts for 2010.

Table 3.4
Department of Fish & Wildlife Litter Removal Activity
January 1 – December 31, 2010

Total Hours Worked (Supervisor + Crew)	684
Total Pounds Collected (Litter + Illegal Dump + Recycled)	51,040
Acres	226
Number of Illegal Dumps Cleaned	Unknown

Because of the budget reduction to WRRLCA for 2011-13, WDFW is not receiving any funding for the biennium.

Department of Corrections

The 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 Walla Walla. Table 3.5 summarizes DOC's litter crew activity in 2011.

Table 3.5
Department of Corrections Litter Removal Activity

	Jan–Dec 2010	**Jan-Dec 2011**
Total Hours Worked (Supervisor + Crew)	47,666	40,428
Total Pounds Collected (Litter + Illegal Dump + Recycled)	836182	736,452
Miles	2 ,710	2,382
Acres	672	977
Number of Illegal Dumps Cleaned	9	7

DOC will receive the same funding for 2011-13.

Department of Natural Resources

The Department of Natural Resources (DNR) Camps Program, in partnership with DOC, puts offender crews to work on state lands. As illustrated by Table 3.5, this program has considerable impact on litter cleanup and illegally dumped materials in state-owned forests. For the 2009-11 Biennium, DNR's litter funding was reduced by $105,000 to $415,000. Table 3.6 summarizes DNR crew activity in 2011.

Table 3.6
Department of Natural Resources Litter Removal Activity

	Jan–Dec 2010	Jan-Dec 2011
Total Hours Worked (Supervisor + Crew)	26,871	7,926
Total Pounds Collected (Litter + Illegal Dump + Recycled)	290,953	233,049
Miles	1,212	318
Acres	203	76
Number of Illegal Dumps Cleaned	741	265

Because of the budget reduction to WRRLCA for 2011-13, the DNR's funding was reduced to $320,000.

Department of Transportation

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

In 2010, WSDOT crews removed and disposed of 3,621 tons of litter from state roadways (roughly seven million pounds).

Because of the budget reduction to WRRLCA for 2011-13, WSDOT did not receive any funding for the biennium.

Looking Ahead

The 2011-13 Biennium is as challenging as it was in 2009-11. Coordination of the 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 Beyond Waste, the state's solid and hazardous waste plan. Recognizing we will continue to generate many wastes, the Beyond Waste Plan also calls for valuing these materials as resources, and moving them into closed-loop recycling systems or diverting them for other uses instead of disposing of them.

To measure progress, a record of the amount and types of waste generated is essential. To determine the amount of waste generated in Washington State, Ecology uses the amount of materials disposed each year, plus the amount of materials recycled and diverted from disposal. The way we calculate this number has changed 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 until 2005. After decreasing every year from 2006-09, the amount of waste generated increased in 2010 before dropping again in 2011. This may indicate we are on our way to improving this trend. The recent recession may have played a part in reducing our waste generation as well.

Washington State's population has continued to grow since Ecology began to track disposal and recycling. Population growth rates in Washington have averaged 1.8 percent per year from 1988 to 2011, with the total population increasing more than 2.1 million during that period.[1]

With an increase in population often comes an increase in waste generation, and this has certainly been true in Washington. However, the amount of waste disposed of, as well as the amount recycled and diverted, has increased faster than the population, resulting in an increase in waste generation over the last 12 years (see Figure 4.1).

Since 1994, 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 3.5 percent. The total amount of waste generated annually since 1994 has increased by 8.5 million tons.

Since we began measuring disposed solid wastes back in 1994, Washington citizens have generated more than 226 million tons of solid waste. This is roughly equal to 90 percent of the total solid waste generated in the United States in 2010, and weighs about the same as disposing of 111 million cars in a landfill.[2]

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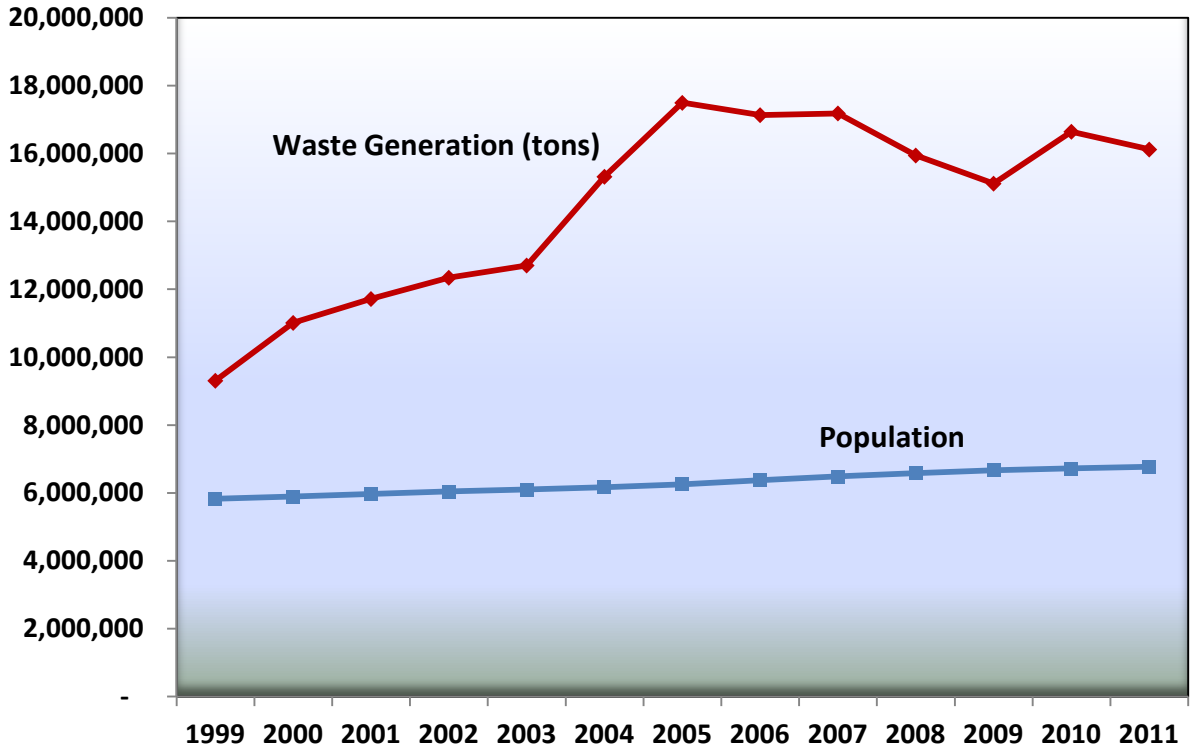
[1] Population figures from Office of Financial Management at http://www.ofm.wa.gov/

[2] U.S. Environmental Protection Agency: http://www.epa.gov/otaq/cert/mpg/fetrends/2012/420r12001a.pdf

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 we dispose of in landfills and incinerators are considered part of our "waste." However, materials we separate from disposal for recycling, or some other useful activities other than disposal 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 these materials will be put toward 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.

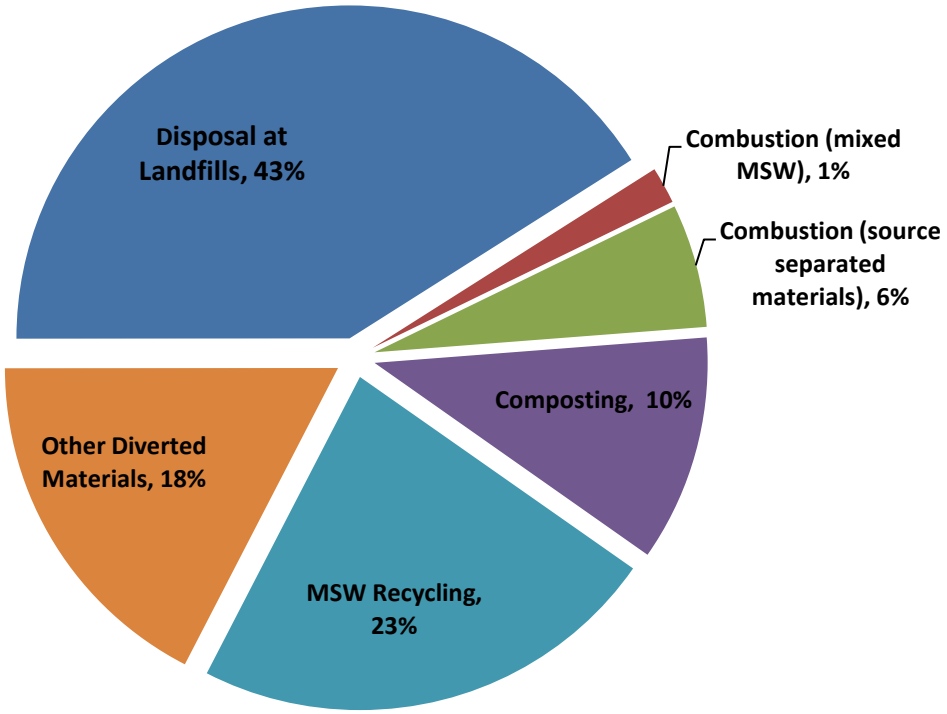
4. Composting in regulated facilities.

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 2011.

Figure 4.2
Waste Management Methods 2011



Some material types have one unique final use, such as aluminum cans that are recycled back into more aluminum cans rather than composted or burned for energy. 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. As recyclers develop systems to track this type of information, data quality is improving.

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. In addition, because of reporting requirements in *Chapter 173-350 WAC, Solid Waste Handling Standards*, we are getting more details from facility annual reports on wastes we dispose of. We are also getting information on waste disposed of in other states (for example, waste tires generated in Washington that are disposed in Oregon and some other states).

We 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.

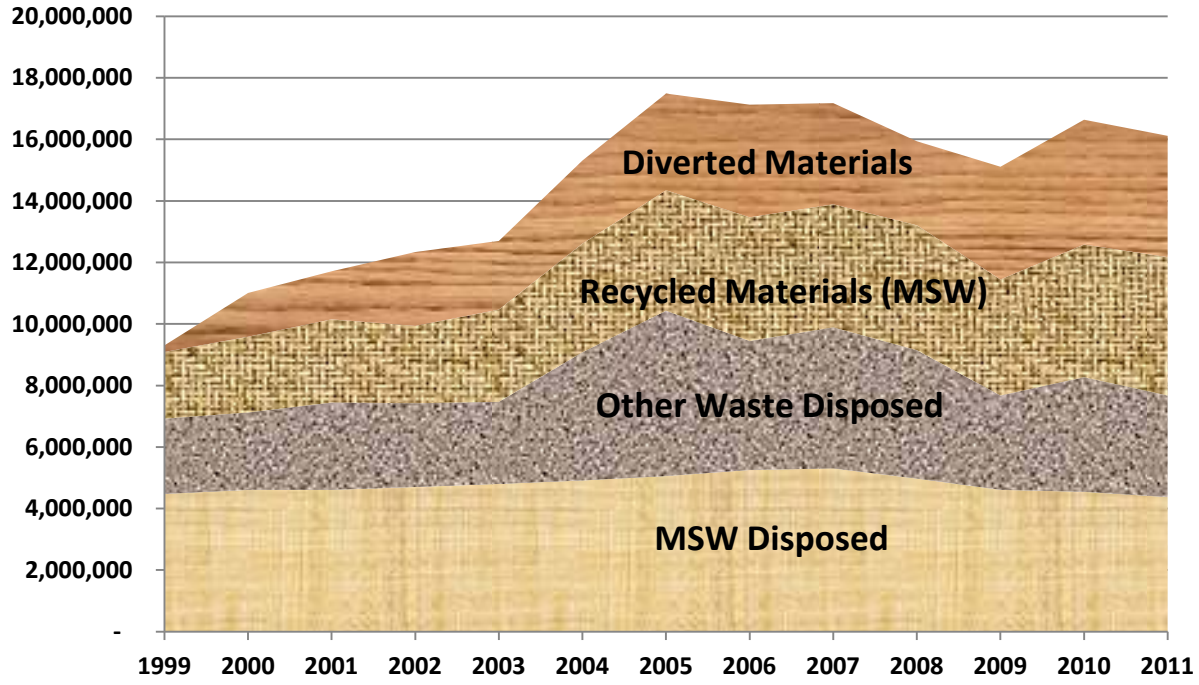
The other measured part of Washington's waste generation number is comprised of materials recycled and diverted from disposal. The reported list of materials included as recycling and diversion has increased over time. Since 1986, Ecology has largely followed the guidance of the Environmental Protection Agency 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 continue to increase our efforts to get better reporting from recyclers and those who divert waste from disposal. Due to Ecology tracking additional materials, 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 16,643,568 tons in 2010, and then decreased to 16,119,679 tons in 2011.

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 *Municipal Solid Waste Recycling* 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. Municipal solid waste (MSW) or materials in the first category are sometimes called "traditional" recycling. Materials in the second category diverted from disposal, combined with the "traditional" materials, make up the "diversion" rate.

Per capita numbers from for the municipal solid waste stream are shown in Table 4.1. Residents and businesses in the state generated 7.19 pounds MSW per person per day in 2011; 3.54 pounds were disposed and 3.64 pounds were recovered for recycling. For per capita MSW numbers for 1986 – 2011, 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	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MSW Disposed	4.27	4.32	4.37	4.43	4.52	4.48	4.14	3.79	3.71	3.54
MSW Recycled	2.28	2.69	3.14	3.43	3.46	3.38	3.38	3.10	3.51	3.64
MSW Generated	6.55	7.01	7.51	7.86	7.97	7.86	7.52	6.89	7.22	7.19

Municipal solid waste 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, and recycled and diverted materials. The result is a much higher generation number for the state – 13.05 pounds per person per day, with 6.84 pounds recycled/diverted and 6.22 pounds disposed (Table 4.2).

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

Per Capita Solid Waste	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Disposed[3]	6.74	6.71	8.07	9.14	8.12	8.36	7.64	6.31	6.74	6.22
Recycled/ Diverted	4.46	4.70	5.54	6.18	6.60	6.16	5.65	6.11	6.82	6.84
Generated	11.19	11.41	13.61	15.32	14.72	14.51	13.29	12.42	13.56	13.05

The total waste generation numbers include all waste – household, business, 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, and therefore they should be disposed in a landfill.

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

Much of the total waste stream is wastes that could be recycled or reused, or just not created in the first place. These are wastes we need to focus prevention and reduction efforts on as described in the state's Beyond Waste Plan. 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.

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 from three municipal solid waste landfills in Oregon (Finley Butte, Wasco, and Columbia Ridge) that receive waste from Washington State.

In 2011, a total of 7,676,711tons were disposed. Table 4.3 shows the amounts and general types of waste disposed of since 1999 by Washington citizens[4]. Spreadsheets identifying the disposal location, type and amount of waste for each county for 1994 - 2011 are at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

[4] "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	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
MSW/ Commercial	4,480,761	4,610,914	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
Demolition	530,417	685,799	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
Industrial	325,135	157,634	563,249	546,299	743,042	1,356,415	1,092,305	512,277	530,835	361,017	277,691	446,521	279,215
Inert	23,875	19,542	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
Wood	158,022	197,929	246,754	91,697	90,303	89,905	61,918	52,833	40,579	39,926	29,449	8,822	9,726
ASH (other than SIA)	N/A	N/A	N/A	N/A	N/A	536,651	420,222	148,545	88,093	76,943	129,072	189,626	164,340
Sludge	62,919	95,050	1,473	1,762	22,835	10,171	12,458	33,490	30,432	35,682	16,550	1,985	419
Asbestos	12,961	11,777	10,929	11,177	15,455	18,252	21,951	29,700	103,686	11,914	12,654	12,683	13,677
Petroleum Contaminated Soils	372,734	284,778	616,725	784,703	568,681	489,385	957,788	740,341	735,773	1,057,069	786,762	766,381	582,541
Other Contaminated Soils	N/A	N/A	N/A	N/A	N/A	146,554	231,428	225,488	321,762	125,440	327,918	448,486	764,481
Tires[5]	10,362	40,908	7,752	4,919	22,226	15,212	22,446	33,698	50,704	25,541	28,834	23,275	14,156
Medical	5,474	6,349	5,255	2,417	2,498	2,624	2,651	2,899	3,998	3,013	2,983	11,618	7,064
Other	28,450	178,156	198,259	124,512	270,992	196,793	197,010	256,627	189,316	250,656	226,601	210,758	307,046
Total[6]	**5,537,142**	**6,288,836**	**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**

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

In 2011, there was an overall decrease in the amount of waste disposed. There were increases in asbestos, inert, industrial, sludge, petroleum contaminated soil, tires and medical waste. Most of these wastes are best landfilled. Municipal/commercial, demolition and wood categories amounts decreased. In addition to waste reduction and recycling efforts in those categories, the sluggish economy and limited building and development may have also accounted for reduced disposal in those 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. Ecology is planning to begin work on a similar study in the next biennium (2013/15).

As we move forward to implement the Beyond Waste Plan, specific information on the contents of our waste will be essential to understand the makeup of the solid waste stream. This will help us focus efforts to eliminate and reduce specific types of wastes or materials, and allow us 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 municipal solid waste (MSW) stream*, or discards from households and businesses.

In 1989, the 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 set by the Legislature refers to the MSW recycling rate. To determine this rate and ensure it is consistent and comparable with past years, Ecology has measured a very 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.[7]

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. These efforts ranged from drop boxes to curbside collection of a variety of recyclable materials. Despite all the efforts citizens, government and industry made, the state did not reach the 50 percent goal by 1995. In 2002, the Legislature amended the law and pushed forward the 50 percent goal to 2007, but the state did not attain the 2007 goal. Legislators also set a state goal to establish programs to eliminate yard waste in landfills by 2012.

Although Washington did not achieve the goals established by the Legislature in the intended period, Washington's recycling rate increased steadily as infrastructure and markets developed. In 2011, 86.5 percent of the state's population had access to curbside recycling for materials such as paper, plastic and metals. This was a slight decrease from 86.6 percent with access to curbside recycling in 2010, but an increase over the 82 percent with access when this was 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 previously by the Legislature.

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

Each year since 1986, Ecology has conducted a survey 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[8] of the waste stream.

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 - 2011.

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[7] 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.

[8] *Ibid.*

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 of 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%

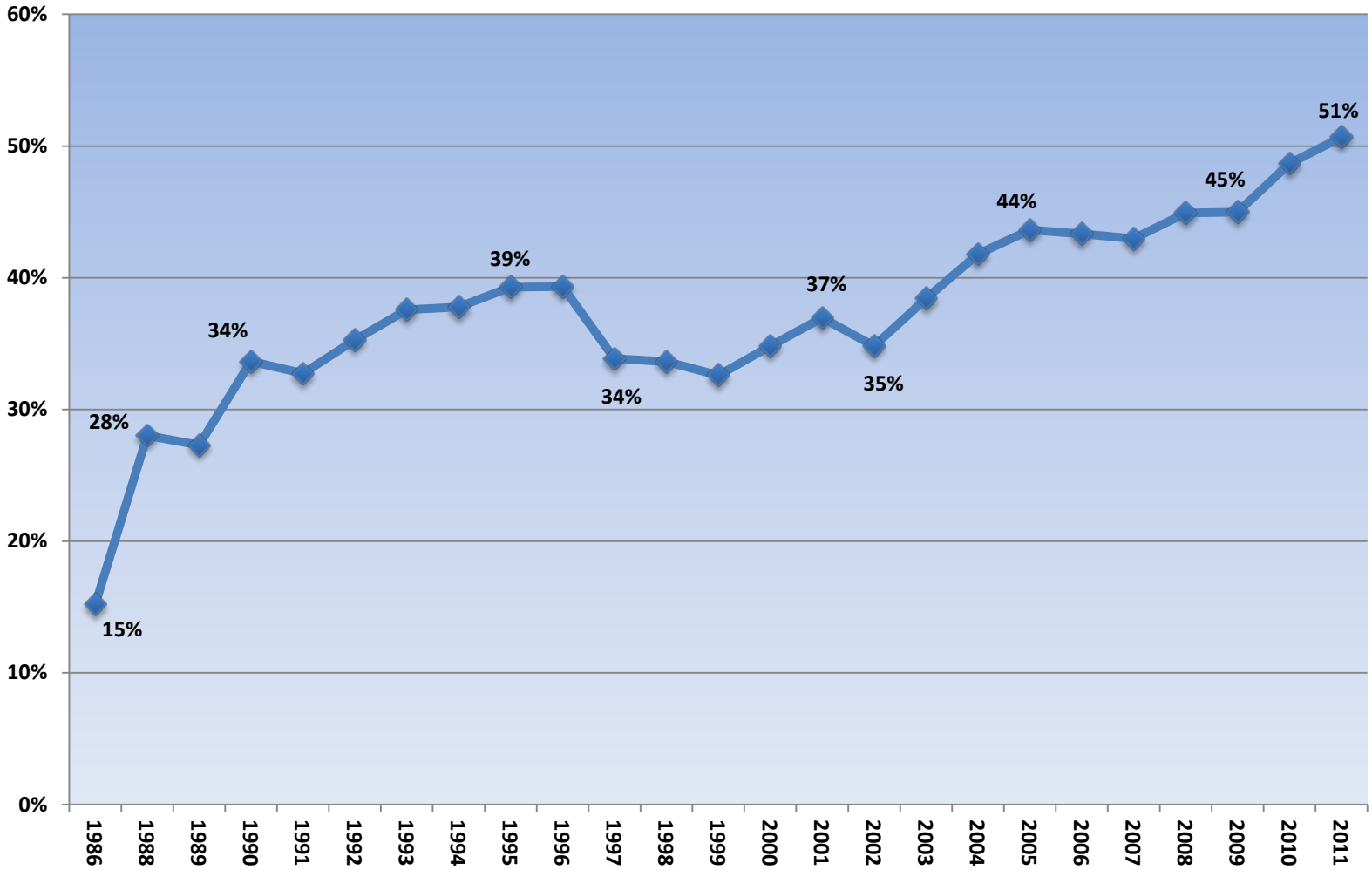
Markets continued to improve in 2000, raising the recycling rate again to 35 percent. Although markets for most materials fell in 2001, the increased activity and better reporting for key materials brought the rate to 37 percent. Drops in market conditions for paper, glass and yard debris, combined with 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, the market demand for ferrous and nonferrous metals was high during 2003, which helped to 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 continued at that rate in 2007. The economic recession that began around 2008 brought a reduced disposal rate and continued good recycling habits, which 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 (see Figure 4.5). 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 2011



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, having added one million people since 1998. Ecology believes newcomers, as well as longtime residents, need ongoing education and advertising to learn to recycle or to continue to do so.

Many curbside programs in the state are changing to commingled or single-stream (mixed) collection systems in an effort 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 2011. 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 commingled collection also increased the range of materials collected; however, the act of mixing or commingling 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 commingled programs have been shown to collect about 10 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 report by Ecology in June 2010 indicates that a certain amount of the residential commingled 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 materials that the market cannot recycle yet and are collected anyway, or 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 may be 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 the recycling activity in the state each year and report the results. From 1986 until 2002, tools to measure recycling activity in Washington included only 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*. The annual reports for facilities are mandatory. Facilities could receive a penalty for failing to submit an annual report.

Ecology sends the survey and annual reporting forms to recycling facilities, other firms involved in recycling (such as brokers), haulers and local governments. They reply with information about the types and quantities of recyclable materials they collected. Although the recycling survey portion of the measurement tool is mandatory, there is no penalty for not returning the

Information, and some firms do not respond. Some firms respond with estimates of the amount and origin of materials. These factors offer challenges to compiling good county-specific recycling and diversion information.

This situation creates the need for intensive cross-checking of data to fill the gaps left on reporting forms. Ecology does this through phone calls and e-mail correspondence with 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, by county, and by 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 that is 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 representative 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 have been 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 forms 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 – 2011 MSW Recycling

So we can consistently compare results from year to year, Ecology includes much 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 2008-11.

Table 4.5
MSW Recycled Tonnage Reported
MSW Recycling Rates[9] 2008-11

Recycled Materials Reported (MSW)	2008	2009	2010	2011
Aluminum Cans	12,842	21,098	13,655	13,115
Appliances/White Goods	43,401	39,777	48,881	44,174
Batteries – Auto Lead Acid	25,219	21,493	26,986	27,297
Cardboard	569,688	491,266	471,477	542,333
Cartons	5,475	5,526	2,763	705
Container Glass	94,077	100,823	109,916	96,145
Electronics	17,265	22,190	25,569	31,148
Fats and Oils	124,289	92,345	91,050	128,511
Ferrous Metals	1,013,552	998,721	1,332,254	1,458,201
Fluorescent Light Bulbs	1,600	1,229	1,087	1,096
Food Scraps (post-consumer)	48,664	77,699	62,041	129,229
Gypsum	86,603	38,662	30,882	39,902
HDPE Plastics	7,742	13,876	18,824	12,475
High-Grade Paper	57,929	47,266	76,667	66,664
LDPE Plastics	14,040	15,407	16,772	27,024
Mixed Paper	367,834	274,982	287,814	280,055
Newspaper	282,981	267,524	233,924	275,025
Nonferrous Metals	94,340	142,931	123,680	146,164
Other Recyclable Plastics	11,245	12,524	13,009	18,194
PET Plastic Bottles	9,827	16,767	15,803	16,986
Photographic Films	442	354	433	2,074
Rubber Materials	6	8	10	n/a
Steel Cans	10,526	17,293	15,060	17,975
Textiles (rags, clothing, etc.)	19,946	16,445	24,976	25,580
Tires (recycled)	40,124	35,439	26,775	25,678
Used Oil	78,443	110,038	71,725	76,612
Wood Waste	381,866	200,980	347,137	178,403
Yard Debris	641,130	689,849	537,442	608,947
Yard Debris and Food (mixed)	n/a	n/a	285,965	209,364
Total MSW Recycled	**4,061,094**	**3,772,509**	**4,312,581**	**4,499,073**
Total MSW Disposed[10]	**4,978,496**	**4,613,329**	**4,548,275**	**4,377,843**
Total MSW Generated	**9,039,590**	**8,385,838**	**8,860,856**	**8,876,917**
MSW Recycling Rate	**44.93%**	**44.99%**	**48.67%**	**50.68%**

[9] Detail may not add due to rounding.

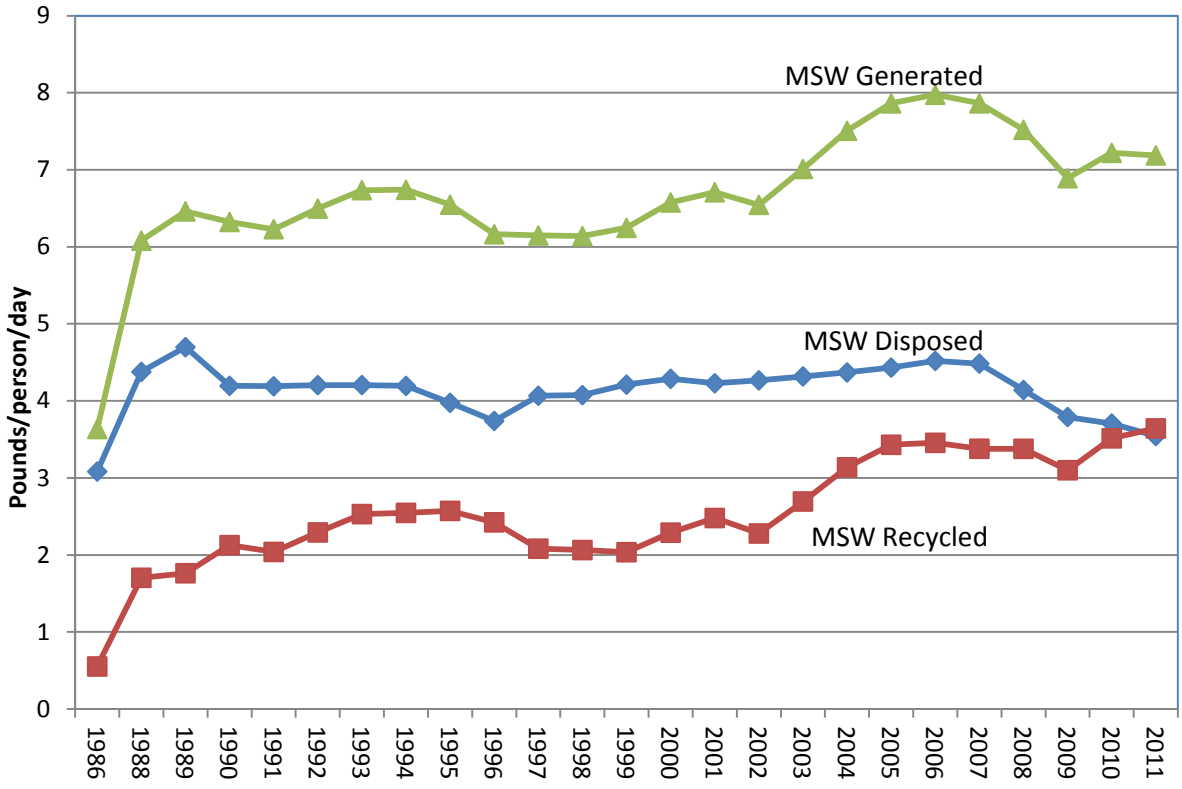
[10] The amount of MSW disposed represents only the quantity defined "recyclable portion" of the waste stream from municipal and commercial sources. It excludes the following waste types reported from landfills and incinerators: demolition, industrial, inert, wood, ash, sludge, asbestos, contaminated 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 his or her household, school, workplace and anywhere else solid waste is produced. The figures below present only an average of the total contributions of all residents. Some people may actually contribute much more or less waste than others. However, the picture tends to be more tangible when described in individual or "per person" terms. Figure 4.6 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 2011, each resident of the state generated 7.19 pounds of municipal solid waste per day, disposing 3.54 pounds per person; 3.64 pounds per person was 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 to 2010 (see Table 4.6).

Figure 4.5
Pounds of MSW Disposed, Recycled
& Generated Per Person/Day
1986 - 2011



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[11]
2001-11

MSW Per Capita	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Disposed	4.23	4.27	4.32	4.37	4.43	4.52	4.48	4.14	3.79	3.71	3.54
Recycled	2.48	2.28	2.69	3.14	3.43	3.46	3.38	3.38	3.10	3.51	3.64
Generated	6.71	6.55	7.01	7.51	7.86	7.97	7.86	7.52	6.89	7.22	7.19

[11] 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 determined a consistent recycling rate that is comparable to past years by measuring the part of the waste stream known as MSW. However, 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 termed "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 from the recycling and diversion facilities the number of tons of material diverted from landfills. 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).[12] Washington shows a diversion rate of 57 percent in 2011 (Table 4.7).

Table 4.7
Diversion Rates
1999 - 2011

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%

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 the recycling facility to report the final use of the material

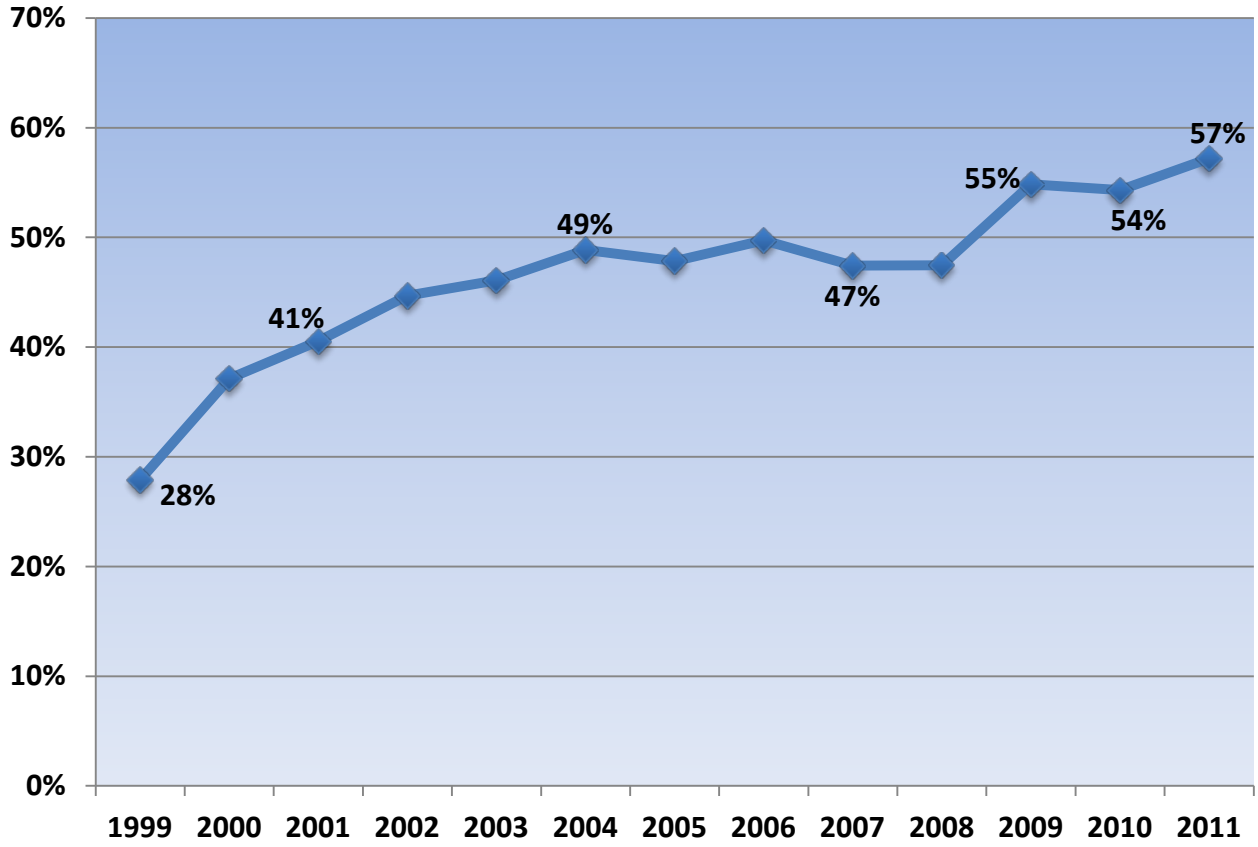
[12] Waste types used to calculate diversion include municipal, demolition, inert, industrial, wood, tires, medical and other. Excludes asbestos, sludge and contaminated soils.

(recycled, composted, burned for energy), the facility 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 4.7 shows the diversion rate in Washington since Ecology began measuring it in 1999.

Figure 4.6
Washington State Diversion Rates – 1999 to 2011[13]



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 of solid waste recyclables collected or diverted from the waste stream. However, if the facility is

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

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.

Measurement Methodology

See the above section for a complete discussion of measurement methodology as it pertains to recycling and diversion.

Results – 2011 Diversion

Diversion is the term used to measure more materials than just 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 2008-11.

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

Diverted & Recycled Materials Reported	2008	2009	2010	2011
Agricultural Organics[14]	31,800	45,431	55,689	76,645
Aluminum Cans	12,842	21,098	13,655	13,115
Antifreeze	6,586	5,194	4,783	4,872
Appliances/White Goods	43,401	39,777	48,881	44,174
Ash, Sand & Dust used in Asphalt Production	-	344	20,364	-
Asphalt & Concrete	1,510,051	2,186,429	2,188,200	2,211,889
Batteries – Auto Lead Acid	25,219	21,493	26,986	27,297
Cardboard	569,688	491,266	471,477	542,333
Carpet and Pad	3,297	3,317	3,867	3,653
Cartons	5,475	5,526	2,763	705
Construction & Demolition Debris	339,066	302,836	269,603	271,716
Container Glass	94,077	100,823	109,916	96,145
Container Glass (used as aggregate)	-	-	3,212	19,966
Electronics	17,265	22,190	25,569	31,148
Fats and Oils[15]	124,289	92,345	91,050	128,511
Ferrous Metals	1,013,552	998,721	1,332,254	1,458,201
Fluorescent Light Bulbs	1,600	1,229	1,087	1,096
Food (recovered)	-	-	402	429
Food Processing Wastes (pre-consumer)	3,494	14,027	27,762	59,220
Food Scraps (post-consumer)[16]	48,664	77,699	62,041	129,229
Gypsum	86,603	38,662	30,882	39,902
HDPE Plastics	7,742	13,876	18,824	12,475
High-Grade Paper	57,929	47,266	76,667	66,664
Household Batteries	2,270	535	458	465
Industrial Batteries	-	99	1	1,620
Industrial Organics[17]	45,586	85,692	83,681	46,544
Industrial Paper	-	-	6,476	3,686
Land Clearing Debris	169,428	162,939	150,287	160,086
Land Clearing Debris for Energy Recovery	141,406	78,018	130,766	125,039
LDPE Plastics	14,040	15,407	16,772	27,024
Mattresses	-	-	-	1,213

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

Diverted & Recycled Materials Reported	2008	2009	2010	2011
Miscellaneous	-	13	57	510
Mixed Paper	367,834	274,982	287,814	280,055
Newspaper	282,981	267,524	233,924	275,025
Nonferrous Metals	94,340	142,931	123,680	146,164
Oil Filters	2,639	2,535	1,775	2,229
Other Fuels (Reuse & Energy Recovery)	-	-	5	175
Other Organics[1]	86,191	47,430	145,251	149,510
Other Recyclable Plastics	11,245	12,524	13,009	18,194
Paint (Reused)	928	552	207	180
PET Plastics	9,827	16,767	15,803	16,986
Photographic Films	442	354	433	2,074
Post-Industrial & Flat Glass	-	1,750	2,390	1,230
Post-Industrial Plastics	-	223	-	-
Reuse (Clothing & Household)	2,678	22,001	6,164	15,050
Reuse (Construction & Demolition)	-	151	8,360	1,839
Reuse (Miscellaneous)	105	4,148	5,036	-
Roofing Material	10,205	10,872	14,518	15,470
Rubber Materials	6	8	10	-
Steel Cans	10,526	17,293	15,060	17,975
Textiles (Rags, Clothing, etc.)	19,946	16,445	24,976	25,580
Tires (Baled)	5,912	9,672	-	4,697
Tires (Burned for Energy)	8,440	10,725	18,121	10,450
Tires (Recycled)	40,124	35,439	26,775	25,678
Tires (Retread/Reuse)	3,829	6,164	10,834	7,813
Used Oil	78,443	110,038	71,725	76,612
Used Oil for Energy Recovery	33	177	2,568	2,409
Wood Waste	381,866	200,980	347,137	178,403
Wood Waste for Energy Recovery	331,528	613,888	847,115	626,325
Yard Debris	641,130	689,849	537,442	608,947
Yard Debris and Food (mixed)	-	-	285,965	209,364
Yard Debris for Energy Recovery	26,029	49,994	50,452	118,909
Total Diverted + Recycled Materials	**6,792,597**	**7,437,668**	**8,370,985**	**8,442,909**
Total Waste Disposed[1]	**7,516,909**	**6,126,660**	**7,043,048**	**6,315,653**
Total Waste Generated	**14,309,506**	**13,564,327**	**15,414,033**	**14,758,562**
Diversion Rate	**47.47%**	**54.83%**	**54.31%**	**57.21%**

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 2011 reduced greenhouse gas emissions by about 2.7 million tons (MTCE) or 798 pounds per person. The 8.4 million tons of material diverted from disposal in Washington in 2011 saved more than 139 trillion British thermal units of energy. This is similar to conserving 1.1 billion gallons of gasoline – enough to power 1.2 million homes for a year (nearly half the households in Washington). [18]

[18] 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.doe.gov/emeu/states/_seds_updates.html.

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, 6,624,958 tons of waste were disposed in all types of landfills and incinerators in Washington in 2011 (Table 4.9). For total solid waste disposed from 1993 – 2011, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Table 4.9
Total Amounts of Solid Waste Disposed in Washington

Disposal Method	2003	2004	2005	2006	2007	2008	2009	2010	2011
Municipal Solid Waste Landfills	4,572,275	5,506,112	5,517,342	5,398,008	5,354,005	5,157,547	4,775,888	4,875,010	4,925,583
Incinerated Waste	303,978	327,837	335,533	326,584	312,006	297,832	277,101	288,208	263,812
Wood waste Landfills[19]	34,188	*	*	*	*	*	*	*	*
Inert / Demolition Landfills	476,214	509,927	1,531,642	1,231,565	1,708,445	1,261,131	693,349	966,184	791,132
Limited Purpose Landfills	586,670	1,075,102	1,387,934	760,088	600,928	623,063	624,575	738,952	644,431
Total	**5,973,325**	**7,418,978**	**8,772,451**	**7,716,245**	**7,975,444**	**7,339,573**	**6,370,913**	**6,868,354**	**6,624,958**

Municipal Solid Waste Landfills

Amount of Waste Disposed of in Municipal Solid Waste Landfills

In 2011, 15 municipal solid waste landfills accepted waste totaling 4,925,583 tons.[20] Of the 15 landfills, 12 were publicly owned and 3 privately owned.

Six of the 15 landfills received over 100,000 tons of waste in 2011. The three largest landfills in Washington are Cedar Hills in King County (812,684 tons), LRI – 304th Street in Pierce County (1,120,973 tons), and Roosevelt Regional Landfill in Klickitat County (2,042,949 tons).

In 2011, two landfills received less than 10,000 tons, Northside Landfill in Spokane County and city of Tacoma landfill, compared with 12 MSW landfills receiving less than 10,000 tons in 1994.

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

[20] 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.

Figure 4.8 shows that several smaller and a few mid-sized landfills closed between 1995 and 1996 in response to more stringent regulations for MSW landfills (*Chapter 173-351 WAC, Criteria for Municipal Solid Waste Landfills*). Other landfills are reaching their remaining capacity and not planning to expand. There has been a gradual decrease in the number of landfills since 1996. There are only 15 operating municipal solid waste landfills in the state.

Figure 4.7
Number of MSW Landfills
(Based on Tons Disposed)

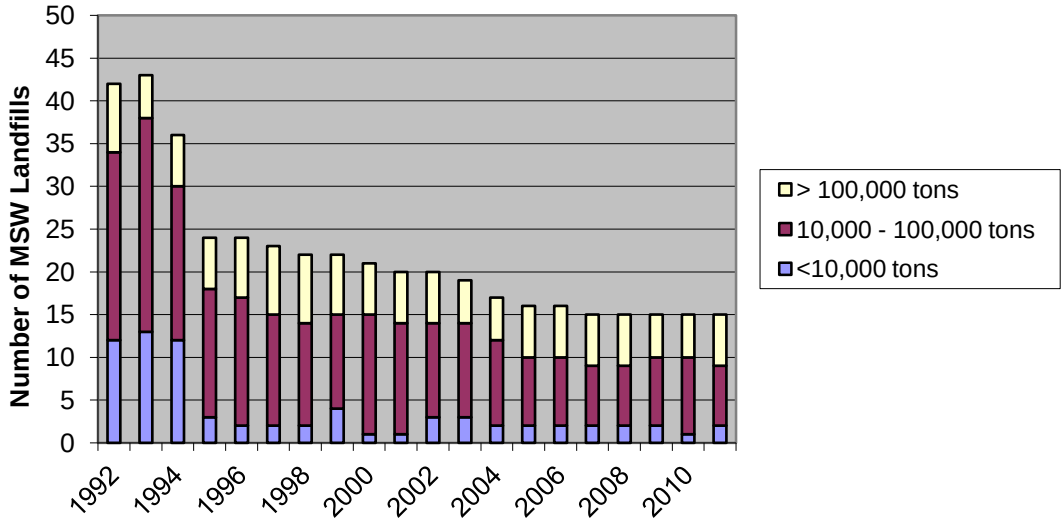


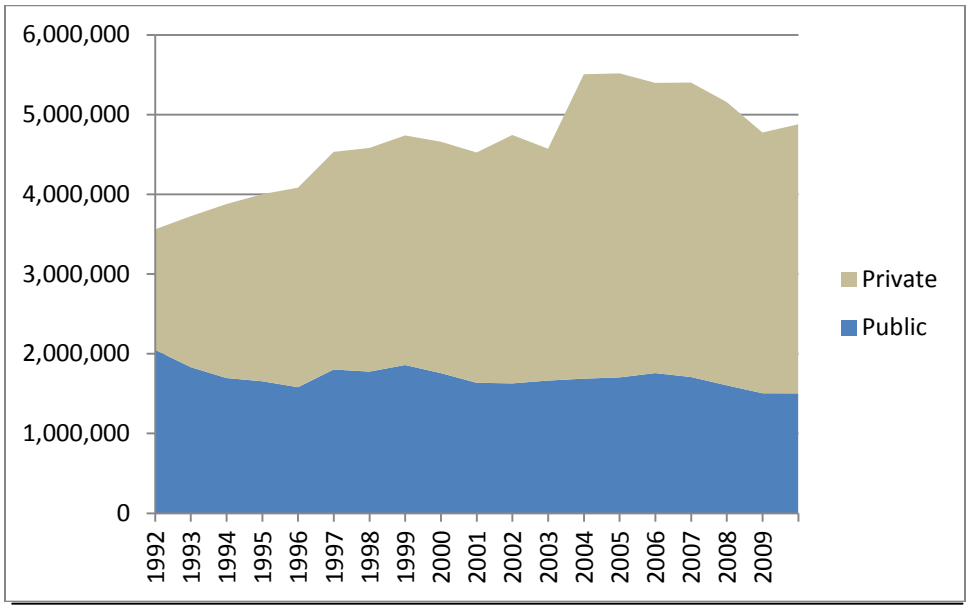
Table 4.10 shows the relationship of waste disposal to public/private ownership. As the table illustrates, 1,545,773 tons of solid waste disposed went to publicly owned facilities (31 percent), with the remaining 3,379,809 tons going to private facilities (69 percent).

Table 4.10
Waste Disposed in MSW Landfills – Public/Private

Ownership	Number of MSW Landfills		Amount of Waste Disposed (Tons)		% Total Waste Disposed	
	1991	2011	1991	201	1991	2011
Public	36	12	2,696,885	1,545,773	69	31
Private	9	3	1,192,207	3,379,809	31	69
Total	**45**	**15**	**3,889,092**	**4,925,582**	**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 4.9). The trend has continued since 1991, when the state first started to track this type of information. The amount of waste disposed in the private facilities has increased from 31 percent since 1991 to 69 percent in 2011. The private Roosevelt Regional Landfill in Klickitat County and LRI 304th Street Landfill in Pierce County can account for the majority of this increase.

Figure 4.8
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.[21] 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 2010, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/. Table 4.11 shows changes in waste, types and amounts disposed in MSW landfills from 2001-11. MSW landfill data from 1992 – 2011 is available at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

[21] "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	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Municipal / Commercial[22]	3,440,727	3,394,428	3,598,760	3,631,873	3,787,080	3,847,352	3,637,010	3,435,505	3,383,984	3,261,582
Demolition Waste	379,405	324,069	366,087	541,945	551,572	532,409	363,343	260,500	254,453	307,815
Industrial Waste	179,058	212,918	1,034,615	624,958	182,661	131,167	130,929	115,390	164,755	102,842
Inert Waste	17,092	2,635	1,705	15,780	15,842	22,491	11,055	6,387	6,672	7,903
Commercial Waste[23]	99,048	93,036	-	-	-	-	-	-	-	-
Wood	55,149	47,622	25,576	9,896	4,462	71	18	424	206	574
Ash (other than SPI)	-	-	3,444	2,857	2,432	3,959	2,102	1,096	1,907	1,663
Sewage Sludge	1,762	23,435	10,172	12,476	21,303	6,703	7,892	15,732	2,455	2,033
Asbestos	4,908	9,625	12,086	7,943	5,633	5,379	4,308	4,975	4,996	6,574
Petroleum Contaminated Soils	457,061	342,172	279,982	320,283	455,964	326,019	693,719	515,567	476,368	426,085
Other Contaminated Soils	-	-	49,454	212,692	224,608	295,930	119,711	232,673	391,868	74,568
Tires	5,776	9,512	7,462	6,942	8,525	11,797	13,162	8,151	9,750	6,413
Special	567	-	-	-	-	-	-	-	-	-
Medical	372	2,459	2,565	2,576	2,721	2,805	2,932	2,907	12,109	8,726
Other [24]	103,636	110,364	114,204	127,121	135,206	167,933	171,366	176,581	168,720	718,805
Total	**4,744,561**	**4,572,275**	**5,506,112**	**5,577,342**	**5,398,008**	**5,354,005**	**5,157,547**	**4,775,887**	**4,878,241**	**4,925,583**

[22] Some facilities include demolition, industrial, inert, commercial and other small amounts of waste types in the MSW total. In 2004, municipal and commercial categories were combined.
[23] In 2004, the municipal and commercial categories were combined.
[24] Some of the "other" types of waste reported include auto fluff, vactor waste, WWT grit and uncontaminated soils.

Future Capacity at Municipal Solid Waste Landfills

As of September 2012, 15 MSW landfills were 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 2012, the facilities estimated about 266 million tons, or about 54 years of capacity at the current disposal rate, an increase from 2012.

Changes in permit conditions, early landfill closures, projections of fewer expansions and changing volumes affect remaining capacity, which has fluctuated the past several years. Of the 15 currently operating landfills, 13 have greater than 5 years of remaining permitted capacity. Some landfills are planning expansions in the future. Table 4.12 includes an estimated number of facilities with specified remaining years of life.[25]

Table 4.12
Estimated Years to Closure for MSW Landfills

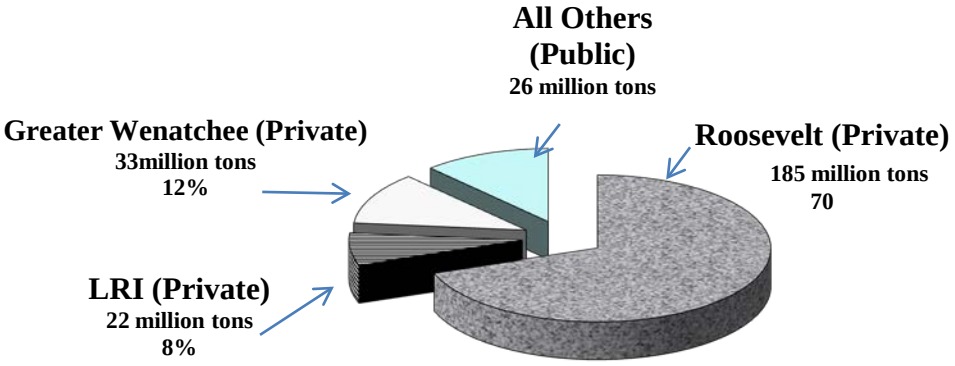
Years to Closure	% of total Remaining Capacity	Number of Facilities	Public	Private
Less than 5 years	0.11	3	3	0
5 to 10 years	0.25	1	1	0
Greater than 10 years	99.64	11	8	3
Totals	**100%**	**15**	**12**	**3**

Capacity numbers in 2012 indicated more than 99 percent of remaining capacity was at landfills with more than 10 years before closure. Eleven of the 15 operating MSW landfills are publicly owned, with about 10 percent of the remaining capacity (26 million tons). About 90 percent of the remaining permitted capacity (240 million tons) is at the three privately owned facilities, compared to 73 percent in 1993.

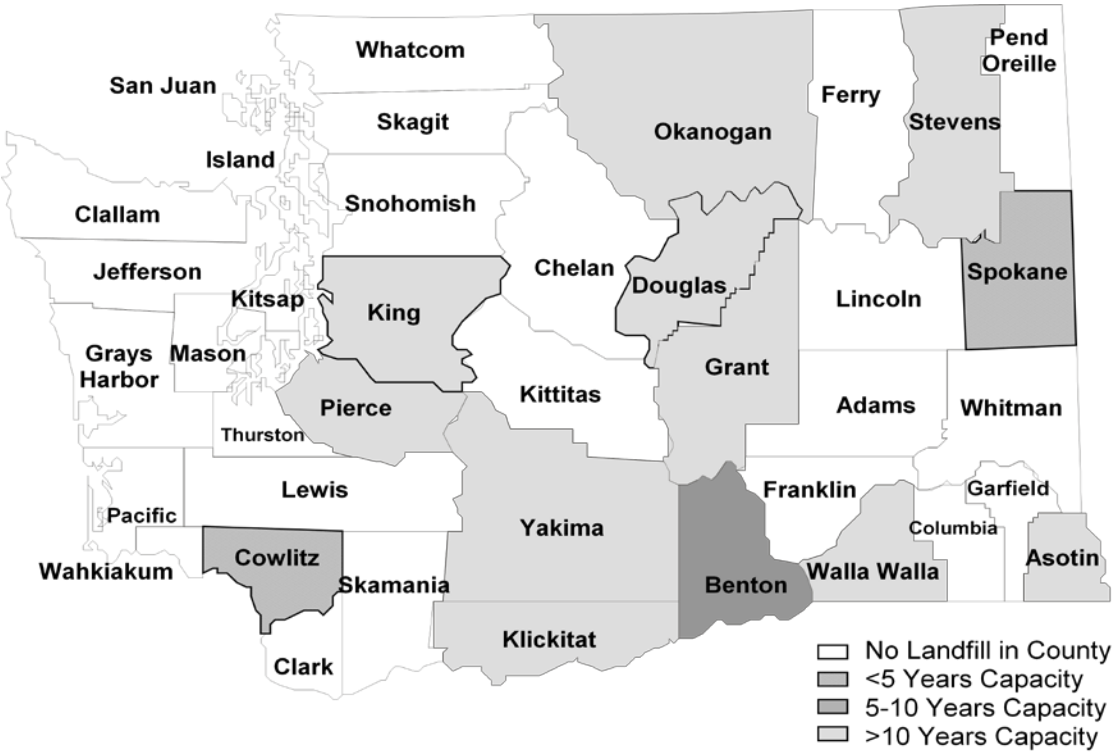
The majority of the capacity, 70 percent of the total statewide capacity, is at the privately owned Roosevelt Regional Landfill in Klickitat County. Two other private landfills have the next largest remaining capacity: Greater Wenatchee (12 percent) and LRI in Pierce County (7 percent). The 12 publicly owned landfills have 10 percent of the remaining statewide capacity (see Figure 4.10). Map 4.A shows the counties and the remaining years of capacity of their MSW landfills.

[25] Cowlitz County will be closing its existing Tennant Way MSW landfill in late 2013. The county is working toward re-permitting and acquiring Weyerhaeuser's current regional limited purpose landfill at Headquarters Road for operation as a municipal solid waste landfill.

Figure 4.9
2012 Remaining Permitted Capacity at MSW Landfills

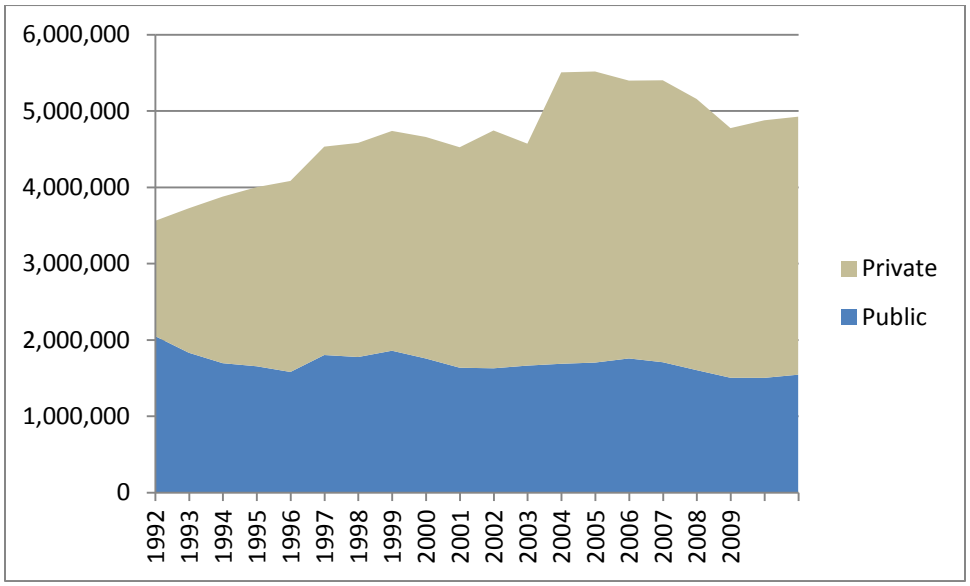


Map 4.A
Remaining Permitted MSW Landfill Capacity as of April 2012



The remaining capacity at private landfills has exceeded that for public facilities since the amounts were tracked in 1992 (Figure 4.11).

Figure 4.10
Remaining Capacity MSW Landfills
(Public/Private in Million Tons)



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.C). In 2011, the facility received some type of solid waste from 26 counties in Washington, including the majority of the solid waste from 14 counties. They also received waste from Alaska, Oregon and British Columbia.

For other counties that do not have landfills, Roosevelt or the Oregon landfills have become the most utilized 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.

Ecology bases its 55-year estimate of total remaining permitted capacity on the amount of waste disposed in MSW landfills in 2010. 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 being imported into the state for disposal or a shift to in-state disposal of waste currently being 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 263,812 tons of solid waste. It is the only incinerator in the state that burns municipal solid waste in the state. For amounts and types of waste incinerated in 2011 see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

MSW Landfill Disposal vs. Incineration

Table 4.13 compares the amount of solid waste disposed in MSW landfills, and waste-to-energy facilities and incinerators in 2011.

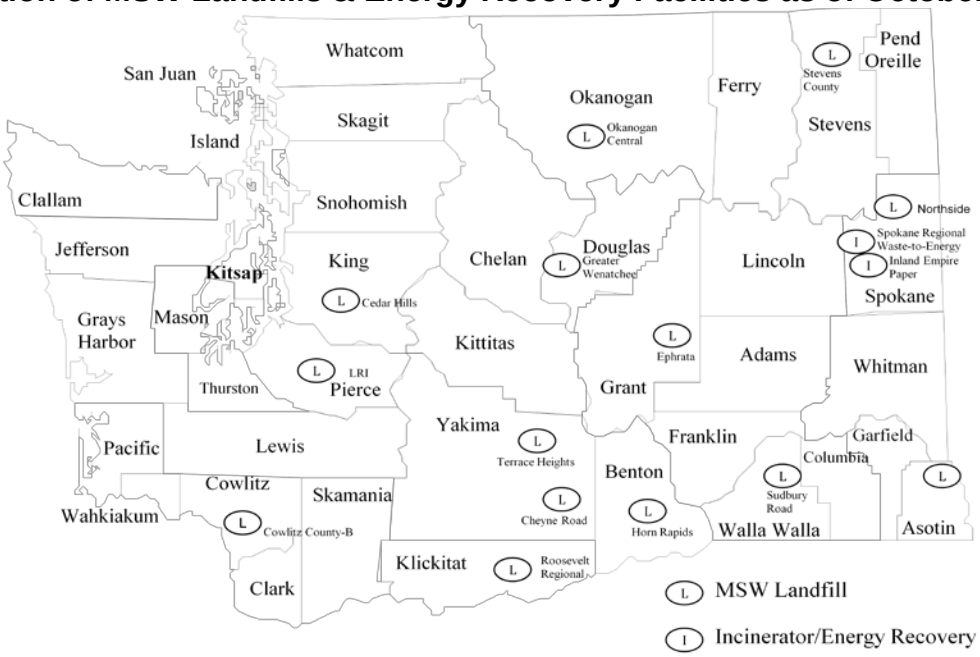
In 1991, 98 percent of waste was disposed in MSW landfills and 2 percent was incinerated. The highest percentage of incinerated waste in the state, 12 percent, occurred in 1995.

Table 4.13
Waste Disposed in MSW Landfills and Incinerators in 2011

Facility Type	Tons	Percent
MSW Landfills	4,925,583	95%
Incinerators	263,812	5%
Total	**5,189,395**	**100%**

In 2011, only about 5 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. Map 4.B shows the location of MSW landfills and energy-recovery facilities in Washington.

Map 4.B
Location of MSW Landfills & Energy Recovery Facilities as of October 2012



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 2011, the Spokane Waste-to-Energy Recovery facility, the only facility of this type in the state, sent 78,441 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 woodwaste landfill and inert/demolition landfill types no longer exist. Inert waste is narrowly defined for disposal in an *inert* landfill. Demolition waste will no longer be accepted at an inert landfill. Landfills accepting demolition or wood waste would 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 detailed reports for the individual inert and limited purpose landfills, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

For a more consistent look at inert landfills over time, some waste categories were combined for Table 4.14. For inert/demolition landfill data from 1992 - 2003 and inert landfill data for 2004-11, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Table 4.14
Waste Types and Amounts Disposed at Inert Landfills (in Tons)[26]

Waste Types	2003	2004	2005	2006	2007	2008	2009	2010	2011
Demolition	95,008	28,967	39,701	89,595	89,457	-	-	-	-
Industrial	81,474	-	-	-	2,150	1,940	799	**945**	1930
Inert	163,435	379,298	944,153	973,855	1,324,663	1,250,973	604,196	929,578	574,291
Wood	1,082	2,526	402	610	-	-	-	-	
Asbestos	11	-	-	-	-	-	-	-	
Ash (other than SPI)	-	-	7,989	7,497	7,052	7,680	6,320	**5,311**	5,029
PCS	131,872	66,260	215,286	91,399	277,812	-	-	-	
Contaminated soils (other)	-	-	-	-	-	-	81,074	**28,363**	136,586
Tires	664	-	-	-	-	-	-	-	
Other	2,668	33,472	324,110	68,609	7,311	538	960	1,951	1,296
Total Tons	**476,214**	**509,927**	**1,531,641**	**1,231,565**	**1,708,445**	**1,261,131**	**693,349**	**966,148**	**791,132**

[26] 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 4.15 shows waste types disposed in Limited Purpose Landfills. For Limited Purpose Landfill data from 1992-2010, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Table 4.15
Waste Types and Amounts Disposed at Limited Purpose Landfills (in Tons)

Waste Types	2003	2004	2005	2006	2007	2008	2009	2010	2011
Demolition	68,946	174,519	220,076	215,543	245,604	255,098	254,824	221,043	222,163
Industrial	325,863	262,560	420,285	257,297	173,992	149,978	113,636	157,960	124,392
Inert	157,431	36,155	53,597	39,928	48,784	100,115	27,335	43,322	25,259
Wood	8,420	32266	21,494	19,629	11,702	18,210	11,608	8,823	9,373
Ash (other than SPI)	-	533,201	409,376	138,616	77,082	65,117	121,329	180,620	155,923
Sludge	-	-	-	-	460	460	460	-	-
Asbestos	1,302	1,581	1,624	1,420	1,374	1,614	2,313	2,357	1,544
PCS	4,890	20,399	224,064	32,836	20,656	11,398	75,275	96,639	31,390
Soils (uncont.)	-	-	13,706	29,006	-	-	-	9,327	53,419
Tires	81	713	690	423	65	35	122	30	128
Other	19,737	13,708	23,022	25,390	21,210	21,038	17,673	18,830	20,840
Total Tons	**586,670**	**1,075,102**	**1,387,934**	**760,088**	**600,928**	**623,063**	**624,575**	**738,952**	**644,431**

The wood waste landfill category no longer exists under *Chapter 173-350 WAC, Solid Waste Handling Standards*. For wood waste landfill data from 1992 – 2003, see http://ecy.wa.gov/programs/swfa/solidwastedata/.

Movement of Solid Waste for Disposal

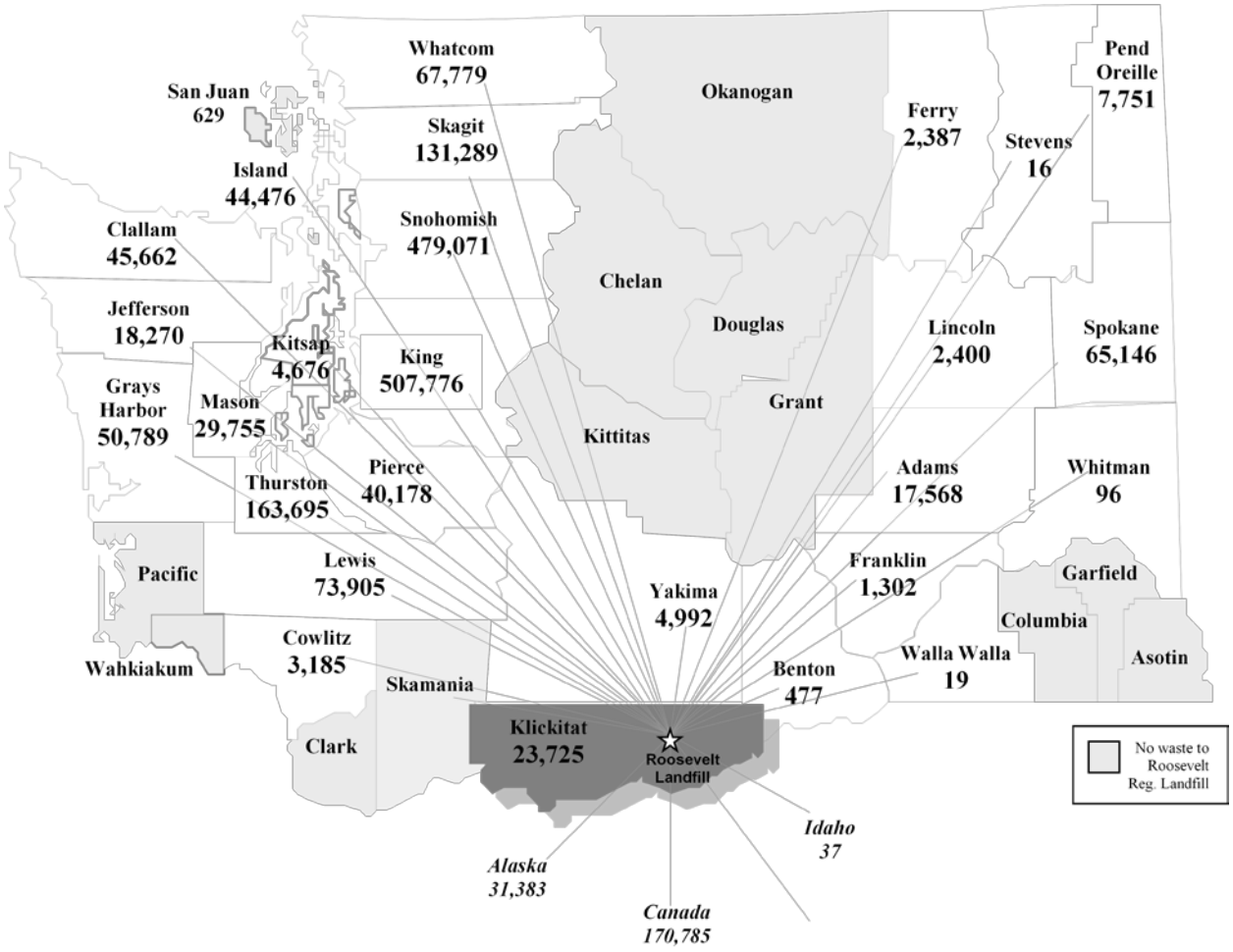
Movement of Waste Between Counties

All landfills and incinerators report the source, types and amounts of waste they receive from out of county. Eight of the 15 active MSW landfills reported receiving solid waste from other counties in 2011.

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 PCS, 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 25 of the 39 Washington counties and also from out-of-state and out-of-country (Map 4.C).

Map 4.C
2010 Solid Waste to Roosevelt Regional Landfill (in Tons)



For many counties that still have operating MSW landfills, Roosevelt Regional Landfill has become an option to dispose of some of their non-municipal waste, thus saving local landfill capacity for future need. Twelve of the 25 counties rely on Roosevelt for the majority of their MSW disposal.

Fourteen counties and the city of Seattle send the majority of their MSW to Oregon facilities. One other county sent a significant amount of waste to Oregon. 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 2011 (and previous years) at http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

Waste Imported from Outside the State

Landfills and incinerators also report the source, types and amounts of waste received from out-of-state or out-of-country. In 2011, a total of 448,611 tons of solid waste, about 7 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.

Table 4.16 shows types of waste received from out-of-state for disposal. The majority of this waste (362,403 tons) went to Roosevelt Regional Landfill. Of that, 262,919 tons came from British Columbia, with the remainder from Alaska (30,224 tons), Oregon (38,492 tons) Idaho (216 tons) and Guam (115)

.

Table 4.16
Out-of-State Waste Disposed in Washington

Type of Waste	2004	2005	2006	2007	2008	2009	2010	2011
Municipal Solid Waste	144,396	147,746	166,634	195,056	183,488	210,082	225,899	250,336
Demolition	3,477	2,962	3,212	4,964	3,848	5,846	14,322	68,552
Industrial	41,171	55,085	44,725	41,600	28,601	3,386	19,852	18,740
Inert	59	269	65	8	59	90,020	2,563	82,676
Woodwaste	1	-	-	30	5,413	11	0	0
Ash (other than SIA)	-	-	-	-	-	1,271	0	0
Sludge	-	19	10,883	-	-	-	470	1,615
Asbestos	304	831	283	354	262	175	532	840
Petroleum Contaminated Soils	7,957	4,801	3,650	4,954	3,804	3,605	12,554	3,521
Other Contaminated Soils	-	-	-	-	-	-	-	14,653
Tires	4,694	1,813	3,054	3,773	5,458	4,382	7,664	4,867
Medical	-	-	-	-	-	-	-	1,835
Other	728	1,332	1,585	1,982	1,055	744	3,234	976
Total	**202,787**	**214,858**	**234,091**	**252,720**	**231,988**	**319,522**	**287,646**	**448,611**

Nez Perce County, Idaho disposed of 27,711 tons of MSW in Washington's Asotin County Landfill. Asotin County and Nez Perce County prepared a joint local comprehensive solid waste management plan to meet the requirements of Washington State statute. They have an agreement for joint use of the landfill.

Graham Road Recycling and Disposal in Spokane County received 3,221 tons and the Weyerhaeuser limited purpose landfill in Cowlitz County received 1,503 tons. See http://www.ecy.wa.gov/programs/swfa.solidwastedata/ for imported totals for 1991 – 2011.

Waste Exported from the State

Another aspect of solid waste movement is the amount exported from Washington to another state for disposal. In 2011, a total of 1,574,099 tons of waste created in Washington were disposed of in Oregon landfills. Table 4.17 compares the waste amounts and types exported and imported. See http://www.ecy.wa.gov/programs/swfa.solidwastedata/ for exported totals for 1993 - 2011.

Table 4.17
Comparison of Imported to Exported
Waste for all Solid Waste Facilities

Type of Waste	Imported		Exported	
	1991	2011	1993	2011
Municipal Solid Waste	24,475	250,336	710,515	1,102,526
Demolition	1,412	68,552	2,245	171,051
Industrial	-	18,740	864	66,503
Inert	208	82,676	-	240
Woodwaste	36	0	-	38
Ash (other than SIA)	-	0	-	1,726
Sludge	-	1,615	-	-
Asbestos	-	840	1,623	6,399
Petroleum Contaminated Soils	-	3,521	22,308	128,587
Other Contaminated Soils	-	14,653	-	25,257
Tires	-	4,867	-	14,156
Medical Waste	-	1,835	-	172
Other	-	976	18,512	57,344
Total	**26,131**	**448,611**	**756,067**	**1,574,099**

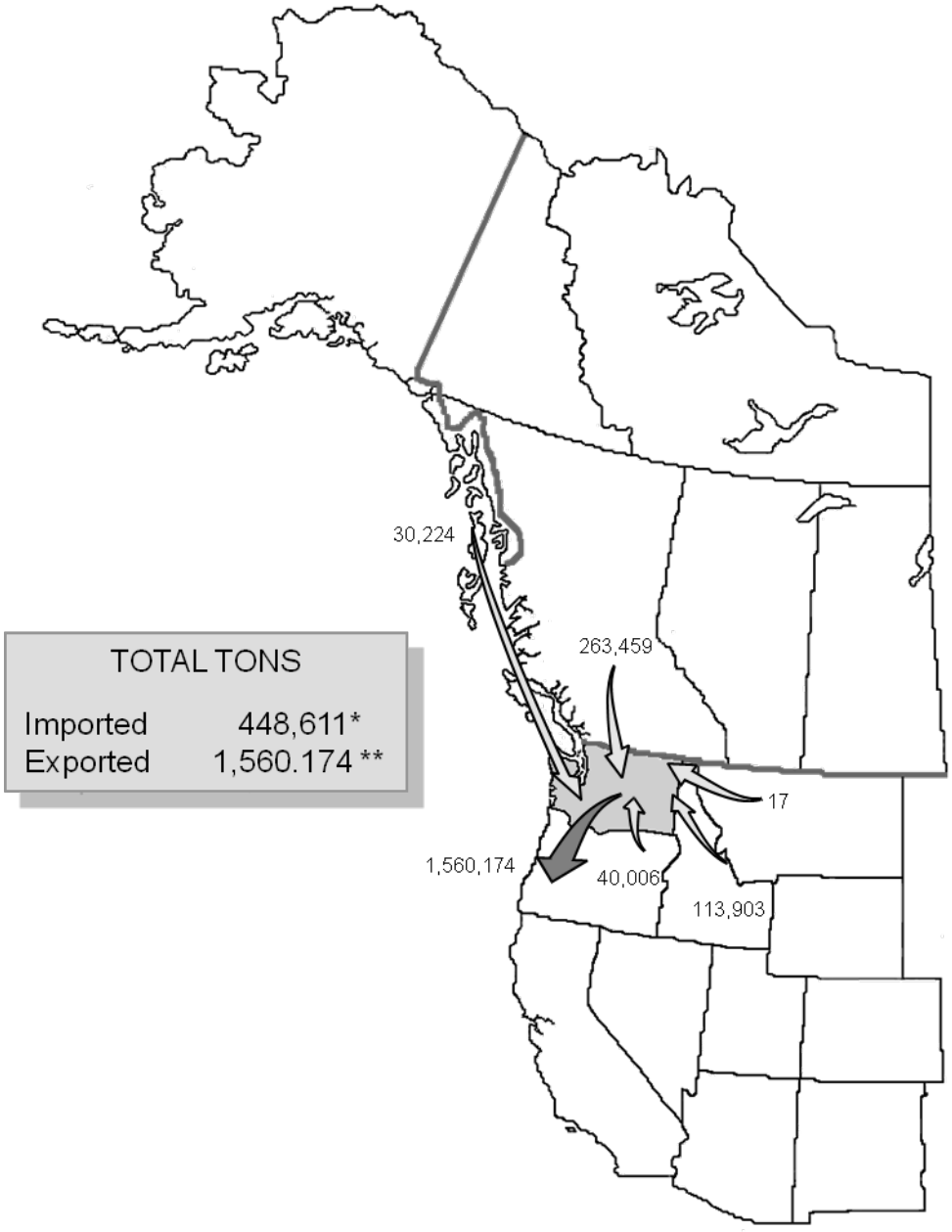
Major exporters of their MSW in Washington included the city of Seattle; Adams, Benton, Clark, Columbia, Franklin, Kitsap, Pacific, San Juan, Skamania, and Whitman counties; along with portions of Snohomish, Walla Walla, and Whatcom counties. Reasons to export out-of-state have to do with closure of local landfills and negotiation of favorable long-haul contracts.

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.

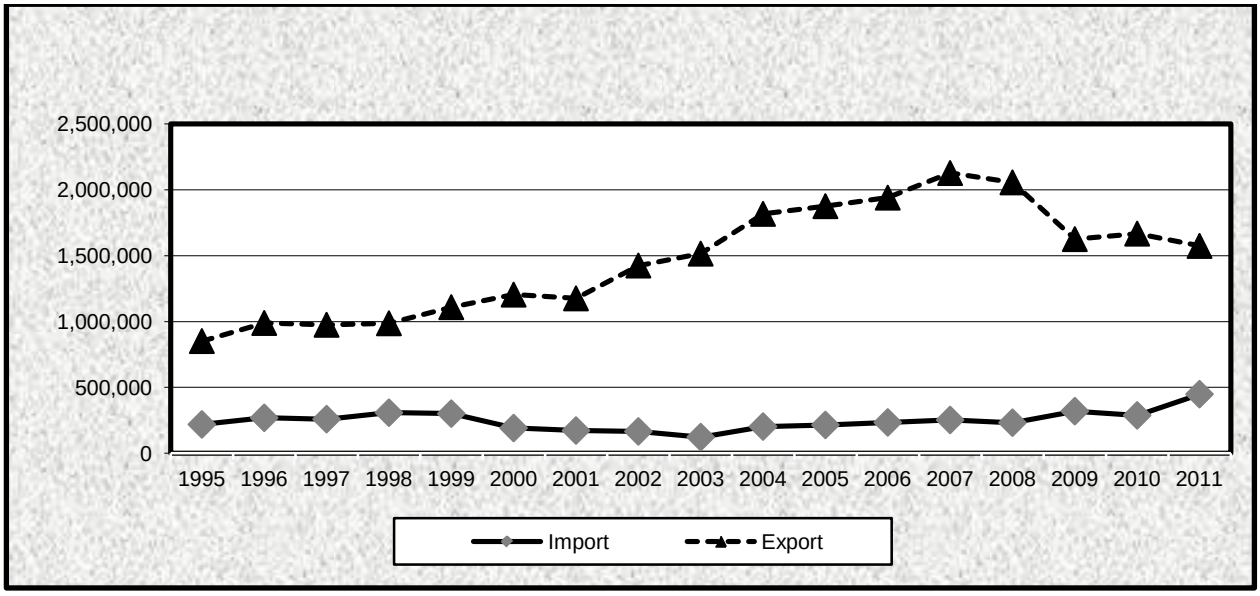
Map 4.D identifies the sources and amounts of waste that were imported and exported in 2011.

Map 4.D
Imported and Exported Waste (2011)

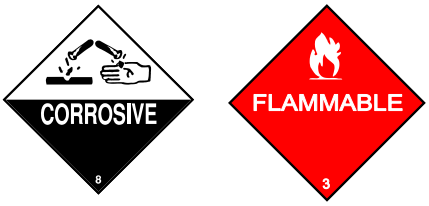


As shown in Figure 4.12, Washington exports have been much higher than imports since 1991. In 2011, about four and a half times as much waste was exported to Oregon's landfills (Columbia Ridge, Wasco and Finley Buttes) as was imported to Washington for incineration or disposal.

Figure 4.11
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.

- Total MRW collected in 2011 was about 23.8 million pounds.
- The average amount of HHW disposed of per participant was 53.4 pounds, and per capita was 1.62 pounds.
- More than 3.3 percent of Washington residents used a fixed facility or collection event to remove hazardous waste from their households, about 7.8 percent of all households.
- Counties that publicly collected the most CESQG waste per capita were Lewis, Yakima, Skagit, Whatcom and Kitsap.
- Counties that collected the most used oil per capita were Garfield, Stevens, Skamania, Columbia, Lincoln and Wahkiakum.
- Approximately 81 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. In addition, collection facilities have further developed with mobile units and satellite 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 pass-through funding to local governments for these purposes. CPG is historically funded by the Local Toxics Control Account (LTCA).[1] However, the 2009-11 funding comes from the State Building and Construction Account (SBCA). LTCA funds were transferred to the General Fund to help balance the state budget. SBCA is funded through bonds that are sold by the state treasurer.

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 individual MRW reports.

2011 Data

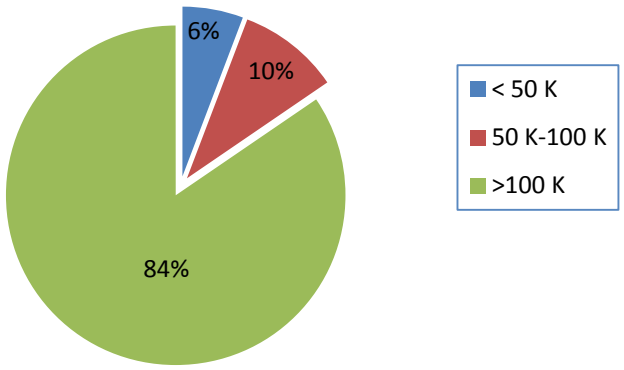
Chapter 173-350 WAC, Solid Waste Handling Standards, requires local programs to submit MRW report forms annually. Annual reports are required to be submitted by April 1 for the previous calendar year collections. Information received from local programs through MRW annual reports provides Ecology with 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.

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

This year's report focuses on 2011 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 2011, Douglas and Mason Counties did not report any HHW or used oil collections. Private collectors provided the numbers shown in this report for Douglas and Mason 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. Figure 5.1 shows the percentage of the state population that resides in counties of less than 50,000, 50,000 to 100,000, and more than 100,000.

Figure 5.1
Percent of State Population by County Size



Permanent fixed facilities now service most of the state. In 2011, 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 conduct collection events.

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 2011, 17 fixed facilities serviced CESQGs, and 4 different counties provided collection events for CESQGs.

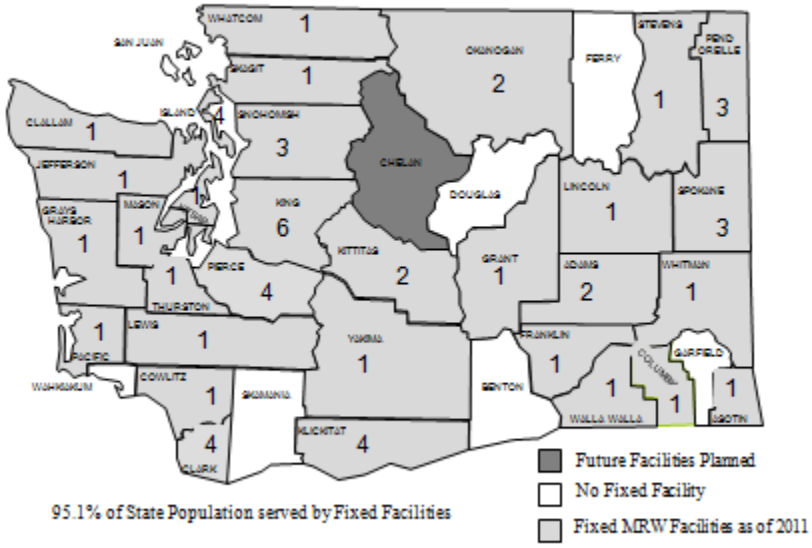
Table 5.1 shows the estimated population (based on data provided by the Office of Financial Management) by size of individual counties. In Washington State there are 42 programs that manage MRW. These programs include all 39 counties.

Table 5.1
Individual County Population by Size (2011)

< 50 K		**50 K – 100 K**		**> 100 K**	
Garfield	2,250	Walla Walla	58,800	Cowlitz	102,700
Wahkiakum	4,000	Mason	61,100	Skagit	117,400
Columbia	4,100	Clallam	71,600	Benton	177,900
Ferry	7,600	Chelan	72,700	Whatcom	202,100
Lincoln	10,600	Grays Harbor	72,900	Yakima	244,700
Skamania	11,150	Lewis	76,000	Kitsap	253,900
Pend Oreille	13,000	Island	78,800	Thurston	254,100
San Juan	15,900	Franklin	80,500	Clark	428,000
Adams	18,950	Grant	90,100	Spokane	472,650
Klickitat	20,500	**50 K – 100 K Total**	**662,500**	Snohomish	717,000
Pacific	20,900			Pierce	802,150
Asotin	21,650			King	1,942,600
Jefferson	30,050			**> 100K Total**	**5,715,200**
Douglas	38,650				
Okanogan	41,200				
Kittitas	41,300				
Stevens	43,600				
Whitman	44,800				
< 50K Total	**390,200**			**State Total**	**6,767,900**

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.

Map 5.A
57 MRW Facilities as of 2011



MRW Collected

As shown in Table 5.2, Washington programs collected approximately10.9 million pounds of HHW, 7.8 million pounds of used oil (UO) and 4.9 million pounds of CESQG waste, for a total of 23.8 million pounds of MRW during 2011.

Note: A computer programming error resulted in inflating numbers in the 2009 and 2010 reports. Table 5.2 below has been updated with the correct numbers for those years. The numbers originally reported in 2009 and 2010 respectively were:

Collection Year	HHW lbs (no UO)	Used Oil lbs	CESQG lbs	Total MRW lbs
2009	14,704,355	8,925,818	5,637,850	29,268,023
2010	14,858,912	9,435,676	5,198,109	29,492,697

Table 5.2
Total Pounds per Waste Category 2000-11

Collection Year	HHW lbs (no UO)	Used Oil lbs	CESQG lbs	Total MRW lbs
2000	10.5M	8.3M	1.1M	19.8M
2001	15.6M	11.3M	1.0M	27.9M
2002	13.5M	9.2M	1.4M	24.1M
2003	16.0M	11.7M	1.3M	29.0M
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

Collection by Waste Category and Type

As shown in Table 5.3, the most dominant waste types of MRW collected in 2011 were non-contaminated used oil, antifreeze, latex paint, oil-based paint, paint related materials, and flammable liquids. 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 23.8 million pounds of MRW collected in 2011.

Table 5.3
Six Most Dominant MRW Waste Types Collected in 2011

Waste Type	Total Lbs.
Non-Contaminated Used Oil	7,822,541
Antifreeze	2,501,624
Latex Paint	2,198,653
Oil-based Paint	1,672,954
Paint Related Materials	1,418,887
Flammable Liquids	1,010,074
Total	**16,624,733**

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 2011

Waste Type	HHW	CESQG	Total
Acids	146,220	37,348	183,568
Acids (Aerosol Cans)	514	373	887
Aerosols (Consumer Commodities)	150,816	33,241	184,057
Antifreeze	662,695	1,838,929	2,501,624
Bases	205,851	28,862	234,713
Bases, Aerosols	107	3	110
Batteries (Auto Lead Acid)	816,183	52,929	869,112
Batteries (Small Lead Acid)	19,975	7,219	27,194
Batteries (Dry Cell)	320,862	22,003	342,865
Batteries (Nicad/NIMH/Lithium)	32,573	15,533	48,106
CFCs	3,497	350	3,847
Chlorinated Solvents	942	4,147	5,089
Compressed Gas Cylinders	291	653	944
CRT's	616,786	12,774	629,560
Cyanide Solutions	72	69	141
Dioxins	0	5,500	5,500
Electronics	587,414	30,176	617,590
Fire Extinguishers	10,335	1,445	11,780
Flammable Solids	5,766	25,494	31,260
Flammable Liquids	704,341	305,733	1,010,074
Flammable Liquids, Aerosols	0	0	0
Flammable Liquids Poison	116,160	13,746	129,906
Flammable Liquid Poison, Aerosols	26,801	114	26,915
Flammable Gas (Butane/Propane)	107,981	2,710	110,691
Flammable Gas Poison	1,287	0	1,287
Flammable Gas Poison, Aerosols	70,088	1,509	71,597
Latex Paint	2,075,971	122,682	2,198,653
Latex Paint, Contaminated	279,180	49,309	328,489
Mercury Compounds (Dental Amalgam)	30	8,038	8,068

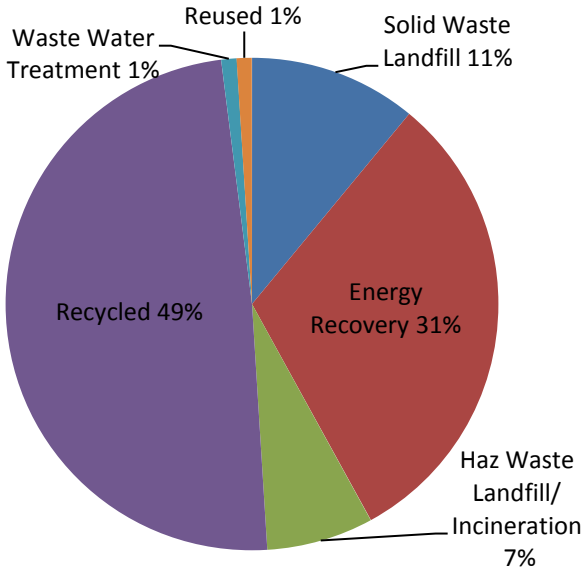
Waste Type	HHW	CESQG	Total
Mercury Containing Batteries (Button, etc)	90	3	93
Mercury Devices (Monometers, Barometers, etc.)	654	36	690
Mercury (Fluorescent Lamps & CFLs)	253,737	178,751	432,488
Mercury (Pure Elemental)	380	199	579
Mercury (Switches & Relays)	35	18	53
Mercury (Thermostats/Thermometers)	1,525	658	2,183
Nitrate Fertilizer	4,920	40	4,960
Non-PCB Containing Light Ballasts	2,382	10,159	12,541
Non-Regulated Liquids	49,024	276,932	325,956
Non-Regulated Solids	122,851	282,762	405,613
Oil-Based Paint	1,479,170	193,784	1,672,954
Oil-Based Paint, Contaminated	41,620	84,574	126,194
Oil Contaminated (oily H2O, oil w/PCB's, etc.)	14,171	336,525	350,696
Oil Filters	196,517	10,677	207,194
Oil Filters Crushed	12,462	600	13,062
Oil Non-Contaminated	7,611,321	211,220	7,822,541
Oil Stained Rags, Absorbent Pads, etc.	3,793	14,186	17,979
Organic Peroxides	1,850	673	2,523
Other Dangerous Waste	10,758	671,548	682,306
Oxidizers	42,493	4,971	47,464
Paint Related Materials	1,171,529	247,358	1,418,887
PCB Containing Light Ballasts	28,061	16,935	44,996
Pesticide/Poison Liquid	312,999	18,640	331,639
Pesticide/Poison Solid	181,350	15,335	196,685
Photo/Silver Fixer	324	17,799	18,123
Reactives	18,277	2,264	20,541
Tar and/or Adhesives	14,528	3,757	18,285
Used Cooking Oil	39,816	0	39,816
MRW TOTAL	**18,579,375**	**5,221,293**	**23,800,668**

* 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 is now included with the HHW total in Table 5.4 instead of the CESQG total as in the past. Note: In 2011 MRW facilities recycled 292,229 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 facilities must deal with. The majority of MRW facilities 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. Seven percent of all MRW is disposed at a hazardous waste landfill or incinerator. Figure 5.2 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 5.2
2011 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 used oil sites as participation numbers are not tracked at these sites. This last column of this table represents all MRW collected in that county, including privately collected CESGQ wastes. The included private collection data was first presented this way in 2008, with previous reports including this data for Pierce and King Counties only. 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^	6,277	0	0%	$0	0.00	858	4,803
Asotin	9,901	2,000	20.2%	$64.74	78.08	156,159	191,609
Benton^^	69,615	0	0%	$0	0.00	4,234	104,909
Chelan	35,534	730	2.1%	$123.38	197.30	144,029	280,243
Clallam	35,767	658	1.8%	$119.12	152.42	100,295	295,304
Clark	168,414	13,006	7.7%	$52.82	157.80	2,052,345	3,242,735
Columbia^	2,147	0	0%	$0	0.00	960	15,822
Cowlitz	43,584	1,638	3.8%	$81.70	281.23	460,658	757,921
Douglas*	16,098	0	0%	$0	0.00	0	7,064
Ferry	4,419	22	.5%	$78.39	17.63	388	2,956
Franklin	25,017	308	1.2%	$27.78	11.86	3,652	18,849
Garfield	1,231	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	Inc. w/ Asotin	18,267
Grant	35,399	253	.7%	$200.55	104.00	26,309	75,643
Grays Harbor	35,261	1,715	4.9%	$169.69	63.38	108,690	262,356
Island	40,420	2,513	6.2%	$92.27	198.15	497,943	710,634
Jefferson	17,883	1,035	5.8%	$63.07	42.47	43,953	105,589
King	857,359	67,271	7.9%	$49.78	44.31	2,980,584	6,340,255
Kitsap	107,357	8,406	7.8%	$95.04	86.24	724,915	1,225,795
Kittitas	22,096	581	2.6%	$132.55	118.74	68,987	175,436
Klickitat	9,888	8,400	85%	$2.94	9.19	77,220	199,567
Lewis	34,300	961	2.8%	$113.62	251.01	241,221	492,515
Lincoln	5,811	308	5.3%	$30.38	166.48	51,276	93,406
Mason*	32,687	0	0%	$0	0.00	0	2,968
Okanogan	22,257	399	1.8%	$139.73	28.32	11,300	39,592
Pacific	15,551	192	1.2%	$100.91	85.94	16,500	52,692
Pend Oreille	7,939	7,910	99.6%	$5.69	12.00	94,928	117,761
Pierce	327,308	9,575	2.9%	$56.55	40.44	387,205	1,565,283
San Juan	13,403	217	1.6%	$165.59	165.76	35,970	61,589
Skagit	51,725	4,721	9.1%	$69.03	42.66	201,400	443,447
Skamania	5,662	169	3%	$105.81	135.50	22,899	90,037
Snohomish	288,439	9,972	3.5%	$70.78	80.70	804,739	2,248,793
Spokane	202,445	34,000	16.8%	$8.92	17.04	579,320	1,719,458
Stevens^^	21,238	0	0%	$0	0.00	3,259	188,864
Thurston	109,197	14,491	13.3%	$30.00	29.20	423,025	756,090

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	2,080	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	16,597
Walla Walla	23,530	1,858	7.9%	$86.38	36.86	68,487	138,685
Whatcom	91,219	7,046	7.7%	$43.50	28.04	197,559	519,417
Whitman	19,367	894	4.6%	$51.08	32.64	29,184	51,946
Yakima	85,911	4,012	4.7%	$76.98	86.00	344,978	1,165,771
STATEWIDE	**2,903,736**	**205,261**	**7.1%**	**$56.39**	**53.42**	**10,965,429**	**23,800,668**

* These counties did not report in 2011 and total pounds shown represents the amount private companies collected from CESQG's in those jurisdictions.
^^ These counties scaled back operations in 2011 and HHW pounds reported represent those collected at limited MRW sites and CESQG amounts reported are from private companies.
^ These counties did not report participation or cost information numbers in 2011

Household Hazardous Waste (HHW)

Participants per Housing Unit

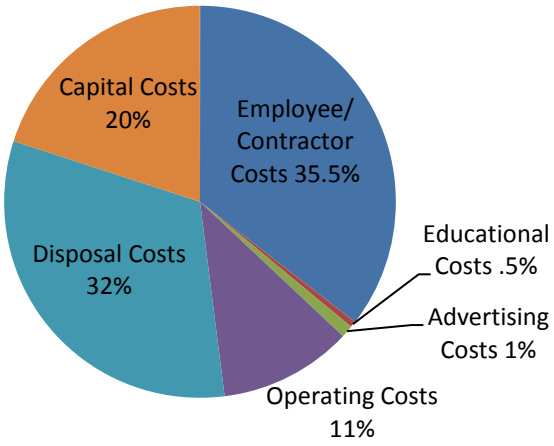
Counties that exhibit ten percent or higher of participants per housing unit provide excellent public education to encourage use of facilities or events, have very convenient locations for their collection facilities, or both. The participation number and rate for Klickitat and Pend Oreille counties seem high, but were verified before this report was completed.

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 more than $11.5 million in 2011 statewide (does not include CESQG costs). In 2010, HHW programs spent approximately $8.5 million. The increase in HHW costs by approximately $3 million is mostly due to the construction of a new facility. Figure 5.3 shows the overall breakdown of HHW costs as reported to Ecology.

Figure 5.3
2011 HHW Costs



HHW Pounds per Participant and per Capita

The average pounds collected statewide per participant for HHW was 53.42. Table 5.6 shows the top five counties with the highest collections of HHW in pounds per capita (not participant) for 2009-2011. Statewide, HHW pounds per capita collected was 1.62 pounds.

Table 5.6
High Collections of HHW (No Used Oil Sites)
Pounds per Capita by County in 2009-11

HHW 2009		
County	**Size**	**Lbs**
Pend Oreille	<50K	6.28
San Juan	<50K	5.80
Thurston	>100K	5.41
Snohomish	>100K	4.61
Klickitat	<50K	4.27

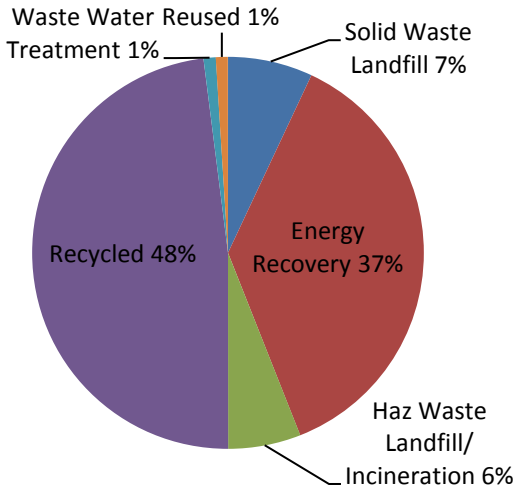
HHW 2010		
County	**Size**	**Lbs**
Thurston	>100K	7.68
Cowlitz	>100K	6.65
Clark	>100K	5.15
Lincoln	<50K	4.67
Klickitat	<50K	4.25

HHW 2011		
County	**Size**	**Lbs**
Pend Oreille	<50K	7.30
Asotin	<50K	7.21
Island	50-100K	6.32
Lincoln	<50K	4.84
Clark	>100K	4.80

HHW Disposition

Figure 5.4 shows the final disposition of all HHW collected throughout Washington State in 2011.

Figure 5.4
2011 HHW Final Disposition



Conditionally Exempt Small Quantity Generator (CESQG)

Twenty local MRW programs collected CESQG wastes in 2011. The City of Tacoma offers CESQG's collection assistance for fluorescent lights only. Counties that sponsored CESQG waste collections are:

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

The top five counties that publicly collected the most CESQG waste per capita in 2011 were:

- Lewis
- Yakima
- Skagit
- Whatcom
- 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 2011 were:

- Klickitat
- Clark
- Skamania
- Spokane
- Yakima

Table 5.7
2011 Washington State Public and Private CESQG Collections in Pounds by County

County	Publicly Collected CESGQ Waste	Public CESQG Waste Collected/Capita	Privately Collected CESGQ Waste	Total CESQG Waste Collected	Total CESQG Waste Collected/Capita
Adams	0	0	3,682	3,682	.19
Asotin	1,095	.05	1,573	2,668	.12
Benton	0	0	28,791	28,791	.16
Chelan	8,502	.12	17,270	25,772	.35
Clallam	0	0	26,717	26,717	.37
Clark	0	0	1,110,753	1,110,753	2.60
Columbia	0	0	792	792	.19
Cowlitz	11,122	.11	7,344	18,466	.18
Douglas	0	0	7,064	7,064	.18
Ferry	0	0	0	0	0
Franklin	0	0	15,197	15,197	.19
Garfield	0	0	267	267	.12
Grant	1,238	.01	13,790	15,028	.17
Grays Harbor	12,761	.18	8,596	21,357	.29
Island	25,139	.32	5,873	31,012	.39
Jefferson	6,272	.21	4,059	10,331	.34
King	172,727	.09	1,210,263	1,382,990	.71
Kitsap	104,052	.41	25,970	130,022	.51
Kittitas	1,264	.03	8,430	9,694	.24
Klickitat	0	0	86,013	86,013	4.20
Lewis	66,194	.87	9,505	75,699	.99
Lincoln	0	0	7,130	7,130	.67
Mason	0	0	2,968	2,968	.05
Okanogan	0	0	3,879	3,879	.09
Pacific	3,854	.18	1,073	4,927	.24
Pend Oreille	0	0	260	260	.02
Pierce*	4,568	.01	695,855	700,423	.87
San Juan^	?	?	0	?	?
Skagit	71,628	.61	24,694	96,322	.82
Skamania	0	0	22,098	22,098	1.98
Snohomish	103,623	.15	120,301	223,924	.31
Spokane	0	0	621,298	621,298	1.31
Stevens	0	0	3,763	3,763	.09
Thurston	25,010	.10	46,308	71,318	.28
Wahkiakum	0	0	3,772	3,772	.94
Walla Walla	0	0	21,114	21,114	.36
Whatcom	93,522	.46	83,308	176,830	.88
Whitman	0	0	8,332	8,332	.19
Yakima	207,064	.85	43556	250,620	1.02
Statewide Totals	**919,635**	**.14**	**4,301,658**	**5,221,293**	**.77**

* City of Tacoma's CESQG program collects fluorescent lighting only.
^ San Juan's CESQG totals were included in the HHW numbers and cannot be pulled out

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 2010 were:

- Antifreeze
- Used Oil – Contaminated (oily water, etc)
- Flammable Liquids
- Oil-Base Paint
- Paint Related Materials

Table 5.8
Washington State Public and Private CESQG Collections for 2011 by Waste Type

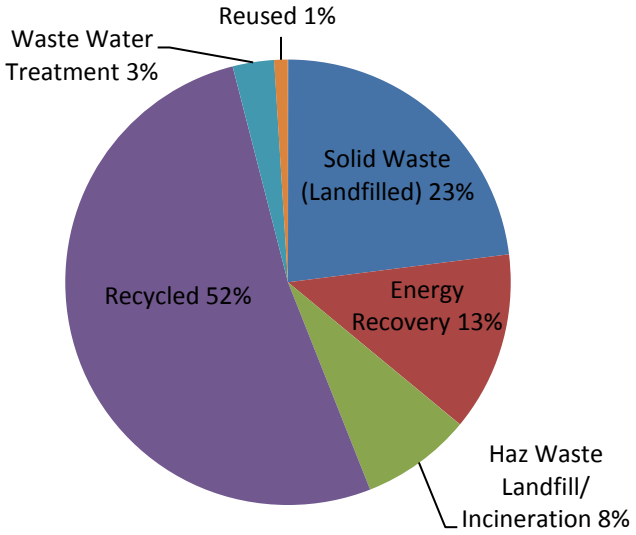
Waste Type	Public Collections	Private Collections	Totals
Antifreeze	17,146	1,821,783	1,838,929
Other DW	7,356	664,192	671,548
Used Oil-Cont. (oily water, etc)	20,349	316,176	336,525
Flammable Liquids	119,727	186,006	305,733
Paint - Oil Base	161,871	31,913	193,784
Paint Related Materials	46,564	200,794	247,358
Non-Regulated Solids	4,006	278,756	282,762
Non-Regulated Liquids	38,018	238,914	276,932
Mercury Collections	131,368	56,335	187,703
Used Oil - Non-Contaminated	43,768	167,452	211,220
Paint – Latex	115,471	7,211	122,682
Paint - Oil Base –Contaminated	6,358	78,216	84,574
Batteries – Auto Lead Acid	50,127	2,802	52,929
Paint - Latex Contaminated	14,397	34,912	49,309
Acids	23,134	14,214	37,348
Aerosols - Consumer Commodities	6,643	26,598	33,241
Electronics	3,272	26,904	30,176
Bases	17,768	11,094	28,862
Flammable Solids	3,254	22,240	25,494
Batteries - Alkaline/Carbon	8,381	13,622	22,003
Pesticides - Poison/Liquid	6,137	12,503	18,640
Photo/Silver Fixer	6,915	10,884	17,799
PCB Containing Light Ballasts	10,127	6,808	16,935
Batteries-Nicad/Lithium	5,077	10,456	15,533
Pesticides - Poison/Solids	12,111	3,224	15,335
Oil Stained Rags, Absorbent Pads, etc.	2,982	11,204	14,186
Flammable Liquid Poison	13,746	0	13,746
CRT's	0	12,774	12,774
Oil Filters	3,991	7,286	11,277
Non-PCB Containing Light Ballasts	8,893	1,266	10,159
Batteries - Small Lead Acid	2,468	4,751	7,219
Dioxins	0	5,500	5,500
Oxidizers	2,602	2,369	4,971
Chlorinated Solvents	194	3,953	4,147
Tar/Adhesives	2,122	1,635	3,757
Flammable Butane/Propane	111	2,599	2,710
Reactives	40	2,224	2,264
Flammable Gas Poison – Aerosols	1,509	0	1,509
Fire Extinguishers	422	1,023	1,445
Organic Peroxides	476	197	673
Compressed Gas Cylinders	49	604	653
Acids – Aerosols	376	0	376
CFC's	50	300	350
Flammable Liquid Poison – Aerosols	114	0	114
Cyanide Solutions	4	65	69
Nitrate Fertilizer	40	0	40
Totals	**919,635**	**4,301,658**	**5,221,293**

CESQG Disposition

Sixty-five percent of all CESQG waste collected in 2011 was either recycled or used for energy recovery. See Figure 5.5 for the complete disposition of CESQG wastes in 2011. There are several differences between final disposition of HHW and CESQG wastes worth noting:

- 37 percent of HHW was sent for energy recovery versus 13 percent of CESQG wastes.
- Less HHW waste gets landfilled (13%) compared to CESQG waste (31%).

Figure 5.5
2011 CESQG Final Disposition



Collection/Mobile Events

Table 5.9 represents the number of mobile and collection events held statewide from 2009-11. The number of events decreased from for the first time since we began tracking this number over the last two years (141 events in 2009 to the 120 events in 2011).

The amount of waste collected through these types of events was approximately 2 million pounds in 2011, which is approximately 8 percent of all MRW collected in 2011. The Waste Mobile in King County conducted 45 mobile events that collected a little more than 1 million pounds of MRW in 2011.

Table 5.9
2009-11 Collection/Mobile Event Collection Amounts

Type of Event	Number of Events			Pounds Collected		
	2009	2010	2011	2009	2010	2011
Mobile	99	79	73	1,574,873	1,606,286	1,130,122
Collection	42	46	47	507,311	439,572	876,410
Totals:	**141**	**125**	**120**	**2,082,184**	**2,045,858**	**2,006,532**

Used Oil Sites

In 2011, facilities and collection sites reported collecting a total of 7,857,614 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 2009-11.

Table 5.10
Used Oil High Collection Counties - Pounds per Capita by County Size
Collected at Facilities and Used Oil Collection Sites 2009-11

Used Oil Sites - 2009			Used Oil Sites - 2010			Used Oil Sites – 2011		
County	**Size**	**Lbs**	**County**	**Size**	**Lbs**	**County**	**Size**	**Lbs**
Garfield	<50K	8.0	Garfield	<50K	7.8	Garfield	<50K	8.0
Stevens	<50K	4.3	Skamania	<50K	4.1	Stevens	<50K	4.2
Skamania	<50K	3.8	Stevens	<50K	4.0	Skamania	<50K	4.0
Pend Oreille	<50K	3.8	Lincoln	<50K	3.8	Columbia	<50K	3.4
Wahkiakum	<50K	2.9	Wahkiakum	<50K	3.5	Lincoln	<50K	3.3
Cowlitz	50-100K	3.2	Cowlitz	50-100K	2.9	Wahkiakum	<50K	3.1

Statewide Level of Service

The Washington State Office of Financial Management reported that as of 2011, Washington State had an estimated 2,903,736 housing units[2]. MRW Annual Reports revealed there were 205,261 participants who used the services of either an MRW collection event or MRW fixed

[2]This information was downloaded from Web site 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 225,787 participants served in 2011. This number represents 7.8 percent of all households in Washington State. Table 5.11 shows the percent of participants served statewide since 2001.

Table 5.11
Percent of Participants Served Statewide

Year	Percent Participants Served	Year	Percent Participants Served
2001	6.1	2007	9.1
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		

Trends in Collection

The majority of counties in Washington State have at least one fixed facility. While the number of collection events held in 2011 declined, collection events can be a useful strategy to reach residents inconveniently located from fixed facilities.

Overall, MRW collections leveled off between 2005 and 2007. 2008-11 has seen a significant reduction in the amount of MRW collected with the biggest drops in 2009 and 2011. This is most 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.

Also, as product stewardship programs become more prevalent in the future, collection numbers may go down or up depending on how MRW programs are utilized by stewardship programs. The Electronics Recycling Program started collecting covered electronic products in 2009. As expected, MRW programs collected approximately 1.3 million pounds less in 2009 than 2008. MRW programs collected close to two million pounds of electronics and CRTs in 2008 compared to a little more than 700,000 pounds in 2009, a little more than 1 million pounds in 2010, and a little more than 1.2 million pounds in 2011. For more information about the E-Cycle Washington Program, see Chapter 2.

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 recycling program. In 2010, the Washington State Legislature passed a product stewardship bill for mercury-containing lighting products. Paint and rechargeable batteries legislation was introduced in the 2012 legislative session and brought back again in the 2013 legislative session.

This is a positive shift in MRW management as some manufacturers are beginning to accept responsibility for the end-of-life management costs of their products versus externalizing those costs onto public agencies.

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?

Product stewardship principles have also guided establishment of the Take-it-Back Network in King County, Snohomish County, Pierce County, Yakima County, and the city of Tacoma.

The Take-it-Back Network was set up by local governments and consists of "*a group of retailers, repair shops, nonprofit organizations, waste haulers and recyclers that offer convenient options for recycling certain products that should not be disposed in the trash.*" Because the Take-it-Back Network is a voluntary program for businesses, it can be difficult to get data on the total amount of materials brought back to them.

Appendix A
Tire Pile Cleanups – Historical Information

Tire Pile Cleanup 1990-98

In 1989 the Washington State Legislature passed Substitute House Bill (SHB) 1671 (Sections 92 – 95) which established a $1 per tire fee on the retail sale of new vehicle tires for the Vehicle Tire Recycling Account (VTRA). This account provided approximately $14.4 million to clean up 28 unpermitted tire piles in 9 counties around Washington. Collection of the tire fee ended in 1994 and the account was fully spent in 1998. Table A-1 summarizes the tire pile cleanups performed using the VTRA.

Table A-1
Tire Pile Cleanup 1990-98

Year	Sites	*Tons of Tires	Cost
1990	1	922	$102.667
1991	14	7,940	$1,816,894
1992	3	12,633	$1,241,133
1993	2	570	$65,394
1994	1	9,320	$166,000
1995	2	41,586	$4,114,859
1996	3	23,802	$3,235,372
1997	1	1,750	$310,200
1998	1	28,000	$3,378,947
TOTAL	**28**	**126,523**	**$14,431,466**

*One ton of tires is equal to about 100 passenger tires

Tire Pile Cleanup 2007-10

In 2005, the Legislature passed SHB 2085, creating a Waste Tire Removal Account to fund cleanup of unauthorized and unlicensed tire piles. This account provided $9.4 million to clean up 175 unpermitted tire piles in 30 counties around Washington. Starting in 2010, Ecology receives a biennial budget of $1 million from this account. The remainder of the account transfers to the Washington State Department of Transportation's Motor Vehicle Account.

Table A-2 provides a summary listed by county of the completed tire removals using the Waste Tire Removal Account funding. The cost of all removals, total tons removed, and amount of tires recycled are listed in the table. Map A-1 shows the approximate locations of these tire

cleanup efforts, including one dot for the 14 sites located in and around Goldendale (Klickitat County). Common recycling and reuse of waste tire materials includes crumb rubber, stamped rubber bumpers, tire rings, fuel for cement kilns and scrap steel (wheel rims).

Table A-2
Tire Pile Cleanup 2007-10

County	Sites	Tons	Cost	% Recycled
Adams	1	213	$ 51,659	100%
Benton	8	1,044	$ 227,252	84%
Chelan	4	814	$ 188,400	72%
Clallam	7	1,321	$ 368,883	78%
Clark	3	742	$ 144,209	94%
Cowlitz	5	331	$ 70,011	93%
Franklin	5	1,293	$ 326,819	91%
Grant	14	2,636	$ 707,921	78%
Grays Harbor	11	1,620	$ 289,573	92%
Island	1	43	$ 7,852	100%
Jefferson	7	1,046	$ 221,390	78%
King	11	2,233	$ 418,061	91%
Kitsap	2	249	$ 42,630	99%
Kittitas	6	965	$ 242,169	100%
Klickitat	17	21,489	$ 2,464,005	13%
Lewis	13	6,390	$ 1,036,278	39%
Lincoln	7	747	$ 236,396	92%
Mason	6	1,303	$ 237,354	97%
Okanogan	2	557	$ 157,635	99%
Pend Oreille	3	213	$ 26,693	98%
Pierce	8	823	$ 158,789	95%
Skagit	1	62	$ 13,154	91%
Snohomish	4	486	$ 127,258	92%
Spokane	5	1,399	$ 277,789	100%
Stevens	1	97	$ 23,367	100%
Thurston	5	1,225	$ 244,165	97%
Walla Walla	3	415	$ 105,445	88%
Whatcom	4	237	$ 61,784	73%
Whitman	1	278	$ 50,652	66%
Yakima	10	4,560	$ 921,052	20%
TOTAL	**175**	**54,832**	**$ 9,448,644**	**84%**

Map A-1
Completed Tire Pile Cleanups in Washington 2007-10