Solid Waste in Washington State



17th Annual Status Report



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SOLID WASTE IN WASHINGTON STATE

17TH ANNUAL STATUS REPORT

Prepared by:

Washington State Department of Ecology Solid Waste and Financial Assistance Program

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Chapter I Issues Facing Solid Waste

Beyond Waste – The First Five years; The Next Five Years



The First Five Years: The *Beyond Waste Plan*, issued in November 2004, will soon be five years old. The plan is the state's long-term strategy to eliminate most wastes and the use of toxic substances in 30 years, or within one generation. *Beyond Waste* is the state plan for both solid and hazardous wastes, and meets state law requirements.

The plan consists of five initiative areas - Industrial Wastes, Moderate Risk Waste, Organics, Green Building and Measuring Progress – which serve as catalysts to move us towards a less wasteful future. The plan also addresses current hazardous and solid waste needs of today. Each area has 30 year goals, with recommended actions to lead us toward the goals, and five-year milestones to gauge progress.

The *Beyond Waste Plan* provides an umbrella vision for the good work going on in the state, and much has been accomplished so far. Progress has been made on 63 of the initial 74 five-year milestones, with such notable accomplishments as:

- An electronics product stewardship program started in January 2009.
- Green building standards are required for state funded buildings. As of July 2008, this includes affordable housing projects funded through the Washington housing trust fund.
- The amount of organic materials diverted from landfills continues to increase. Anaerobic digestion is being actively pursued as an additional organic management strategy.
- Industries significantly reduced their use of hazardous substances. Efforts are focusing on reducing toxic threats.
- Ecology developed 16 progressive indicators to track the statewide effects of reducing wastes on our environment, economy and society.
- And much, much more. (Additional accomplishments on *Beyond Waste Plan* initiatives can be found in *Chapter II Partnering for the Environment*).

The Next Five Years: Despite this impressive list of accomplishments, there is still much more work to do. And one of those tasks it to update the *Beyond Waste Plan*. Just as local governments must update their solid waste plans, so must the state. An updated plan is due by the end of 2009. The update process, which will include both internal and external input, has already started.

Significant stakeholder input and research went into writing the *Beyond Waste Plan*. It is a 30 year plan, and still provides good direction. The update will focus on establishing a new set of milestones to guide our work for the next five years. In the time since the original plan was drafted, the focus on climate change, the health of Puget Sound and reducing toxics in products have increased dramatically. The

plan's vision addresses these issues, but the update will strengthen this focus, and incorporate other new developments into the plan as well. (The plan and progress report are available online at <u>www.ecy.wa.gov/beyondwaste/</u>.)

Reducing Toxic Threats

Reducing the 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 level of contamination behind. New research is increasingly finding that very low levels of some types of toxic chemicals can cause serious harm.

Reducing toxic threats by preventing the releases in the first place is the smartest, cheapest and healthiest approach. Increasing Ecology's investment in prevention strategies is the focus of the agency's Reducing Toxic Threats priority initiative and is a fundamental principle of the *Beyond Waste Plan*.

This initiative, building on work already being done within Ecology, is aimed at fostering the development of prevention approaches in order to avert exposures to toxic chemicals and avoid future costs that come when toxic chemicals find their way into the environment. Two focus areas have been identified: preventing use of toxic chemicals in consumer products and preventing toxics from entering Puget Sound.

With resources at a premium, it will be increasingly important to keep expenses low and to build on positive results achieved by others. Ecology is working 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 being used.

Prevention strategies are not without their challenges, including the following:

- *Insufficient data*. Information on the presence of toxic chemicals in products is often not available. Without this data it's difficult to evaluate risk.
- Understanding how to consider life-cycle impacts. Back-end consequences such as cleanup or disposal costs are usually not factored into front-end design decisions. As a result, costs for cleanup and disposal 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 for doing so.
- *Inadequate protections at the federal level.* States need to act because of the absence of an effective national system to provide consistent protections from toxic chemicals.

In the face of these challenges, our efforts to reduce toxic threats focus on five key policy areas:

- Protecting the most vulnerable human and environmental populations, especially children.
- Expanding producer responsibility to improve product safety.
- Strengthening our ability to gather data on the presence of chemicals in products and the environment.

- Continuing to implement the PBT (persistent, bioaccumulative and toxic chemicals) strategy.
- Expanding incentives and regulations to spur development of safer alternatives to toxic chemicals and reduce their use.

Over the last 18 months a number of significant accomplishments have been made in this arena.

Expanding producer responsibility:

As discussed in *Chapter II Partnering for the Environment*, the E-cycle Washington program was developed and was launched in January, 2009. This program, while not designed to specifically address the toxics found in electronics, will significantly reduce the amount of toxics going directly to the landfill by increasing recycling of products containing problem chemicals.

Implementing the PBT strategy:

The PBT strategy is centered on the development of chemical action plans (CAPs). These plans are designed to examine all the uses, releases and exposures caused by ongoing and historic use of persistent, bioaccumulative and toxic chemicals (PBTs) and to recommend actions to reduce harm to human health and the environment. To date, three CAPs have been completed.

The first CAP, published in 2003, was for mercury. At the same time the CAP was issued, the legislature passed the Mercury Education and Reduction Act (MERA). In the five years Ecology has been implementing the CAP and MERA, over 12,000 pounds of mercury has been prevented from entering the environment.

Ecology, working with Department of Health issued a chemical action plan for a group of chemical flame retardants called PBDEs in 2006. This plan called for legislation (passed by the 2007 legislature) to ban the manufacture, sale and distribution of most of the commercially available PBDE mixtures as of January 1, 2008. This same legislation gave Ecology the authority to trigger a ban of other, specific uses of these chemicals if we could find safer, technically feasible alternatives that would also meet applicable fire safety standards. In December 2008, Ecology and Department of Health were able to make this finding. A report was be submitted to the legislature December 31, 2008, outlining these findings. As a result, manufacture, sale and distribution of PBDEs will be prohibited in televisions, computers and residential upholstered furniture as of January 1, 2011.

Ecology and Health more recently completed a chemical action plan for lead. This plan is expected to be finalized in January 2009. Priority recommendations focus on protecting children, who are the most vulnerable population. These recommendations include actions to find and help children who are already exposed AND actions to prevent exposures from the largest sources. The largest source of lead exposure is lead-based paint. Implementing these priority recommendations will require new legislation, funding and the cooperation of a number of other agencies, especially the Departments of Health, Labor and Industries and Community Trade and Economic Development.

Spur the development of safer alternatives:

The 2008 Legislature passed the *Children's Safe Products Act*. Implementing this act will provide significant new data on the presence of toxic chemicals in children's products, helping us to develop

programs and strategies to protect children. The law requires Ecology to work with Department of Health to develop a list of chemicals of high concern for children, put this list into rule and subsequently require manufacturers of children's products sold in Washington to report on their use of these chemicals in their products. We will present a report to the legislature in January, 2009 outlining our approach to developing this list, which is well underway, along with policy options for using the reported data. Rule development will begin in summer 2009.

Financing Solid Waste for the Future

The *Beyond Waste Plan* is focused on preventing the generation of solid and hazardous wastes. Local governments are currently dependent on tip fees tied to the amount of disposed waste (the more waste, the more money) to fund their programs. Funding is used for everything from infrastructure development to waste reduction and recycling programs. We need to find alternate funding mechanisms to fund the solid waste system, including prevention programs that will help move local programs beyond waste. Information on existing solid waste funding mechanisms is available in the finance background paper to the *Beyond Waste Plan*. <u>http://www.ecy.wa.gov/biblio/0407032.html</u>

A 2007 study provides a comprehensive estimate of statewide costs of and revenues from solid waste management activities and services. The study also identifies gaps and limitations in existing revenue and expenditure data. The Solid Waste Management Cost Flows in Washington State study is available at: <u>http://www.ecy.wa.gov/beyondwaste/BWDOCS_consultantStudy.pdf</u>

Finding a more sustainable solid waste finance system will be a long term process. The next phase of study, to examine funding mechanisms in more depth in search for options supportive of the *Beyond Waste* vision, is currently in process.

Beyond Waste Implementation Working Group – The Next 50 Percent

The Beyond Waste Implementation Working Group (IWG) has developed proposals that will contribute to reductions of greenhouse gas generation associated with solid wastes when implemented. These proposals build on the prioritized recommendations from the 2007 Climate Action Team (CAT) process known as *AW-3: Significant Expansion of Source Reduction, Reuse, Recycling, and Composting* and the CAT's 2007 interim report titled: *Recommendation 11 Reduce waste and Washington's emissions of GHGs through improved product choices and resource stewardship.*

Through the waste reduction and recycling efforts of the last 20 years, Washington is now diverting about 47 percent of the solid waste generated in the state to reuse, recycling and beneficial use applications.

We believe that pursuing the recommended strategies to recycle "the next 50 percent" will result in at least a measurable 6 million metric tons of carbon dioxide equivalents (MMTCO_{2e}) being reduced per year. ¹

Beyond Waste Implementation Working Group Goal:

The goal of the Beyond Waste Implementation Working Group is: To significantly expand source reduction, reuse, recycling and composting and build on what is best and most successful in the current waste management system by developing an implementation plan targeting products with the largest GHG reduction potential.

To accomplish the goal, the IWG was charged to build on existing source separation strategies and the *Beyond Waste Plan* implementation approaches. The group was to develop an implementation plan considering actions that:

- Optimize the collection and processing infrastructure needed to more effectively capture recyclable materials with the highest carbon footprint generated from industrial, commercial, agricultural and residential sources.
- Expand, recruit or develop in-state businesses that use recyclable materials in their manufacturing processes (including investment, financing and incentives).
- Remove organics from the disposal stream so that they can be beneficially used for healthy soils, bioenergy production and new products.
- Create product stewardship framework legislation applicable to consumer products focusing on the full product life-cycle including cradle-to-cradle design, material and energy content, manufacturing and end of life recycling/reuse.
- Determine actions to expand byproduct synergy, zero waste business practices, design for the environment and other emerging commercial activities.
- Review implementation of existing environmentally preferred purchasing policies and recommend new environmentally preferred purchasing policies to be used by state and local government entities, which will result in reduced GHG generation.
- Support and expand consumer product reuse and related business activities.

Through the IWG deliberations, the following materials were targeted as having significant greenhouse gas reduction potential:

- Paper (1.6 million metric tons of carbon dioxide equivalents (MMTCO₂e)
- Metals (0.4 MMTCO₂e)
- #1 & #2 plastics (0.1 MMTCO₂e)
- Other plastics (1.5 MMTCO₂e)
- Construction & demolition (1.7 MMTCO₂e)
- Contaminants in recyclable materials (GHG reduction potential is not known, however, contaminants reduce the recyclability of the targeted materials above).

¹ Based on EPA's Waste Reduction Model (WARM). WARM has received occasional criticism for overstating emission reductions for some materials. However, WARM does not provide GHG calculations for all materials covered in these recommendations so the gross GHG reductions may in fact be greater than what can be modeled.

The tonnage estimates reflect the results of using the USEPA Waste Reduction Model (WARM) for calculating GHG reductions related to alternative solid waste management methods. WARM does not calculate GHG reduction potential for all products and materials. So, the potential for realizing additional greenhouse gas reductions is high.

In addition, there is the potential of 0.8 MMTCO_2 e to be realized through anaerobic digestion of dairy wastes. This potential becomes greater with the addition of other organic farm and food processing wastes.

The IWG developed many action proposals to accomplish the outlined tasks. To winnow the many ideas down to the few, the criteria of "readiness to proceed" and "GHG reduction potential" were used.

It is important to remember that the solid waste management system is part of larger systems. Materials are extracted, turned into products, used and then disposed. The solid waste management system has traditionally focused only on the last point in the system – disposal. Recycling has been demonstrated to be an effective strategy to reduce the impacts of disposal. It is now recognized as being an effective tool to reduce the upstream impacts of extraction, production and use as well. The action proposals set forth below keep these farther reaching benefits in mind.

Action Recommendations and Implementation Timeline

Possible for 2009 legislative session:

1 A. *Optimize the solid waste collection system* – focuses on collection and creates financing mechanisms to accomplish these actions.

1 B. *Product stewardship framework legislation* – aimed at improving the environmental performance of products, specifically reducing their carbon footprint and increasing their recycling.

1 C. Establishing a comprehensive organics management system -

- 1. Green electricity Bio-power/Anaerobic Digestion Legislation.
- 2. Compost products use subsidy.
- 3. Compost product procurement by the Department of Transportation.

Non-legislative actions for 2009:

2.A. Collaborate with industry to influence the supply chain, particularly retail.

2.B. Establish a workgroup by Governor's Executive Order to develop an Environmentally Responsible Purchasing strategy for state and local governments.

Develop for the 2010 legislative session:

3.A. Establish strong government environmental procurement and responsible purchasing practices in statute.

3.B. Gain legislative authorization of a sustainable product design institute.

Develop for the 2011 legislative session:

- Stimulating Recycled Material Use
- Incentives for Industry.

- Assure utilization of collected materials through aggressive market development strategies.
- Research and Development.

Appendix B of the report found at

http://www.ecy.wa.gov/climatechange/2008CATdocs/IWG/bw/110308_beyond_waste_iwg_report.pdf contains a funding matrix that describes the potential funding sources for the recommendations.

New Organic Recycling Technologies – Building a Sustainable Bioeconomy in Washington

The *Beyond Waste Plan* asks us to turn our waste organic materials into feedstocks for renewable fuels, energy, products and fertilizers. As we work to create renewable fuels, energy, and products, we also create a green economy and employment opportunities for a skilled labor force. We envision a sustainable bioeconomy I where wasted organic materials become resources with inherent value.

Like today's recycling efforts we are reclaiming organic waste for further uses. The endpoint uses will have stable and growing demand over time.

What products will always have a demand? We think these include: fuels for our transportation needs, energy for our homes and businesses, fertilizer for production of our food and agricultural commodities, and stable carbon to place back into soils to increase productivity, and store carbon over the long term.

Anaerobic Digesters

In the *Beyond Waste* Organics Initiative, expanding and strengthening closed-loop recycling and reuse of organic materials are priorities. Anaerobic digestion (AD) is a proven, well-tried and tested technology that meets the criteria of "closed-loop recycling and reuse". AD converts organic matter to biogas in the absence of oxygen, with nutrient rich fiber and liquid as by-products.

Feedstocks for AD include sewage, animal manures, agricultural crops, animal by-products, organic wastes from industry (mainly from food processing) and the organic fraction of household waste. AD management of agriculture, commercial, and residential organic wastes is common in Europe and becoming more popular in the US, including Washington State.

In Washington there are currently three dairy digesters processing manure, one of which co-digests other organic wastes with the manure. Several more digesters are in the planning phase or are under construction; they are planning to co-digest manure and other organic wastes. As many as 100 to 150 digesters may be built throughout Washington, both on and off farms, providing efficient management of biomass, generation of renewable power, and removal of greenhouse gasses.

Here is an example of how anaerobic digesters manage livestock manure, remove greenhouse gases, and generate renewable energy:

Each year the manure from a typical 1,330-pound cow releases methane that equals about five tons of CO_2 -equivalent into the atmosphere². That is about the same amount of CO_2 generated by a car getting 20 miles per gallon and traveling 12,000 miles per year.

• Using anaerobic digesters to manage the manure from the 135 largest Washington dairies (effective for 500 cows or more) would reduce methane emissions by .05 million metric tons per year.³



• Anaerobically: digesting this manure could generate 140,099 mega-watt hours per year, which could provide electric power for nearly 16,000 homes⁴.

Benefits of AD management of agriculture, commercial, and residential organic wastes include:

- Greatly reduce manure odor levels, by 90 percent or more.
- Reduce bacteria/pathogens: heated digesters reduce pathogen populations dramatically in a few days; additional post-digester composting can ensure pathogen-free end products.
- Nutrient management: in the process of anaerobic digestion, the organic nitrogen in the manure is largely converted to ammonium, the primary constituent of commercial fertilizer, which is readily available and taken up by plants. Much of the phosphorus is removed through the solids in the process, requiring less nitrogen application to land to balance the nutrients. This technology may allow operators to support more animals on the same acreage.
- Co-generation and energy cost reduction: anaerobic digesters produce methane gas which can be captured for generating electricity for on-farm use. If the operation is large enough, potential sales of excess power back to the grid may be possible.
- Final products: the final products of anaerobic digestion are quite suitable for composting and use either on the farm as bedding material or as a soil amendment, or sold off the farm as an organic-based fertilizer/soil enhancer.

Ecology is currently working with stakeholders to make sure human health and the environment is protected as we travel this new path.

Researching New Technologies

Continuing research and project development must occur to meet the goals of the *Beyond Waste Plan* and Washington's Climate Change Initiative, while protecting our economic, natural and social vitality. We need to create clear paths between the *Beyond Waste* Organics Initiative Goals, the health of Puget Sound, the Columbia River and the Climate Change Initiative.

² http://www.sehn.org/tccCowsClimateChangeandCarbonCredits.html

³ 2008 Climate Action Team, <u>Recommendations for the Development of Agricultural Sector Carbon Offsets in Washington</u> <u>State</u>, October 2008.

⁴ The New Book of Popular Science. 2000 edition. <u>Electrical Energy</u>, Grolier Incorporated, 1998.

In 2005, the Solid Waste and Financial Assistance Program (SWFAP) issued a report on Washington biomass⁵. The inventory of 44 organic material sources became the basis for investigations that the program is conducting through interagency agreements with the University of Washington and Washington State University. Figure 1.1 shows these organic materials grouped into five main categories. The five categories group materials that have similar physical and chemical attributes, such as moisture content, (dry versus wet), high versus low lignocellulosic materials, volatile solids, lipids and protein content. Municipal organics contain materials across the full spectrum of physical and chemical attributes.

The attributes dictate each material's potential for recovering fuels, energy, fertilizers, and other valuable co-products. SWFAP has provided funds to investigate the process systems for reclamation and use of these materials identified in the figure.

Figure 1. 1 Washington State Organic Resources that are a Renewable Resource for Fuels, Energy, Fertilizer Recovery and other Co-Products



Waste to Fuels Technology Project

This project runs under an interagency agreement with the Biological Systems Engineering Department, within Washington State University. The project has two main focal points. First, renewable fuels can

⁵ Biomass Inventory and Bioenergy Assessment, An Evaluation of Organic Material Resources for bioenergy Production in Washington State, Frear et al., Biological Systems Engineering Department, Washington State University, 2005.

be generated from organic materials in our municipal waste stream through several processes. Material characteristics have been determined for 42 waste types, and cost curves determined for assessing transportation costs for three basic processing methodologies:

- Anaerobic digestion.
- Production of cellulosic ethanol.
- Thermo-chemical production of oils for fuel, and stable carbon char.

Results can be seen in the study at: http://www.ecy.wa.gov/biblio/0707025.html.

Second, the project is also developing a municipal organics high solids anaerobic digester (HSAD) that will recover methane for fuel or energy, fertilizers to support our agricultural needs, and compost for enhancing and improving soil productivity. The project objective is to produce a computer model that will be used to test variables at a HSAD facility. These variables may include physical configuration and equipment needs for the facility, operating parameters, feedstocks mixtures, recoverable methane, fertilizers, and liquid and solids changes. Results of this project are highly encouraging. A world wide literature and technology review has been completed. Laboratory studies are complete, and computer code that models various digester configurations are written and calibrated. Preliminary results can be seen at: http://www.ecy.wa.gov/biblio/0707024.html. The WSU research team is combining this effort with findings from other funded research and has identified two distinct methods for recovering ammonium sulfate and phosphate fertilizers, while purifying the digester gases of acid compounds that damage generators and reduce engine life. These processes are in pilot scale testing by WSU and Andgar Corporation at the Vander Haak dairy in Whatcom County.

Organic Waste to Resources Project

The goal of the Organic Waste to Resources projects was to take further steps in the *Beyond Waste Plan* and increase organics recovery by focusing on new processing technologies. These projects incorporate sustainable, closed-loop, full cycle uses of organic materials to meet the following objectives:

- Produce renewable fuels to help replace current fossil fuels.
- Create carbon neutral and carbon negative solutions for fuels, energy and products.
- Recover valuable industrial and agricultural nutrients in process technologies.
- Support durable, secure systems through distributed production.
- Create sustainable economic vitality, social equity and environmental balance.
- Produce transferable research and technology that can be replicated around the state.

Twelve research proposals were received for review. Of these, the six proposals that were selected for funding are summarized below.

Project 1: <u>Converting Lignocellulosic Rich Urban Waste to Ethanol</u>, University of Washington, Department of Forestry, Dr. Rick Gustafson, PI.

This project will use waste paper and wood residue and investigate the process for converting the cellulose contents to ethanol. The project has three main tasks: 1) Develop an optimized process for converting lignocellulosic rich urban waste to ethanol. 2) Develop engineering models tracking material

and energy balance in biorefineries with the process configurations established in the first phase of the research and serving as the basis for a techno-economic analysis of the proposed biorefineries. 3) Build a life cycle assessment (LCA) around the biorefinery models to quantify key environmental and economic development impacts from harvest through distribution and storage, refining, fuel use, and ultimate waste management (e.g., ash, etc.) centered around the conversion of urban lignocellulosic waste to ethanol. Each research phase will build on the results of the previous project at the end of the research, optimal systems for using urban lignocellulosic waste to produce ethanol will be described and key aspects of the economic and life cycle environmental and economic development feasibility will be revealed.

Project 2: <u>Bio-refinery Concept to Convert Softwood Bark to Transportation Fuels</u>, Washington State University, Department of Biological Systems Engineering, Dr. Manuel Garcia-Perez, PI.

Washington generates over 14.2 million tons of woody biomass annually. The underutilized softwood bark generated by the forest and paper industries represents a clear opportunity to spur rural economic activity. While this project focuses on softwood bark, the methods can easily be applied to other woody biomass. The concept conceives the existence of distributed pyrolysis units close to biomass resources to produce crude bio-oils and refineries close to consumption centers to further convert these materials into transportation fuels and chemicals. The aim of this project is to test a new bio-refinery concept at laboratory scale to transform crude bio-oil obtained from the pyrolysis of softwood bark into new transportation fuels. The project envisions distributed pyrolysis units close to biomass resources, to produce crude bio-oils and chars, and refineries close to consumption centers to further convert these materials into transportation fuels and chars, and refineries close to consumption centers to further convert these materials into transportation fuels and chars, and refineries close to consumption centers to further convert these materials into transportation fuels and chemicals. The bio-oil produced is an intermediate to fuel. The char value is as a soil amendment in which carbon is sequestered over long term in soil. This is a project partner to the following project, working as the generator of the char.

Project 3: <u>Use of Biochar from the Pyrolysis of Waste Organic Material as a Soil Amendment</u>, Washington State University, Center for Sustaining Agriculture and Natural Resources, Chad Kruger, and David Granatstein, co-PI.

"Biochar", a typical by-product of biomass pyrolysis for energy, is being promoted for its potential largescale and low-cost carbon sequestration in soil. Much of the knowledge regarding biochar derives from studies of Terra Preta soils in the Amazonian basin, where biochar-like materials appear to have substantially altered soil physical and chemical properties and led to long-lasting carbon storage and improved crop production. The proposed project will produce biochar from Washington biomass materials using low-temperature pyrolysis. The biochar will be tested for its impact on soil properties, particularly the potential to store carbon, and any growth effects on plants grown in the greenhouse. Base case economic projections will be made for the opportunity biochar may present for organic management, carbon sequestration, and agriculture. The project will also partner with the project "Biorefinery to convert softwood bark to transportation fuels" (described above) to conduct a literature review on any environmental contaminants from pyrolysis and to perform the qualitative and quantitative analyses confirming that the proposed technology does not generate polyaromatic hydrocarbons (PAHs) or dioxins. Project 4: <u>Organic Soil Amendments, A True Path to Zero Waste</u>?, Washington State University with collaboration from University of Washington, Agricultural Extension, Dr. Craig Cogger, PI.

The goals of this project are to quantify the benefits of land application of organic amendments as a fertilizer source, as a means to increase soil carbon stores and as a way to increase soil water holding capacity. In addition, the suitability of digestate produced by anaerobic digestion of biosolids and municipal organic food waste for soil amendments will be determined. This work will be done in cooperation with municipal wastewater treatment agencies. Working with agencies that currently operate anaerobic digesters and have existing land application programs offers the potential for accelerated progress towards landfill diversion and use of residuals. Existing field sites will provide data for quantification of the benefits of use of composts for soil carbon storage and potential increased water holding capacity.

Project 5: <u>Biohydrogen and Biodiesel Co-production with Treatment of High Solid Food Waste</u>, Washington State University, Department of Biological Systems Engineering, Dr. Shulin Chen, PI.

This project will develop a two-step process to produce hydrogen and biodiesel with treatment of high solid food waste. Dark fermentative hydrogen production is accomplished by the bacteria Clostridia, under anaerobic metabolism. This fermentative bacteria will use glucose derived from the organic waste carbon to produce hydrogen and volatile fatty acids (VFA) (e.g., acetate or butyrate). Since Clostridia are resistant to numerous treatment methods that control methane forming bacteria, the methanogens in the mixed anaerobic culture can be controlled to 'turn off' the anaerobic conversion of H₂ or VFA to methane. One third of the carbon is converted to carbon dioxide in the first-step process while two thirds of the carbon is converted to volatile fatty acids. In the second step, the remaining carbon in the form of VFA is used as a carbon feed to microalgae and/or yeast for simultaneous vector reduction and production of lipids for biodiesel. A yeast, *Cryptococcus curvatus*, can be grown to a high cell density on acetate and has been selected for its ability to readily uptake VFA as its carbon source and its ability to metabolize the carbon into accumulated high content lipids inside the cells; thereby allowing for the development of a high rate single cell oil (SCO) production process.

Project 6: <u>Evaluate Pretreatment Technologies for Converting Washington Biomass to Bioethanol</u>, Washington State University, Department of Biological Systems Engineering, Dr. Shulin Chen, PI.

Green waste, straws, and forest residues, approximately 4.5 million bone dry tons annually, are the main organic material in Washington for support of a future bioeconomy. These organic residues consist of mainly cellulose and hemicelluloses whose basic units are sugars that can be fermented into ethanol or many other chemicals. Pretreatment and hydrolysis processes are required to liberate these sugars, since the sugar units are tightly locked within the fiber structure of the biomass. In this project, a thorough evaluation of pretreatment methods will be conducted for the application to Washington biomass. The uniqueness of this approach and methodology includes: (1) emphasizing straws and green wastes on which relatively little work has been done compared with corn stover, and (2) considering the effect of using a mixture of feedstocks on the pretreatment process to generate technical information that is pertinent to the diverse feedstock base of the state. Converting the cellulosic biomass identified above

represents a great opportunity for addressing atmospheric impacts by reducing CO_2 emissions by displacing fossil fuels. A bone dry ton of biomass may potentially be converted to 60 to 90 gallons of ethanol. This could yield 320 to 480 million gallons of ethanol from biomass sources annually without the use of food production lands that corn ethanol production requires.

The New Recyclables Transporter Requirements

The 2005 Legislature passed ESHB 5788, Transportation and Handling of Recyclable Material. As a result, Ecology is proposing a new rule, Chapter 173-345 WAC, *Recyclable Materials—Transporter & Facility Requirements*. Chapter 173-345 WAC applies to businesses that transport recyclable materials, facilities that recycle solid waste, and material recovery facilities (MRFs), except for those facilities with current solid waste handling permits issued under Chapter 173.350 WAC.

The purpose of this rule is to establish minimum standards for the transportation of recyclable materials; establish notice and reporting standards for solid waste recycling facilities and material recovery facilities (MRFs); ensure that recyclable materials are not delivered to transfer stations, solid waste incinerators or landfills for disposal; and establish penalties for transporters of recyclable materials, solid waste recycling facilities, and MRFs that do not meet these requirements.

The rule is expected to be effective in February 2009. More information about rule development and public involvement can be found on Ecology's web site at: http://www.ecy.wa.gov/programs/swfa/rules/ruleTrans.html

Regulatory Review

Regulatory review of solid waste laws and rules is an important step in the longer term effort to make progress toward achieving the *Beyond Waste Plan* vision. The Solid Waste and Financial Assistance Program is currently assessing regulatory barriers that stand in the way of:

- Safe and effective solid waste management.
- Increased producer responsibility.
- Reducing solid wastes.
- Reducing the use of toxics.
- Recycling.
- Reuse.
- Reducing health and environmental effects of solid waste management.

SWFAP is internally surveying staff and developing a list of issues and concerns with current laws and rules. The next step will be to develop regulatory options, working with the State Solid Waste Advisory Committee as well as the Climate Action Team.

Chapter II Partnering for the Environment

Beyond Waste Encourages Partnerships



Building strong partnerships underlies the success of Ecology's Solid Waste and Financial Assistance Program (SWFAP). SWFAP has worked hard to cultivate effective partnerships with businesses, local governments, community organizations, other state agencies, and the agricultural community and industry groups across the state. By working together, groups are able to offer their unique perspectives and resources to move toward an economically and environmentally vibrant future in Washington.

Beyond Waste, the state's solid and hazardous waste plan is both visionary and practical. The vision for moving beyond waste involves a fundamental shift from managing wastes to preventing them from being generated. Wastes that cannot be eliminated can become resources for closed-loop recycling systems. Recognizing that existing wastes need proper and safe management, the plan also addresses current hazardous and solid waste management systems.

Partnerships continue to play a key role in the implementation of the Beyond Waste Plan.

- 1. Green building staff partner with building associations and interested non-profits to provide green building education and certification programs around the state.
- In addition to providing in-house models for composting food-waste, organics specialists are working to further anaerobic digester use and providing technical assistance and training to existing and proposed composting facilities.

The Beyond Waste Vision:

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

- 3. Environmentally preferred purchasing staff is working with the Department of General Administration to create green contracts. They also provide assistance to other state agencies and local governments looking to purchase more sustainable products.
- 4. Staff is working closely with electronics manufacturers on the E-cycle electronics recycling program.
- 5. The Solid Waste and Financial Assistance Program's Industrial Section partnered with five pulp and paper mills in the state to reduce their waste and resource use. This "Industrial Footprint" project was funded with a grant from EPA.

An especially exciting partnership has been the *Beyond Waste* work with the Climate Action Team (See Chapter 1). Recognizing that reducing waste and increasing recycling has huge benefits for the climate, a Beyond Waste Implementation Working Group was formed consisting of many different stakeholders. The proposals developed and put forth by this group, if approved and implemented, stand to reduce greenhouse gas emissions and move *Beyond Waste* many giant steps forward. And of course, one of the most vital partnerships of the *Beyond Waste Plan* is with local governments, which have primary responsibility for solid waste management in the state. The *Beyond Waste* vision and intent is being included in more local solid and hazardous waste plans. Jurisdictions continue to provide their citizens with new services, such as improved recycling and composting programs, which allow them to divert waste from landfills and instead turn it into a resource. Some of these efforts are funded through the Coordinated Prevention Grant (CPG) program.

The Public Participation Grant (PPG) programs also funds projects that support the *Beyond Waste* recommendations and goals being implemented by citizens and non-profit groups.

Additional details on these and other *Beyond Waste* related efforts can be found in subsequent sections as well as online at <u>www.ecy.wa.gov/beyondwaste/</u>

Partnering for the Environment through Sustainable "Green" Building

The long-term goal of the Green Building initiative of the *Beyond Waste Plan* is for sustainable building to become standard building practice in Washington. Green buildings create healthier and more durable commercial buildings and homes, which saves significant amounts of energy and water, encourages salvage and reuse of building materials and dramatically reduces construction and demolition waste.

Eleven milestones were identified as critical during the first five years of the *Beyond Waste Plan* implementation if this long-term goal is to be achieved. To date, seven out of the eleven 5-year Green Building Milestones have been achieved or exceeded:

- Washington is a national leader in green building.
- All new state government buildings meet green building standards.
- Government has removed at least one major regulatory barrier to green building and some economic incentives are in place.
- At least two additional reuse and recycling facilities are in operation in underserved areas.
- Ten percent of new residential and commercial construction uses green building practices.
- The curricula for all accredited architectural programs in the state incorporate green building design.
- Industry-specific short courses are available across the state.
- Growth in the green building industry has continued to increase over the last year and market share of certified green buildings in Washington is still on the rise. (See Figure 2.1.)





Full implementation of chapter 39.35D RCW *High-performance public buildings* occurred this year as the Evergreen Sustainable Development Standard became mandatory in July 2008, for all housing projects receiving funds from the Washington Housing Trust Fund. This Fund, administered by the Department of Community Trade and Economic Development (CTED), assists many housing authorities and land trust groups in Washington to finance their affordable housing projects.

Ecology partners with public agencies to ensure the successful implementation of this statute and to encourage growth in private green building activities. The following describes some of the work over the past year.

Eco-charrette Facilitation

As a primary activity, Ecology staff facilitates eco-charrettes for public building or publiclyfunded projects affected by Chapter 39.35D RCW. An *eco-charrette* is defined by the National Charrette Institute (NCI) as, "a collaborative planning process that harnesses the talents and energies of all interested parties, to create and support a feasible plan that represents transformative community change." Charrette services include technical assistance, facilitation and a written, illustrated post-charrette report with recommendations. Agencies affected by the green building mandate have welcomed this service as evidenced by the volume of requests for it. Some of the projects that Ecology facilitated charrettes for include:

ArtSpace Everett Lofts

This project was a joint venture between ArtSpace, a national non-profit, and the local Arts Council of Snohomish County. The project will replace a parking garage in downtown Everett with mixed-use commercial development. It will provide 40 units of affordable housing for artists and their families; create a Visual Arts Education Center, arts-related commercial space, and new offices for the Arts Council. The bottom floor is

to have a ceramics 'hotshop' and exhibition space and each unit on the upper floors will be designed with accommodations for the lifestyle of an artist. Funded potentially with Housing Trust Fund money, the developers are trying to achieve the Evergreen Sustainable Development Standard and possibly LEED Gold.

The Buck Property, San Juan Community Home Trust

The Robert S. Buck family and the Home Trust have been collaborating on an overall design for a 46.5 acre parcel that will be annexed to the Town of Friday Harbor and ease the housing shortage on the island. The project will integrate 120 affordable homes in a three-phase building program with market-rate homes, open space, principles of low impact development (LID), and bicycle/walking paths, developed into one cohesive neighborhood.

Housing Development Center

Affordable Community Environments (ACE) is partnering with the Boys and Girls Club and Fruit Valley Elementary School to provide an innovative mixed-use project. The project will include approximately 48 units of rental housing serving a range of households, including low-income families with children. Community space will provide after-school programming for neighborhood children in partnership with the Boys and Girls Club. Also planned are facilities and services for residents of all ages in the project, commercial space that will house ACE's new corporate offices, and, potentially, additional office or neighborhood serving retail. The event was well attended and resulted in the project team choosing to exceed the minimum requirements of the Evergreen Standard for Affordable Housing.

Phoenix House

The Longview Housing Authority (LHA) joined with the Washington State Drug Abuse Prevention Center (DAPC) to construct a multi-family residential property in Kelso that will serve as transitional housing for 20 post-partum women completing alcohol and substance abuse treatment, and for their dependent children. Three two-story structures will have private rooms clustered around shared, central living rooms and will also contain services for the recovering moms. The well-attended event resulted in the project team deciding that they were going to comply with the Evergreen Standard for Affordable Housing even though they were not required to do so.

Olympic Crest Phase II

The next part of a multi-family affordable development acquired by the Housing Authority of Thurston County in 1993, the Phase II project will be three, two-story wood frame buildings with a mix of 2- and 3-bedroom units to make eight permanentlyaffordable apartment homes per building. The new 1.1-acre development is in East Olympia, and like its adjacent attractive, privately-situated housing, Olympic Crest Apartments, Phase II is expected to be rented at capacity with low turn-over. Pervious pavement for parking, native landscaping and proximity to a popular trail are also features of the project.

Sail River Heights, Makah Tribal Housing Department

Sail River Heights is a 51-acre parcel that lies south and slightly east of the town of Neah Bay. Working jointly with CTED, USDA, US Indian Health Service, and Common Ground in Seattle, the Makah Tribal Housing Department plans are to develop a badly-

needed, mixed-use tribal neighborhood of affordable/low-income homes with related, supportive community uses, as part of the ongoing Tribal Homeownership Project. Market-rate rental housing for medical / professional staff may also be developed.

The Makah Housing Authority is developing a large logged parcel for 20-70 affordable homes. Since Housing Trust Fund dollars will finance part of this project, Ecology is helping organize the eco-charrette(s) that the Evergreen Standard requires. Staff is working jointly with Common Ground, which has been providing technical assistance to the Housing Authority for the conception of this phased project.



The Washington State Department of Fish and Wildlife has not built a new hatchery in over 20 years. Located in Tumwater, the Deschutes Hatchery will be constructed to comply with the Leadership in Energy and Environmental Design (LEED) Silver Standard or above. The charrette provided the design team an opportunity to learn about the LEED system. After initial skepticism, the group engaged the process and came up with a number of sustainable strategies that will be integrated into the project. This will be the first LEED hatchery built.

Organizational Support for Private Sector Efforts

The following groups are instrumental in fostering sustainable building in the state. Ecology supports their membership and activities with technical assistance, planning, and in-kind work, often as Board or Steering Committee Members:

United States Green Building Council (USGBC) has been

instrumental in encouraging adoption of green building practices by the commercial building sector nationwide with their Leadership in Energy and Environmental Design (LEED®) programs.

Cascadia Region Green Building Council is a regional branch of the USGBC that encourages sustainable building in the states of Washington, Oregon, Alaska, and the Canadian Province of British Columbia. As a member and partner, Ecology provided technical assistance for the Appraisal Guide, a collaborative effort with Built Green® (See below), that is being completed through Public Participation Grant (PPG) funding. The Guide will help the real estate community appraise green features in buildings, and help bridge the current financing challenges in the green building sector.





Northwest EcoBuilding Guild pioneered green building in the State and continues to lead its members toward increasingly sustainable practices.

BuiltGreen® has grown from a few local building association groups into the premier residential green building program in Washington. Ecology has assisted in expanding the program in Eastern Washington, helping form new local chapters and launching their checklists tailored to the climate and needs of their area (BuiltGreen Tri-Cities/Walla-Walla, Inland Northwest Built Green, Central Washington BuiltGreen Association and Built Green – Spokane Home Builders Association).



Habitat for Humanity is a national non-profit organization that builds homes through volunteers and 'sweat equity' for families otherwise unable to afford them. Through a successful PPG, Ecology helped develop content for the Mainstream Green Conference held in Tacoma in October 2008. The conference increased Habitat's commitment and knowledge base on the benefits of green construction and how to apply green strategies. Habitat also operates the ReStore that sells used construction materials or materials left over from construction projects, much like a thrift store. Ecology is assisting in establishing these where possible, since they address an existing gap in the construction and demolition debris reuse and recycling infrastructure.

National Sustainable Building Advisor Program (NaSBAP) is a nine-month, community college-based program that educates building professionals, public sector personnel, and other interested people about the range of green building approaches.

Washington State Hotel and Lodging Association has started work toward greening the existing hotel and lodging stock, and their operation and maintenance practices.

Organizational Support for Counties and Cities

Sustainable Communities of Clark County is a collaborative effort of a non-profit organization, Project GreenBuild, with local green building businesses joined by building officials, planners and solid waste specialists from the Clark County and the Cities of Vancouver, Washougal, La Center, and Battle Ground. In partnership with the local governments, Clark County applied for and was awarded an Ecology grant to develop a local green building program within the joint Sustainable Communities of Clark County framework.

Sustainable Development Task Force of Snohomish County, now a non-profit, is an effective *ad-hoc* group of business professionals and local government officials who volunteer time and expertise to advocate for and educate about sustainable development in Snohomish County. The Task Force is working with county plan reviewers to streamline the permitting process as an incentive to developers to use LID.

Chelan County and groups within it have begun a focus on sustainability. Ecology has been working with the City of Wenatchee, Chelan County, Chelan PUD, Port of Chelan, Wenatchee Valley Community College, the local realtors' association, and other various stakeholders representing several interests, to develop a program that would be very similar to the Snohomish Sustainable Development Task Force. The realtors' association intends to apply for PPG funding for this project, which will eventually lead to a sustainability element in the Chelan County Comprehensive Solid Waste Plan.

Sustainable September was initiated in 2007, by the Kirkland Chamber of Commerce, two nearby community colleges and the City of Kirkland to foster sustainable business and living practices with events focused throughout September.

Friends of Tenino, a citizens' group, approached Ecology in search of information about sustainable development and resources that can be used by the city's planning commission to create incentives for green and community-oriented development. The group promotes principles of sustainability, low-impact development, and smart growth for the expansion of Tenino, and was exploring opportunities for conducting a community-based eco-charrette.

Spokane Green Collar Jobs Task Force is a partnership of local city government economic development programs, the Spokane Community Colleges, and local non-profits to create a Green Collar Jobs industry in Spokane.

Yakima Area Arboretum is working with Ecology, Central Washington Built Green Association, NW EcoBuilding Guild, and Living Shelter Design to develop a framework for a green remodel of the Arboretum's Jones Center. This project will serve as a classroom facility and be a green building that showcases some of the more elaborate green technologies available on the market. The center will have interpretive displays on the green technologies in the building and describe the benefits of building green.

A few other projects for which Ecology has consulted include:

- *Heritage Center*, a \$200 million project in Olympia slated to start construction in 2010
- *Lemon House*, a single-family effort to start a demonstration remodeling project in Thurston County
- Project GreenBuild's Living Building in Vancouver
- *The North-South Corridor*, possible deconstruction in Spokane of a major arterial (multi-agency involvement)
- *The World for a Sustainable Humanity's retrofit an existing urban neighborhood*, using only green technologies, also in Vancouver

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

Guided by the *Beyond Waste Plan*, Ecology seeks partnerships with institutions, agencies and communities around the state to expand and strengthen closed-loop recycling and reuse of organic materials. In 2007, the total amount of organics collected for recycling or reuse increased by 195 thousand tons compared to 2006. (See Figure 2.2.)



Ten milestones were identified as critical during the first five years of the *Beyond Waste Plan* implementation if this long-term goal is to be achieved.

To date, four out of the ten 5-year Organics Milestones have been achieved or exceeded:

- State government and other large institutions use Ecology's food scrap recycling project as a model.
- Best management practices for organics recycling are in use and at least 6 programs are operating at institutions and agencies.
- Organics recycling goals and actions are incorporated into several local solid waste plans.
- One or more pilot projects using biomass energy technology are in operation.

Significant progress has been made on the additional five Organics Milestones:

- Strategy for increasing agriculture and industrial organics recycling is being implemented.
- Effective incentives for organics recycling are identified and pursued.
- Home composting programs are active and successful in every county.

- A plan to address statutory and regulatory barriers to closed-loop organics recycling is widely supported.
- Most people are aware of healthy soils program and a significant percent of public understand benefits of healthy soils.

Minimal progress has been made on the remaining Milestone:

• Product labeling requirements in place for organic products that are sold or given away.

As we expand technical and financial assistance to our partners, the gap narrows between organics disposed and organics recycled and diverted from the landfill, and closed-loop organics management becomes more tangible.

Partnering with Schools and Universities to promote organics recycling

Several organics research and demonstration projects were completed and initiated in 2007/2008:

- Earth TubTM Research: *Beyond Waste* contingency funds helped pay for Earth Tub research conducted by Washington State University (WSU) Puyallup Research Station. Earth TubsTM are small, contained systems that can be used on-site to compost organics such as food scraps.
- WSU gathered "finished" compost from four Earth TubsTM around western Washington (including Ecology's Earth TubTM) to evaluate the quality of the product. The study concluded that regardless of feedstocks used or temperatures reached during the composting phase, after 24 weeks of curing outside of the Tub, most of the products earned a high quality mark. WSU created a final report of the study that can be found at

http://www.puyallup.wsu.edu/soilmgmt/EarthTub.htm

- Vermicomposting Demonstration: Sierra Heights Elementary School in the Renton School District received a 2007/2009 Organic Waste to Resources grant to build a worm composting program at their school. By the end of the grant cycle, Sierra Heights will have a permanent composting program at the school. They will also write a "How To..." manual and model vermicomposting program for the rest of the school district.
- Washington State University (WSU): Ecology and the WSU Energy Extension have partnered to increase staff technical assistance and base knowledge as it relates to biomass and bioenergy.
- Advanced Organics Processing Technologies: Washington State University and University of Washington received several 2007/2009 Organic Waste to Resources grants. (For additional information about these projects, see Chapter 1 – Issues Facing Solid Waste.) Research topics included:
 - Turning urban and forestry wood wastes into transportation fuels.
 - Using biochar (a by-product of pyrolysis) as a soil amendment.
 - Creating bio-hydrogen from food scraps.
 - Examining the carbon sequestration potential of carbon amended soils.
 - Testing the quality of biosolids co-digested with food scraps at a wastewater treatment plant.

Partnering with local government to build organics processing capacity through planning and grants

Counties are adding *Beyond Waste* Organics Initiative elements to their solid waste plans. Through Coordinated Prevention Grants (CPG), Ecology is helping communities build programs to manage organic materials. Education and outreach programs for home composting and natural yard care, expanded residential and commercial organics collection, on-site composting for schools, chipping programs and full scale composting facility development all contribute to the goal of closed-loop organic materials management.

Partnering with stakeholders to identify incentives and decrease regulatory barriers to closedloop organics management

Climate change and the push to reduce Washington's carbon footprint (greenhouse gas production) drives much of the current regulatory activity. In this case, anaerobic digestion was identified by the Climate Action Team as a process to manage organic wastes and reduce greenhouse gas production. The process captures methane from decomposing organic matter to fuel a generator and create energy. (See *Chapter 1 - Issues Facing Solid Waste.*)

Dairy farms may benefit from anaerobic digesters, where in addition to manure, they may also process food scraps from the solid waste stream. Ecology is leading a stakeholder group of dairy farmers, digester manufacturers, health district representatives, local solid waste staff, and composters to identify regulatory barriers for facilities handling solid waste. (See *Chapter 1 - Issues Facing Solid Waste*.)

Partnering with the Washington Organic Recycling Council to promote Healthy Soils and Expanding Compost Markets

Washington Organic Recycling Council (WORC) is a not-for-profit association dedicated to the support and promotion of all aspects of organics recycling. WORC members include compost facility owners and operators, local and state government representatives and others with an interest in all things organic.¹

Two of the *Beyond Waste* Organics Initiative milestones are being advanced by WORC through a Public Participation Grant (PPG). The final products of WORC's efforts will include soil blending trials with different composts, demonstrating the amendment qualities, a revised guide on compost end use, and several presentations on incorporating commercial compost in pre-andpost construction landscapes. Additional workshops will target topsoil manufacturers with data supporting the increased use of compost in topsoil blends. These outreach materials and presentations create a demand for compost while promoting healthy soils.

¹ For more information about membership and activities of WORC, please go to <u>www.compostwashington.org</u> or email <u>info@compostwashington.org</u>.
WORC chose Healthy Soils as its theme for the 2008 Annual Conference. The topics revolve around the connections between healthy soils and human health, climate change, and organics recycling.

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

Ecology views commercial composting as a key element in the closed-loop organics recycling system. To build consumer confidence, the compost facilities which 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 while protecting human and environmental health.

Composting facilities are regulated under *chapter 173-350 WAC*, *Solid Waste Handling Standards*. The composting standards include design and operating requirements for permitted facilities. In addition, testing criteria must be met in order for the final product to be considered "composted material". *WAC 173-350-220, Composting Facility Standards* also offer several categories of composting activities which are exempt from solid waste permit requirements. The exemption categories were designed to "promote composting while protecting human health and the environment."

In 2007, forty-one (up from 33 in 2006) commercial facilities reported over 855,070 tons of organics were processed into over 1,091,415 cubic yards of compost. This is an increase from 33 facilities processing 719,312 tons in 2006. (See

<u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u> for the facilities reporting composting activities in calendar year 2007.) Organic materials processed by these facilities, if generated as a waste in Washington, are included in the recycling and diversion data in Chapter V of this report, and listed by type of feedstock. The material is also counted in the recycling and diversion data listed in the aforementioned website and listed by type of feedstock.

Food scrap composting occurred at ten compost facilities throughout the state. Food scrap categories include post-consumer, pre-consumer and food processing waste. Of these ten facilities, nine accepted pre-consumer food scraps, four accepted post-consumer food scraps, and two accepted food processing waste. Some of these facilities accepted more than one category of food scraps, including four facilities that accepted both pre- and post-consumer food scraps.

Ecology continues to work with Washington State University 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 are continuing to partner with Washington Department of Transportation promoting compost use for erosion control and stormwater management along roadways.

Compost Facility Operator Training

Every year, Ecology partners with the WORC and Washington State University Puyallup Research Station to lead the Compost Facility Operator Training program. In 2008, compost facility operators, owners and regulators from as far away as Guam, descended on Puyallup to learn about safe and effective ways to make compost from a multitude of feedstocks. In addition to classroom time learning about odor control, facility design, and soil biology, students get hands-on experience building their own compost piles, sampling compost, touring compost facilities and evaluating pre-built piles.



Instructor Jeff Gage (Compost Design Services) holds a composting piece of fish for a student to smell.



Students watch instructor, Craig Cogger (WSU Puyallup), use a soil sample to illustrate soil quality.

This training program provides an invaluable opportunity for students and instructors to learn and share ideas regarding the proper operation and regulation of compost facilities in Washington.

Biosolids

Managing biosolids by recycling/beneficial use is the preferred choice in Washington. Ecology's biosolids program supports the state's goal and statutory preference for the 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 to be "biosolids" and is regulated as a commodity, not as a solid waste. The statute further directs that biosolids be beneficially recycled to the maximum extent possible. We strongly encourage all producers of biosolids to pursue beneficial use.

The total production of biosolids within the state in 2007 was approximately 99,500 dry tons. Of this amount 82 percent was land applied, 14 percent was incinerated, 0.5 percent was landfilled, and 4.5 percent was temporarily stored (most of which was to be land applied in 2008)

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 Agriculture in Douglas County (<u>Left</u>: Control; <u>Middle</u>: Commercial Fertilizer; <u>Right</u>: Biosolids)



Use of Biosolids in Horticulture in King County (Left: Control; <u>Right</u>: Biosolids Compost)





Permit Program and 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 jurisdiction, oversees the state biosolids program. In order to support the state biosolids program, Ecology charges a fee to permittees.

The state biosolids rule was revised in 2007, and went into effect on June 24, 2007. The current biosolids general permit went into effect on June 5, 2005, and will expire June 5, 2010.

The state biosolids rule and the biosolids general permit govern the quality of biosolids applied to the land and the 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 that are applied to areas where access and crop harvest restrictions can be put in place. The 2007 revision of the state biosolids rule also requires screening and sets a standard for allowable recognizable manufactured inert in biosolids similar to that for compost under *WAC 173-350-220, Composting Facility Standards*.

There are about 375 facilities that are required to be covered under the biosolids general permit. The majority of facilities are publicly owned wastewater treatment plants, including those on state and federal facilities (military bases, prisons, parks, etc.). Other types of facilities that are 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), and 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.

"Provisional" approval is obtained by a facility 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 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 protect human health and the environment. Any such conditions are subject to appeal.

By streamlining the permitting process through changes to the state biosolids rule and the biosolids general permit and making a greater effort towards getting the necessary information from all permittees, we expected the rate of final approvals provided during the current permit cycle would be much greater than during the first permit cycle. This has been shown to be the case. During the seven years under the first biosolids general permit cycle, only 85 final approvals were granted. However, during the three years since the revised biosolids general permit was issued, Ecology has issued 150 final approvals.

Delegation to Local Health Department Jurisdictions

Currently, a total of six local jurisdiction health departments have accepted some degree of delegation for carrying out the state biosolids program. Among those only four have current agreements with an expiration date as required by the state biosolids rule. However, two jurisdiction health departments continue to operate agreements with no stated expiration date. Each of the delegated jurisdiction health departments have entered into a formal *Memorandum of Agreement* with Ecology.

The delegated jurisdiction health departments have actively taken the lead in conducting various aspects of the biosolids management program within their jurisdiction. Most other jurisdiction health departments provide some degree of assistance to Ecology. Funding and workload demands on staff continue to be the major reason given by jurisdiction health departments when choosing not to pursue delegation of the biosolids program.

Partnering for the Environment through Environmentally Preferable Purchasing (EPP)

Environmentally Preferable Purchasing (EPP) means considering environmental and human health effects when purchasing decisions are made. Each year, state and local governments in Washington have the opportunity to leverage over \$4 billion in purchasing power to buy products and services that:

- Protect human health.
- Create less greenhouse gas emissions over their lifecycle.
- Reduce or eliminate toxic chemicals.
- Boost energy and water efficiency.
- Create less waste.
- Support markets for green products and green jobs.
- Save money through increased product life, fewer health and safety claims, and lower maintenance and disposal costs.

The *Beyond Waste Plan* encourages state and local government to increase the purchase of environmentally preferable goods and services in the following priority areas: electronic products, cleaning products, vehicles and automotive products, building materials (including paints, carpet, fixtures, and furnishings), and landscape and grounds management.

Ecology's EPP team, including staff from the Solid Waste and Financial Assistance and Hazardous Waste and Toxics Reduction Programs, helps state and local agencies meet *Beyond Was*te EPP goals through their work in the following areas:

EPP Website

Ecology launched the environmentally preferable purchasing section of the *Beyond Waste* website, which includes:

- Concise EPP product fact sheets on how to purchase flooring, vehicles, recycled paint, electronics, cleaning products, lighting, compost, native plants, and steel wheel weights.
- How to use standards and certification programs to add EPP language to contracts.
- EPP-related laws and directives.
- EPP and green meeting resource guides.

In 2009, the website will be expanded with more product fact sheets, information on toxics in products and lifecycle analysis, and other tools. (Go to the *Beyond Waste* EPP website at http://www.ecy.wa.gov/beyondwaste/epp.html to view.)

Collaboration with the Office of State Procurement

Ecology works collaboratively with the Office of State Procurement (OSP) at the Department of General Administration to increase the number of state contracts offering environmentally preferable products. These contracts are available to state agencies, political subdivisions, higher education and certain non-profits. In 2008, Ecology worked with OSP on the following state contracts:

- Flooring products, by including specifications for carpeting that meets the NSF-140 environmental standard.
- Flooring installation, contract by insuring that reclamation of used carpet was included and specifying recycled content.
- Cleaning chemicals.

- Recycled paint.
- Grainger Industrial Supplies.
- Vehicle parts, by adding steel wheel weights.
- Electronics by, providing e-cycling language.

Ecology also worked with OSP to develop a policy for the General Administration Purchasing Manual on environmental criteria for computer purchases and provided comments on the new state recycling contract.

Ecology is also working with OSP to boost marketing of EPP products and to include language in contracts to require vendors to report purchases of EPP products. OSP and Ecology will be working together in the future to green more contracts.

Outreach to State and Local Governments

Since over 90 percent of state spending occurs off of state contracts, Ecology performs outreach to governments to offer help with achieving their EPP goals. Ecology provides training and technical assistance to purchasing, facilities and sustainability staff. Ecology responded to more than 70 technical assistance requests from state and local governments and other entities in 2008.

Many small business owners in Washington are interested in competing for government contracts for environmentally preferable products and services. Ecology is working with state and local governments to provide education and technical assistance to innovative business owners.

Laws and Directives

In 2008, Governor Gregoire's Office of Sustainability initiated development of a new Executive Order on Sustainability. Ecology worked with the Interagency Sustainability Committee and the Office of State Procurement to develop the sustainable purchasing section and guidelines of the new Executive Order.

Also in 2008, the Governor's Climate Action Team approved the Beyond Waste Implementation Working Group's proposal to reduce the carbon footprint of governmental purchasing. It is anticipated that proposed legislation will require all purchases made with Washington state funds meet environmental performance characteristics, such as lowest possible Greenhouse Gas emissions and no toxicity. Currently, state purchasing contracts are awarded on price, availability and physical performance. This measure, if and when enacted, will add a fourth criterion, environmental performance, to the list.

State government is directed through laws and directives to make progress in environmentally preferable purchasing. Current EPP-related laws and directives are:

- Executive Orders 02-03 and 05-01 both direct state governments 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.
- The Governor's Climate Change Challenge (Executive Order 07-02) was signed by Governor Gregoire in 2007. It establishes the following goals for reducing greenhouse gas emissions and building a clean energy economy for Washington State:
 - Retrofit the most polluting diesel engines in school buses and local government vehicles.
 - Construct high performance green buildings.
 - By 2009, reduce total energy purchases by state agencies by ten percent from 2003 levels, thus achieving the goals established in Executive Order 05-01.

Promoting Strong Product Standards and Certification Programs

Standards and certifications programs are important tools for encouraging the design of products and services with positive attributes. Standards establish specific human health, environmental and social criteria by which products can be measured and compared. Certifications or "ecolabels" are awarded to products that meet the 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.

In 2008, Ecology participated in the ongoing revision of the Green Seal standard on cleaners, known as GS-37. Cleaners may contain chemicals that cause cancer, respiratory irritation, skin and eye corrosion, and other harmful effects to human health and the environment. GS-37 approved products are used widely in government buildings, schools and other institutions, so revised standards are very important.

Widely accepted standards and certification programs are designed to:

- Incorporate and address product life cycle stages from raw materials to end-oflife.
- Require on-site testing and verification by an independent laboratory or certifying group.
- Often incorporate performance and safety standards that the product must meet or exceed.

Reliable standards and certification organizations:

- Are independent of ties to product manufacturers.
- Use a broad-based stakeholder consensus process (typically involving manufacturers, users, government, environmentalists, and academia) or other rigorous process to develop standards.

- Provide information 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, strong standards encourage the design of products and services with positive environmental and human health attributes.

Reducing Small-Volume Hazardous Materials and Wastes (Moderate-Risk Waste, MRW) Initiative

As Washington looks forward to the second five years of the implementation of the *Beyond Waste Plan* it is time to evaluate progress so far as well as review recommendations and milestones within the initiative. This process of evaluation and modifications to this initiative has begun and will continue through most of 2009. The current management system for wastes from households and businesses that generate small quantities of hazardous waste relies on taxes and fees which cannot sustain it over the long run. Below are an overview of the initiative and some highlights of progress or status of each recommendation. Before each recommendation is discussed it is important to understand the overarching goals of the MRW Initiative.

The following are **30-year goals for the Small-Volume Hazardous Materials (MRW) Initiative**:

Safer Products and Services

Most threats to human health and the environment have been eliminated by minimizing chemical hazards associated with the life-cycles of products and services. Products and Services that are less toxic are available to meet consumer demand, and highly-hazardous products are generally unavailable.

Efficient Materials Management

Human health and the environment are well protected. Reuse and recycling are optimized for any remaining hazardous materials still in use as producers, retailers, government, consumers, the solid waste industry, and other sectors have collaboratively developed a system for safely and responsibly managing hazardous materials.

Greater Economic Vitality

Economic sectors in Washington thrive in the domestic and global marketplace as hazardous materials are systematically eliminated from products and services. New programs and technologies are developed to manage the remaining hazardous materials more effectively and efficiently. Consumer confidence has increased, risks and liabilities have decreased, and costs for managing wastes are reduced.

Many opportunities exist to work toward reducing and eliminating the risks associated with these products and materials. Momentum is building for less harmful alternatives to be offered and used, and for more of these products and materials to be reused and recycled. Several regional and national initiatives are already underway and can be advanced through implementation of

the MRW recommendations. Ultimately, we need to move from a government-funded special diversion and disposal system for moderate risk wastes to systematically eliminating hazards associated with these products and materials in partnership with the private sector.

The original ten recommendations of the MRW initiative appear below in two groups. The first eight recommendations are actions that will work toward eliminating hazardous substances from products and services in the future. In addition, these actions will relieve some of the current pressure felt across Washington State by the MRW collection network, which is financially unable to manage all of the MRW generated. The last two recommendations focus on strengthening the effectiveness of the existing MRW management system, which provides numerous benefits throughout the state.

Eliminating MRW hazards in the future

- Prioritize substances to pursue.
- Reduce threats from mercury.
- Reduce threats from Polybrominated diphenyl ethanol (PBDE).
- Develop an electronics product stewardship infrastructure.
- Ensure proper use of pesticides, including effective alternatives.
- Reduce and manage all architectural paint wastes.
- Lead by example in state government.
- Ensure MRW and hazardous substances are managed according to hazards, toxicity and risk.

Ensuring that the existing MRW system is effective

- Fully implements local hazardous waste plans.
- Ensure facilities handling MRW are in compliance with environmental laws and regulations.

As a first step towards the next five years of the *Beyond Waste Plan* Ecology is getting input from staff and stakeholders which will continue into 2009. In the mean time it is useful to recognize that significant progress has been made on many of the recommendations during the first four plus years of the original plan implementation cycle. Short highlights of the progress made to date follow:

- Local governments are increasingly updating their out-of-date hazardous waste plans and re-examining the required local programs to provide balanced programs to their citizens and businesses.
- The new *Guidelines for Local Hazardous Waste Management Plans* are expected to be completed in 2009 and should lead to more updated local plans that support the goals of the *Beyond Waste Plan*.
- Many local governments are ramping up implementation of their local hazardous waste plans to serve their local business communities and citizens, and assure that their collection facilities are in full compliance with the solid waste

rules.

- Local governments are upgrading existing MRW collection facilities to be in full compliance with the solid waste rules, *WAC 173-350-360, Moderate Risk Waste Handling*.
- Innovative local MRW programs to assist small businesses and promote integrated pest management methods are spreading across the state. This trend includes an effort in support of the Urban Waters and Puget Sound Initiatives called the Local Source Control Specialists Program. This is a partnership with counties and cities around the Puget Sound and in the Spokane River areas resulting in the hiring of local source control specialists. These local control specialists have received extensive training from multiple Ecology programs and industry experts and have made hundreds of technical assistance site visits to local businesses. These specialists are helping local businesses manage their wastes, stormwater and other processes with a higher level of safety and environmental protection. Some of the counties now making Source Control Visits to businesses.
- Product Stewardship principles and programs are becoming better understood and supported by more counties. For example, many local governments will become partners with the Washington Materials Management and Financing Authority to collect covered electronics and get reimbursed by manufacturers for providing these services.
- All Moderate Risk Waste (MRW) collection facilities in the state have been inspected for compliance with the current rules and either are in compliance or are on compliance schedules.
- More than 100 contractor or wholesaler locations are taking mercury containing thermostats under the Thermostat Recycling Corporation's take back program. In addition, where there was one local household hazardous waste collection facility taking mercury thermostats in 2006, there were more than 14 facilities offering that service to the public in 2007, due to the expansion of the TRC program to public collection centers.
- The Washington Poly-Brominated Diethyl Ether (PBDE) law required products banned from the state on the following schedule:
 - Bans the use of the penta and octa forms of PBDEs, with limited exceptions, by 2008.
 - \circ Bans the use of the deca form in mattresses by 2008.

- Bans the use of the deca form in televisions, computers, and residential upholstered furniture by 2011, as long as a safer, reasonable, and effective alternative has been identified by the state departments of Ecology and Health and approved by fire safety officials.
- An Electronics Product Stewardship system is emerging (See discussion below). This is the result of legislation calling for a comprehensive statewide system to recover TVs, computers and monitors at no cost to the user. The Materials Management and Financing Authority has developed a statewide collection system for covered electronics that started January 2009.
- The national Paint Product Stewardship Initiative continues to make progress toward the implementation of a nationally-coordinated leftover paint management system funded by the paint industry (See discussion below). A second Memorandum of Understanding (MOU) is being implemented and has been signed by 16 local governments and supporting organizations in the state. The MOU calls for:
 - Development of a sustainable industry financing system, a Paint Stewardship Organization.
 - A statewide demonstration project in Minnesota.
 - Subsequent roll-out of a national system beginning with Washington and Oregon.
- Environmentally Preferred Purchasing (EPP) systems and practices are being developed and promoted. (See discussion above.)
 - A new EPP Web site has been established. A review of the navigation of the Website has taken place.
 - We are continuing to work with General Administration (GA) regarding incorporation of environmentally preferable purchasing in their trade show and in general purchasing contracts.
 - An interim recycled-content paint purchasing state contact has been completed at GA.
- The Institutionalizing Environmentally Preferable Purchasing and Tri-state Meeting were combined to discuss how best to:
 - Institutionalize environmentally preferable purchasing.
 - Collaborate on the eco-certification of products.
 - Greening the Grainger catalog.
 - Sharing of product fact sheets.
 - Continue on-going efforts to launch environmentally preferable purchasing Website.

Architectural Paint Product Stewardship – Partnering with Industry for a National Solution

Why is paint an issue?

Leftover architectural paint is an unintentional but natural leftover product from painting projects. It is estimated that ten percent of all paint sold becomes leftover. Despite the fact that with proper sorting 60-70 percent of latex paints can be recycled into new paint, very little ends up being recycled. Latex is approximately 60 percent of the leftover paint brought into household hazardous waste (HHW) collection programs in Washington. The total quantity of leftover paint generated (latex and oil-based) is about 0.247 gallons per person per year. Therefore, with approximately 6.5 million Washington residents, an estimated 1.6 million gallons of leftover paint is generated each year in Washington.

Because leftover paint ranges between 40-70 percent of all HHW, it is a significant financial and logistical burden for local government programs. Free liquids are not allowed to be disposed of with municipal solid waste. Some local jurisdictions encourage individuals to solidify their latex paint prior to disposal, but this management option is not always practical and can be expensive. Additionally, the 40 percent of leftover paint that is oil-based contains hazardous flammable toxic liquid ingredients which should never be disposed of with solid waste. This same scenario plays out in programs across the US and has lead to the Paint Product Stewardship Initiative. Government needs the paint industry expertise to help solve this problem in a safe, resource efficient, and cost-effective manner.

Origins of the Paint Product Stewardship Initiative (PPSI)

The Paint Product Stewardship Initiative (PPSI) was formed through the efforts of the Product Stewardship Institute (PSI) beginning in 2003. PSI provided the capacity to effectively coordinate a multi-stakeholder and multi-state approach to the issue on a national level. The goal of the PPSI was to find a resolution to leftover paint using the principles of product stewardship because the status quo was not adequate to address the challenge.

The Paint Industry Steps Up

The National Paint and Coatings Association (NPCA) is a voluntary non-profit association, originally organized in 1888, and represent approximately 350 manufacturers, distributors, and raw material suppliers to 95 percent of the US paint industry. NPCA serves as an industry advocate, provides compliance assistance resources, and is a community liaison for the industry. NPCA has previously worked with individual states on regulatory issues but had never been approached to develop national solutions before PSI contact them in 2003. They liked the idea of a coordinated approach and were very willing to engage in the process.

The Paint Product Stewardship Initiative (PPSI)

With facilitation, logistical support, and research provided by the Product Stewardship Institute, a group of over 50 stakeholders met quarterly for a year at various locations in the US. This effort resulted in a Memorandum of Understanding (MOU) which called for funding to research eleven topics deemed critical to understanding before potential solutions

could be created. Nearly \$1M was raised by the various stakeholder groups to fund these projects. (Additional information can be found at

http://www.productstewardship.us/displaycommon.cfm?an=1andsubarticlenbr=208.)



At the conclusion of the first MOU and after most of the projects had been completed, a second MOU was developed and signed. The majority of the stakeholders and more than 16 Washington local governments and organizations were signatories to the second MOU. The second MOU called for the development of a nationallycoordinated leftover paint management system to be developed and primarily financed by the paint industry. Governments will continue to have a significant role in

leftover paint management. These roles will include encouraging waste reduction, recycling, and help in establishing additional collection points for leftover paint where needed. A demonstration project marks the beginning of the implementation part of the second MOU. One state will be used to explore how the system can work on a statewide basis prior to rolling out the nationallycoordinated system. The final report can be found at

http://www.productstewardship.us/displaycommon.cfm?an=1andsubarticlenbr=175

At this point, it is anticipated that Minnesota will be the location for the demonstration project. NPCA will provide funding for continuation of the PPSI process and the design of the demonstration project through:

- A collection/disposal business plan.
- An education/marketing campaign proposal.
- Design of a new non-profit Paint Stewardship Organization (PSO).
- Continue facilitation of the process by PSI with contributions from government stakeholders.

In March 2007, NPCA developed a statement of support of the second MOU. Key elements in the NPCA statement regarding implementation and direction included:

- Consumer education.
- No mandatory retail take-back.
- Cost effective.
- Industry operated Paint Stewardship Organization.
- Implement the demonstration project (probably in Minnesota).
- Use results from the demonstration project to inform the national roll-out process and schedule.

PPSI Demonstration Project

A group of stakeholders were formed as the PPSI Demonstration Project Planning Committee with representatives from US EPA, PSI, Iowa, Snohomish County, Ecology, Amazon Environmental, Hirshfields Paint, Dunn-Edwards Paint, Minnesota Pollution Control Agency, Minnesota Solid Waste Management Coordinating Board, and NPCA. The agreed process is to pass enabling legislation followed by rapid implementation, monitoring and evaluation of the demonstration project. With early passage of an enabling bill, implementation could begin as soon as early 2009. Specific tasks to be accomplished during the demonstration project include:

- Create the Paint Stewardship Organization (PSO), which will be funded and led by NPCA.
- Educate about source reduction.
- Increase collection points as needed.
- Support the revenue side for recycled paint markets.
- Measure/evaluate the programs.

Supporting product stewardship legislation is needed to address a number of legal and fairness issues. These include:

- Prohibiting collusion among competitors regarding price or markets.
- Ensuring all manufacturers are participating.
- Providing a mechanism to assure that manufacturers' costs are recovered.
- Internalizing cost in the product so manufacturers pay for the program and pass costs down to retail/consumers.

Progress Continues

NPCA and industry stakeholders have moved a long way towards product stewardship since 2003. At the time of this writing Washington State does not plan to sponsor paint product stewardship legislation in 2009, but there is legislative movement that might include paint in this session or the next session. Oregon is working on possible product stewardship framework legislation that may be introduced into their 2009 legislative session.

The *Washington Electronics Recycling Act, Chapter 70.95N RCW*, provides a basis to model other product stewardship initiatives in Washington and elsewhere. The Northwest Product Stewardship Council's Paint Group is collecting data and performing analysis in collaboration with other leading states to facilitate the smooth implementation of the national system in the Northwest.

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

Beyond Waste is the state plan for managing hazardous and solid waste. This 30-year plan has clear and simple vision: eliminate wastes whenever we can and use the remaining wastes as resources. The goal of the fifth *Beyond Waste* 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.

Ecology's Solid Waste and Financial Assistance Program (SWFAP) and Hazardous Waste and Toxics Reduction Program (HWTR) developed a series of indicators that track progress toward *Beyond Waste* goals. Ecology made major strides on this initiative by developing effective and reasonable ways to measure how successful Washington is at reducing the use of toxic substances and the generation of both solid and hazardous wastes. Ecology is also addressing the broader themes of *Beyond Waste* by developing measures that show how our progress toward these goals relates to economic, environmental and social vitality.

Ecology released the second update of the *Beyond Waste Progress Report* in October 2008. The performance indicators track progress toward the major *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, such as increased economic vitality. We are beginning to see some trends related to the implementation of *Beyond Waste* in some of the specific indicators. Baselines have been established, and the trends are available on the *Beyond Waste Progress Report*. Specific indicators include solid waste generation, hazardous waste generation, risk from toxic releases, solid waste recycling, hazardous waste recycling, electronics recycling, organics recycling, and green building.

The recently updated *Progress Report* has 16 indicators and measures three major areas of focus:

- Eliminating wastes and toxics, and using waste as resources.
- Economic, environmental and social vitality.
- Reducing risks.

According to the *Progress Report*, we are making significant progress in some key areas. We have been recycling more solid waste (garbage), organics (compostable) and electronics (old computers) over the last few years. However, some trends are disappointing. Despite our recycling efforts, in 2006 we threw away \$207 million worth of recyclables. (See recyclable disposed chart Figure 2.3.)



Among the good news is that green building versus conventional construction is increasing. Also, 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, go to the website: <u>http://www.ecy.wa.gov/beyondwaste/bwprog_front.html</u>.

Implementation of 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. As of January 1, 2007, in order to legally sell these products in or into the state of Washington, manufacturers must:

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

Manufacturers are automatically members of the Washington Materials Management and Financing Authority (Authority) and beginning January 1, 2009, they must participate in the Standard Plan for recycling electronic products. Starting in 2010, if a manufacturer or a group of manufacturers meets certain requirements they can opt out of the Standard Plan and form an independent recycling plan with approval from Ecology. The Standard Plan will be managed by a board of directors of the Authority which will be comprised of eleven large and small computer and television manufacturers. The board of directors will prepare, submit and implement the Standard Plan for the recycling of the electronic products covered by the law

Great progress was made as Washington quickly approached January 1, 2009, when households, charities, school districts, small businesses and small governments are now able to drop-off the electronic products covered by this law for recycling at no charge. Accomplishments as of December 2008 include:

- 230 manufacturers have been registered with the Electronic Product Recycling Program.
- A network of 200+ collection sites across the state has been established.
- Four processors (recyclers) of electronic products have undergone the required compliance audit to prove they will meet the performance standards and have been registered to provide recycling services for the Electronic Product Recycling Program.
- Comprehensive rules, *chapter 173-900 WAC*, *Electronic Product Recycling Program*, have been adopted, delineating the requirements of this program for manufacturers, collectors, transporters, and processors of electronic products covered by the law (See <u>http://www.ecy.wa.gov/pubs/0707042.pdf</u>).
- The web site developed for the Electronic Product Recycling Program continues to be augmented to provide up-to-date and detailed information for all affected parties on registration requirements, fees, public involvement opportunities and more (see http://www.ecy.wa.gov/programs/swfa/eproductrecycle/index.html).



• A public information and education campaign has been launched. A program name, logo and easily identifiable web address have been developed through a stakeholder work group. A toolkit full of information has also been developed and distributed to local governments to help them promote the E-Cycle Washington program. Public education materials prepared by Ecology and the Authority are being distributed. Outreach and communication to the media has been initiated and will continue over the coming months, leveraging public interest in the program and generating some free publicity.

Partnering for the Environment through Financial Assistance Grants to Local Government – Coordinated Prevention Grants (CPG)

Coordinated Prevention Grants (CPG) are funded by the Local Toxics Control Account (LTCA).² The CPG program is administered by Ecology through chapter 173.312 WAC *Coordinated Prevention Grants* 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 and improve grant administration.
- Promote regional solutions and cooperation between governments.

The 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.

Eligibility

Eligible applicants for CPG grants include:

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

Ecology allocates the 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 cities that coordinate with counties are eligible to ask for and may receive funding up to the per capita

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

allocation for their city. The availability and amount of funding depends upon legislative appropriations to the LTCA.

Awards

The Coordinated Prevention Grant program awards funds in two cycles, regular and off-set:

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.

Off-Set Cycle: Funds for the off-set 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 appropriations. Ecology awards off-set cycle funds through a competitive process.

The 07-08 Off-set cycle projects began January 1, 2007. Ecology awarded 56 grants for 81 projects totaling \$4,641,608. See the detailed breakout by category below.

The 2007-09 biennial budget was approved by the legislature and appropriated \$25.5 million dollars:

- \$19.5 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.
- \$4.0 million provided for grants to fund new organics composting and conversion, green building, and moderate risk waste initiatives described in the state's *Beyond Waste Plan*. Allocation of these funds occurred during the 09-10 off-set cycle. These projects begin January 1, 2009.
- Up to \$2.0 million of the appropriation may be used for grants to local governments to provide alternatives to backyard burning of organic materials. This will assist local communities that are impacted by the ban of outdoor burning imposed through *Washington's Clean Air Act (chapter 70.94.743 RCW)*.

The 08-09 Regular cycle funds were awarded to 140 Washington counties, cities, and JHDs totaling \$21,066,232. Of these, 20 received Alternative to Burning (ATB) and Beyond Waste proviso funds totaling \$2,382,916. The grant funds were distributed as follows:

	Off-set Cycle 1/1/07 – 12/21/08	Regular Cycle Including ATB 1/1/08 -12/31/09
Organics	\$1,728,089	\$1,378,603
Organics (ATB and BW Proviso)		\$2,382,916
Moderate Risk Waste	\$1,423,592	\$9,140,146
Waste Reduction and Recycling	\$968,677	\$4,956,801
Solid Waste Enforcement	\$233,500	\$3,126,951
Green Building	\$92,750	\$72,439
Other	\$195,000	\$8,375
SUBTOTAL LTCA Funds	\$4,641,608	\$21,066,232
TOTAL LTCA FUNDS		\$25,707,840

Local Government Efforts Implementing Beyond Waste Vision Using CPG Funds

Local governments are carrying out programs that support the *Beyond Waste* vision. Examples of a number of completed and current projects are described below, highlighting efforts in Green Building, Recycling of Organics, and Reducing Threats from Small-Volume Hazardous Wastes.

Organics: Local governments are helping communities reduce the waste of organic materials. Many local governments are building regional composting facilities, setting up commercial and residential food waste collection programs or offering yard waste chipping options. They are also offering discounts on mulching lawn mowers and educating citizens on the options to reduce waste. These options include home composting and planting native plants.

Some example projects include:

- Whitman County Public Works created a public compost facility in the City of Palouse. This will allow the city and residents to compost yard waste.
- San Juan Public Works provided composting workshops and sold composters at a discount to residents as part of their food and yard waste reduction program.
- Thurston County Water and Waste Management worked with the WSU Master Composters to provide education, infrastructure and assistance for establishing food waste composting programs to all schools requesting assistance in Thurston County.

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 are encouraging the building of high performance "green" buildings. They educate builders and give public recognition to those who "build green". Local governments also construct demonstration buildings and help builders reuse materials. Some example projects include:

• King County Solid Waste Division developed a toolkit to assist King County cities in the development of green building programs.

• Seattle Public Utilities developed five building material salvage case studies to help promote residential and small commercial building deconstruction.

Waste Reduction and Recycling: Local governments provide residential and commercial recycling, technical help to businesses, recycling collection events, education programs, on-site waste audits, and recycling drop off locations. These activities help raise Washington's recycling rate. Some example projects include:

- Skagit County Public Works increased recycling at public events by purchasing ClearStream© recycling bins that are shared with five cities in the county.
- The City of Shelton transitioned to a dual-stream automated recycling system by negotiating a new contract with the hauler, changing their service level ordinance, purchasing a few new containers but mostly retrieving a surplus of free used ones, and providing education and outreach to increase participation.

Moderate Risk Waste: Local governments help businesses and residents properly dispose of moderate risk waste (hazardous waste generated from households and businesses in small amounts) by building and maintaining moderate risk waste collection facilities and conducting special collection events. The governments also help small businesses with technical matters, promote the use of less toxic products, and work with others to find solutions for problem wastes such as electronics and mercury. Some examples of new projects include:

- Lincoln County Public Works upgraded their existing Moderate Risk Waste (MRW) facility by adding a permanent floor structure, secondary containment, gas monitoring, ventilation system and a covered structure.
- Kitsap County Health Department established a referral program between local and state business licensing entities and the health department to identify businesses that produce small quantities of hazardous waste to provide them with best management practices, education and technical assistance.

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. (See discussion below. Partnering for the Environment through Local Planning.) These plans outline effective approaches to reduce their solid and hazardous wastes.

Solid Waste Enforcement: Local governments enforce the solid waste laws and local ordinances. They enforce these by permitting and inspecting facilities, responding to complaints about illegal dumping and improper waste handling or storage, and issuing citations.

Grants to Citizens – Public Participation Grants (PPG)

Washington's *chapter 170.105D RCW*, *Hazardous Waste Cleanup – Model Toxics Control Act*, provides for a Public Participation Grant (PPG) program. These grants support projects that help people educate and work together to solve solid waste and hazardous waste problems. These grants make it easier for people (groups of three or more unrelated individuals or not-for-profit public interest organizations) to be involved in waste issues. The goals for the PPG program are:

- Increase the public's involvement in the cleanup and restoration of contaminated sites.
- Fund environmental education projects that emphasize eliminating waste and preventing pollution.
- Carry out projects that promote state solid waste or hazardous waste management priorities.

The PPG program expanded its outreach to the not-for-profit community to try and increase public involvement on projects related to the following:

- Protect Puget Sound (a portion of available funding was set aside solely for projects that assist in achieving the goal of establishing a healthy, sustainable Puget Sound.)
- Commencement Bay, Duwamish River and Spokane River Cleanups.
- Persistent Bioaccumulative Toxins (PBTs) such as mercury, lead and some flameretardants.
- Help put into action the state's Solid and Hazardous Waste Management Plan, the *Beyond Waste Plan*.

Public Participation Grant projects motivate people to change their behavior and take action to improve the environment. These projects create awareness of the causes and the costs of pollution. They provide strategies and methods for solving environmental problems. This highly competitive grant program applies strict criteria to applications, awarding grants to projects that prevent pollution and produce measurable benefits to the environment.

Awards

The PPG program writes grants for either one or two years. All Hazardous Substance Release Site (Cleanup Sites) grants are automatically written for the biennium (2 years). The Pollution Prevention Education/Technical Assistance grants may be written for one or two years. The most a grant recipient may receive for a one-year grant is \$60,000; a two-year grant recipient may receive up to \$120,000.

Funding for the 2007-2009 biennium was the highest allotted to date in the history of the grant program. The PPG allotment was \$3,179,530. Of that amount, approximately \$1,750,000 was designated for projects that would directly impact the present and future cleanup of Puget Sound.

For the July 1, 2007 – June 30, 2008 (fiscal year 2008) grant period, Ecology awarded 41 Public Participation grants funding \$2,241,300 worth of projects. In fiscal year 2008, \$1,276,500 was awarded to Puget Sound related projects (21 projects) and \$964,800 was awarded for non-Puget Sound projects (20 projects.)

Public Participation Grants Achieving Environmental Outcomes

Waste management priorities for the state identified in the Beyond Waste Plan are:

- Reducing the use of toxic substances.
- Decreasing waste generation.
- Increasing recycling.
- Properly managing any wastes that remain.

Many projects receiving grants in fiscal year 2008 are consistent with the goals of the *Beyond Waste Plan* and the *Puget Sound Initiative* and help create the partnerships needed to achieve Washington's vision. Some completed and current projects that reflect the education/outreach activities occurring statewide in Washington State follow:

Puget Sound Initiative

Cleanup Oversight Grants

- The Citizens for a Healthy Bay project will protect the post-Superfund health of Commencement Bay through education and citizen involvement.
- The Duwamish River Cleanup Coalition project will educate citizens on the cleanup of contaminated sediment in Duwamish River communities and help restrict further pollutants from contaminating the area.Pollution Prevention Grants
- The Puget Sound Car Wash Association project will provide education outreach regarding the environmental hazards of car wash fund raisers.
- The Puget Soundkeeper Alliance project will certify 20 new marinas, representing 5,000 boaters, in water contamination prevention.
- The People for Puget Sound project will educate citizens on the dangers of toxic chemicals to the marine ecosystem, specifically Puget Sound.

Green Building Initiative Grants

- The North Peninsula Building Association project will provide community outreach regarding green building practices and sustainable living on the Olympic Peninsula.
- The Sustainable Development Task Force for Snohomish County project will promote green building, sustainable development, and low-impact development practices through project advocacy workshops in Snohomish County.
- The NW Eco Building Guild project will spread awareness on the financial and environmental benefits of green building in Thurston County and neighboring counties.
- The Lopez Community Land Trust project will create and disseminate a "Sustainable Community Homes Manual" in order to reduce ecological footprints in the San Juan Islands.

Other River Initiatives

Cleanup Oversight Grants

- The Heart of America Northwest project will provide information to citizens regarding the Hanford cleanup process and ensure public opinions are heard and understood.
- The Lands Council- This project will educate communities on the dangers of heavy metals and PCBs in the Spokane and Coeur d'Alene Rivers.
- The Lake Roosevelt Forum- This project will facilitate communication between environmental agencies and the Lake Roosevelt community in an effort to increase public participation.

Pollution Prevention/Technical Assistance (non-Puget Sound) Green Building Initiative Grants

• The Central Washington Built Green Association project will promote green building in central Washington and improve standards for energy/water efficiency, waste reduction, and indoor air quality.

Sustainable Living Grants

- The Sustainable Living Center project will conduct a public outreach campaign in an effort to reduce waste, conserve natural resources, and emphasize proactive planning towards a sustainable community in the Walla Walla area.
- The Washington Organic Recycling Council project will promote organic recycling by expanding compost markets through public education.
- The Re Use Works project will promote solid waste reduction by encouraging donation, reconditioning and purchase of large, used appliances.
- The Leavenworth Recycles project will establish and promote recycling within the Leavenworth community through education and advertising campaigns.

Partnering for the Environment through Local Planning

Local solid waste planning is the cornerstone of solid waste management in Washington State. The state Legislature asks counties and cities to make sound decisions about solid waste handling and to base these decisions on approved and "current" comprehensive solid waste management plans (*RCW 70.95.110(1)*). These 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 foundations 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 for carrying out the programs. The plans are to be maintained 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 had submitted local hazardous waste plans. Local hazardous waste plans include 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 70.951 RCW*, which required local governments to amend their hazardous waste plans to include plans to address used motor oil from households.

Since the hazardous waste plans have been completed, some counties have revised them. Some have combined their solid waste and hazardous waste plans. One of the recommendations of the *Beyond Waste Plan* is to fully implement local hazardous waste plans. Ecology is current updating the *Hazardous Waste Planning Guidelines* and the *Solid Waste Planning Guidelines*.

These updates will provide suggestions on how to incorporate *Beyond Waste* projects into local plans.

Ecology provides technical assistance to local governments as they prepare and carry out their plans. Ecology also approves the plans. Table 2.1 lists the local solid waste and hazardous waste plans for each county.

COUNTY	SW Plan (date last	WR/R GOAL	HW Plan (date last	Combined Plans?	COMMENTS
	approved)		approved)	(Yes/No)	
Adams	Yes 2005	50% WR/R BY 2012	1992	No	Comprehensive Solid Waste Management Plan (CSWMP) updated April 2005. Hazardous Waste Plan (HW) is joint with Adams, Lincoln and Grant Counties.
Asotin	Yes 1998	26% by 1997	1993	No	Solid Waste Plan update began January 2007. Resolved status of agreements with Lewiston, Idaho.
Benton	Yes 2007	50% by 2020	1991	Yes	CSWMP approved July 2007
Chelan	Yes 2007	25% recycling rate by 2010 5% reduction from the current waste stream by 2010	2007	Yes	CSWMP was updated April 2007.
Clallam	Yes 2007	30% in next 5 years, 40% long term goal	1991	No	No plans to update HW plan.
Clark	Yes 2008	50% WRR by 1995	2002	Yes	Plan approved.
Columbia	Yes 2003	20% WR/R	1991	No	CSWMP approved. HW Plan being split off from joint plan with Walla Walla and written as new standalone for Columbia County.
Cowlitz	Yes 2008	50% WRR by 1995	1993	No	Plan approved.
Douglas	Yes 2002	25% by 2008	2002	Yes	The plan was to be updated in 2007. The county had received preliminary comments from Ecology and UTC. However, they've been granted an extension through December 31, 2009 due to the Greater Wenatchee landfill expansion.

 Table 2.1

 Current Status of Solid and Hazardous Waste Plans in Washington (as of September 2008)

COUNTY	SW Plan	WR/R GOAL	HW Plan	Combined	COMMENTS
COUNTI	(date last		(date last	Plans?	COMMENTS
-	approved)	0.504 MID (D.1	approved)	(Yes/No)	
Ferry	Yes 1993	35% WR/R by 1995 50% WR/R by 2013	1994	No	City of Republic withdrew from County plan in May 2008, and most of SWAC resigned in dispute over new flow control ordinance. Staff currently recruiting new SWAC (short two members), and preparing RFQ for planning consultants. Staff still considering combining CSWMP and HW plans, but no decision yet.
Franklin	Yes 1994	35% R by 1995 5% WR by 1998	1993	No	Preliminary plan submitted. Adoption of final plan expected in first quarter 2009.
Garfield	Yes 2008	26% WR/R by 1997	1992	No	Plan approved September 2008.
Grays Harbor	Yes 2001	50% WRR by 1995	1991	No	Requested Ecology to do an informal review of their draft plan, expect a final draft by January 2009. Will start on HW plan after completing SW plan.
Island	Yes 2008	Assist the State in achieving its goal of 50%	2008	Yes	Plan approved April 1, 2008.
Jefferson	Yes 2007	At 46.1% using state definition, goal of 50%	1991	No	Considering a review of HW plan.
King	Yes 2002	50% residential by 2006 43% nonresidential by 2006	1997	No	Latest CSWMP approved May 10, 2002. Plan calls for targets to be evaluated every 3 years as new data becomes available from waste monitoring studies. CSWMP Revision in process, expected completion, fall of 2009. 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 Program published a 2001-2002 Annual Report that provides the vision, mission and goals of the plan. HW plan revision (incorporating the principles and goals of Beyond Waste) begins in 2009, expected completion 2010.

COUNTY	SW Plan (date last approved)	WR/R GOAL	HW Plan (date last approved)	Combined Plans? (Yes/No)	COMMENTS
Seattle	Yes 2005	Recycle or compost: 60% of all waste generated in Seattle by 2012; 70% by 2025	1997	No	Because the City of Seattle and King County have independent CSWMPs, the HW plan remains independent and is administered by the Local Hazardous Waste Management Program. 2004 Plan Amendment Approved August 19, 2005. CSWMP revision begins in 2009, expected completion 2010.
Kitsap	Yes 2000	Supports the state goal of reaching 50% recycling.	2000	Yes	The Kitsap CSWMP includes an update to the 1990 HW Plan. The text is fully integrated into the 2000 CSWMP. CSWMP revisions (incorporating components of Beyond Waste and climate change) began in 2007, expected completion in summer of 2009.
Kittitas	Yes 2003	50% by 2008	2003	Yes	Plan approved.
Klickitat	Yes 2000	50% diversion	2000	Yes	Will begin work on plan amendment or revision in 2009.
Lewis	Yes 2008	18% WRR by 1995, no goal	2000	Yes	Plan approved.
Lincoln	Yes 1999	35% WR/R by 1997	1992	No	County has hired a consultant, convened new SWAC, and is drafting preliminary plan. Expected to be ready for submission for Ecology review by end of 2009.
Mason	Yes 2007	Mentions state goal of 50% by 2007	1991	No	Currently in review to update HW plan; plan will continue to be stand alone.
Okanogan	Yes 2006	Supports the state goal of reaching 50% recycling	2006	Yes	Plan Approved February 9, 2006.
Pacific	Yes 2006	At 14.4% in 2005, goal to reach 25%	1990 – 2000 Operations Plan	No	No plans to update HW plan.
Pend Oreille	Yes 2002	45% WR/R by 2015	1993	No	Consultants hired. Plan currently undergoing preliminary draft.
Pierce	Yes 2008	50% WRR by 1995	1990	No	Updated CSWMP. Updating a separate HW plan during 2009.
San Juan	Yes 1996	50% by 1995	1991	No	Currently updating CSWMP. Expected completion in 2009. Considering combining the SW and HW plans.

COUNTY	SW Plan (date last	WR/R GOAL	HW Plan (date last	Combined Plans?	COMMENTS
	approved)		approved)	(Yes/No)	
Skagit	Yes 2005	50% diversion	1992	No	Plan approved on December 2, 2005. Currently getting all cities aboard an updated SW plan.
Skamania	Yes 2002	40% WRR by 1998 50% long range goal	2001	Yes	Started updating CSWMP, April 2006.
Snohomish	Yes 2001	50% recycling goal to be reached approximately 2008	1993	Partially	Latest CSWMP approved July 11, 2001. The recycling potential assessment (RPA) combines two approaches to reaching 50% - a blend of education/ programs and a regulatory approach. The 2001 CSWMP is intended to begin the consolidation of the HW Plan, to update but not replace it. The CSWMP was updated in 2004 to include the replacement of two solid waste facilities and to include the City of Everett under the County's solid waste system. CSWMP and HW Plan revisions (incorporating components of Beyond Waste and climate change) beginning in 2009, expected completion 2010.
Spokane	Yes 1998	50% recycling by 2008	1993	No	Preliminary draft submitted in August. Final draft being prepared. Expect completion by mid-2009.
Stevens	Yes 1994	36% WR/R by 2012	1993	No	Plan completed and approved in July 2008.
Thurston	Yes 2001	Increase recycling rate by 2.5% by 2005	1993	No	Preliminary draft expected by March 2008. Currently reviewing HW plan.
Wahkiakum	Yes 2008	20% WRR by 1996	2001	No	Plan approved 2008.
Walla Walla	Yes 1994	40% by 2002	1991	No	City of Walla by inter local agreement has assumed responsibility for preparation of SWMP. New staff hired and deciding on scope of work for eventual consultant.
Whatcom	Yes 1999	50% diversion	1991	No	County currently updating CSWMP. Received draft in November 2008. The City of Bellingham is no longer the lead on MRW. Based on Ecology's comments on the draft plan, the County will decide whether to create a separate HW plan or combine the HW plan into the SW plan.

COUNTY	SW Plan (date last approved)	WR/R GOAL	HW Plan (date last approved)	Combined Plans? (Yes/No)	COMMENTS
Whitman	Yes 2006	40% WR/R by 2001	1992	No	Plan approved and current.
Yakima	Yes 2003	35% by 2005 40% by 2007	1991	No	Currently working on CSWMP revision. Plan should be ready for preliminary review before the end of 2009. HW plan to be incorporated.

Partnering for the Environment through Waste Tire Pile Cleanup

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 have existed for a significant length of time. Ecology has been working with the local health jurisdictions to clean up unauthorized dumpsites and prevent further waste accumulation.

Waste Tire Pile Cleanups 1989 through 1998

In 1989, the Washington State Legislature passed Substitute House Bill (SHB) 1671 (Sections 92 – 95) which established a one dollar 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 nine counties around Washington. Collection of the tire fee ended in 1994 and the account was fully spent in 1998. (See Table 2.2)

Tire Pile Cleanup 1990 to 1998							
Year	# Sites	Estimated Number of Tires	Cost				
1990	1	92,200	\$102,667				
1991	14	794,000	\$1,816,894				
1992	3	1,263,300	\$1,241,133				
1993	2	57,000	\$65,394				
1994	1	932,000	\$166,000				
1995	2	4,158,600	\$4,114,859				
1996	3	2,380,200	\$3,235,372				
1997	1	175,000	\$310,200				
1998	1	2,800,000	\$3,378,947				
TOTAL	28	12,652,300	\$14,431,466				

Table 2.2 Fire Pile Cleanup 1990 to 1998

Tire Cleanup Fund Created in 2005

In 2005, the Legislature passed Substitute House Bill (SHB) 2085, creating a Waste Tire Removal Account to fund cleanup of unauthorized and unlicensed tire piles. Funds for this

account come from a one dollar fee charged on each new replacement tire sold in Washington. Under SHB 2085, the state will collect this fee until July 2010.

To be eligible for the cleanup program, piles must contain more than 800 waste tires (or the combined weight of 16,000 pounds of tires). Ecology coordinates cleanups of waste tire piles with local health departments, fire departments, businesses, tribes, and private citizens.

Waste Tire Pile Cleanup Progress Through 2008

By October 2008, Ecology identified 162 tire pile sites in Washington State, containing approximately five million waste tires. Cleanup data in the following tables are provided in tons of tires (one ton of tires equal about 100 passenger tires). Cleanup activities started in May 2007. By the end of 2007, a total of 23 tire pile sites containing nearly three million tires were removed. (See Table 2.3) In order to remove the largest tire pile (containing over two million tires) as quickly as possible, most of the tires from the Goldendale-Wing Road site were shredded and landfilled. Nearly 50 percent of the tires from the other 22 sites were recycled or reused. Common recycling and reuse includes crumb rubber, stamped rubber bumpers, tire rings, scrap steel (wheel rims), and fuel for cement kilns.

During the first ten months of 2008, another 41 tire pile sites containing over one million tires were removed. Tire recycling and reuse improved to more than 60 percent of these tires cleaned up.

The remaining 98 sites containing over one million tires are scheduled for cleanup during 2009 and 2010.

Year	Sites	Tons	Recycled or Reused	Cost
2007 *	23	28,162	18%	\$ 3,549,525
2008	41	10,817	60%	\$ 2,198,043
Complete	64	38,979	30%	\$ 5,747,568
Remaining	98	11,113	N/A	\$ 2,568,782
TOTAL	162	50,092	N/A	\$ 8,316,350

Table 2.3Summary of Completed Tire Pile Cleanups

*Goldendale-Wing Road site was the longest clean up completed in 2007, a total of 20,240 tons with only eight percent recycled/reused.

In collaboration with local governments, Ecology continues to identify new tire pile sites across the state. Table 2.4 summarizes the status of tire pile cleanup across Washington.

County	Complete	Tons	Cost	Remaining	Tons	Cost
Adams	0	0	0	2	174	\$42,066
Benton	2	481	\$ 79,816	5	375	\$97,439
Chelan	1	538	\$111,354	2	200	\$50,000
Clallam	1	21	\$5,704	3	330	\$76,483
Clark	3	743	\$144,209	0	0	0
Cowlitz	4	328	\$69,473	2	200	\$50,000
Ferry	0	0	0	1	100	\$25,000
Franklin	0	0	0	3	600	\$150,000
Grant	6	1,485	\$359,942	9	880	\$233,031
Grays Harbor	0	0	0	9	785	\$204,950
Jefferson	5	904	\$193,256	1	100	\$40,422
King	3	671	\$126,237	7	640	\$157,829
Kitsap	1	93	\$15,961	2	105	\$19,516
Kittitas	3	498	\$121,510	4	300	\$73,389
Klickitat	12	20,994	\$2,330,827	4	600	\$114,417
Lewis	7	5,872	\$919,991	5	510	\$119,044
Lincoln	2	70	\$13,537	3	130	\$23,742
Mason	2	107	\$29,088	4	408	\$97,909
Okanogan	1	524	\$145,305	1	100	\$25,000
Pend Oreille	0	0	0	3	300	\$75,000
Pierce	2	331	\$69,056	8	900	\$212,190
Skagit	0	0	0	1	75	\$15,593
Snohomish	0	0	0	4	375	\$93,485
Spokane	0	0	0	4	1340	\$245,129
Stevens	0	0	0	1	85	\$18,900
Thurston	3	1,172	\$234,577	2	190	\$47,100
Walla Walla	0	0	0	2	136	\$32,247
Whatcom	0	0	0	2	200	\$50,000
Yakima	6	4,145	\$777,727	4	975	\$178,902
TOTAL	64	38,977	\$5,757,568	98	11,113	\$2,568,783

Table 2.4Tire Pile Cleanup Program by County

The subsequent two maps show the progress of tire pile cleanup, displayed by county. Map A, with a black background, represents completed tire cleanup. Map B, with a grey background, represents remaining tire cleanup sites.



Map A - Tire Pile Cleanups Completed from May 2007 to October 2008



Map B - Tire Pile Cleanups Remaining for 2009 - 2010



Grasser's Auto before February 6, 2007



Grasser's Auto after July 17, 2007

A Few Examples of Tire Cleanup Efforts

Grasser's Auto Wrecking, Centralia, Lewis County: A total of 862 tons of tires were removed and 86 percent recycled or reused at a total cost of \$160,000 (about \$1.85 per tire). Cleanup completed prior to the floods in 2007.



West Richland Auto before July 11, 2007



West Richland Auto after March 20, 2008

West Richland Auto Wrecking, West Richland, Benton County: A total of 174 tons of tires were removed, 100 percent recycled or reused at a total cost of \$26,600 (about \$1.52 per tire).



Submerged tire reef



U.S. Army tire removal

Salt Water State Park: Ecology teamed with the Washington State Department of Fish and Wildlife, Washington State Parks and Recreation Commission, and U.S. Army to remove 4 tons of tires from Puget Sound. State Parks will construct a 300-foot replacement reef, made from docks, pre-cast concrete post, and artificial kelp. All of the removed tires were landfilled.

Partnering for the Environment through Outreach, Assistance and Information Sharing

Washington State Solid Waste Information Clearinghouse

In 2008, Ecology completed the first phase of the project and launched the second phase of the web-based "Washington State Solid Waste Information Clearinghouse" (<u>https://fortress.wa.gov/ecy/swicpublic/</u>). The website will be completed by the spring of 2009.

A committee of several local government staff has worked with Ecology to plan and develop the information-sharing website. The Information Clearinghouse will allow Coordinate Prevention Grant (CPG) recipients to report work accomplished online and to share lessons learned with others statewide, helping all recipients to strengthen their programs. The system will collect and maintain information about county and city programs and will facilitate sharing of tools and resources.

The main audience for this site is local government: solid and hazardous waste and health department staff. The site became accessible to the public in late 2008. The Information Clearinghouse includes:

- State Profile
- County and City Profiles
- Outreach Materials
- Calendar of Events
- Classified Ads

If you want to learn more about the Information Clearinghouse, provide feedback, or have questions, please contact Shannon McClelland, project coordinator, at (360) 407-6398 or mcsh461@ecy.wa.gov.

Public Events Recycling Law

On July 22, 2007, the *Public Events Recycling Law (RCW 70.93.093)* went into effect in Washington State. This law requires a recycling program at every official gathering and sports facility in which vendors are selling beverages in single-use aluminum cans, and/or glass and/or plastic bottles <u>and</u> where there is a commercial curbside recycling collection program in the area. The intent of this law is to increase recycling opportunities, and reduce waste at official gatherings and sports facilities statewide. The beverage vendors are responsible for providing and funding the recycling program at the official gathering/sports facility.

Ecology conducted an outreach campaign to increase the awareness of the public event recycling requirements. The campaign focused on creating and distributing a four-page best management practices brochure that was mailed out to more than 600 stakeholders in affected communities statewide. Targeted audiences that received the brochure and letter include high schools (249), colleges and universities (53), city/county parks and recreation departments (89), convention centers (10), youth sports' leagues (55), fairs and festivals (56), stadiums (12), and city/county recycling coordinators (123). Dedicated event recycling webpage's on Ecology's website were also created and include

information on the law, how to set up an event recycling program, a link to the brochure and other resources, and a FAQs page. (See

http://198.238.211.77:8004/programs/swfa/eventrecycling/.)

Although a follow-up survey did not receive a statistically significant number of responses, many respondents indicated they had started new event recycling programs, or plan to start a program in 2009, because of the new law and the information they received in the campaign.

Landfill and Incinerator Operator Certification Programs

Washington State law requires solid waste landfills and incinerators to have certified operators on site 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 requirements for having certified operators on site at all times apply 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 must be a certified operator.

In February 2004, Ecology reached an agreement with the Solid Waste Association of North America (SWANA) to conduct the training, testing, continuing education, re-certification, and program administration for landfill certification. Annually SWANA provides Ecology with a list of currently certified persons. Ecology notifies interested parties of upcoming training and testing. The incinerator certification program continues to be Ecology's responsibility.

In 2007, there were a total of 204 active certifications for landfill operators and 57 active certifications for incinerator operators.

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

Ecology's Terry Husseman Sustainable Public School Award Program aims to recognize Washington State kindergarten through 12th grade public schools for developing and managing waste reduction, recycling, environmental education, and sustainability programs. Schools are selected for the creative features of their programs, their purchasing practices, and their overall success at reducing waste and increasing recycling. The program rewards schools for developing innovative environmental curriculum or operating longstanding programs that inspire a sense of
environmental stewardship in the students. Additionally, schools that submit outstanding plans for future programs will receive funds to assist with start-up costs.

On May 22, 2008, Ecology Director, Jay Manning, and Solid Waste and Financial Assistance Program Manager, Laurie Davies, presented \$36,025 in cash awards to 47 schools from across the state. About 150 school children filled the auditorium of the Department of Social and Health Services headquarters building in Olympia to celebrate their schools' exceptional efforts to conserve resources, reduce waste, and preserve the environment.

There are three award categories:

- The **Seed Award** assists schools with the costs of starting waste reduction, recycling and sustainability programs. In 2008, 26 schools received awards ranging from \$200 to \$3,200.
- The **Sustainable School Award** helps schools continue and expand ongoing programs that focus on waste reduction, recycling, and sustainability. In 2008, 19 schools received awards ranging from \$100 to \$375.
- The Environmental Curriculum Award encourages schools to develop curricula to teach environmental awareness in Washington schools. The curriculum should introduce students, teachers, staff, and administrators to the concepts of sustainability including its social, economic, and environmental relevance. In 2008, two schools each received an award of \$1,000.

The awards for creating an original curriculum went to programs that will have the children take part in the day-to-day operations of the school's recycling program and experience the social issues involved its operations. Other awards will help fledgling programs with start-up costs or encourage established programs to continue operating.

Many of the programs add composting and green-purchasing plans to the more common recycling activities. Some schools are helping their communities by creating recycling and compost centers, mapping shorelines and providing the maps to businesses and citizens, and planting useful wetland areas.

At the annual ceremony, guests and other visitors enjoyed the educational displays and activities hosted by the Ecology Youth Corps, Litter Program, Ecology Composting Program, and the Hands On Children's Museum. After enjoying the organic refreshments, guests could contribute their leftovers to the Ecology composting bin.

Table 2.5 identifies the 2006-2007 winners of the Terry Husseman Sustainable Public School Awards.

Seed Award	F						
Bainbridge High School, Kitsap County	\$2,500						
Boston Harbor Elementary, Thurston County	\$2,130						
Central Valley Kindergarten Center, Spokane County	\$250						
Chautauqua Elementary School, King County	\$500						
Cowlitz County Youth Services and Loowit High School	\$2,000						
Discovery Community School and Carl Sandburg Elementary School, King	\$720						
County							
Edison Elementary, Skagit County	\$2,300						
Evergreen Elementary, Snohomish County	\$1,000						
Ferndale High School, Whatcom County	\$600						
Islander Middle School, King County	\$1,500						
La Conner Middle School, Skagit County	\$1,100						
Liberty Lake Elementary, Spokane County	\$225						
Lynden High School, Whatcom County	\$800						
Lydia Hawk Elementary, Thurston County	\$500						
Olympic Middle School, Mason County	\$3,200						
Prospect Point Elementary, Walla Walla	\$1,000						
River's Edge High School, Benton County	\$1,500						
Sacajawea Elementary School, Benton County	\$600						
Seth Woodard Elementary, Spokane County	\$1,000						
Stanwood Middle School, Snohomish County	\$1,000						
Summit K-12, King County	\$650						
Talbot Hill Elementary, King County	\$200						
Wapato High School, Yakima County	\$2,000						
Washington Elementary, King County	\$1,000						
West Valley High School, Spokane County	\$1,500						
White River High School, Pierce County	\$250						
Sustainable School Award	•						
Adams Elementary School, Spokane County	\$100						
Burton Elementary School, Clark County	\$200						
Edgerton Elementary School, Pierce County	\$100						
Evergreen Elementary School, Pierce County	\$200						
Gatewood Elementary School, King County	\$200						
Knolls Vista Elementary, Grant County	\$100						
Lister Elementary, Pierce County	\$200						
Marcus Elementary, Benton County	\$100						
Mount Baker School District No. 507, Whatcom County	\$375 each						
Acme Elementary Mount Baker Junior/Senior, Kendall Elementary, and							
Harmony Elementary							
New Market Skills Center, Thurston County	\$200						
Olivia Park Elementary School, Snohomish County	\$100						
Olympia High School, Thurston County	\$275						
Sakai Intermediate School, Kitsap County	\$200						
Secondary Academy for Success, King County	\$275						
Trout Lake School, Klickitat County	\$375						
West Valley City School, Spokane County	\$275						
Creative Environmental Curriculum							
New Market Skills Center, Thurston County	\$1,000						
River's Edge High School, Benton County	\$1,000						

Table 2.52007-2008 Sustainable Public School Award Recipients

For more information, visit the Terry Husseman Sustainable Schools Awards site at <u>http://www.ecy.wa.gov/programs/swfa/terryhusseman.html</u>.

Partnering for the Environment with Washington State Recycling Association

Ecology partners with several green building organizations as discussed under the Green Building Initiative and the Washington Organics Recycling Council (WORC).

Ecology's Solid Waste and Financial Assistance Program (SWFAP) supports its mission through partnering with non-profits, such as environmental groups and trade associations that have a parallel mission. The Washington State Recycling Association (WSRA) is a trade association whose mission is to provide leadership and education to foster the expansion, diversity, and economic vitality of recycling as part of sustainable resource management. Ecology continues to be a member and work with WSRA to further recycling.

WSRA is one of the longest-standing state recycling associations in the country. WSRA's goals support and are aligned with the *Beyond Waste Plan*, the statewide plan to reduce waste and the use of toxic substances.

WSRA supported *Beyond Waste* in 2007/2008 by providing representatives to the Solid Waste Advisory Committee (SWAC) and the subcommittee studying alternative financing systems for the solid waste system. WSRA provided a venue for presentation and discussion of *Beyond Waste* issues in their annual conference. The Washington Recycles Every Day (WRED) events also provided recycling industry and government representatives with an opportunity to study and discuss issues key to implementing *Beyond Waste*, such as contamination in the comingled recycling system, design for recycling, and plastics recycling.

Ecology is a "gold" level member of WSRA and provides a representative to their board of directors. Representatives from Ecology were involved on various WSRA committees, which work on objectives related to the main WSRA mission. Ecology staff was involved with the following WSRA committees in 2007/2008, Education; Member Development, Legislative and Policy, and Executive.

The Education Committee developed and implemented a scholarship program to bring students interested in a recycling career to the WSRA conference. Conferences are three-day educational and networking sessions for professionals in the recycling industry, often focusing on overarching themes that relate recycling to similar issues addressed in the *Beyond Waste Plan*. Four students attended the May 2008 conference because of this program. These students have continued to be active participants in WSRA.

WSRA's Education Committee also developed an educational booth about recycling, and staged and staffed the booth at several community events. They distributed informational flyers about recycling programs, including the new electronics recycling law. The committee staged the booth at events such as Earth Day, health and safety fairs, conferences, and other "green fairs".



Other WSRA committees in which Ecology plays a role include Awards, Communications, Conference Steering, Conference Host, and Washington Recycles Every Day.

Ecology's membership and joint projects with WSRA allow us to have a voice with a wide variety of recycling-related businesses, in all areas of the state. WSRA members range from family-owned haulers to Fortune 500 companies, from both rural communities

and major cities, and represent private industry as well as local and regional governments, businesses and schools.

The Closed-Loop Scoop Newsletter

The Solid Waste and Financial Assistance Program (SWFAP) publishes a quarterly newsletter called *The Closed-Loop Scoop*. This newsletter shares important information among public works departments, health districts, private recyclers, Ecology, and other clients and stakeholders. The editor encourages all interested parties to contribute articles that will help readers stay current on legislative matters, solid waste program successes and ideas, and upcoming meetings. More than 700 individuals and organizations across the state subscribe, with many parties opting to receive their copy electronically. *The Closed-Loop Scoop* is available on the Ecology SWFAP Publications and Forms Web page, http://www.ecy.wa.gov/programs/swfa/nav/publication.html.

Recycling Information Line

The Solid Waste and Financial Assistance Program (SWFAP) operates a toll-free information line to help citizens find ways to reduce waste and recycle. In 2008, staff helped almost 9,400 callers on the 1-800-RECYCLE hotline. While many callers simply want to know where and how to recycle common items (those taken by recycling centers and local curbside programs), others have questions of a more complex nature.

Staff can direct callers to locations for the safe disposal of household hazardous waste. Information on used oil recycling and used oil haulers is available. Locations for the recycling of construction, demolition, and land clearing debris are provided. The information line also lists companies that offer commercial pickup for business recycling. Targeted waste streams, such as electronic waste and items containing mercury, continue to offer the information line increased opportunities.

While many local governments operate information lines within their own areas, the statewide information line continues to serve as a first contact for many. Ecology's statewide hotline can also provide callers with information on specialized recycling opportunities including one time collection events, and others beyond their own city or county. Staff maintains the database by periodically contacting all recyclers to determine commodities handled, location (or

areas served), and hours. Basic recycling information from the database is available at the information line's web site: <u>http://1800recycle.wa.gov</u>. This web site also provides links to other on-line databases and exchanges, along with local government and recycling company web sites. Other sections of the SWFAP web site provide information on using sustainable building materials (<u>http://www.ecy.wa.gov/programs/swfa/greenbuilding/</u>) and information about solid waste facilities and disposal data <u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u>.

The 1-800-RECYCLE web site also includes a web page developed for kids of all ages. The 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. Check it out at http://www.ecy.wa.gov/programs/swfa/kidspage/.

Chapter III Solid Waste Handling Infrastructure



This chapter describes the number of basic solid waste facilities and their locations across Washington State. This chapter includes facilities regulated under the following:

- *Chapter 173-351 WAC, Criteria for Municipal Solid Waste Landfills*, which sets permitting, construction, and operating standards for municipal solid waste landfills in the state.
- *Chapter 173-306 WAC, Special Incinerator Ash Management Standards*, which pertains to MSW incinerator ash monofills.
- Chapter 173-350 WAC, Solid Waste Handling Standards, which went into effect in 2003. These standards replace the requirements of the *Minimum Functional* Standards for Solid Waste Handling (MFS), chapter 173-304 WAC, for the majority of other solid waste handling facilities.

In Washington State, local jurisdictional health departments issue all permits except for the ash monofill which is issued by Ecology. Ecology is responsible for preparing the solid waste regulations and has a permit review function for all other solid waste facilities.

This chapter presents information about solid waste facilities as of December 2008.

Ecology has identified 692 solid waste handling facilities. These facilities are in Table 3.1 and sorted by type. In addition to permitted facilities, some facilities, if they meet certain conditions, are exempt from permitting under *Chapter 173-350 WAC, Solid Waste Handling Standards*.

Some recycling processors and intermediate recycling facilities are exempt and Ecology included them in the facility count this year. In addition, some exempt composting facilities are also included.

Facility Type	Statewide Total
Ash Monofill	1
Municipal Solid Waste Landfills	16
Inert Waste Landfills	26
Limited Purpose Landfills	15
Composting Facilities	33
Composting Facilities (exempt)	8
Recycling Processors (exempt)	140
Intermediate Recycling Facilities (exempt)	125
Intermediate Recycling Facilities	33
Land Application	20
Energy Recovery and Incineration Facilities	3
Drop Boxes	50
Transfer Stations	103
Piles	56
Surface Impoundments	2
Tire Piles	5
Moderate Risk Waste Handling Facilities	56
Total All Facilities	692

Table 3.1Facility Types Statewide

Table 3.2 identifies the county in which the solid waste facilities are located. Additional data about the amounts and types of waste disposed in the various landfills and energy recovers/incinerators is found in *Chapter V Solid Waste Generation, Disposal and Recycling in Washington State*.

Most facilities are required to submit an annual report to the local jurisdictional health department and Ecology as part of their permit requirements or to meet their exemption from permitting requirements. Much of that data is used to determine the waste generation, recycling/diversion rates and disposal amounts for the state. This data is discussed in more detail in *Chapter V Solid Waste Generation, Disposal and Recycling in Washington State*.

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Adams										2	2			2
Asotin	1	2												1
Benton	1	3				2	3	12		4	4	1		2
Chelan		1			1			4			3			
Clallam			1				2	5			3			1
Clark			1		2		2	8			3			8
Columbia											1			1
Cowlitz	1		1		1	1	1	3			1			1
Douglas	1	2						3			1			
Ferry								1			1			1
Franklin					3		2	7		1	1			1
Garfield								8			1			
Grant	2				2	10	2	4		4	2			2
Grays		1	1				1			2	6			1
Harbor														
Island					3	3	4	6			3	2		3
Jefferson		2			3	1		4			1			1
King	1		1		3	2	6	43			13			3
Kitsap					1	4		8			4			1
Kittitas			1					3			2			2
Klickitat	1			1	1	1		1			3			3
Lewis			1		1	6		4			3			1
Lincoln					1					1	1			1
Mason						3		15			1			1
Okanogan	1							3			2			1
Pacific								1		3	2			1
Pend Oreille											3		1	3
Pierce	2	2			3	1	18	34			10	1		2
San Juan						1		1			2			1
Skagit					4	1		9			2	1		1

Table 3.2Identifies the Facilities, by County, as of December 2008

County	MSW Landfill	Inert Waste Landfill	Limited Purpose Landfill	Ash Monofill	Composting Facility	Drop Box	Piles Facility	Recycling Facility	Impoundment	Land Application	Transfer Station	Waste Tire and Storage	Energy Recovery Incinerators	MRW Facility
Skamania								1			3			
Snohomish		2			4	5	2	24		1	3			4
Spokane	1	6	1				4	34	1		4		2	1
Stevens	1		1					2			4			1
Thurston					2	3	1	9			1			
Wahkiakum								1			1			
Walla Walla	1	2			2		1	3		2				1
Whatcom		1	1		1	6	3	23			4			1
Whitman		1	1		2		1	2	1		1			1
Yakima	2	1	4		1		3	12			1			1
Total	16	26	15	1	41	50	56	298	2	20	103	5	3	56

Chapter IV Statewide Litter Prevention & Cleanup Programs



Chapter 70.93 RCW, *the Waste Reduction, Recycling, and Model Litter Control Act*, makes Ecology the lead agency in managing statewide

litter programs. Work in 2008 focused on increasing awareness of and compliance with Washington's secured load laws. The Solid Waste & Financial Assistance Program (SWFAP) carries out the following core elements of the statewide litter program:

- Helping with coordination of litter control and prevention activities.
- Carrying out the litter prevention campaign.
- Conducting periodic statewide litter surveys.
- Managing allocations from the Waste Reduction, Recycling and Model Litter Control Account.
- Running Ecology Youth Corps litter cleanup crews (EYC).
- Managing the Community Litter Cleanup Program (CLCP).
- Strengthening partnerships with other state agencies and local governments.

Litter Prevention Campaign

The "litter and it will hurt" campaign is the statewide social marketing campaign aimed at reducing litter on Washington roadways. The campaign has used multiple strategies over several years to raise awareness, alter beliefs, and ultimately change behaviors about litter.

- Key elements of the campaign include:
- Television, radio, and outdoor (billboard) media.
- A litter hotline.
- A roadway signage program.
- A website.
- Distribution of litterbags and campaign materials.
- Enforcement activities.

The "litter and it will hurt" campaign is based on on-going research about why people litter. This research indicates strong messages about littering fines and penalties are the most effective deterrent to litter. The "litter and it will hurt" slogan premiered in 2002, and campaign materials feature the fines for littering and the litter hotline phone number.

In 2006, Ecology completed a thorough campaign evaluation. The evaluation confirmed that the campaign's messages were having a positive impact on peoples' awareness of litter issues, attitudes towards littering behavior, and most importantly, the amount of litter in the state. The evaluation led to a new three-year campaign plan that focuses the campaign on enforcement and potentially dangerous litter, especially unsecured loads. Work implementing the new plan continued in 2007 and 2008.

New Secured Load Video

In the last two years, Ecology spent significant time promoting the secured load issue: the need for all vehicle loads to be properly secured to prevent debris escape. A telephone survey of Washington residents shows that people have become more aware of the issue. Awareness rose from 38 percent in March 2007, to 51 percent in June 2008, after several weeks of advertising. However, feedback indicated people still had many questions about what "secured" means and exactly "how to" secure a load.

Ecology decided to produce a video with more detailed information. In summer 2007, a consultant team began researching best management practices and appropriate tools for securing loads. Since Washington State Patrol (WSP) has expertise in the area, the consultants collaborated with WSP on a video script. The video was shot and edited in fall 2007. In January 2008, the "Tips for Secured Loads" video debuted both on-line and in DVD format. The video is broken into chapters that focus on specific loads such as construction materials, household goods, yard debris, and garbage. A companion brochure with lots of photographs was published and both the video and the brochure were translated into Spanish. In 2008, Ecology distributed close to 200 DVDs and over 2,700 people have visited the website. To see the video, please visit the secured load webpage.¹

To promote the new "Tips for Secured Loads" video, Ecology held three press events in April 2008. Instead of focusing on enforcement, the events were designed to promote positive action and included staging a live demonstration of how to secure a load properly. With the help of a public relations consultant, Ecology held "secured load neighborhood interventions" at the homes of three families; one in Seattle (4/11), one in Spokane (4/15) and one in Tri-Cities (4/17). At each event, a family member loaded unwanted items into a truck --without any prior prompts on the correct tools to use. A Washington State Patrol officer then provided a critique and reviewed some tips that people should follow to ensure each load is properly secured.

Print, television, and radio coverage was excellent in each media market. Highlights included making the front page of the *Seattle Post Intelligencer* on the same day the Dalai Lama arrived in Seattle and appearing on Good Morning Northwest in the Tri-Cities. A copy of the press release is on Ecology's <u>news webpage</u>.²

Enforcement Activities

For a fourth year, Ecology collaborated with Washington State Patrol (WSP) and county sheriff offices to conduct litter emphasis patrols. In April 2008, the King County Sheriff's Office and six of eight WSP districts conducted unsecured load emphasis patrols. This was the first time enough funding was available for WSP to participate on a statewide level.

¹ <u>http://www.ecy.wa.gov/programs/swfa/litter/secure.html</u>

² http://www.ecy.wa.gov/news/2008news/2008-091.html

The emphasis patrols continue to be an efficient way to have law enforcement focus on litter. In three weeks, law enforcement officers logged 1,080 hours and made 3,988 educational contacts resulting in 237 litter citations.

Litter Hotline Program

The litter hotline is a toll-free phone line (866-LITTER-1) available to people 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. Ecology operates the litter hotline in cooperation with the Washington State Patrol and the Washington State Department of Licensing. The registered owner of the vehicle reported via the hotline is sent a letter from the WSP, notifying them of details of the incident and the fines for littering.

The hotline continues to be a key component of the campaign. Through October 2008, the hotline logged 15,674 calls, ten percent less than the same period in 2007. However, on-line reports rose three percent from 1,388 in 2007 to 1,429 in 2008. In 2009, Ecology will again evaluate the effectiveness of the litter hotline program by analyzing responses to an anonymous survey of those who receive hotline letters, to make sure the program is having the intended impact.

Partnership with Schools

Research has shown that young adults do not respond to traditional media (television and radio commercials). The younger generation primarily uses the internet to get information, entertainment, and even interact with friends. In response to that trend, Ecology started an internet-based project to engage young people.

In partnership with Comcast Spotlight and Washington DECA, Ecology held an on-line video contest for high school students. Given basic information and materials about the "litter and it will hurt" campaign, student were invited to create 30-second television commercials. Timing conflicts between completion of a contest website, promotion of the contest, and busy schedules of high school students limited the number of entries received. However, all entries were excellent and many students were involved. A panel of judges chose a winner, which was professionally produced and aired on youth-oriented cable channels (i.e. MTV, VH-1, Comedy Central) in May 2008. The winning spot can be viewed on the litter homepage.³

Litter Program Fund Allocation

The Waste Reduction, Recycling and Model Litter Control Account (WRRMLCA) supports a variety of programs. The legislation (Chapter 70.93 RCW) directs fund allocation as follows: 20 percent to local government programs.

30 percent to waste reduction and recycling efforts within Ecology.

50 percent to litter clean-up and prevention efforts, as well as, administrative costs.

³ http://www.ecy.wa.gov/programs/swfa/litter/

Besides providing monies for the Ecology Youth Corps (EYC), the fifty percent dedicated to clean-up efforts also pays for litter activities carried out by other state agencies. Funding for the litter prevention campaign, litter staff, and the litter survey, comes from the fifty percent as well.

For this biennium (July 2007–June 2009), \$18.42 million from the WRRMLCA was divided as follows:

	TOTAL	\$18.42 million
Litter Cleanup & Prevention		\$9.06 million
Waste Reduction & Recycling Act	ivities	\$5.64 million
Local Government Funding Progra	ms	\$3.72 million

Ecology Youth Corps

The 32nd year of operation for the Ecology Youth Corps (EYC) was marked in 2007. The Ecology Youth Corps⁴ web site contains 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 crews and median crews. 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 14 - 17 year olds. They mostly clean shoulder areas and interchanges of major state routes and interstates. Additional work occurs on county roads, state and county parks, recreational lands, and other public areas. Over 2,000 youths from across the state apply annually for approximately 300 positions. Youth crews work two four-week summer sessions with a complete turnover of crews occurring mid-summer.

Median crews are composed of young adults 18 years and older. They clean challenging areas of roadways, including medians, complex ramps and interchanges, and exceptionally high-traffic areas.

In 2007, EYC crews collected litter on roadways and public land in the following counties: **Central Region (CRO)**: Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, and Yakima.

Eastern Region (**ERO**): Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, and Whitman.

Northwest Region (NWRO): King, Kitsap, Skagit, Snohomish, and Whatcom.

Southwest Region (SWRO): Clark, Cowlitz, Grays Harbor, Lewis, Mason, Pierce, and Thurston.

⁴ <u>http://www.ecy.wa.gov/programs/swfa/eyc/index.html</u>

The EYC also ensures that youth learn about broader issues of waste reduction, recycling, litter control, composting and other environmental concerns, such as global warming, air and water quality, salmon recovery, and the principles of sustainability. Crews may take field trips to a landfill, a wastewater treatment plant, an estuary, a "green building," or a local organic farm as part of their work experience. Table 4.1 summarizes EYC work for 2007.

Table 4.1

Ecology Youth Corps Program Outputs January 1 – December 31, 2007							
Total Hours Worked (Supervisor + Crew)	81,964						
Total Pounds Collected (Litter + Illegal Dump + Recycled)	1,149,356						
Miles	5,547						
Acres	449						
Number of Illegal Dumps Cleaned	100						

Figure 4.1 shows the amount of litter the EYC has picked up over that last eight years.



Figure 4.1 Total Number of Pounds Picked Up by EYC by Year

Ecology continues to operate the EYC in partnership with the Washington State Department of Transportation (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 2009. Early in 2009, Ecology will have to make the

decision to either request the supervisor full time employees back, so EYC supervisors can once again be Ecology employees, or begin negotiating a new agreement with WSDOT.

Litter Survey

Every five years Ecology conducts a litter survey project to measure the amount and types of litter around the state. The litter survey is a yearlong field research project with EYC crews accomplishing a majority of the fieldwork. In the summer of 2008, Ecology staff completed a sampling plan that includes 120 randomly selected roadway sites. The sampling plan includes interstate, state route, county road, and highway interchange sites, in both urban and non-urban areas.

In the fall of 2008, EYC crews visited each survey site and conducted an initial clean, removing all litter. They will visit the sites again in the spring and fall of 2009, collecting all the litter that has accumulated. A crew will then sort and weigh the litter samples. A statistician will perform an analysis that will give Ecology a snapshot of litter in the state as well as a comparison to previous litter survey results. Ecology expects a final report in February 2010. Information on previous litter studies are on the <u>litter webpage</u>.⁵

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 the problems of litter and illegal dumps on roadways and other public land. CLCP contracts are written on a biennial schedule (two-year period from July-June) and 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 the communities taking part. Several jurisdictions also use volunteer groups to assist in cleanup and or educational efforts.

For the cycle that began July 2007, Ecology awarded \$2.8 million in CLCP funding. All 39 counties applied for and received funds. In late 2007, Ecology issued guidelines for a supplemental application period to distribute \$320,400 unallocated funds. Ecology awarded project funding based on merit of the projects proposed. The projects must end by June 30, 2009.

There were 22 supplemental requests totaling \$551,000. Nine projects were fully funded and five received partial funding. The funding by activity was:

- \$133,500 for litter prevention education and outreach.
- \$111,600 for capital and equipment purchases.
- \$75,300 for additional litter pickup and illegal-dump cleanup.

⁵ <u>http://www.ecy.wa.gov/programs/swfa/litter/public.html#a1</u>

Ecology published new guidelines for the CLCP in the fall of 2008, with applications due in January 2009. Ecology did not change the three-part formula used in previous cycles to determine the funding amount awarded to each applicant:

<u>Forty percent</u> of the total amount of money is equally divided between applicants to ensure minimum funding for a basic program in all jurisdictions.

<u>Thirty-seven and a half percent</u> of the total amount of money is split based on geographic and demographic factors (area, population, miles of roads, and miles driven), ensuring that jurisdictions with higher populations or more road miles receive more funds.

<u>Twenty-two and a half percent</u> of the total amount of money is allocated based on additional needs criteria, based on the efficiency and effectiveness of the individual programs.

Activities completed through the CLCP are responsible for over half of all miles cleaned and pounds collected with state litter funding. Table 4.2 highlights the work accomplished during 2007. The 3.9 million pounds picked up account for 63 percent of the total reported to Ecology for the year.

Table 4.2Community Litter Cleanup Program OutputsJanuary 1 – December 31, 2007

Total Hours Worked (Supervisor + Crew)	195,907
Total Pounds Collected (Litter + Illegal Dump + Recycled)	3,966,231
Miles	28,128
Acres	3,392
Number of Illegal Dumps Cleaned	4,331

Litter Cleanup by Other State Agencies

The state agency litter work group continues to meet once or twice a year to review activities, improve coordination, and discuss funding. Representatives from the departments of Corrections, Natural Resources, Transportation, Fish and Wildlife, the Parks and Recreation Commission, and Ecology comprise the workgroup.

Using a consensus process, the workgroup negotiates the amount each agency receives through interagency agreements to fund litter and illegal dump activities. For the first time in several funding cycles, additional money was available to the state agency workgroup for expansion of programs. While all work group agencies received a small increase, a majority of the additional \$275,500 went towards enforcement activities and the addition of two new correctional crews. Table 4.3 lists the budget for the current biennium.

Agency	07-09 Biennium
Department of Natural Resources	\$ 520,000
Department of Corrections	\$ 625,000
Department of Transportation	\$ 88,000
Parks & Recreation Commission	\$ 75,000
Department of Fish & Wildlife	\$ 27,500
TOTAL	\$1,335,500

Table 4.3Interagency Agreements between Ecology and
Other State Agencies for Litter Activities
July 1, 2007 – June 30, 2009

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, please go to the "Parks" section on the litter <u>website</u>.⁶

For the biennium (July 2007-June 2009), Parks received an increase of \$25,000 bringing the current interagency agreement total to \$75,000. Parks has continued to clean up litter and illegal dumps and increase recycling in parks statewide. The additional funds support enforcement projects such as purchase of surveillance cameras and additional signage. Any law enforcement officer can enforce litter laws, but it is often not a priority for resource agencies. This additional funding will provide focus for Parks law enforcement staff.

Department of Corrections

The Department of Corrections (DOC) receives funding through Ecology to run community based correctional litter crews on state roads, on state lands, and in local communities. For the biennium (July 2007-June 2009), Corrections received an increase of \$175,000 bringing the current interagency agreement total to \$625,000. The funds support crews in Seattle, Tacoma, Wenatchee, Ellensburg, Yakima, Tri-Cities, Moses Lake, Spokane and Walla Walla. Table 4.4 summarizes DOC crew activity for 2007.

⁶ <u>http://www.ecy.wa.gov/programs/swfa/litter/who.html#a7</u>

Sandary 1 December 31, 2007							
Total Hours Worked (Supervisor + Crew)	30,723						
Total Pounds Collected (Litter + Illegal Dump + Recycled)	555,673						
Miles	1,999						
Acres	659						
Number of Illegal Dumps Cleaned	273						

Table 4.4Department of Corrections Litter Removal ActivityJanuary 1 – December 31, 2007

Department of Natural Resources

The Department of Natural Resources Camps Program, in partnership with Department of Corrections, puts offender crews to work on state lands. As illustrated by the data in Table 4.5, this program has considerable impact on the cleanup of litter and illegally dumped materials in state-owned forests.

For the biennium (July 2007- June 2009), DNR received an increase of \$65,000 bringing the current interagency agreement total to \$520,000. Some of the additional funds will go to the camps programs that clean up state lands. However, a majority of the additional funds will go towards enforcement activities: purchase of surveillance cameras and participation in emphasis patrols.

The funds support crews at the following camps: Naselle, Larch, Cedar Creek, Monroe, Olympic, Airway Heights and Mission Creek. An additional \$55,000 was devoted to contracted and volunteer crew activities. Table 4.5 summarizes DNR crew activity for 2007.

Table 4.5
Department of Natural Resources Litter Removal Activity
January 1 – December 31, 2007

Total Hours Worked (Supervisor + Crew)	43,487
Total Pounds Collected (Litter + Illegal Dump + Recycled)	612,451
Miles	4,438
Acres	70
Number of Illegal Dumps Cleaned	661

Department of Transportation

The Department of Transportation (WSDOT) is responsible for picking up litter along state roads, including the bags of litter collected by Adopt-a-Highway groups, the Ecology Youth Corps, and Department of Corrections. The current interagency agreement between Ecology and WSDOT provides \$88,000 to offset the costs of disposing of the litterbags.

In 2007, WSDOT crews removed and disposed of 23,821 cubic yards of litter from state roadways (roughly 4.8 million pounds).

Looking Ahead

Litter program plans for 2009 include completion of the state's third litter survey measuring the quantities and types of litter in the state. Ecology has used past survey results to guide program activities and measure the litter prevention campaign's effectiveness. Campaign plans include litter emphasis patrols in spring 2009 and routine advertising in spring and summer. Messaging will continue to focus on the secured load issue and promotion of the litter hotline.

This next year will be challenging. The current revenue forecast for the litter account has declined resulting in a budget shortfall. Ecology will need to manage that shortfall which may result in impacts to the litter prevention and pick up programs. Only time will tell.

Chapter V Solid Waste Generation, Disposal, and Recycling in Washington State



One of the basic aspects of carrying out the *Beyond Waste Plan* is preventing wastes in the first place, rather than managing wastes at the end of the pipe. Recognizing that 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 instead of disposing of them.

In order to measure the progress of *Beyond Waste*, a record of the amount and types of waste generated is essential. To determine the amount of waste that is generated in Washington State, Ecology uses the amount of materials disposed each year, plus the amount of materials recycled and diverted from disposal. As we have gained more understanding of the waste stream and obtained better information about how wastes are managed, the way we calculate this number has changed.

The amount of waste generated has continued to rise each year, with a slight downward trend in this curve in 2006 and 2007. Washington State's population has continued to grow since Ecology began to track disposal and recycling. Population growth rates in Washington have averaged 2 percent per year from 1988 to 2007, with the total population increasing by almost 1.9 million during that period.¹ With an increasing population often comes an increase in waste generated. However, the amount of waste disposed of, as well as the amount recycled and diverted, has increased at a faster rate than the population.

Changes in this report:

Instead of separate chapters on recycling and disposal, this chapter is a combined discussion of waste generation looking at the total amounts of waste recycled, diverted and disposed. Because of this approach, the narrower, traditional definition of **municipal solid waste recycling** and the details of that portion of the diverted waste stream are found in Appendix A.

Since 1994, when Ecology began measuring the disposal stream through annual reports from disposal facilities, per capita waste generation has grown at an average annual rate of seven percent, with the total annual waste generation increasing by over 10 million tons. Since 1994, Washington citizens have generated over 156 million tons of solid waste, roughly equivalent to the amount of solid waste discarded in the United States in one year.

Figure 5.1 shows growth in total solid waste generation and population in Washington.

¹ Population figures from Office of Financial Management: <u>http://www.ofm.wa.gov/</u>

Solid Waste Generation and Population Growth in Washington
20,000,000
18,000,000
16,000,000
14,000,000

Figure 5.1



Determining the Amount of Waste Generated

Total waste generation is determined simply by adding the amount of waste disposed to the amount of material recycled and diverted from disposal. It is easy to see why the materials we dispose of in landfills and incinerators are considered part of our "waste". However, materials that we separate from disposal for recycling or some other useful activity other than disposal are also a part of our total waste generation. These materials are entering 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 methods:

- Disposal in landfills.
- Combustion of mixed MSW.
- Combustion of source separated material (burning for energy).
- Composting.
- Recycling (transforming material into the same or other products MSW only).
- Other Diversion (includes recycling of non-MSW materials and reuse).

² "Citizens" as used in this chapter refers not only to each person in the state, but includes business, industries, manufactures and other activities that produce solid wastes.



Figure 5.2 shows a breakdown of the statewide waste management methods in 2007.

Some material types have one unique final use. However, there is often more than one final use for a material reported as "recycled" or "diverted", depending on the market shifts and demand. In 2006, Ecology began asking for a more detailed breakdown of these uses for all materials reported.

The largest measured part of Washington's waste generation number is the disposed waste stream. This number has been increasing for several reasons. In some cases we are simply throwing away more. In addition, with the new reporting requirements from chapter 173-350 WAC, *Solid Waste Handling Standards*, we are getting more details on the wastes that we dispose of. We also are getting information about waste disposed of in other states (for example tires that are disposed in Oregon). We are including all materials that are disposed in landfills. An example is clean soil and rock, things that are not defined as solid waste by our regulations, but are disposed of as a waste at a landfill.

The other measured part of Washington's waste generation number is made up of materials recycled and diverted from disposal. The list of materials included under recycling and diversion has increased over time. Since 1986, largely materials that are defined as municipal solid waste by the Environmental Protection Agency have made up the recycling number. (See *Appendix A: Municipal Solid Waste Recycling* for complete details on MSW recycling).

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

We have increased our efforts to get better reporting from recyclers and those that are diverting waste from disposal. Due to tracking additional materials, improved tracking and reporting from recyclers, as well as actual increases in recycling and diversion, the numbers have increased over time. In 2005, the total annual waste generation in Washington reached 17,494,320 tons, decreasing slightly in 2006 to 17,132,744 tons. In 2007, the total annual waste generation increased slightly to 17,182,663 tons.

Figure 5.3 shows the categories of solid waste tracked by Ecology under the broad categories of MSW disposed, other waste types disposed, MSW recycled and solid waste diverted from disposal (non-MSW).



Figure 5.3 Total Solid Waste Generation in Washington

Per Capita 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. We use the term in different ways in this report.

The recycling rate in *Appendix A: Municipal Solid Waste Recycling* looks at portion of the waste stream termed the **municipal solid waste stream**. This is waste that mainly households and commercial businesses generate. It includes such items as durable goods, nondurable goods, containers and packaging, food waste and yard trimmings. It does not include industrial waste,

inert debris, asbestos, biosolids, petroleum contaminated soils, or construction, demolition and land clearing debris. Materials that are recycled in the former category make up the "traditional" recycling rate. Some materials in the later group that are diverted from disposal make up the "diversion" rate.

Per capita numbers from Appendix *A: Municipal Solid Waste Recycling* for just the **municipal solid waste stream** are shown in Table 5.1. The per capita generation of **municipal solid waste** in the state in 2007 was 7.86 pounds per person per day, 4.48 pounds were disposed of and 3.38 pounds were recovered for recycling. (For per capita MSW numbers 1986-2007 see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.)

MSW only	2000	2001	2002	2003	2004	2005	2006	2007
Disposed	4.29	4.23	4.27	4.32	4.37	4.43	4.52	4.48
Recycled	2.29	2.48	2.28	2.69	3.14	3.43	3.46	3.38
Generated	6.58	6.71	6.55	7.01	7.51	7.86	7.97	7.86

 Table 5.1

 Municipal Solid Waste Disposed, Recycled and Generated (pounds/person/day)

Municipal solid waste is not all the waste that is produced in the state. To determine the **total waste generation**, we add **all** of the materials recycled, diverted and disposed. This includes not only MSW disposed, but all other waste types disposed at landfills and incinerators, as well as recycled and diverted materials. This result in a much higher generation number for the state of 14.51 pounds per person per day, with 6.16 pounds recycled/diverted and 8.35 pounds disposed (Table 5.2)

 Table 5.2

 All Solid Waste Disposed, Recycled/Diverted and Generated (pounds/person/day)

Per Capita	2000	2001	2002	2003	2004	2005	2006	2007
Disposed ³	6.73	6.83	6.74	6.71	8.07	9.14	8.12	8.35
Recycled/Diverted	3.67	3.91	4.46	4.70	5.54	6.18	6.60	6.16
Generated	10.40	10.75	11.19	11.41	13.61	15.52	14.72	14.51

These numbers are not just waste that is disposed by each person from their household. These include wastes produced by business, industries and other manufacturing activities in our state. They also include wastes that are being cleaned up from our environment, like petroleum contaminated soils from leaking gas tanks at service stations, asbestos being removed from

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

buildings that are torn down or remodeled, and contaminated soils that are dredged from Puget Sound. These types of wastes should be placed in a landfill.

Much of the waste stream includes wastes that could be recycled or reused, or just not made in the first place. These are wastes that 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"

The amount of waste disposed each year continues to increase. In 2007, a total of 9,867,059 tons was disposed. Table 5.3 shows the amounts and general types of waste disposed of since 1994 by Washington citizens⁴.

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. Spreadsheets identifying the disposal location, type and amount of waste for each county for 2007, and previous years' information, can be found 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.

Waste Type	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
MSW/ Commercial	3,905,291	3,800,114	4,203,507	4,276,276	4,480,761	4,610,914	4,611,406	4,703,879	4,805,205	4,917,870	5,060,502	5,258,076	5,308,393
Demolition	482,118	502,425	462,784	529,515	530,417	685,799	759,586	835,400	650,473	884,567	1,014,526	1,127,022	1,085,620
Industrial	155,141	184,220	206,169	208,398	325,135	157,634	563,249	546,299	743,042	1,356,415	1,092,305	512,277	530,835
Inert	5,154	4,091	117,512	107,452	23,875	19,542	428,789	321,451	280,358	419,115	1,337,372	1,029,559	1,386,971
Wood	41,615	58,355	221,437	89,142	158,022	197,929	246,754	91,697	90,303	89,905	61,918	52,833	40,579
ASH (other than SIA)	N/A	536,651	420,222	148,595	88,093								
Sludge	71,941	55,584	72,747	65,440	62,919	95,050	1,473	1,762	22,835	10,171	12,458	33,490	29,972
Asbestos	10,369	9,385	13,130	13,044	12,961	11,777	10,929	11,177	15,455	18,252	21,951	29,700	103,686
Petroleum Contaminated Soils	214,174	270,980	474,907	198,082	372,734	284,778	616,725	784,703	568,681	489,385	957,788	740,341	735,773
Other Contaminated Soils	N/A	146,554	231,428	225,488	321,762								
Tires	25,023	5,226	2,724	12,129	10,362	40,908	7,752	4,919	5,102	15,212	22,446	33,698	24892.63
Medical	N/A	5,213	7,469	7,704	5,474	6,349	5,255	2,417	2,498	2,624	2,651	2,899	3997.61
Other	144,115	121,051	10,794	41,866	28,450	178,156	198,259	124,512	270,992	196,793	197,010	256,627	206,485
Total	5,054,941	5,016,644	5,793,180	5,549,048	5,537,142	6,288,836	7,450,177	7,428,216	7,454,944	9,083,516	10,432,576	9,450,605	9,867,059

Table 5.3Waste Disposed by Washington Citizens

The types of wastes that are reported by landfills are very general and it is hard to know exactly the types of materials that are included. For example, the municipal solid waste, as it is reported by disposal facilities, would include anything that a household or a business throws away. We don't know how much of that waste is paper, food, cans, plastics, bottles, other recyclable materials or who actually made the waste – a household or a business. We also don't know the specific content of wastes reported as industrial or inert. It is difficult to focus waste reduction and recycling efforts on a particular type of waste or on a producer of that waste without having more details. The details can only be determined through a rigorous sampling study, such as a waste characterization study.

A waste characterization study provides a much more detailed look at what is in the waste stream. There are various ways to conduct a waste characterization study. A statewide study could take samples of waste from various sources. For example, a garbage truck from a known neighborhood would be emptied at a transfer station. The waste from that truck would be sorted into several different material groups. It would be repeated during all four seasons. Other sampling would be done in other locations around the state. Depending on the needs of the study, various sources of the waste (that is the sector of society where the waste was generated – residential single-family, multi-family, commercial, institutional, industrial, agricultural, etc.) could be sampled.

These studies provide very valuable information that is critical for us to understand the makeup of the waste stream, to know who is producing the waste, and to know what materials are in the waste stream that we should be reducing or eliminating. To be the most useful, waste characterization studies need to be repeated on a regular basis, but they are expensive to conduct.

A statewide waste characterization was last completed in 1992. Since then some individual counties have conducted waste characterizations studies. Information from them has been extrapolated for use statewide.

As we move forward with implementing 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. Ecology is evaluating methods and possible funding alternatives to conduct regular statewide waste characterization studies. Planning has begun on a statewide study to be conducted in the 2009 calendar year.

Waste Recycled and Diverted from Disposal⁵ Measuring Recycling and Diversion Rates

To determine a recycling rate that is consistent and comparable to 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 municipal solid waste (MSW) by the Environmental Protection Agency.⁶ Since the mid-1990s, however, Ecology has noted very large increases of material recovery in

⁵ See Appendix A: Municipal Solid Waste Recycling for a complete discussion of MSW Recycling.

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

"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 been putting efforts into recovering and recycling these wastes that are outside of 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 more. Knowledge of this waste stream is increasing, although it is not easy to characterize.

Measuring diverted materials is as simple as collecting the number of tons of material diverted from landfills. Many recycling survey respondents have voluntarily listed this information on the recycling survey in the past; in 1999 Ecology began asking for it more specifically.

Ecology is now calculating a "diversion" rate alongside of 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 recyclables that are part of MSW. Ecology then compares the resulting figure to total waste generation (minus a subset of landfilled materials that were not available for recycling or diversion).⁷ Washington shows a diversion rate of 47 percent in 2007. (See Table 5.4⁸)

Wood waste is a large portion of the recovery stream in Washington. A major portion of the 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. In 2002, Ecology began to gather figures on recovered wood that is burned and to measure it as a diverted material. Ecology believes that an undetermined amount of the wood reported as "recycled" is actually burned for energy recovery or used as "hog fuel". Table 5.4Diversion Rates1999 to 2007

Year	Diversion Rate					
1999	28%					
2000	37%					
2001	41%					
2002	45%					
2003	46%					
2004	47%					
2005	47%					
2006	49%					
2007	47%					

In agriculture, waste materials are being 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.

⁷ Waste types used to calculate diversion include municipal, demolition, inert, commercial, wood, tires, medical, and other. Excludes industrial wastes, asbestos, sludge and contaminated soils.

⁸ Diversion rates were adjusted retroactively in 2006 to reflect the deletion of the category of topsoil (also described as soil blends).



Figure 5.4 shows the diversion rate in Washington since Ecology began measuring it in 1999.

Figure 5.4

Ecology maintains that we need to study the non-MSW waste stream in more detail. We lack definite information on the total volume of waste created, especially in the industrial sector. If the facility diverting material is conditionally exempt from permitting under chapter 173-350 WAC, *Solid Waste Handling Standards*, the reporting requirement for solid waste recyclables covers these activities. However, if the facility does not fall under requirements for conditional exemption from solid waste permitting, reports are voluntary, as with out of state facilities or haulers with no fixed facility. This makes it difficult to figure a recycling or diversion rate for many of these materials.

Measurement Methodology

The Legislature requires Ecology to measure the recycling activity in the state each year and report the results. From 1986 until 2002, the tools for measuring recycling activity in Washington included only the annual recycling survey. With the new reporting requirements under chapter 173-350 WAC, *Solid Waste Handling Standards*, the measurement tools now include annual reports for recycling facilities and intermediate solid waste handling facilities, along with the annual recycling survey. Ecology is receiving more information with these additional reporting requirements.

Ecology sends the survey and annual reporting forms to recycling facilities, firms, haulers, and local governments. These parties reply with information about the types and quantities of recyclable materials they collected. Though 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 the materials. These factors offer challenges to compiling good county-specific recycling and diversion information. This situation

⁹ Diversion rates were adjusted retroactively in 2006 to reflect the deletion of the category of topsoil (also described as soil blends).

also creates the need for intensive cross-checking of the data. This is done through a phone and email survey of the end-users of recyclable materials, recycling facilities, other intermediate collectors of recyclables, and local governments. Ecology develops aggregate figures for each commodity and compares these to the results collected.

The recycling survey is essentially voluntary in that the solid waste rules put forth no penalty for those who do not respond. The annual reports for facilities are mandatory in that facilities could receive a penalty for failing to submit an annual report. Ecology bases the reliability of the results on review of draft numbers sent to local governments, and comparisons to waste characterization, disposal data, and commodity end-user information. Companies reporting on the recycling survey may just report tonnage they collected directly from generators. Facilities responding to annual reports, however, need to submit tonnage information for all materials handled at their facility. Also, county recycling coordinators and solid waste managers are asked to review the figures. Finally, Ecology checks figures against double-counting by verifying exchange of materials between reporting entities.

For the 2007 reporting year, both the recycling survey forms and the annual reporting forms were available on Ecology's website. Respondents can now print and complete the forms on paper or download the forms, complete electronically and e-mail the completed forms to Ecology. This system proves to be very successful. It provides the crucial and time-saving computer access to the survey, which some respondents need. It also allows Ecology staff to check the forms and follow up on errors or calculate conversions (pounds to tons, for example) before entering the data into the off-line database. These quality-control steps help maintain integrity of the data.

Results – 2007 Diversion

When Ecology began to measure other materials along with the traditional MSW recycling, this expanded measure was termed "diversion". It continued to include the same materials that it used since 1986 to calculate the MSW recycling rate. These materials are part of the MSW stream, as Ecology defined it when designing the recycling survey in the mid-1980s. (See *Appendix A: Municipal Solid Waste Recycling*) Table 5.5 provides tonnage figures for each material that figures into the diversion rate from 2004 to 2007, including recycled MSW materials and non-MSW such as construction and demolition debris. Hundreds of businesses, local government, and non-governmental organizations are recycling and diverting huge amounts of material from landfills.

Diverted & Recycled Materials Reported (tons) ¹⁰ Diversion Rates										
Diverted and Recycled Materials Reported	2004	2005	2006	2007						
Aluminum Cans	16,010	15,441	14,951	14,005						
Antifreeze	8,050	8,767	7,507	7,055						
Ash, Sand & Dust used in Asphalt Production	40,409	14,588	4,008	2,521						
Asphalt & Concrete	2,002,171	1,783,418	2,295,278	2,089,972						
Carpet and Pad	304	186	897	1,193						
Composting Furnish	44,419	81,904	121,454	149,492						
Computers & Parts	6,568	8,534	11,386	12,325						
Construction & Demolition Debris	166,325	521,087	300,820	302,089						
Container Glass	81,405	82,773	90,992	96,934						
Corrugated Paper	535,662	565,698	570,802	555,757						
Donated Food & Merchandise	306	435	627	286						
Ferrous Metals	866,641	974,535	1,048,885	1,009,826						
Fluorescent Light Bulbs	732	729	1,063	979						
Food Processing Wastes	3,185	38,823	25,369	-						
Food Waste	126,257	125,390	171,744	167,268						
Gypsum	35,648 ¹¹	56,618	62,482	52,767						
HDPE Plastics	7,991	9,319	8,000	11,348						
High-Grade Paper	70,210	58,661	71,774	82,806						
Household Batteries	149	294	1,350	1,755						
Industrial Batteries	29	-	-	-						
Landclearing Debris	268,486	475,015	258,563	168,007						
Landclearing Debris for Energy Recovery	-	-	208,010	136,205						
LDPE Plastics	10,604	16,209	14,928	13,695						
Milk Cartons/Drink Boxes-Tetra	8	4,529	5,755	5,787						
Miscellaneous	5	108	2	-						
Mixed Paper	230,934	322,732	316,874	361,043						
Newspaper	261,306	259,157	294,887	289,250						
Nonferrous Metals	99,317	122,490	135,976	115,718						
Oil Filters	3,719	2,721	2,189	2,635						
Other Fuels (Reuse & Energy Recovery)	115	16	1	-						

 Table 5.5

 Diverted & Recycled Materials Reported (tons)¹⁰ Diversion Rates

 ¹⁰ Detail may not add due to rounding. See *Appendix A: Municipal Solid Waste Recycling* for a list of materials counted as MSW recycling. Data includes organic materials processed by commercial composting facilities. See http://www.ecy.wa.gov/programs/swfa/solidwastedata/ for the facilities reporting composting activities.

¹¹ Decrease can be attributed to a drop in reporting for this material.

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Diverted and Recycled Materials Reported	2004	2005	2006	2007
Other Recyclable Plastics	7,783	7,247	7,776	12,350
Other Rubber Materials	12	-	39	50
Paint (Reused)	688	912	1,051	344
PET Plastics	6,748	8,534	7,558	14,024
Photographic Films	522	487	458	429
Post-Industrial & Flat Glass	2,253	4,877	5,404	1,706
Post-Industrial Plastics	-	697	-	-
Reuse (Clothing & Household)	738	2,891	804	4,346
Reuse (Construction & Demolition)	5,853	1,929	1,120	1,374
Reuse (Miscellaneous)	215	24	-	-
Roofing Material	8,186	2,353	9,120	10,188
Textiles (Rags, Clothing, etc.)	28,927	28,750	28,724	65,286
Tin Cans	10,082	12,133	13,936	22,315
Tires	37,568 ¹²	53,777	23,528	27,869
Tires (Baled) ¹³	-	-	7,690	9,660
Tires (Burned for Energy)	15,400	5,167	9,236	16,735
Tires (Retreads)	251	4,089	5,575	4,764
Used Oil	104,211	111,692	87,304	86,174
Used Oil for Energy Recovery	825 ¹⁴	306	1,283	129
Vehicle Batteries	25,518	28,903	25,414	25,734
White Goods	56,920	47,302	49,796	44,667
Wood	257,495	351,855	289,612	228,146
Wood Fiber/Industrial Paper	213	-	-	-
Wood for Energy Recovery	129,927	163,408	372,678	353,683
Yard Debris	646,674	643,376	665,902	684,181
Yard Debris for Energy Recovery	-	30,859	21,607	25,069
Total Diverted + Recycled Materials	6,233,974	7,061,745	7,682,189	7,289,943
Total Wastes Disposed ¹⁵	7,062,771	8,116,647	7,909,259	8,082,140
Total Waste Generation	13,296,745	15,178,391	15,591,448	15,372,083
Diversion Rate	46.88%	46.52%	49.27%	47.42%

¹² In 2004 and 2005, tires include recycled and re-treaded tires.
 ¹³ Began to measure as separate category in 2006.

¹⁴ In 2004 and 2005, a portion of the used oil burned for energy recovery is reported as recycled and included above.

¹⁵ For purposes of calculating a diversion rate, this analysis includes only the wastes that are potentially recyclable. Waste types used in this calculation include MSW, demolition, inert, wood, tires, medical waste and other unclassified wastes. It excludes industrial wastes, asbestos, sludge, and contaminated soils.

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Waste Diversion Benefits

Waste prevention and diversion from landfill disposal (or recycling) are potent strategies for reducing greenhouse gas emissions and conserving energy. Products that enter the waste stream have energy impacts and associated greenhouse gas (GHG) emissions at each stage of their life cycle: 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 the combustion of fossil fuels.

Fossil fuels are also required for extracting and processing the raw materials necessary to replace those materials that are being 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 lower greenhouse gases emitted during manufacturing.

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

Washington's measured diversion efforts for 2007 reduced greenhouse gas emissions by about 3 million tons (MTCE) or 1000 pounds per person. This is similar to removing 2.5 million passenger cars from the roadway each year - over half of the passenger cars in Washington.¹⁶

The 7.3 million tons of material diverted from disposal in Washington in 2007 saved over 133 trillion BTUs of energy. This is equal to about half of all energy used in homes in the state annually or one million gallons of gasoline.

Waste Disposed in the State of Washington

Another way to look at the waste disposed is to include all the waste that goes to landfills or

¹⁶ Figures derived using Waste Reduction Model (WARM), Environmental Protection Agency, <u>http://www.epa.gov/globalwarming/actions/waste/warm.htm</u>.

incinerators in the state. This includes waste brought in from out of state, but does not include waste sent out of state for disposal. With all categories included, 7,975,444 tons of waste was disposed of in all types of landfills and incinerators in Washington in 2007 (See Table 5.6). For total solid waste disposed of from 1993 - 2007 see

http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

DISPOSAL METHOD	2001	2002	2003	2004	2005	2006	2007
Municipal Solid Waste Landfills	4,525,019	4,744,561	4,572,275	5,506,112	5,517,342	5,398,008	5,354,005
Incinerated Waste	496,152	311,474	303,978	327,837	335,533	326,584	312,006
Woodwaste Landfills ¹⁷	53,298	33,171	34,188	*	*	*	*
Inert/Demolition Landfills	733,843	476,917	476,214	509,927	1,531,642	1,231,565	1,708,445
Limited Purpose Landfills	645,592	605,284	586,670	1,075,102	1,387,934	760,088	600,928
TOTAL	6,453,904	6,171,407	5,973,325	7,418,978	8,772,451	7,716,245	7,975,444

 Table 5.6

 Total Amounts of Solid Waste Disposed of in Washington

Municipal Solid Waste Landfills

Amount of Waste Disposed of in Municipal Solid Waste Landfills

*In 2007, 15 municipal solid waste landfills accepted waste totaling 5,354,005 tons.*¹⁸ *Of the 15* landfills, 12 were publicly owned and 3 were privately owned.

Six of the 15 landfills received over 100,000 tons of waste in 2007. Three of the largest landfills in Washington, Cedar Hills in King County, LRI – 304th Street in Pierce County, and Roosevelt Regional Landfill in Klickitat County, received 1,010,429 tons, 1,132,945 tons, and 2,251,940 tons, respectively. In 2007, two landfills received less than 10,000 tons, Delano Landfill in Grant County and Northside Landfill in Spokane County, compared with 12 MSW landfills in 1994.

Table 5.5 shows that several smaller and a few mid-sized landfills closed between 1995 and 1996 in response to the more stringent regulations for MSW landfills (chapter 173-351 WAC, *Criteria for Municipal Solid Waste Landfills*). Other landfills are reaching their remaining capacity and are not planning on expanding. There has been a gradual decrease in the number of landfills since 1996. At this time no new MSW landfills are planned in the state, although some are planning expansions.

¹⁷ The category of woodwaste landfills is no longer included under *Chapter 173-350 WAC, Solid Waste Handling Standards*.

¹⁸ Throughout this report, different disposal amounts are discussed. These numbers vary based on the types of facilities being discussed, the source of the waste and the 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 5.5 Number of MSW Landfills (based on tons disposed)

Table 5.7 shows the relationship of waste disposal to public/private ownership. As the table illustrates, 1,709,143 tons of solid waste disposed of went to publicly owned facilities (32 percent), with the remaining 3,644,862 tons going to private facilities (68 percent).

he	OWNERSHIP	NUME M LAND	SER OF SW OFILLS	AMOU WA DISPOSI	JNT OF STE ED (Tons)	% TOTAL WASTE DISPOSED	
		1991	2007	1991	2007	1991	2007
	PUBLIC	36	12	2,696,885	1,709,143	69	32
	PRIVATE	9	3	1,192,207	3,644,862	31	68
	TOTAL	45	15	3,889,092	5,354,005	100	100

Table 5.7Waste Disposed in MSW Landfills – Public/Private

amount of waste disposed of in MSW landfills shows movement from the publicly owned facilities to those owned by the private sector (See Figure 5.6). The trend has continued since 1991, when the state first started tracking this type of information. The amount of waste disposed of in the private facilities has increased from 31 percent since 1991 to 68 percent in 2007. 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 5.6 Comparison of Waste Disposed in Public and Private MSW Landfills (tons)

Types of Waste Disposed of in Municipal Solid Waste Landfills

Traditionally, many people think of the waste going into MSW landfills as being mostly household waste.¹⁹ Annual facility reports show that a much wider variety of waste is disposed of in the MSW landfills. These wastes need to be considered in terms of remaining available capacity. Fourteen of the fifteen landfills reported disposing types of solid waste other than MSW. Demolition, industrial, inert, wood waste, sludge, asbestos, petroleum-contaminated soils (PCS), other contaminated soils and tires were the major waste streams. (One landfill reported all types of waste under the general "municipal" category so exact amounts cannot be determined. Other landfills report in only a few categories. This makes knowing exact amounts of specific waste types difficult. (For the amounts and types of waste that individual MSW landfills reported in 2007, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.)

Table 5.8 shows changes in waste, types, and amounts disposed of in MSW landfills from 1998 through 2007. For MSW landfill data from 1992 - 2007, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/.

¹⁹ "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).

WASTE TYPES	2000	2001	2002	2003	2004	2005	2006	2007
Municipal /Commercial ²⁰	3,336,745	3,432,359	3,440,727	3,394,428	3,598,760	3,631,873	3,787,080	3,847,352
Demolition Waste	569,239	373,254	379,405	324,069	366,087	541,945	551,572	532,409
Industrial Waste	88,841	201,198	179,058	212,918	1,034,615	624,958	182,661	131,167
Inert Waste	19,349	26,376	17,092	2,635	1,705	15,780	15,842	22,491
Commercial Waste ²¹	93,752	66,391	99,048	93,036	-	-	-	-
Wood	47,087	34,254	55,149	47,622	25,576	9,896	4,462	71
Ash (other than SPI)	-	-	-	-	3,444	2,857	2,432	3,959
Sewage Sludge	47,783	1,473	1,762	23,435	10,172	12,476	21,303	6,703
Asbestos	7,922	5,991	4,908	9,625	12,086	7,943	5,633	5,379
Petroleum Contaminated Soils	231,290	217,721	457,061	342,172	279,982	320,283	455,964	326,019
Other Contaminated Soils	-	-	-	-	49,454	212,692	224,608	295,930
Tires	43,188	8,567	5,776	9,512	7,462	6,942	8,525	11,797
Special	437	917	567	-	-	-	-	-
Medical	239	387	372	2,459	2,565	2,576	2,721	2,805
Other ²²	173,711	156,131	103,636	110,364	114,204	127,121	135,206	167,933
TOTAL	4,659,582	4,525,019	4,744,561	4,572,275	5,506,112	5,577,342	5,398,008	5,354,005

 Table 5.8

 Waste Types Reported Disposed in MSW Landfills (tons)

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²⁰ Some facilities include demolition, industrial, inert, commercial and other small amounts of waste types in the MSW total. In 2004, the municipal and commercial categories were combined.

²¹ Some facilities include demolition, industrial, inert, commercial and other small amounts of waste types in the MSW total. In 2004, the municipal and commercial categories were combined.

²² 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 2007, 14 MSW landfills were operating in Washington State. Ecology determined the amount of remaining capacity for these landfills by asking them to report remaining permitted capacity, as well as the expected closure date. In 2008, the facilities estimated about 203 million tons, or about 37 years, of capacity at the current disposal rate. 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 14 currently operating landfills, 11 have greater than 5 years of remaining permitted capacity. Some landfills are planning expansions in the future. (See Table 5.15 for an estimated number of facilities with specified remaining years of life.)

Estimated Years to Closure for MSW Landfills							
YEARS TO CLOSURE	% OF TOTAL REMAINING CAPACITY	NUMBER OF FACILITIES	PUBLIC	PRIVATE			
Less than 5 years	0.3	3	2	1			
5 to 10 years	3.6	4	4	0			
Greater than 10 years	96.1	7	5	2			
TOTALS	100%	14	11	3			

Table 5.9

Capacity numbers in 2008 indicated that about 96 percent of the remaining capacity was at landfills with more than 10 years before closure. Eleven of the 14 operating MSW landfills are publicly owned with about 7 percent of the remaining capacity (14 million tons). About 93 percent of the remaining permitted capacity (189 million tons) is at the three privately owned facilities, compared to 73 percent in 1993. The majority of the capacity, about 82 percent of the total statewide capacity, is at the privately owned Roosevelt Regional Landfill in Klickitat County. Another 11 percent of the statewide total capacity is at the LRI privately owned landfill in Pierce County, along with 2 percent at the publicly owned Cedar Hills landfill in King County. The remaining 5 percent of capacity is spread among the remaining 11 landfills in the state (See Figure 5.7).



The Oregon Department of Environmental Quality was asked about the remaining capacity at the three municipal solid waste landfills that receive waste from Washington. Estimates are over 200 million tons of remaining capacity, or between 80-100 years.

Map 5.A: Shows the counties and the remaining years of capacity of their MSW landfills.



Map 5.A: Remaining Permitted MSW Landfill Capacity (as of April 2008)

The remaining capacity at private landfills has exceeded that for public facilities since the amounts were tracked in 1992 (See Figure 5.8).





Besides the amount of remaining capacity, the availability of that capacity needs to be considered. The Roosevelt Regional Landfill accepts waste from a wide variety of locations (See Map 5.C). In 2007, the facility received some type of solid waste from 26 counties in Washington, including the majority of the solid waste from fifteen counties. Waste was also received from Alaska, Oregon and British Columbia. For other counties that do not have landfills, Roosevelt or the Oregon landfills have become the disposal option. Other landfills in the state accept the majority of waste from the county in which they operate. In order to reserve the capacity for local citizen needs, some are also using regional facilities for some of their disposal needs.

Ecology bases its 37-year estimate of total remaining permitted capacity on the amount of waste disposed of in MSW landfills in 2007. This amount will vary depending upon 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 that is 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

Three waste-to-energy facilities and incinerators statewide burned 312,066 tons of solid waste. Of that amount, 19,885 tons were wood waste at the Inland Empire Paper facility in Spokane, and 34,805 tons were waste at the Ponderay Newsprint Company in Pend Oreille County. These two

incinerators do not burn MSW. In 2007, about 5 percent of solid waste was incinerated statewide. The highest percent of waste incinerated in the state was 12 percent in 1995. For the amounts and types of waste incinerated in 2007, using the new reporting categories, see http://www.ecy.wa.gov/programs/swfa/solidwastedata/).

MSW Landfill Disposal vs. Incineration

Table 5.10 shows a comparison of the amount of solid waste disposed of in MSW landfills and waste-to-energy facilities and incinerators in 2007.

Waste Disposed of in MSW Landfills and Incinerators in 2007						
FACILITY TYPETONSPERCENT (%)						
MSW Landfills	5,354,005	94%				
Incinerators	312,006	6%				
TOTAL 5,666,071 100%						

Table 5.10

In 1991, ninety-eight percent of the waste was disposed of in MSW landfills and 2 percent was incinerated. The highest percent of incinerated waste in the state, 12 percent, occurred in 1995. In 2007, 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 5.B: Shows the location of MSW landfills and energy-recovery facilities in Washington.



Map 5.B: Location of MSW Landfills & Energy Recovery Facilities (as of October 2007)

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 2007, the only facility of this type in the state, the Spokane Waste-to-Energy Recovery facility, sent 77,796 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 <u>inert</u> 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 landfills 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 <u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u>.)

For a more consistent look at inert landfills over time, some waste categories were combined for Table 5.11. (For inert/demolition landfill data from 1992 - 2003 and inert landfill data for 2004 - 2007, see <u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u>.)

mert Lunainis (in tons)									
WASTE TYPES	2001	2002	2003	2004	2005	2006	2007		
Demolition	211,901	243,593	95,008	28,967	39,701	89,595	89,457		
Industrial	-	-	81,474	-	-	-	2,150		
Inert	199,256	112,457	163,435	379,298	944,153	973,855	1,324,663		
Wood	167	445	1,082	2,526	402	610	-		
Asbestos	3	6	11	-	-	-	-		
Ash (other than SPI)	-	-	-	-	7,989	7,497	7,052		
PCS	319,105	120,159	131,872	66,260	215,286	91,399	277,812		
Tires	765	257	664	-	-	-	-		
Other	2,646	-	2,668	33,472	324,110	68,609	7,311		
TOTAL (tons)	733,843	476,917	476,214	509,927	1,531,641	1,231,565	1,708,445		

Table 5.11Waste Types and Amounts Disposed at
Inert Landfills (in tons)23

For limited purpose landfill data from 1992 - 2007, see <u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u>

²³ Chapter 173.350 WAC defines inert waste and limits the types of materials disposed in 'inert' landfills. Formerly these landfills were 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.

Limited Purpose Landnins (in tons)								
WASTE TYPES	2001	2002	2003	2004	2005	2006	2007	
Demolition	71,817	98,827	68,946	174,519	220,076	215,543	245,604	
Industrial	325,114	282,747	325,863	262,560	420,285	257,297	173,992	
Inert	202,577	195,303	157,431	36,155	53,597	39,928	48,784	
Wood	6,841	2,747	8,420	32266	21,494	19,629	11,702	
Ash (other than SPI)	-	-	-	533,201	409,376	138,616	77,082	
Sludge	-	-	-	-	-	-	460	
Asbestos	1,282	1,311	1,302	1,581	1,624	1,420	1,374	
PCS	13,222	9,888	4,890	20,399	224,064	32,836	20,656	
Soils (uncont.)	-	-	-	-	13,706	29,006	-	
Tires	41	59	81	713	690	423	65	
Other	24,698	14,402	19,737	13,708	23,022	25,390	21,210	
TOTAL	645,592	605,284	586,670	1,075,102	1,387,934	760,088	600,928	

Table 5.12Waste Types and Amounts Disposed at
Limited Purpose Landfills (in tons)

The woodwaste landfill category no longer exists under chapter 173-350 WAC, *Solid Waste Handling Standards*. (For woodwaste landfill data from 1992 - 2003 see <u>http://ecy.wa.gov/programs/swfa/solidwastedata/</u>.)

Movement of Solid Waste for Disposal

Movement of Waste Between Counties

All landfills and incinerators report the source, types and amounts of waste they received from out of county. Seven of the 15 active MSW landfills reported receiving solid waste from other counties in 2007.

Some of the MSW movement was because of closer proximity to a neighboring county's landfill. This was especially true for the 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 the closure of many local landfills, Roosevelt Regional Landfill in Klickitat County and Oregon's regional landfills has become the chosen disposal options. The Roosevelt Regional Landfill received some type of solid waste from 26 of the 39 Washington counties and also from out of state and out of country (See Map 5.C).



Map 5.C: 2007 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. Thirteen of the 26 counties rely on Roosevelt for the majority of their MSW disposal.

Nine counties and the City of Seattle send the majority of their MSW to Oregon facilities. Three other counties send a significant amount of waste to Oregon. Much of the waste that goes to the Columbia Ridge Landfill is Oregon is waste other than MSW.

You can find spreadsheets that identify the disposal location, type, and amount of waste for each county for 2007 (and previous years) at <u>http://www.ecy.wa.gov/programs/swfa/solidwastedata/</u>.

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 2007, a total of 252,720 tons of solid waste, about 3.0 percent of the waste disposed of and incinerated in Washington, was imported from beyond the state's boundaries for disposal at MSW landfills and energy-recovery facilities. The amount of waste imported for disposal decreased from a high of 6 percent in 1996. The termination of a contract between Roosevelt Regional Landfill and a California entity accounted for much of the drop in imported waste.

Table 5.13 shows the types of waste received from out of state for disposal. The majority of this waste (198,988 tons) went to Roosevelt Regional Landfill. Of that, 134,021 tons came from British Columbia, with the remainder from Alaska (25,436 tons) and Oregon (39,458 tons).

Out-of-State waste Disposed in wasnington								
Type of Waste	2002	2003	2004	2005	2006	2007		
Municipal Solid Waste	112,097	77,803	144,396	147,746	166,634	195,056		
Demolition	6,104	3,824	3,477	2,962	3,212	4,964		
Industrial	42,953	30,584	41,171	55,085	44,725	41,600		
Inert	1,097	-	59	269	65	8		
Woodwaste	35	28	1	-	-	30		
Sludge	-	621	-	19	10,883	-		
Asbestos	350	1,245	304	831	283	354		
Petroleum Contaminated Soils	1,769	3,114	7,957	4,801	3,650	4,954		
Tires	1,162	5,157	4,694	1,813	3,054	3,773		
Medical	-	-	-	-	-	-		
Other	359	508	728	1,332	1,585	1,982		
TOTAL	165,935	122,884	202,787	214,858	234,091	252,720		

Table 5.13
Out-of-State Waste Disposed in Washington

Nez Perce County, Idaho, disposed of 28,000 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 9,092 tons and the Weyerhaeuser limited purpose landfill in Cowlitz County received 15,329 tons. (See http://www.ecy.wa.gov/programs/swfa.solidwastedata/ for imported totals for 1991 – 2007.)

Waste Exported from the State

Another aspect of solid waste movement is the amount exported from Washington to another state for disposal. In 2007, a total of 2,127,605 tons of waste created in Washington was disposed of in Oregon landfills, an increase from 705,608 tons in 1992. Table 5.14 compares the waste amounts and types exported and imported.(See <u>http://www.ecy.wa.gov/programs/swfa.solidwastedata/</u> for exported totals for 1993 - 2007.)

Waste for all Solid Waste Facilities							
TYDE OF WASTE	IMPO	RTED	EXPORTED				
I I FE OF WASIE	1991	2007	1993	2007			
Municipal Solid Waste	24,475	195,056	710,515	1,397,054			
Demolition	1,412	4,964	2,245	223,471			
Industrial	-	41,600	864	265,125			
Inert	208	8	-	-			
Woodwaste	36	30	-	-			
Ash (other than SIA)	-	-	-	-			
Sludge	-	-	-	-			
Asbestos	-	354	1,623	97,287			
Petroleum Contaminated		1 051	22 308	116 230			
Soils	-	4,934	22,308	110,239			
Other Contaminated Soils	-	-	-	25,832			
Tires	-	3,773	-	84			
Medical Waste	-	-	-	1,177			
Other	-	1,982	18,512	1,335			
TOTAL	26,131	252,720	756,067	2,127,605			

Table 5.14Comparison of Imported-to-ExportedWaste for all Solid Waste Facilities

Major exporters of MSW in Washington included the City of Seattle, Clallam County, Columbia County, Clark County, Franklin County, Kitsap County, Pacific County, San Juan County, Skamania County, and Whitman County, along with portions of Benton County, Snohomish County, and Whatcom County. Reasons for exporting out of state have to do with the closure of local landfills and the negotiation of favorable long-haul contracts.

In addition to reports from MSW landfills in Oregon, waste tire data gathered through the recycling survey showed 25,661 tons of tires were disposed in Oregon. This disposal has occurred

over the last several years but the tonnage was not included until the 2005 report. Additional tires are disposed in Montana but the information has not been available.

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 5.D identifies the sources and amounts of waste that were imported and exported in 2007.



Map 5.D: Imported and Exported Waste (2007)

As can be seen in Table 5.9, Washington exports have been much higher than imports since 1991. With the loss of the California contract at Roosevelt Regional Landfill, waste imports dropped from a high of 307,850 in 1998, to 198,988 tons in 2007. Exported waste amounts have increased with over eight times as much waste being exported to Oregon's landfills (Columbia Ridge, Wasco, and Finley Buttes) as is imported to Washington for incineration or disposal.



Figure 5.9 Trend of Imported/Exported Solid Waste

CORROSIVE

FLAMMABLE

Chapter VI 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-

- Total MRW collected in 2007 was just over 32.2 million pounds.
- The average amount of HHW disposed of per participant was 74.8 pounds, and per capita was 2.62 pounds.
- Over 3.5 percent of Washington residents used a fixed facility or collection event to remove hazardous waste from their household, about 9.1 percent of all households.
- The counties that publicly collected the most CESQG waste per capita were Yakima, Whatcom, Lewis, Cowlitz, and Chelan.
- The counties that collected the most used oil per capita were Mason, Stevens, Wahkiakum, Skamania, San Juan, and Yakima.
- The ten categories of collected waste that increased the most from 2006 were Flammable Gas Poison, Oil w/PCB's, Oil (Contaminated), Oil Filters (off-site), Batteries (nicad/NIMH/lithium), Bases, Flammable Liquid Poison (Aerosols), Organic Peroxides, CRT's, and Latex Paint.
- Approximately 82 percent of all HHW was recycled, reused, or used for energy recovery.

household waste. Both HHW and CESQG waste are exempt from state hazardous waste regulations.

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

In the late 1980's, permanent collection facilities, now known as fixed facilities, began to replace the collection events in order 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.

It should be noted the data in this chapter are 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 been issued a solid waste permit by the appropriate local authority.



Chapter V Solid Waste Generation, Disposal and Recycling in Washington State includes additional data statewide.

Funding

Washington State's 1988 Model Toxics Control Act provides a large part of the funding for public MRW programs through the Coordinated Prevention Grant program. Many jurisdictions use funds to plan and carry out local MRW programs.

By 1991 all local governments in the State of Washington had submitted MRW plans. Every local MRW plan includes sections on CESQG technical and disposal assistance, MRW public education, MRW enforcement, and HHW collection.

Accuracy of Data Collection

Ecology created and circulates a standard reporting form to all MRW programs. Nonetheless, 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.

2004 – Some reporting errors have been identified since the 2004 report numbers were published. The 2004 HHW numbers and consequently the overall MRW number for 2004 have changed dramatically. One facility over reported the total amount of latex paint collected by 3 million pounds. Another facility reported the total amount of HHW that came to its facility from all sources (versus the facilities county of residence) in 2004. This same facility, due to the afore mentioned reporting confusion and a contract change saw its HHW number go from 4,068,503 pounds collected in 2004 to 4,395 pounds collected in 2005. The actual number for 2004 is impossible to know for what was collected in the county it resides. These two reporting anomalies account for upwards of 7 million pounds over reported in 2004 in the HHW and overall MRW categories.¹

2005 - Columbia County did not report their used oil collections so the number from the previous year was carried over.

Lincoln County experienced limited quantities and stored their MRW. They only submitted HHW quantities, participation numbers, and costs from the past three years. This data was averaged over the time period to establish the numbers for 2005. In addition, Klickitat County's participation numbers seem high but the county could not confirm this for us.

One facility in King County reported all CESQG waste received at its facility from all Washington State counties it services for CESQG collections. These numbers were backed out of the King County total based on other annual reports submitted to Ecology.

2006 – Lincoln County did not report in 2006 (see 2005 above). Except for used oil collection sites, Clallam County did not have anything further to report because they chose not to conduct

¹ See Table 6.2 for a year by year breakdown of HHW, CESQG, and overall MRW pounds collected back to 1999. By accounting for the reporting confusion mentioned above, the numbers are more in line with overall collection trends and explain the large jump seen from 2003 to 2004.

the collection events in 2006 that they normally do. Clallam County was anticipating a fixed facility to come on-line in 2006, but the facility did not open until early 2007. If using 2005 collection totals for Clallam and Lincoln Counties, approximately 110,000 pounds of MRW did not get collected or reported in 2006.

The total in Table 6.3 in the 2006 annual report should have been 26,279,699 pounds, which would have accounted for 81.4 percent of all MRW collected in 2006, not 65.3 percent as reported in the document.

The CESQG totals for Pierce County in 2005 and 2006 were originally thought to be based on Pierce County only collections, but were found to be the statewide collection totals for Emerald Services. This year's report shows the Pierce County only total, as well as, Emerald's collection total statewide.

Year 2007 Data

Ecology requires local programs to submit MRW report forms annually. For the past few years, Ecology has requested annual reports be submitted by April for the previous calendar year collections. The information received from local programs through the MRW annual reports provides Ecology with data on MRW infrastructure, collection trends, costs, and waste types received at collection events and fixed facilities. Ecology translates this data into the information contained in this chapter and designs it to be specifically useful to those who operate or work MRW programs within Washington State.

This year's report focuses on 2007 data with some comparisons to the data published in previous years' reports. In an effort to provide useful information for individual programs, it was determined that data would be presented in categories by county size.

Figure 6.1 indicates a distinction between counties with a population of less than 50 thousand, of 50 to 100 thousand, and of more than 100 thousand.



Many HHW collection systems are approaching stability. Permanent fixed facilities now service most of the state. In 2007, Chelan, Douglas, Garfield, San Juan, Skamania, and Wahkiakum counties did not have fixed facilities. San Juan County had a fixed facility, but had to close in June of 2005. San Juan County does plan to reopen at an undetermined later date. Garfield residents use the facility in Asotin County and Cowlitz County conducts a mobile unit in Wahkiakum County. Chelan, Douglas, and Skamania counties conduct collection events but may convert to fixed facilities in the future. The City of Port Angeles opened a new facility early in 2007 to serve Clallam County residents.



City of Port Angeles New Facility

Also, Stevens County is planning one new facility and Pierce County may be seeing two new facilities in the future. Mason County is looking to expand its current facility. Cowlitz County added a new facility in 2008 and will be closing its existing facility in 2009.

Collection services for CESQGs have leveled off statewide. For 2007, 16 fixed facilities serviced CESQG's and four different counties provided collection events for CESQGs.

Table 6.1 shows the size of individual counties. In Washington State there are 42 programs that manage MRW. These programs include all 39 counties.

<50K					
Adams	17,600				
Asotin	21,300				
Columbia	4,100				
Douglas	36,300				
Ferry	7,550				
Garfield	2,350				
Jefferson	28,600				
Kittitas	38,300				
Klickitat	19,900				
Lincoln	10,300				
Okanogan	39,800				
Pacific	21,600				
Pend Oreille	12,600				
San Juan	15,900				
Skamania	10,700				
Stevens	43,000				
Wahkiakum	4,000				
Whitman	42,700				
<50K total	376,600				

Table 6.1Individual County Population by Size (2007)

50K-100K					
Chelan	71,200				
Clallam	68,500				
Cowlitz	97,800				
Franklin	67,400				
Grant	82,500				
Grays Harbor	70,800				
Island	78,400				
Lewis	74,100				
Mason	54,600				
Walla Walla	58,300				
50K-100K total	723,600				

>100K					
Benton	162,900				
Clark	415,000				
King *	1,275,100				
Kitsap	244,800				
Pierce	790,500				
Skagit	115,300				
Snohomish	686,300				
Spokane	451,200				
Thurston	238,000				
Whatcom	188,300				
Yakima	234,200				
Seattle *	586,200				
>100K total	5,387,800				

* King excludes Seattle

State Total 6,488,000

Map 6.A shows which counties have permanent facilities, the number of facilities in each county, and which counties are likely to develop a permanent facility in the future.

Map 6.A Fifty-five MRW Facilities as of 2007



MRW Collected

As shown in Table 6.2, Washington collected approximately 14.9 million pounds of HHW, 9.7 million pounds of used oil (UO) from collection sites (includes antifreeze and oil filters), and 7.6 million pounds of CESQG waste, for a total of 32.2 million pounds of MRW during 2007. The two most significant trends seen since 2004 is the increase of CESQG waste collected and the decrease in Used Oil collected. The increases seen in CESQG collection totals are attributed to statewide collections by Phillip Services (Kent Facility) in King County and the Emerald Services facility in Pierce County. The most significant increase has come from antifreeze collections by Emerald Services. The drop seen in Used Oil collections needs to continually be monitored. There are more cars on the road than ever, so one would expect this category to keep increasing. The recent trend to changing oil every 5,000 miles compared to 3,000 miles and less do-it-yourself oil changers may be impacting this category.

Y ears 1999 – 2007								
Collection Year	HHW lbs (no UO)	Used Oil lbs	CESQG lbs	Total MRW lbs				
1999	9.9M	9.3M	637K	20.4M				
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				

Table 6.2 Total Pounds per Waste Category Years 1999 – 2007

* An estimated 7 million pounds of HHW was over reported in 2004. These numbers reflect a change from the numbers shown in the 2004 report.

Collection by Waste Category and Type

As shown in Table 6.3, the most dominant waste types of MRW collected in 2007 were noncontaminated used oil, antifreeze, latex and oil-based paint, flammable liquids, and lead-acid batteries. These totals include used oil and antifreeze collected at all collection sites. These six specific waste types accounted for 83.5 percent of the estimated 32.2 million pounds of MRW collected in 2007.

ix wost Dominant wik w waste Types Conected in 2				
Waste Type	Total Lbs.			
Non-Contaminated Used Oil	9,776,267			
Antifreeze	5,541,292			
Latex Paint	4,509,498			
Oil-based Paint	3,095,564			
Flammable Liquids	2,076,206			
Lead-Acid Batteries	1,988,385			
TOTAL	26,987,212			

Table 6.3Six Most Dominant MRW Waste Types Collected in 2007

Table 6.4 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 for 2007.

	W Concelled by	vasie Category II	2007
WASTE TYPE	HHW	CESQG	TOTAL
Acids	124,548.60	24,284.00	148,832.60
Acids (aerosol cans)	200.00	1,115.00	1,315.00
Aerosols (consumer commodities)	180,053.00	12,073.00	192,126.00
Antifreeze	352,247.00	4,917,220.00	5,269,467.00
Antifreeze Off-site*	0.00	271,825.00	271,825.00
Bases	219,090.00	22,620.00	241,710.00
Bases, Aerosols	683.00	363.00	1,046.00
Batteries (lead acid)	1,946,535.00	41,850.00	1,988,385.00
Batteries (small lead acid)	5,725.00	2,337.00	8,062.00
Batteries (dry cell)	229,339.00	15,420.00	244,759.00
Batteries (nicad/NIMH/lithium)	30,030.00	4,262.00	34,292.00
CFC's	1,410.00	0.00	1,410.00
Chlorinated Solvents	3,722.00	3,000.00	6,722.00
CRT's	693,834.00	63,391.00	757,225.00
Electronics	688,729.00	9,007.00	697,736.00
Flammable Solids	48,078.00	24,230.00	72,308.00
Flammable Liquids	1,173,283.00	902,923.00	2,076,206.00
Flammable Liquids, Aerosols	15.00	0.00	15.00
Flammable Liquids Poison	155,394.00	3,357.00	158,751.00
Flammable Liquid Poison, Aerosols	11,509.00	2,157.00	13,666.00
Flammable Gas (butane/propane)	122,282.00	1,297.00	123,579.00
Flammable Gas Poison	3,930	1,012.00	4,942.00
Flammable Gas Poison, Aerosols	16,255.00	216.00	16,471.00
Latex Paint	4,413,546.00	95,952.00	4,509,498.00
Latex Paint, Contaminated	480,498.00	52,219.00	532,717.00

Table 6.4Total Pounds of MRW Collected by Waste Category in 2007

WASTE TYPE	HHW	CESQG	TOTAL
Mercury Compounds (dental amalgam)	10.60	400.34	410.94
Mercury Devices (monometers, barometers, etc)	6.64	651.00	657.64
Mercury (fluorescent lamps & CFL's)	2.83	1.89	4.72
Mercury (pure-elemental)	1,095.70	105.3	1,201.00
Mercury (switches & relays)	.90	.50	1.4
Mercury (thermostats/thermometers)	57.82	70.01	127.83
Nitrate Fertilizer	2,854.00	0.00	2,854.00
Non-Regulated Liquids	34,107.00	56,292.00	90,399.00
Oil-Based Paint	2,800,247.50	295,317.00	3,095,564.50
Oil-Based Paint, Contaminated	376,739.00	58,895.00	435,634.00
Oil Contaminated	118,983.00	129,219.00	248,202.00
Oil Filters	30,751.00	3,122.00	33,873.00
Oil Filters Off-site*	0.00	146,523.00	146,523.00
Oil Filters Crushed	8,206.00	0.00	8,206.00
Oil Non-Contaminated	2,111,969.00	71,445.00	2,183,414.00
Oil Non-Contaminated Off-site *	0.00	7,381,935.00	7,381,935.00
Oil with Chlorides	5,699.00	1,622.00	7,321.00
Oil with PCBs	12,240.00	5,867.00	18,107.00
Other Dangerous Waste	83,330.52	562,234.00	645,564.52
Organic Peroxides	2,766.00	769.00	3,535.00
Oxidizers	50,860.00	3,642.40	54,502.40
Pesticide / Poison Liquid	291,128.20	6,305.00	297,433.20
Pesticide / Poison Solid	231,619.00	10,765.00	242,384.00
Photo/Silver Fixer	709.00	11,290.00	11,999.00
Reactives	2,405.00	1,760.00	4,165.00
MRW TOTAL	17,066,723.31	15,219,931.04	32,286,654.35

* Used oil, oil filter, and antifreeze collection sites other than a collection facility or event. These wastes were collected at various county locations and generator status is impossible to know for certain. In order to stay consistent with past reports, these numbers are included with the CESQG numbers.

Note: In 2007 446,128.00 pounds of materials such as propane tanks, cardboard, cans, etc. were recycled by MRW facilities. This number is not included in any of the data in the above table or elsewhere in this Chapter. It is being noted here because it is a waste stream that MRW facilities must deal with. The majority of MRW facilities manage these recyclables appropriately.

The form was changed to get better accuracy for mercury collections and to reduce the amount reported in the "Other Dangerous Waste" category. The newly added waste categories include: Aerosols (consumer commodities), CFC's, Mercury Devices (monometers, barometers, etc.), Mercury Compounds (dental amalgam), Nitrate Fertilizer, Non-Regulated Liquids, Photo/Silver Fixer, and Materials Recycled (propane tanks, cardboard, cans, etc.). The newly added categories were not included as any of the ten categories of wastes collected that increased the most from the previous year listed in the box on the first page of this chapter.

The Materials Recycled Category totals are not included in any waste totals in this document, but are mentioned at the end of Table 6.4. The biggest impact from these new categories on past categories comes from Aerosols (consumer commodities). For example the existing categories of Flammable Liquids, Aerosols went from 33,630 pounds in 2006 to 15 in 2007 and Flammable Gas Poison, Aerosols went from 99,290 pounds in 2006 to 16,471 in 2007. The "Other Dangerous Wastes" category did see a reduction as total pounds reported went from 1,044,986.86 in 2006 to 645,564.52 in 2007.

Disposition of MRW Waste

The disposition of MRW is generally well managed. Most MRW is recycled or used for energy recovery. Very little of the collected MRW is safe for solid waste disposal and seven percent of all MRW is disposed of at a hazardous waste landfill or incinerator. See Figure 6.2 for final disposition of MRW between recycled, reused, energy recovery, hazardous waste landfill or incineration, solid waste landfill, and disposal through a waste water treatment plant.



Figure 6.2 MRW Final Disposition

MRW Data

Table 6.5 shows various data by county. This data includes privately collected CESGQ wastes by Emerald Services and Phillip Services Corporation per county. This data has only been shown in past reports for Pierce and King Counties. 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.

COUNTY	HOUSING UNITS	HHW Participants	% Participant / Housing Units	HHW Cost / Participant	HHW lbs / Participant	HHW Total lbs	HHW, SQG, & Used Oil Total lbs
Adams	6,296	325	5.2%	\$20.23	26.40	8,581.00	41,724.00
Asotin	9,744	907	9.3%	\$60.25	88.44	80,218.00	86,676.32
Benton	64,931	5,333	8.2%	\$28.74	29.30	156,241.11	471,485.14
Chelan	33,682	780	2.3%	\$93.43	144.31	112,565.24	251,876.24
Clallam	34,408	583	1.7%	\$147.51	67.56	39,385.00	261,880.00
Clark	163,266	16,065	9.8%	\$25.62	107.55	1,727,820.59	1,897,620.59
Columbia	2,155	9	.4%	\$79.33	193.67	1,743.00	2,685.00
Cowlitz	42,350	1,717	4.1%	\$57.70	106.09	182,150.00	558,180.00
Douglas	14,700	583	4.0%	\$64.94	85.75	49,990.01	106,642.01
Ferry	4,071	32	.8%	\$24.09	49.72	1,591.00	9,189.00
Franklin	22,256	323	1.5%	\$28.57	63.11	20,384.90	439,868.90
Garfield	1,311	Inc. with Asotin	Inc. with Asotin	Inc. with Asotin	Inc. with Asotin	Inc. with Asotin	Inc. with Asotin
Grant	32,987	622	1.9%	\$84.37	166.63	103,641.60	161,775.60
Grays Harbor	35,051	991	2.8%	\$151.40	128.99	127,826.02	374,148.06
Island	37,691	2,733	7.3%	\$74.05	89.16	243,679.69	506,251.48
Jefferson	16,219	1,140	7.0%	\$70.81	33.95	38,702.19	149,598.21
King	520,378	57,915	11.1%	\$43.72	64.18	4,432,754.18	8,506,018.27
Seattle	292,231	17,753	6.1%	\$84.64	97.62	1,732,990.87	1,732,990.87
Kitsap	102,539	6,991	6.8%	\$110.30	100.05	699,441.93	1,401,011.25
Kittitas	19,190	470	2.4%	\$388.52	297.11	139,642.30	262,443.30
Klickitat	9,827	8,480	86.1%	\$5.37	14.71	124,704.00	159,729.00
Lewis	33,224	1,259	3.8%	\$115.17	244.53	307,860.73	526,602.08
Lincoln	5,738	65*	1.1%	\$122.21	186.26	12,107.00	41,011.00
Mason	29,640	4,391	14.8%	\$30.47	17.10	75,086.01	572,701.01
Okanogan	20,571	268	1.3%	\$264.97	217.48	58,287.00	92,621.00
Pacific	14,913	240	1.6%	\$487.50	37.90	9,097.12	83,246.12
Pend Oreille	7,386	1,438	19.5%	\$81.20	60.02	86,306.00	88,333.00
Pierce	319,373	9,180	2.9%	\$63.54	92.14	895,878.55	1,719,682.55

Table 6.5 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 Total lbs
San Juan	11,323	300	2.6%	\$181.13	213.08	63,925.20	127,847.20
Skagit	48,486	3,656	7.5%	\$41.47	139.36	509,503.20	712,775.20
Skamania	5,326	268	5.0%	\$73.64	168.24	45,087.00	90,967.00
Snohomish	273,343	19,071	7.0%	\$49.83	96.83	1,846,661.94	4,244,007.08
Spokane	193,512	33,838	17.5%	\$17.31	29.56	1,492,095.07	2,269,155.07
Stevens	19,521	428	2.2%	\$91.41	187.81	80,385.00	307,439.00
Thurston	101,293	16,200	16.0%	\$47.42	43.09	698,080.34	1,246,275.42
Wahkiakum	2,027	Inc. w/ Cowlitz	Inc. w/Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz	Inc. w/ Cowlitz
Walla Walla	23,032	1,909	8.3%	\$76.06	53.40	101,934.10	157,331.10
Whatcom	87,094	7,168	8.2%	\$52.00	53.87	386,110.15	824,993.38
Whitman	18,565	1,146	6.2%	\$40.37	42.15	48,301.00	71,958.00
Yakima	84,368	2,454	2.9%	\$105.76	132.42	324,958.23	1,535,026.83
STATEWIDE	2,764,018	227,952	8.2%	\$46.66	74.8	17,065,716.20	32,284,241.87

* Average of last 3 years

Household Hazardous Waste (HHW)

Participants per Housing Unit

Counties that exhibit ten percent or higher of participants per housing unit are either performing excellent public education to encourage the use of facilities or events, have very convenient locations for their collection facilities, or both. The participation number and rate for Klickitat County seem high and was not verified before this report was completed.

Cost per Participant

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 of scale both in quantities received and in disposition options. Also, there are differences in service levels of the basic program, accounting differences, and errors. This data does, however, provide an idea of what is possible and an incentive to contact those counties that appear to operate efficiently.

HHW Pounds per Participant

The average pounds collected statewide per participant for HHW was 74.6.

Table 6.6 shows the top five counties with the highest collections of HHW in pounds per capita (not participant) for, 2005, 2006, and 2007. Statewide, HHW pounds per participant collected was 2.62 pounds.

Table 6.6
High Collections of HHW (no Used Oil Sites) Pounds per Capita
by County in 2005-2007

H	HHW 2005			HHW 2006		I	HHW 200)7
County	Size	Lbs./ Capita	County	Size	Lbs./ Capita	County	Size	Lbs./ Capita
Island	50-100K	5.51	Klickitat	<50K	5.35	Pend Oreille	<50K	6.85
Pend Oreille	<50K	5.42	Pend Oreille	<50K	5.18	Klickitat	<50K	6.26
Thurston	>100K	5.41	Clark	>100K	4.89	Skagit	>100K	4.42
Asotin	<50K	4.63	Island	50-100K	4.87	Skamania	<50K	4.21
Spokane	>100K	4.51	Kittitas	<50K	4.36	Clark	>100K	4.16

HHW Disposition

Figure 6.3 shows the final disposition of all HHW collected throughout Washington State.



Figure 6.3 – HHW Final Disposition

Conditionally Exempt Small Quantity Generator (CESQG)

Twenty local MRW programs collect CESQG waste from the public. Counties that sponsor CESQG waste collections are:

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

Yakima County was responsible for over 24 percent of the total statewide volume of publicly collected CESQG waste. This is largely due to Yakima County's policy of not charging businesses to dispose of or recycle their waste. This does not take into account the numbers of CESQG waste collected privately in the county.

The top five counties that publicly collected the most CESQG waste per capita in 2007 were:

- Yakima
- Whatcom
- Lewis
- Cowlitz
- Chelan

Table 6.7 shows the total amount of CESQG waste collected publicly and privately by each county. When both public and private collection numbers are taken into account, the top five counties for CESQG collections per capita in 2007 were:

- Franklin
- Whatcom
- Spokane
- Snohomish
- King

Table 6.7

Washington State Public and Private CESQG Collections for 2007 by County

	Publicly Collected	Privately Collected	Total CESQG	
	CESGQ Waste in	CESGQ Waste in	Waste Collected	CESQG Pounds
County	Pounds	Pounds	in Pounds	Collected/Capita
Adams	0.00	1,654.00	1,654.00	0.09
Asotin	3,813.32	2,645.00	6,458.32	0.30
Benton	40,577.03	11,737.00	52,314.03	0.32
Chelan	25,971.00	24,121.00	50,092.00	0.70
Clallam	0.00	79,718.00	79,718.00	1.16
Clark	0.00	102,897.19	102,897.19	0.25
Columbia	0.00	942.00	942.00	0.23
Cowlitz	38,683.01	16,910.00	55,593.01	0.57
Douglas	1,750.00	1,781.00	3,531.00	0.10
Ferry	0.00	1,467.00	1,467.00	0.19
Franklin	0.00	419,484.00	419,484.00	6.22
Garfield	0.00	98.00	98.00	0.04
Grant	331.00	14,967.00	15,298.00	0.19
Grays Harbor	17,777.04	63,372.20	81,149.24	1.15
Island	26,819.79	29,755.00	56,574.79	0.72
Jefferson	5,829.02	27,893.00	33,722.02	1.18

COUNTY	HOUSING UNITS	HHW % Participant / Housing Units		HHW
		Participants		Cost / Participant
King	0.00	2,441,494.09	2,441,494.09	1.31
Kitsap	82,904.32	223,224.00	306,128.32	1.25
Kittitas*	0.00	2,818.00	2,818.00	0.07
Klickitat	0.00	208.00	208.00	0.01
Lewis	31,948.35	58,556.00	90,504.35	1.22
Lincoln	0.00	3,396.00	3,396.00	0.33
Mason	0.00	45,575.00	45,575.00	0.83
Okanogan	2,383.00	3,777.00	6,160.00	0.15
Pacific	606.00	98.00	704.00	0.03
Pend Oreille	0.00	1,027.00	1,027.00	0.08
Pierce	0.00	823,804.00	823,804.00	1.04
San Juan*	0.00	0.00	0.00	0.00
Skagit	12,413.00	187,859.00	200,272.00	1.74
Skamania	0.00	130.00	130.00	0.01
Snohomish	179,735.14	777,114.03	956,849.17	1.39
Spokane	0.00	774,060.00	774,060.00	1.72
Stevens	0.00	6,454.00	6,454.00	0.15
Thurston	22,891.08	225,907.00	248,798.08	1.05
Wahkiakum	0.00	0.00	0.00	0.00
Walla Walla	0.00	2,263.00	2,263.00	0.04
Whatcom	86,038.23	265,797.00	351,835.23	1.87
Whitman	0.00	7,703.00	7,703.00	0.18
Yakima	177,799.60	11,101.00	188,900.60	0.81
Antifreeze^	271,825	0.00	271,825	
Oil Filters^	146,523	0.00	146,523	
Totals	1,176,617.93	6,661,806.51	7,838,424.44**	(avg.) 1.14

* Kittitas and San Juan Counties do have publicly sponsored CESQG programs, but were unable to separate pounds collected from HHW.

^ These wastes were collected at various county locations and generator status is impossible to know for certain. In order to stay consistent with past reports, these numbers are included with the CESQG numbers.

** This total in Table 6.7 and 6.8 does not match the total in Table 6.2 because the CESQG number in Table 6.2 does not include used oil numbers and these Tables do.

Table 6.8 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 2007 were:

- Antifreeze
- Flammable Liquids
- Oil-Base Paint
- Contaminated Oil
- Latex Paint

ashington State Public and Private CESQG Collections for 2007 by Waste T					
Waste Type	Public Collections	Private Collections	Totals		
Antifreeze	283,477.00	4,905,568.00	5,189,045.00		
Flammable Liquids	81,761.00	821,162.00	902,923.00		
Other DW	21,487.00	540,747.00	562,234.00		
Paint - oil base	234,609.00	60,708.00	295,317.00		
Used Oil - contaminated	217.00	129,002.00	129,219.00		
Paint - latex	87,454.00	8,498.00	95,952.00		
Used Oil - non-contaminated	71,445.00	0.00	71,445.00		
CRT's	32,463.00	30,928.00	63,391.00		
Paint - oil base -contaminated	0.00	58,895.00	58,895.00		
Non-Regulated Liquids	40,288.00	16,004.00	56,292.00		
Paint - latex contaminated	34,509.00	17,710.00	52,219.00		
Batteries-auto lead acid	32,334.00	9,516.00	41,850.00		
Acids	14,075.00	10,209.00	24,284.00		
Flammable Solids	6,247.00	17,983.00	24,230.00		
Bases	17,422.00	5,198.00	22,620.00		
Batteries-alkaline/carbon	10,390.00	5,030.00	15,420.00		
Aerosols	6,031.00	6,042.00	12,073.00		
Photo/Silver Fixer	9,408.00	1,882.00	11,290.00		
Pesticides - Poison/Solids	6,708.00	4,057.00	10,765.00		
Electronics	8,007.00	1,000.00	9,007.00		
Oil w/ Chlorides/PCB's	5,867.00	1,622.00	7,489.00		
Flammable Liquid Poison	5,917.00	825.00	6,742.00		
Pesticides - Poison/Liquid	5,185.00	1,120.00	6,305.00		
Batteries-Nicad/Lithium	1,853.00	2,409.00	4,262.00		
Oxidizers	2,465.40	1,177.00	3,642.40		
Oil Filters	149,625.00	20.00	149,645.00		
Chlorinated solvents	847.00	2153.00	3,000.00		
Batteries Small Lead Acid	2,337.00	0.00	2,337.00		
Reactives	1,187.00	573.00	1,760.00		
Flammable Butane/Propane	1,297.00	0.00	1,297.00		
Mercury Collections	1,194.53	32.51	1,227.04		
Acids - Aerosols	132.00	983.00	1,115.00		
Organic Peroxides	16.00	753.00	769.00		
Bases - Aerosols	363.00	0.00	363.00		
Totals	758,269.93	6,661,806.51	7,838,424.44		

 Table 6.8

 Washington State Public and Private CESQG Collections for 2007 by Waste Type

* Note Approximately 66 percent of all CESQG wastes collected comes from the collection of Antifreeze

As shown in Table 6.8 (discounting the waste type "Other"), the dominant four types of CESQG waste collected in 2007 were antifreeze, flammable liquids, oil-based paint, and latex paint. These totals include wastes publicly and privately collected.

CESQG Disposition

Eight-seven percent of all CESQG moderate risk waste was either recycled or used for energy recovery. See Figure 6.4 for the complete disposition of CESQG wastes. The biggest difference between final dispositions of HHW and CESQG wastes lie in the amount of waste recycled.

Seventy-eight percent of CESQG waste was recycled while 45 percent of HHW was disposed of via the same method. Also significant, is the nine percent of CESQG waste used for energy recovery while 31 percent of HHW waste was disposed of in the same manner.



Collection/Mobile Events

Table 6.9 represents the number of mobile and collection events held statewide in 2006 and 2007. The number of events and amounts collected increased in 2007 from 2006. The amount of waste collected through these types of events was approximately 3.6 million pounds, which is a little over 11 percent of all MRW collected in 2007. Thirty-two mobile events were conducted by the Waste Mobile in King County and these events collected a little over 2 million pounds of MRW.

Type of	Number of Events		Pounds	Collected
Event	2006	2007	2006	2007
Mobile	67	63	2,956,141.06	2,963,460.05
Collection	20	51	437,384.80	686,737.72
Totals:	87	114	3,393,525.86	3,650,197.77

 Table 6.9

 2006 and 2007 Collection/Mobile Event Collection Amounts

Used Oil Sites

In 2007, facilities and collection sites reported collecting a total of 9,776,267 pounds of used oil (contaminated – two percent and non-contaminated – 98 percent). Used oil collection by county population is starting to show consistency with the top producers over the last few years.

See Table 6.10 for the six counties with the highest collections in pounds per capita by county size for 2005, 2006, and 2007.

Used Oil Sites - 2005			Used (Used Oil Sites - 2006			Used Oil Sites - 2007			
County	Size	Lbs./ Capita	County	Size	Lbs./ Capita		County	Size	Lbs./ Capita	
Mason	50K-100K	13.83	Mason	50-100K	10.9		Mason	50-100K	8.1	
Garfield	<50K	8.33	Stevens	<50K	5.5		Stevens	<50K	5.1	
Island	50K-100K	5.36	San Juan	<50K	3.8		Wahkiakum	<50K	4.1	
Stevens	<50K	5.34	Yakima	>100K	3.6		Skamania	<50K	4.0	
Skamania	<50K	4.56	Asotin	<50K	3.3		San Juan	<50K	3.8	
Yakima	>100K	4.16	Cowlitz	50-100K	3.3		Yakima	>100K	3.6	

 Table 6.10

 Used–Oil High Collection Counties, pounds per capita by county size collected at facilities and used oil collection sites

Statewide Level of Service

The Washington State Office of Financial Management reported that as of 2007 Washington State had an estimated 2,764,018 housing units². MRW Annual Reports revealed there were 227,952 participants. The actual number of households served is larger due to the fact that 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 250,747 participants served in 2007. This number represents 9.1 percent of all households in Washington State. Table 6.11 shows the percent of participants served statewide since 2001.

²This information was downloaded from Web site http://ww.ofm.wa.gov/

Percent of Participants Served Statewide									
Year	Percent Participants Served		Year	Percent Participants Served					
2001	6.1		2005	9.0					
2002	6.8		2006	8.6					
2003	8.9		2007	9.1					
2004	8.9								

Table 6 11

Trends in Collection

The majority of counties in Washington State have at least one fixed facility. Of the six counties without a fixed facility, four have plans for one in the future. The number of collection events held in 2007 increased from 87 in 2006 to 114 in 2007. As the population grows, collection events can be a useful strategy to reach residents inconveniently located from the counties fixed facility. It may be time for counties to start thinking about adding fixed facilities in areas to better serve their growing populations because:

- Collection events per amount of waste collected are more expensive.
- Fixed facilities provide a sense of permanence and normality to the collection of MRW.
- Increased operation efficiencies with fixed facilities (including the option of having an efficient location to conduct a collection service for CESQG's).
- Fixed facilities can easily provide a reuse or materials exchange area, which also help lower management costs.

Product Stewardship

Some other methods of managing MRW are beginning to gain wider acceptance in Washington State and across the country.

Product stewardship efforts have resulted in the electronics recycling bill and other work is currently underway for latex paint and compact fluorescent lights. Product stewardship principles have also guided the 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 of in the trash."

The Take it Back Network is a voluntary program on the part of businesses. Due to this arrangement it can be difficult to get data on the total amount of materials brought back to the businesses.

Emerging Waste Streams

Electronics, pharmaceuticals and personal care products continue to be an area of concern for local governments and the public.

Electronics

Components in a number of electrical and electronic products contain one or more of the following substances:

- Mercury
- Lead
- Cadmium
- Embedded batteries
- Polychlorinated biphenyls (PCBs)

The electronics recycling bill should ease the burden of this high volume/high cost waste for local governments once it is up and operating by January 2009. (See *Chapter II Partnering for the Environment* for more details about the electronics recycling program.)

Groups like the Northwest Product Stewardship Council are working with state and local governments, NGO's, retailers and manufacturers to develop strategies to manage these emerging wastes based on product stewardship principles.

Pharmaceuticals

Pharmaceutical wastes have been drawing more and more attention from state and local governments. A USGS Reconnaissance Study in 1999-2000 tested 139 streams for the presence of 95 chemicals, including pharmaceuticals. Steroids, nonprescription drugs, and insect repellent were the chemical groups most frequently detected. Detergent metabolites, steroids, and plasticizers generally were measured at the highest concentrations. Forty-six of the chemicals were pharmaceutically active. In 2006, another study by Eastern Washington University and the USGS analyzed nine biosolids products from seven states. The concentration of pharmaceuticals in biosolids was higher than in water and treated waste water.
In 2005, fifty-three million prescriptions were filled in Washington State. A 2006 King County Survey found that only 33 percent of people will use up all their medication. This leaves a substantial amount of pharmaceutical waste to be managed. This becomes significant from a

public health standpoint. In 2004 the American Association of Poison Control Centers (62 participating members serving 294 million people) reported a total of 2.4 million exposures. Fifty-eight percent of those exposures were from pharmaceuticals.

In 2006, a new two year pilot program started to collect pharmaceuticals at local pharmacies. Group Health sites participated initially, with Bartell Drugs participating later. Between October 2006 and September 2007, 2,972 pounds of medication was collected.

The environmental side effects of pharmaceuticals are showing that aquatic and terrestrial organisms may be affected through endocrine disruption and anti-microbial resistance.



Two tadpoles after 57 days of development in the lab. The one on the right, which has yet to sprout limbs, was exposed to fluoxetine, also known as Prozac, at 50 parts per billion.

Personal Care Products

Personal care products are also becoming a concern for state and local governments. Personal care products include cosmetics, deodorants, nail polish, lotions, hair spray, styling gel, perfumes, and colognes. According to industry estimates as reported by the Toxic-Free Legacy Coalition:

- Consumers may use as many as 25 cosmetic products containing more than 200 different chemical compounds on any given day.
- Eighty-nine percent of the approximately 10,500 ingredients used in personal care products have <u>not</u> been screened for safety by the FDA or anyone else.
- One chemical of concern found in personal care products are phthalates. Phthalates are a reproductive toxin/endocrine disrupter. Some studies have shown impacts on male reproductive system development.
- Moms with higher phthalate exposures were more likely to have boys with altered genital development including smaller penises and undescended testes (Swan et al., 2005; Marsee et al., 2006).
- Baby boys exposed to higher levels of phthalates in breast milk had slightly, but significantly, decreased testosterone levels (Main et al., 2005).

Appendix A Municipal Solid Waste (MSW) Generation, Recycling and Disposal

The discussion of the solid waste generation, disposal, recycling and diversion totals in Chapter V includes **all** types of waste disposed of, composted materials, source-separated materials burned for energy, and non-municipal solid waste diverted from disposal. The following discussion is of the more "traditional" recycling, disposal and generation numbers that include **only the municipal solid waste (MSW) stream**.

In 1989, the Legislature amended the *Solid Waste Management Act* (chapter 70.95 RCW). The law set a state recycling goal of 50 percent, to achieve by 1995. The 50 percent rate set by the legislature refers to the MSW recycling rate. To determine this rate, and assure that 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 municipal solid waste (MSW) by the Environmental Protection Agency.¹

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

In 2007, there were 175 cities and county unincorporated areas offering curbside collection of recyclable materials such as glass, paper, and metals. The number increased from 168 in 2006. At the same time, 137 cities and county unincorporated areas offered curbside collection of yard waste in 2007, increasing from 125 in 2006. This represents a ten percent increase in the number of curbside yard waste collection programs. The availability of recycling collection programs in the commercial sector (both publicly and privately operated) is also increasing, and the amount of materials these programs collect far outweighs what is collected in the residential sector.

Despite all the efforts citizens, government, and industry have made, the state did not reach the 50 percent goal by 1995. In 2002, the Legislature amended the law, giving the state until 2007 to reach the goal. The goal was not achieved in 2007. The legislators also set a state goal to establish programs to eliminate yard waste in landfills by 2012.

In 1999, Ecology began to expand what it measures to include materials outside of the state's

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¹ 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 landclearing debris disposed of at municipal solid waste landfills and incinerators.

definition of municipal recycling, with the "solid waste diversion" measure (see *Chapter V-Moderate Risk Waste Management* for a complete discussion on solid waste diversion). Ecology continues to measure progress on the narrower MSW recycling. This is an important area for municipal governments and industry assessing progress on programs, which are targeting residents and businesses to change disposal practices.

Table A.1							
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%						

Ecology measures MSW recycling by quantifying the MSW materials recycled and dividing by the total MSW generation (recycling plus disposal). Landfills and incinerators are required by state law to report municipal solid waste separate from other wastes, by county of origin, which provides a reliable data source for the denominator.

Recycling Rates for MSW

Annually since 1986, Ecology has conducted a survey to measure the statewide recycling rate for municipal solid waste (MSW). Information comes from local governments, haulers, recyclers, brokers, and other handlers of materials from the recyclable portion² of the waste stream.

From 1986 to 1993, the measured statewide recycling rate increased from 15 percent to 38 percent. This increase had been fairly steady, with a slight dip in 1991. In 1994, the measured recycling rate remained steady at 38 percent. In 1995, the recycling rate resumed its climb to 39 percent. In 1996, the rate dropped to 38 percent. The 1997 recycling rate dropped again to 33 percent as a result of the poor paper fiber market in Asia and a continued glut in the metals market. See Table A.1 for MSW recycling rates for 1986-2007.

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. 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 the market conditions for papers, 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.

² 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 landclearing debris disposed of at municipal solid waste landfills and incinerators.

In 2003, the reporting requirements for recycling facilities changed. These changes resulted in better reporting of recyclables since then. In addition, the market demand for ferrous and nonferrous metals was high during 2003, which aided in bringing 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 an historic high of 44 percent in 2005.

In 2006, the recycling rate dropped slightly to 43 percent, and continued steady at 43 percent in 2007. (See Figure A.1) 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 and electronics, and the economic and environmental impacts of recycling: <u>http://www.ecy.wa.gov/beyondwaste/bwprog_front.html</u>. (See also *Chapter II, Partnering for the Environment*)



Figure A.1 Washington State MSW Recycling Rate - 1986 to 2007

In 2007, 85.8 percent of the state's population has access to curbside recycling services, intended to be as convenient as disposal. Most of the people who do not have curbside services do have access to drop-box recycling. The state's population is growing, with almost 900 thousand new people since 1995. Ecology believes that newcomers to the state may not participate as much in recycling because they missed the waste reduction and recycling outreach programs Ecology and the counties ran in the early 1990s. Studies also indicate that without ongoing education and advertising, people tend to forget the recycling message.

Many curbside programs in the state are changing to commingled or single-stream 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 went into operation, and has continued through 2007. Some evidence suggests that the convenience of not having to sort recyclables leads to more residents taking part. In most cases, programs that changed to commingled collection also increased the range of materials collected; however, the act of commingling the recyclables can create a higher residual rate once the usable materials is sorted out.

Compared to source-separated collection programs, the single-stream programs are collecting about ten percent more material. The results are mixed where end markets are concerned. Reports from mills are showing that the contamination from these programs can be great enough to reduce the usable amount of material by up to 15 percent. Ecology is making an effort to quantify these residuals and determine the quantitative impact on the recycling and diversion data through annual reports from material recovery facilities and the recycling survey.

Measurement Methodology

See *Chapter V – Solid Waste Generation, Disposal and Recycling in Washington State* for a complete discussion of measurement methodology as it pertains to recycling and diversion.

Results – 2007 MSW Recycling

So we can consistently compare results from year to year, Ecology includes the same materials it has used since 1986 in the calculation of the MSW recycling rate. These materials are those originating from the MSW stream, as Ecology defined it when designing the recycling survey in the mid-1980s. Table A.2 provides tonnage figures for each material that contributed to the MSW recycling rate from 2004 to 2007.

Recycled Materials Reported (MSW)	2004	2005	2006	2007	
Aluminum Cans	16,010	15,441	14,951	14,005	
Computers & Parts	6,568	8,534	11,386	12,325	
Container Glass	81,405	82,773	90,992	96,934	
Corrugated Paper	535,662	565,698	570,802	555,757	
Ferrous Metals	866,641	974,535	1,048,885	1,009,826	
Fluorescent Light Bulbs	732	729	1,063	979	
Food Waste	126,257	125,390	171,744	167,268	
Gypsum	35,648	56,618	62,482	52,767	
HDPE Plastics	7,991	9,319	8,000	11,348	
High-Grade Paper	70,210	58,661	71,774	82,806	
LDPE Plastics	10,604	16,209	14,928	13,695	
Milk Cartons/Drink Boxes-Tetra	8	4,529	5,755	5,787	
Mixed Paper	230,934	322,732	316,874	361,043	
Newspaper	261,306	259,157	294,887	289,250	
Nonferrous Metals	99,317	122,490	135,976	115,718	
Other Recyclable Plastics	7,783	7,247	7,776	12,350	
Other Rubber Materials	12	0	39	50	
PET Plastics	6,748	8,534	7,558	14,024	
Photographic Films	522	487	458	429	

Table A.2MSW Recycled Tonnage Reported - MSW Recycling Rates³ 2004-2007

³ Detail may not add due to rounding.

Recycled Materials Reported (MSW)	2004	2005	2006	2007
Textiles (Rags, Clothing, etc.)	28,927	28,750	28,724	65,286
Tin Cans	10,082	12,133	13,936	22,315
Tires	37,568 ⁴	53,777	23,528	27,869
Used Oil	104,211	111,692	87,304	86,174
Vehicle Batteries	25,518	28,903	25,414	25,734
White Goods	56,920	47,302	49,796	44,667
Wood	257,495	351,855	289,612	228,146
Yard Debris	646,674	643,376	665,902	684,181
Total MSW Recycled	3,531,75 3	3,916,87 2	4,020,54 8	4,000,73 3
Total MSW Disposed ⁵	4,917,87 0	5,060,50 2	5,254,10 8	5,308,39 3
Total MSW Generated	8,449,62 3	8,977,37 4	9,274,65 6	9,309,12 6
MSW Recycling Rate	42%	44%	43%	43%

Table A.2 (continued)MSW Recycled Tonnage Reported - MSW Recycling Rates⁶ 2004-2007

Individual Waste Generation (MSW)

Each person contributes to the MSW stream through recycling and disposal of his or her household wastes. The figures below present only an average of the total contributions of all residents. Some people may actually contribute much more waste than others do. However, the picture tends to be more tangible when described in individual or "per-person" terms.

Table A.2 shows an average of how each person in the state contributes to the MSW stream.

⁴ Includes recycled and retreaded tires. Starting in 2005, Ecology began including baled and retreaded tires under diverted materials.

⁵ 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.

⁶ Detail may not add due to rounding.



Figure A.2 Pounds MSW Disposed, Recycled, and Generated Per Person/Day 1986-2007

Washington residents create, recycle, and dispose of about two pounds of MSW per person above the national averages. This larger disposal number is attributed to Washington's larger amount of yard and wood waste than the national average as well as a 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 and to capture and measure any new recycling and diversion that occurs.

In 2007, each resident of the state generated 7.86 pounds of municipal solid waste per day; disposing 4.48 pounds per person and recovering 3.38 pounds per person for recycling. This is down from 2006, when we had an all time high of per capita waste generation of 7.97 pounds per person per day (See Table A.3).

MSW	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Disposed	3.92	4.24	3.90	4.21	4.29	4.23	4.27	4.32	4.37	4.43	4.52	4.48
Recycled	2.42	2.08	2.06	2.04	2.29	2.48	2.28	2.69	3.14	3.43	3.46	3.38
Generated	6.35	6.32	5.96	6.25	6.58	6.71	6.55	7.01	7.51	7.86	7.97	7.86

 Table A.3

 Pounds MSW Disposed, Recycled and Generated Per Person/Day⁷

 1995-2007

⁷ See waste generation chapter for per capita numbers that include diversion and all waste types.