WASHINGTON STATE
DEPARTMENT OF
ECOLOGY

Washington State Solid Waste Plan

Issues Identification

Issues for Consideration and Discussion

Roundtable Meeting Series

Solid Waste and Financial Assistance Program

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Ecology wants to extend special thanks to the State Solid Waste Advisory Committee (SWAC) for suggesting and helping with the issue paper development process. State SWAC members invited a number of workgroup participants to the process, and many SWAC members contributed significant time to help develop to the issue papers.

Ecology was very interested in including people from every sector in the issue paper workgroups to ensure that diverse views were well represented. Participants were solicited and invitations were extended to many individuals from county and city government, health districts, the solid waste industry, business, industry, the non-profit sector, environmental and community interests, and Ecology's Hazardous Progra .

In several instances, people were not able to participate as much as they had hoped. While this was unfortunate for development of the issue papers, the perspectives that were not able to be included in the issue papers will be heard in the Round Table Meetings.

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The following people served on issue paper workgroups

Issue Paper #1—The Sources and Quantities of Solid Waste

Rick Hlavka	Green Solutions
Jim Knudson	Ecology Hazardous Waste and Toxics Reduction
Deborah Reynolds	Washington Utilities and Transportation Commission, State SWAC
Damon Taam	City of Spokane
Dave White	King County
Cheryl Strange	Ecology, Group Facilitator

Issue Paper #2—Roles, Responsibilities and Authorities

Mark Buscher	King County
Ron Draggoo	Douglas County, State SWAC
Jeff Kelley-Clarke	Snohomish County, State SWAC
Kathy Kiwala	Clark County
Helen Matekel	King County
Deborah Reynolds	Washington Utilities and Transportation Commission, State SWAC
Michelle Tsalaky	Washington Refuse & Recycling Association, State SWAC
Peter Christiansen	Ecology, Group Facilitator

Issue Paper #3—Litter and Illegal Dumping

Pamela Badger	King County
Dinah Day	King County
Larry Lanning	City of Spokane
Jim Matsuyama	NE Tri-County Health, State SWAC
Megan Thomas	Ecology Solid Waste
Polly Young	King County
Cheryl Strange	Ecology, Group Facilitator

Issue Paper #4—Collection

Sue Christopher	Okanogan Public Works
Mike Davis	Clark County
Dennis Hein	City of Spokane, State SWAC
Rick Hlavka	Green Solutions
Bill Reed	King County
Bob Schille	Waste Management, Inc., State SWAC
Michelle Tsalaky	Washington Refuse & Recycling Association, State SWAC
Eddie Westmoreland	Waste Connections Inc., State SWAC
Deborah Reynolds	Wash. Utilities and Transportation Commission, State SWAC, Group Co-Facilitator
Don Seeberger	Ecology, Group Co-Facilitator

Issue Paper #5—Waste Disposal Reduction and Avoidance

Jenny Bagby	City of Seattle
Mark Bronson	Yakima County
Monica Hairston	City of Spokane
Bill Reed	King County
Darrel Sunday	Sunday and Associates, Inc., State SWAC
Bob Thode	Fire Mountain Farms, State SWAC
Tom Watson	King County
Jim Wavada	Ecology, Group Facilitator

Issue Paper #6—Waste Reduction

Anchana Bergeson	Ecology Hazardous Waste and Toxics Reduction
Tim Attebery	Washington Food Industry, State SWAC
Rick Hlavka	Green Solutions
Jessie Lang	City of Spokane
Pat Buller Pearson	Puget Soundkeeper Alliance
Deborah Reynolds	Washington Utilities and Transportation Commission, State SWAC
Samanthe Sheffer	Seattle Goodwill
Gretchen Tomkins	Walla Walla County
Tom Watson	King County
Carl Weimer	Resources
Shelly McClure	Ecology, Group Facilitator

Issue Paper #7—Product Stewardship

Ken Armstrong	King County
Tim Attebery	Washington Food Industry, State SWAC
Patricia Jatczak	Ecology Hazardous Waste and Toxics Reduction
Kathy Kiwala	Clark County
Chris Luboff	City of Seattle
Nancy Malaret	Washington Citizens for Resource Conservation, State SWAC
Lisa Sepanski	King County
Monica Hairston	City of Spokane
Dave Peters	Kitsap County
David Stizhal	Northwest Product Stewardship Council
Paige Sorensen	Ecology, Group Facilitator

Issue Paper #9—Landfills, Past, Present and Future

Teresa Eturaspe	Yakima County
Anne Holmes	King County
Tim Hopkinson	Klickitat County
Dean Large	Columbia Resources, State SWAC
Gretchen Olsen	Kitsap County
Michelle Miller	Kitsap County
Damon Taam	City of Spokane
Sally Safioles	Ecology, Group Co-Facilitator
Cheryl Strange	Ecology, Group Co-Facilitator

Issue Paper #10 The True Costs of Solid Waste (combined with Issue Paper #8 on Economics of Recycling)

Yoram Bauman	University of Washington
Bob Colbo	Washington Utilities and Transportation Commission
John Greene	Skumatz Economic Research Associates, Inc.
Rob Guttridge	Clark County
Dennis Hein	City of Spokane, State SWAC
Nicki Johnson	Washington Utilities and Transportation Commission
Jeff Kelley-Clarke	Snohomish County, State SWAC
Jessie Lang	City of Spokane
Wendy Mifflin	Kittitas County
Jerry Parker	Ecology Hazardous Waste and Toxics Reduction
Bill Reed	King County
Deborah Reynolds	Washington Utilities and Transportation Commission, State SWAC
Lisa Skumatz	Skumatz Economic Research Associates, Inc.
Richard Talbot	Jefferson County
Bob Thode	Fire Mountain Farms, State SWAC
Roger Trump	Columbia County
Michelle Tsalaky	Washington Refuse & Recycling Association, State SWAC
Amy Wallace	Whitman County
Susan Fife-Ferris	Sound Resource Management, Consultant to workgroup
Jeff Morris	Sound Resource Management, Consultant to workgroup
Bruno Ridolfi	Ridolfi Engineers, Consultant to workgroup
David Nightingale	Ecology, Workgroup Facilitator

Issue Paper #11—Recycling

Jeff Gaisford	King County
Jessie Lang	City of Spokane
Janet Nazy	Washington State Recycling Association, State SWAC
Deborah Reynolds	Washington State Utilities and Transportation Commission, State SWAC
Amy Wallace	Whitman County
Eddie Westmoreland	Waste Connections Inc., State SWAC
Loretta Zammarchi	Yakima County
Don Seeberger	Ecology, Group Facilitator

Introduction

The Washington State Solid Waste Plan is out of date. It was last updated in 1991, when the solid waste programs and services across the state were quite different than they are today. Much has changed in the solid waste arena during the past ten years. A current solid waste plan is needed to assure that a coordinated solid waste system exists and also to serve as a blueprint for meeting our needs for the future. State law directs Ecology to coordinate development of the plan.

This document is a general summary of the themes, discussions, ideas and topics about the scope of the state plan revision effort. The purpose of this summary is to help frame stakeholder review and discussion of issues affecting the current and future solid waste system in Washington.

Ten issue papers have been under development since October of 2000. **These ten issue papers were never intended to address every subject that should be included in the state solid waste plan.** It is highly likely that additional issues and ideas will be raised during the Round Table Meetings, which is both appropriate and welcome. The issue papers were developed on a variety of topics needing more research before determinations are made about what the state plan should address and what should be emphasized. Additional issues also should be included in the scope of this state plan revision.

The topics to be addressed in the state plan revision will be determined after consideration and discussion of the ideas raised through the issue papers and additional ideas raised through the Round Table Meeting Series.

For every 100 pounds of product manufactured in the United States, about 3,200 pounds of waste are generated, according to Paul Hawken, author of *The Ecology of Commerce* and co-author of *Natural Capitalism*. Hawken says that industry moves, mines, extracts, shovels, burns, wastes, pumps, and disposes of four million pounds of material in order to provide one average middle-class American family's needs for a year. Robert Ayres, the inventor of the term "industrial metabolism," has analyzed the flow of materials in the manufacturing process. His conclusion: 94 percent of the materials extracted for use in manufacturing becomes waste before the product is even made. Eighty percent of what's left becomes waste within six weeks of use.

I. A Draft Vision Statement for Consideration

Participants at the Round Table Meeting Series will be asked to review a draft long-range vision (longer than the 20-year planning horizon.) The Round Table Meeting Series provides a forum for participants to create a perspective about sustainability that is shared by a broader range of stakeholders within regions and across the state. A healthy future depends on a more sustainable way of using our resources.

The draft vision that has been developed for consideration is:

A sustainable economic system exists, based on resource and energy conservation, pollution prevention, waste reduction and material reuse. The historically separate efforts to protect the environment and to promote economic development have merged.

Businesses balance material and energy use with practices that reinvest in environmental capital, recognizing that such stewardship is the basis for their survival and profit.

Individuals recognize their role in achieving and maintaining sustainability as inhabitants and consumers. Consumers demand, are provided with, and choose goods and services with the lowest life-cycle impacts on energy and materials use.

Government economic development policies provide incentives to businesses and industry to achieve and maintain sustainability.

Communities create and sustain local systems that support growth within the limits of the environmental carrying capacity.

What this draft vision statement means

Sustainability means a workable balance between economic, social and environmental forces, where the needs of the present are met without compromising the ability of future generations to meet their needs. Creating this future will be challenging and will take considerable time to achieve. It will require a transition from managing the collection and disposal of waste materials that have already been created to a system based on preventing waste materials from being generated in the first place.

A previous version of this vision statement included two additional sentences, which *are not* included in the vision statement for review at the Round Table Meetings.

The statements that appeared in the previous draft vision statement are:
"The concept of waste has been eliminated in Washington State."
and
"Closed loop production replaces solid waste management."

Ecology recognizes that these two sentences represent a provocative expression of an approach toward a vision of sustainability. While it is important to consider eliminating the concept of waste as one potential approach to achieving this long-range vision, it is equally important to consider other approaches to creating a sustainable system in our state.

In addition, the previous vision statement also included a series of proposed 20-year goals. These goals are also not included in the current vision statement, as it is premature to try to determine what can and should be accomplished in twenty years. Twenty-year targets will be established later in the planning process and will reflect stakeholder input from Round Table Meeting discussions around the state.

II. Development of the Draft Vision Statement

The draft vision statement for consideration was developed several months ago using information and input from a number of sources. These include:

- RCW 70.95.010, establishing waste reduction as the highest priority for handling solid waste
- Input from local government and other stakeholders, including the state SWAC
- Input from Ecology staff
- Review of vision statements and goals of local comprehensive solid waste plans
- Ecology's sustainability principles

Local government representatives and Ecology staff were asked to provide input on the solid waste system challenges and opportunities, the major changes that occurred in the past decade, and what an ideal future would look like.

When asked about an ideal future, the two themes that were consistently raised by stakeholders are waste reduction and the need for a more sustainable system for the longer term. Ecology staff developed an initial draft vision statement based on this input, which was revised a few times based on comments by local government representatives, state SWAC members and Ecology staff.

III. Issue Paper Development Process

After working on the draft vision statements, Ecology project staff compiled lists of ideas, suggestions and concerns that were raised by participants in the early input meetings (between December 1999 and March 2000). From this compilation, a list of research needs was developed that ultimately became the issue papers included in this document as Appendix A. The state plan will address additional issues. Not every issue is the subject of an issue paper.

The state SWAC offered to help research and write the issue papers. SWAC members participated on issue paper workgroups and solicited additional participants. Ecology invited additional participants to try to get representation from every sector on every workgroup.

Issue paper workgroups began meeting in October 2000 and some are still meeting. To date, approximately 45 issue paper workgroup meetings have been held. Workgroup members have discussed and debated ideas, researched issues, identified priority issues and written sections of the issue papers.

Issue Papers are included in Appendix A of this document. Some of the papers are still considered to be draft. Issue Paper #10 on Costs will be completed by April and will be available at that time. A brief summary of the approach to the cost paper is included in Appendix A under Issue Paper #10.

IV. Where We Want To Go

What follows is a summary of potential topics for inclusion in the state solid waste plan. This summary is a compilation of ideas contained in issue papers that pertain to determining the future solid waste system for Washington. The issue papers represent the views of the issue paper workgroup participants collectively. As issue papers, they are a collection of ideas, opinions and concepts, from a variety of stakeholders, assembled together. Exploratory in nature, they do not reflect the final direction of the state plan, nor do they establish positions.

The more complete discussions of these topics can be found under Appendix A in the following issue papers: #1, #5, #6, and #10.

Several topics discussed in the issue papers focus on the future and what we want to create for managing solid wastes in the future. It is important to be deliberate about the state's needs for the future if we are to have success making that future come about. It is common knowledge that the human race is using the planet's natural resources at rates faster than they can be replenished. Moreover, the levels of pollution being produced in the process are higher than the earth and atmosphere can absorb. Planning for a more sustainable future involves preventing as much waste as possible, understanding and factoring in the entire set of costs associated with solid waste generation and handling, and also diverting as much waste material as possible away from disposal once it has been generated. To be successful at preventing waste materials from being produced and reducing pollution effects requires action at the points where the materials are actually generated.

Important decisions need to be made about a future system that promotes sustainability. As we look to the future, the need to move from a solid waste system to a resource management system becomes clear. Existing methods, theories, and philosophies on sustainability point to the need to consider the impacts (including resource depletion, pollution, costs, etc) of all wastes and all phases of the life cycle of products. Pursuing a more sustainable solid waste system requires looking beyond the waste materials and sources that state and local solid waste programs have historically managed. Maintaining the solid waste system we have built for today will not be possible for the long term. As we move to sustainable production systems, the need for the current "end of the pipe" approach of collecting, processing and disposing of massive and increasing amounts of waste materials will diminish. A transition from managing all the wastes that are generated to preventing them from being created is needed.

Types and sources of solid waste

The legal definition of solid waste has evolved over the years, as legislation has been enacted and/or amended to address specific needs in the managing of Washington's solid waste streams. Government has traditionally ensured that collection, transportation, processing and disposal services are available for the residential and commercial components of the solid waste system. Because of this, state and local government solid waste planning has emphasized the municipal solid waste (MSW) stream.

Wastes are generated in extraction, transportation, manufacturing, selling, and using products and services. These waste materials represent significant drains on our natural resources and they also contribute noticeably to the pollution on our land, in our waters, and in our air. The current (and increasing) levels of waste generation are taxing our resources at a rate that is not sustainable for the long-term. Not only do we need to acknowledge and pay attention to the complete solid waste

system, but we also need to reduce as much waste generation as possible, as quickly as possible, throughout all components of the solid waste universe.

It is no longer enough to plan for just the municipal and commercial components of solid waste. Reducing waste and ensuring that human health and the environment are adequately protected requires planning for the entire universe of solid waste. The state solid waste plan should encompass all categories of non-hazardous, non-radioactive solid wastes. This includes the following categories:

- Municipal waste
- Industrial waste
- Resource use and extraction waste
- Transfer waste
- Inert waste
- Moderate risk waste

Note: For further detail about the universe of solid waste, see Table 1 in Issue Paper #1, Appendix A. Hazardous and radioactive solid wastes are addressed in other planning efforts.

Including additional components of the solid waste universe for consideration in the state solid waste plan should also include compiling information about sources, quantities, management and handling, and environmental impacts of those wastes. Not only will this information help to determine priority actions needed, but it will also be instrumental in establishing a way to measure progress toward the vision of a more sustainable solid waste system in the future. Even though the plan may not be able to exhaustively set forth amounts, management facilities, and methods, it should recommend how that information should be collected.

Waste Reduction

Waste reduction emphasizes the prevention of waste volume and toxicity, rather than managing waste. Waste prevention includes:

- Reusing a product in its original form (so it does not become a waste)
- Increasing the life span of a product
- Reducing material or the toxicity of materials used in production or packing
- Changing procurement, consumption, or waste generation habits to result in smaller quantities and/or lower toxicity of waste generated.

What is considered waste today will either not be generated, or will be used as a resource, a feedstock for production. Wastes not generated in the first place do not need to be managed, so the costs and impacts of waste management are avoided altogether.

Although waste prevention has been a legislatively mandated first priority for addressing solid waste, the state has lacked any kind of comprehensive approach to carrying out this direction. A comprehensive, coordinated waste prevention strategy should be developed and implemented.

Excessive consumption of non-essential goods has been held in high esteem in our post-war American culture. This type of consumption is not only considered normal, and a signal of success, but is also tirelessly promoted in virtually every aspect of our culture and economy. For significant reduction of solid waste to occur, this definition of “success” will need to shift.

Diverting materials from traditional disposal

Even with monumental waste prevention efforts, we will continue to have plenty of waste materials to manage for the foreseeable future, almost certainly through the twenty-year planning horizon.

Diverting these excess materials from disposal once the materials are generated should be an integral part of our future solid waste system. This involves finding ways to send fewer materials to end disposal (similar, but not identical to waste reduction, which is preventing the materials from being generated in the first place.)
The diversion options that should be considered as part of the state solid waste plan revision include:

1. Use the materials or waste in another way (such as land application)
2. Instituting bans on the disposal of certain materials (which leads to 1 and 4)
3. Waste segregation (which leads to 1 and 4)
4. Additional Waste Processing (before disposal)

When evaluating these options, attention should be paid to the technical feasibility, economic impacts, public acceptance, social/environmental justice, regulatory fairness and environmental protection.

Clearly, the cost-benefit analysis traditionally used to make choices about solid waste services, management methods and infrastructure has resulted in some unexpected and unfortunate results. For example, the lack of information and a method to evaluate the legacy costs of closed landfills has us as a society paying (or simply not addressing) to mitigate the environmental problems caused by past choices. Despite the fact that landfills were managed properly according to the knowledge available at the time, many closed and abandoned sites have left considerable pollution problems behind.

The pursuit of sustainable solid waste practices predicates consideration of all of the costs of solid waste decisions pertaining to current system or new ways of doing things, including:

- Monetary costs
- Public Health costs
- Environmental/Ecosystem costs
- Societal costs

There is a significant gap between traditional cost-benefit analysis and an alternate method of analysis that includes all of the cost-impact factors that support sustainable solid waste practices. No existing analytical methods exist that make a direct connection between current solid waste management practices and the evaluation of sustainable solid waste practices. An increasing body of research, policy, exploration and new analytical methods are being designed to at least partially fill this void.

Issue Paper #10 on the complete costs of solid waste will be completed by April and will identify issues and ideas to be considered in the plan revision about incorporating the principles of sustainability into solid waste decisionmaking.

V. The Current Solid Waste System and its Needs

The following summary includes the thoughts and ideas contained in issue papers that apply to the existing solid waste system in Washington. This system has been working well for us and we will continue to rely on it for many years, while at the same time beginning to invest in building a system embracing sustainability principles for our long-term future.

This solid waste plan revision needs to recognize and address what is needed to properly maintain the infrastructure and programs that have been established.

This summary reflects thought and ideas included in the following issue papers:
#1 (App B), #4, #9, #10 and #11. The complete issue papers are contained in Appendix A of this document.

Collection

A fairly comprehensive network of residential solid waste collection exists today in Washington. While some information is known about commercial and other non-residential collection of wastes for disposal and recycling, the emphasis of the collection issue paper discussion was on residential collection.

The collection system for residential materials is working adequately, although a number of needs and opportunities were identified by the workgroup to support this system. They include the need to improve operating efficiencies and also to reduce transportation costs and pollution from the use of garbage and recycling trucks. In addition, the collection and transport of moderate risk wastes and biomedical wastes pose difficulties that should be addressed.

Landfills

The primary means for final disposal of solid waste in Washington is landfilling. Of the measured portion of solid waste generated in Washington that is not recycled, 91% goes to some type of landfill. While various levels of state standards have been in place for landfills for nearly 40 years, in retrospect it is clear that they were not always protective enough of human health and the environment. Before statewide landfill standards were in place, some local health jurisdictions around the state were already regulating landfills. These older landfills, while no longer operating, have not gone away. Some of these sites have left a pollution legacy behind for future generations. Local officials believe that many sites have yet to be discovered.

Some of these closed or abandoned sites have been assessed and cleaned up, but many have not, primarily because of the lack of funding and/or consistent regulatory oversight. Human health and the environment need to be protected from the threats that some of these sites pose. Not addressing these sites is a significant breach in our state's solid waste system. The state solid waste plan should address this issue, including facilitating the development of a strategy to identify these sites around the state. In addition, a plan for assessing and cleaning up (as needed) the closed and abandoned landfill sites should be developed, either as a part of the state solid waste plan or through another process.

Although the currently operating landfills are managed under the most stringent standards ever, there is no guarantee that health and/or environmental problems will not result from these facilities in the future. As a way to reduce that potential, consideration should be given to also periodically assessing

operating landfills for any contamination that may be occurring so it can be addressed at the time, thereby minimizing human health and environmental threats.

Another way to minimize health and environmental threats is to consider what types of materials should and should not be going into landfills. This is especially true of materials that previously were classified as hazardous solid wastes, but have been deregulated (or downgraded) in some way to become non-hazardous solid wastes.

The landfill issue paper did not address other types of disposal, such as incineration. There are several incinerators permitted throughout the state to burn solid wastes that range from MSW to industrial wastewater treatment sludge. All disposal options that are currently offered should be reviewed in the state plan revision.

Review of the Existing Solid Waste System

To sufficiently examine the needs of the existing solid waste system, consideration should be given to a complete review of the existing solid waste system, including collection, transport, recycling, other processing and disposal (including closed landfills.) This review would be from a perspective of the extent to which the system is meeting current needs and also what is needed to maintain this system while adequately protecting health and the environment. The assessment should also address the extent to which the current system is solvent, how it is funded and intermediate and short-term funding needs.

Recycling

Building on the work of last year's Recycling Assessment Panel, the issue paper on recycling identifies a number of areas to consider emphasizing in the state solid waste plan revision. Recycling in the State of Washington has declined during the past three years, despite years of investment in establishing a strong network of recycling programs throughout the state. Recycling is an essential component of the current the solid waste system, keeping huge volumes of materials out of the disposal stream, reducing pollution and preserving air, land and water resources.

Regional characteristics must be considered when evaluating ways to improve recycling efficiencies, as a "one size fits all" approach will not work. These factors include: population size and density, economies of scale, climatic differences, distances to markets, costs of marketing reyclables, and market availability. Issues that should continue to be addressed through inclusion in the plan revision are:

- Residential recycling
- Commercial recycling
- Organic materials
- Education
- Construction and demolition
- Market development
- Data collection

Issue paper #10 on costs will also cover economic disincentives to recycling. Ideas for possible inclusion in the plan will be considered when the paper becomes available in April.

Regulatory Definitions

The current state laws governing solid waste have evolved over time and today resemble a patchwork of definitions that impedes common understanding of terms and regulatory approaches. The following definitions, at a minimum, should be examined as part of the planning process:

- Definition of solid waste
- Definition of recycling and recyclable materials
- Definition of solid waste handling
- Definition of disposal site
- Definition of solid waste collection

VI. What We Need to do to get there

The summary below is a compilation of ideas from issue papers that considered the types of approaches needed to make progress toward a sustainable vision of solid waste. These ideas represent not what the future system could be like, but rather how we might go about building that system.

These thoughts have been excerpted primarily from issue papers #2, #3, #4, #5, #7, #9 and #10. The complete text oif each issue paper is contained in Appendix A of this document.

Roles

A gradual shifting of responsibilities from the public sector to the private sector has occurred in the municipal solid waste arena. Changes in technology and a number of court decisions have impacted solid waste operations during the past decade. Regulatory standards need to be updated. Materials in the solid waste stream have changed as well. Computer monitors and mercury switches in consumer products (shoes, toys) are examples. Solid waste management has moved from an environment of certainty and stability to a more dynamic environment demanding quick responses to emerging needs and waste streams.

Ultimately, all levels of government, business, industry, community and citizenry must work collaboratively to ensure a successful long-term approach to solid waste. While existing roles, authorities and responsibilities are fairly well defined, the issue of future roles and responsibilities will need to be addressed. Despite its significance, this topic should be taken up *after* plan recommendations have been developed. The statewide discussion of our collective future should be unconstrained by the existing authorities under which we operate. It is hoped that participants from all sectors will enter into this discussion with an open mind, understanding the importance of examining everyone's role in an open and forthright manner.

For today's waste materials to become tomorrow's materials with value, the impacts of redefining certain solid wastes as products need to be thoroughly researched and evaluated. This shift from *waste* to *product* carries major regulatory and economic ramifications, which should be carefully considered and addressed.

Attitudes, Behaviors and Incentives

The importance of values, beliefs, perceptions and behavior can't be overemphasized in making the shift from the "out-of-sight, out -of-mind" attitude to one of fully understanding and accepting responsibility for the choices we make in all of the roles we assume in society, ranging from property owners, consumers, civic officials and employees to parents, industry executives, builders, recreationists, etc. This is yet another subject to be included within the scope of the state planning effort.

Hand in hand with influencing individual behaviors and attitudes is the need to examine the role of economic incentives, infrastructure and funding for making the transition from a waste-based solid waste system to a resource-based system. At the same time that the future approaches are being

envisioned and planned, Washington's existing solid waste infrastructure must continue to be supported and maintained. Finite resources at the local and state government levels have limited the sustainability-based programs and services that have been offered to date. Making significant progress toward the stated vision will likely depend upon economic signals and the ability to finance the needed changes while continuing to provide today's essential services. In our pursuit of making a transition to the future that we want to create, we must be careful to not invest in programs, policies or infrastructure that perpetuates waste-dependent industry. That would be counterproductive to the direction of preventing as much waste as possible.

Infrastructure

Landfills will continue to be needed for many years to come. Landfills, once closed, do not disappear. They leave a legacy for future generations. Although landfills in Washington are largely in compliance with stringent regulatory standards, they are not pollution-free. Impacts to human health and the environment can and do occur. Therefore, the state solid waste plan should seek ways to ensure that landfills are even better managed and more protective of the environment in the future. The plan revision should explore ways to ensure that all current landfill closure requirements are met.

Litter and Illegal Dumping

Many people hold the belief that littering and illegal dumping has been on the rise in our state. Despite increased cleanup efforts across the state, plenty of litter remains in Washington's public places. Cleanup alone will not eliminate litter and illegally dumped materials, which pollute streams and natural areas, degrade communities, pose safety hazards and cause many other problems. Prevention of litter and illegal dumping needs to be emphasized now. A short-term prevention strategy is being developed with active participation by a variety of stakeholders. The first element of the strategy is underway. In addition, a long-term roadmap for reaching the statewide goal of "zero litter" should be explored. It is recognized that progressive efforts in waste reduction and disposal diversion should also result in less littering behavior. The extent to which litter needs to be addressed in the plan revision is a question that should be considered by Round Table Meeting participants. Perhaps illegal dumping should be considered in conjunction with the collection and disposal components of the solid waste system. Existing information about illegal dumping is sparse, at best.

Product Stewardship

A relatively new concept called product stewardship involves shared responsibility for minimizing the environmental impacts of products throughout all stages of their life cycles. Responsibility is shared among everyone that designs, produces, sells and uses the products. Product stewardship is practiced widely in Europe and Asia. In the U.S. it is starting to come of age.

Product stewardship can take many forms. Some examples of product stewardship approaches include: offering products as services (leasing) instead of selling the products themselves; designing products for the environment; and product take-back programs (such as Kodak disposable cameras that are collected and reused).

During the planning process, roles and relationships for all sectors should be determined. Moreover, measurement and evaluation mechanisms should be established to regularly assess all of the sustainability efforts that affect the solid waste arena. Clearly articulated principles for guiding Washington's product stewardship activities should help to ensure that approaches are workable.

Product stewardship recognizes the need for industry, government, and consumers to jointly promote the development and use of consumer products that pose no–or increasingly fewer–health and environmental impacts. It encourages manufacturers to design products with fewer toxins, and to make them more durable,

reusable, and recyclable. Product stewardship also affords manufacturers the opportunity to look at all of the impacts associated with a product and its packaging–including energy and materials consumption, air and water emissions, the amount of toxic materials in the product, worker safety, and waste disposal–and to take increasing responsibility for the end-of-life management of the products they produce. The challenge is to move beyond disposal and to facilitate a paradigm shift toward sustainable production.

A successful product stewardship strategy can:

- Reduce the volume of material landfilled or incinerated, thus reducing health and environmental impacts while also alleviating the underfunded mandate that many local jurisdictions are faced with by reducing their waste management costs
- Reduce the toxicity of products
- Reduce the demand for raw materials
- Encourage manufacturers to take increasing responsibility for the life-cycle costs associated with the products they produce by providing product feedback and an economic incentive to innovate, reduce, and recycle
- Reallocate costs. Currently, state and local government, along with taxpayers and ratepayers, assume most of the direct costs associated with disposing of or recycling used products, as well as any health and environmental costs associated with the improper use, storage, or disposal of these materials. Product stewardship would add product manufacturers, retailers, and consumers to the list of who pays
- Encourage businesses to develop strategies and implement changes that not only minimize environmental impacts but that enhance product efficiency and profitability–without additional regulatory direction or oversight.

Some product stewardship approaches could involve collection of materials to be returned to vendors or manufacturers. If these types of approaches are considered as alternatives for the solid waste plan, then an efficient collection system should be considered.

VII. More specific alternatives and thoughts from the issue papers that need to be looked at later

Several of the issue paper workgroups included very specific potential alternatives for action that should be considered in the plan. Because the Round Table Meeting process is designed to discuss the range of issues to be included in the plan, these ideas will be considered later in the process. The alternatives are summarized in this section and they will be considered in the next phase of plan development, the consideration of alternatives. Alternatives generated through the Round Table forums and also from the issue papers will be considered and evaluated. Stakeholders will be asked to participate in the consideration and selection of alternatives.

Again, at this point in the process, potential alternatives listed below should be considered to be informational only.

Potential alternatives and ideas about the future—Where We Want to Go

- Solid waste entities should determine how they can contribute to waste prevention, recycling and proper disposal of materials from all segments of the solid waste universe, not just the ones they oversee.
- Move the discussion about beneficial use beyond economic benefits to the waste producer to show the environmental benefit to the land over an extended period.
- Closely monitor energy generation from wastes to ensure that it is not simply transferring a waste from one form of pollution to another (air.)

Potential alternatives about our current system and its needs

- Standardize local reporting of waste types, to the extent possible.
- Get improved data on statewide waste composition, including miscellaneous inert, industrial and C&D.
- Develop a way to measure waste reduction statewide, either directly or indirectly.
- To prevent litter and illegal dumping, use media and education to raise awareness, reinforce messages and teach appropriate behavior.
- Conduct an evaluation of the current litter and illegal dumping enforcement system, then consider various enforcement-related activities.
- Regularly evaluate the 2-5 year litter prevention strategy through thorough measurement of changes, assessment of progress, looking at alternatives and updating the strategy so it always looks forward at least 5 years.
- Assess existing funding mechanisms for litter and illegal dumping programs, including the litter tax.
- Get commitment and involvement of other state agencies, local govts, and the private sector to help with 2-5 yr. prevention effort: enlist help with funding and creative ways to disseminate anti-litter message.
- Commit to cleaning up illegally dumped wastes.
- Maintain currently active litter and illegal dumping cleanup programs, and consider additional cleanup activities.
- Develop clear packaging requirements for sharps that will protect anyone coming into contact with them, and can be agreed to by all parties.
- Develop clear and consistent regulations to adequately deal with biomedical wastes.
- Provide public education on proper methods of handling and disposing of biomedical wastes.
- Reduce demand for self-haul services over time to help reduce capital and operating costs for transfer facilities: Provide other options for self-hauling residents and businesses.
- Develop efficient and affordable services to pick up and dispose of bulky wastes: Counties and cities should work with collection companies.
- In Beneficial Use: Eliminate/prevent any unfair advantages by producers or users over competitors by virtue of willful noncompliance with regulations or unfair/biased application of a rule by the regulating agency (Any BU must be accessible to all producers and recipients that meet the technical and regulatory requirements for reuse of the byproduct.)
- Research disposal bans, including looking at data from existing bans. Assess total costs and benefits, including regulatory fairness and consistency.
- Research whether large benefits exist from banning organic materials from disposal.
- Identify feasible alternatives to disposal bans before instituting bans.
- Require govt in-house waste prevention programs.
- Promote reuse and reduction of construction and demolition materials.
- Promote material exchanges and reuse networks targeting building materials, industrial waste, etc.
- Expand on-site composting programs.
- Streamline MTCA cleanup process for some of the older closed landfill sites.
- Tailor MTCA grant programs so complete landfill cleanups can be done.
- As required in the WACs, ensure that local ordinances adopt amended regulations related to landfills.
- Ensure that landfill closure requirements are met: Develop a closure checklist that is then filed with assessor's office to provide notification to future developers/owner of the actions taken on that parcel.

- Promote interim cleanups on landfill sites: Consider expanding grant eligibility to cover interim cleanups; Get agreed on cleanup standards at the beginning of the process to eliminate the cost of uncertainty.
- MTCA process should incorporate open arms approach for developers willing to invest in contaminated sites for redevelopment (as appropriate). Make the process environmentally sound with rapid review, no risk of changes in rules, and financially attractive. Consider helping with the cost differential of developing a contaminated site versus a non-contaminated site through an incentive program.
- Local government and private sector should be indemnified in providing technical and financial assistance on landfill cleanups.
- Ensure adequate closure and post-closure funds remain in place for the short and long-term.
- Improve dispute resolution process in MTCA:consider an appointed liaison between Ecology site managers and responsible party project managers.
- Streamline the voluntary cleanup process for landfill sites.
- Develop a strategy for identifying, assessing and cleaning up closed and abandoned landfills: Consider working with SWANA or the Municipal Research and Services Center to compile needed info. All affected governmental entities should work together to prioritize the cleanup.
- Assess both closed and currently operating landfills periodically for methods that can minimize HH/E threats: At a minimum, this should include monitoring groundwater, surface waters, soil and air (incl. for methane & other haz gases)—Appropriate pollution control devices should be installed if any contamination is occurring.
- Secure additional funding for Ecology MTCA regulatory oversight: Need more focused and consistent oversight; perhaps even contract out for cleanup review.
- Government should partner with developers to clean up old landfill sites and use them for community benefit.
- Follow through on deed notifications or restrictions on both past and present landfills.
- Pursue legislation allowing rate-setting jurisdictions to set residential rates for regulated franchise.haulers that are consistent with the incentive rate structures established in local comp plans.
- Ecology should share beneficial use determination information with the public.
- Ecology should track volumes of organic materials reused (beneficial use.)
- Make building-related waste disposed of or recycled a separate category in statewide waste characterization study.
- Conduct an organic waste characterization study.
- Franchise haulers should provide information on the full range of recycling and garbage services available.
- Encourage and support studies designed to discover barriers to improving residential recycling collection programs.
- Ecology should support studies on recycling programs to verify or disprove existence of barriers and to identify other circumstances not currently thought of as barriers to improvement.
- Ecology should research new processing methods and technology for organic materials.
- Conduct periodic statewide recycling surveys of all jurisdictions and private recyclers, to obtain information from all levels of the collection system.
- Increase diversion of commercial recyclables through local regulations.

Potential alternatives about what we need to do to get there

- Reduce as much waste as possible from all sectors.
- Develop recommendations on how information should be collected on the entire sw universe.
- For all elements of the solid waste universe being addressed in the plan, conduct fact-finding to determine what materials are generated; how much; how they are managed; to what extent the waste mgmt priorities are being followed; existing authorities for mgmt of these materials; whether HH/E impacts occur as a result of handling these materials.
- After the above information is gathered, prioritize and develop strategies for assuring these wastes are appropriately addressed.
- The plan should explore the intricacies involved in the assumption that we can have both increased take-back programs and also reduced transportation simultaneously.
- Research waste segregation fully to determine whether it makes sense to deal with segregation separately from recycling or disposal.
- Leverage current public willingness to "own the waste problem" and begin NOW to build a better future.
- Washington state must step forward and become a leader by advocating and supporting innovative policies that further waste prevention and by bringing these issues to the attention of the public and the media.
- Ecology should become more involved and visible in some of the national efforts in waste prevention, producer responsibility and toxics reduction.
- Conduct waste prevention education programs that focus on consumer purchasing practices.
- Develop a comprehensive strategy on waste prevention: Ensure the strategy is broader than actions that govt should take; Include industry in development of the strategy.
- Strive to create a closed-loop system, focusing on shift in program and system design, mindset shift and product design & producer responsibility.
- Promote product design that demonstrates producer responsibility.
- Product stewardship should be an important tool for the future.
- State plan should endorse product stewardship as a primary waste management tool.
- Product stewardship programs must account for regional differences while avoiding a patchwork of policies and systems that decrease efficiency and effectiveness.
- Plan should include a set of product stewardship principles that will guide our product stewardship programs.
- Plan should outline the responsibilities, goals, process and target dates for developing a product stewardship policy. The policy should include criteria for selection of priority products and should involve stakeholder groups to create workable solutions.
- Develop a plan for implementing the product stewardship policy.
- Ecology should be designated as the state's lead for developing product stewardship policy.
- The plan should require a mechanism to evaluate the effectiveness of product stewardship activities that are developed and implemented.
- Ideally, regulatory oversight of landfill operation, closure and cleanup activities could be provided at the owner level (e.g. county) rather than on a site-by-site basis.
- People in Washington should be encouraged to take responsibility for the impacts of their solid waste choices in their roles as individuals, in businesses, communities, regions and stewards of our state. We should all share the collective responsibility as stakeholders of Washington's solid waste management system.
- Landfill owners and operators should be proactive in demonstrating that the surrounding environmental media has not been impacted.

- Design future landfills so they can have a second life and link existing sites to future development (Closure plan that accommodates a second use.)
- Design future landfills to be better managed and more protective of the environment.
- Assess what materials should and should not be allowed to be placed in landfills.
- Establish a statewide policy of zero yard waste disposal in urban zones.
- Ecology should develop standards for acceptable use of organic products.
- State can encourage recycling by requiring job-site recycling and/or reuse of materials on all state-funded building projects.
- Adopt sustainable building standards and develop guidelines for state-funded building projects.
- Require the use of cost-effective recycled-content building materials in state-funded building projects.
- DCTED mission and ongoing market development efforts should include developing long-term and sustainable markets for recycled products.
- Continuously monitor the wastestream to measure progress toward waste management goals and to provide information for policy changes in light of changes in technology markets.
- Comprehensively track and model recycling market conditions.
- Ecology must increase communication, coordination and integration of organic material programs to enhance understanding of and support for organics and the roles they play in P2, stormwater management, water conservation, ag production and materials recycling.
- Develop long-term consistent outreach activities that will continue to promote positive waste prevention, reduction and recycling behaviors.
- Create an information/education clearinghouse on Ecology's website to provide downloadable materials about recycling.
- Secure funding for DCTED to integrate marketing of recycled materials into its mission and implementation.
- Public and private sector partnerships are needed to increase resources for more sustainable programs to increase the state's recycling rate.
- Create a revenue-sharing program where UTC-regulated recyclers are allowed to retain a certain portion of the revenue received from the sale of recyclables.
- Make reliable, convenient and affordable recycling services available to all businesses.
- Local jurisdictions should focus on assisting small businesses to recycle.
- Revitalize state purchasing of recycled-content products.

Appendix A

Issue Papers

This Appendix Contains the Following:

Issue Paper #1	Sources and Quantities of Solid Waste
Issue Paper #2	Authorities, Roles and Responsibilities
Issue Paper #3	Litter and Illegal Dumping
Issue Paper #4	Collection
Issue Paper #5	Disposal Reduction and Avoidance
Issue Paper #6	Waste Reduction
Issue Paper #7	Product Stewardship
Issue Paper #9	Landfills
Issue Paper #10	Costs of Solid Waste (Description only)
Issue Paper #11	Recycling

NOTE: Issue Paper #8 is not included, as it has been combined with Issue Paper #10. The topic of Issue Paper #8 is “Economic Disincentives to Recycling.”

Issue Paper #1
Sources and Quantities of Solid Waste

I. The Universe of Solid Waste and Why It Is Important

Mention the word "solid waste" to many citizens of Washington, and images of landfills, garbage cans, and recycling barrels comes to mind. Legally and administratively, many efforts to manage solid waste have focused on residential and commercial solid waste. Previous state solid waste plans (the most recent was done in 1991) have also focused primarily on municipal solid waste (MSW) although other waste plans have touched upon other kinds of waste. Similarly the State Annual Solid Waste Report focuses much of its attention on the MSW sector, especially disposal at regional municipal landfills.

A closer examination of state law, however, reveals that solid waste actually encompasses many more sources and types of materials than are in the municipal waste stream. Technically, it includes industrial, agricultural, moderate risk, hazardous, and even radioactive wastes. Many of these wastestreams have remained largely unacknowledged by governmental solid waste entities.

A whole family of new wastes has entered the solid waste arena. For example, residues and sludges from the treatment of industrial process waste waters in pits, ponds, and lagoons have to be disposed of or reused in environmentally safe methods. Air pollution residues from energy production and a wide variety of production processes need similar care. Other environmental control efforts including the cleanup of Superfund sites and the removal of leaking underground storage tanks have generated solid wastes that should be planned for and addressed. This paper labels such materials as "transfer wastes" because they represent transfer of pollutants from one media (air, water, and soil) to the solid waste universe.

Another category of solid waste that needs to be assessed is "Resource Use and Extraction Wastes" from agriculture, mining, forestry, oil and gas exploration, and fisheries industries.
The solid waste facilities for these materials have remained outside the scope of our attention because the location of these activities has frequently been remote from human populations and difficult to regulate (for example, mining wastes in the Okanogan). They need to be included in the scope of this plan because they reveal the need to reexamine the waste management priorities and their large volume may present threats to human health and the environment. (Coal slurry surface impoundment failure in Kentucky is an example of the millions of dollars of damage that the failure of such a facility can inflict on the environment.)

Part of this inattention resulted from the definitions framework in 1969 when the first state law, Chapter 70.95 RCW was enacted. Subsequent fragmentation of the definitional lines has occurred when waste-by-waste approaches in the law were used to address solid waste problems one at a time. Recycling and franchise hauling definitions also added to the duplication and confusion with lack of a single consistent definition.

Looking at the universe of solid waste is important because a subset of solid waste, hazardous waste, was carved out of the solid waste stream in the late 1970s. Over the years, the boundary line between these two waste kingdoms was fashioned by a variety of exemptions and exclusions. These added to the growing quantities of formerly hazardous wastes being placed back in the solid waste stream. These boundary waste streams need to be spelled out and identified as surely as other waste streams now coming into view.

A. Depicting the Universe of Solid Waste--Table 1

Table 1 (titled "What is the Universe of Generated Solid Waste?") portrays the expanded scope and locates generated hazardous waste and radioactive waste in relation to solid waste. [1] Table 2 lists generated waste that is subsequently subject to collection, storage, treatment, and disposal, as well as recycling and reuse processes. Figure 1 shows the conceptual boundaries of the solid waste system as defined by the waste management priorities. In Table 1, all solid waste is broken into two major subcategories: nonhazardous solid waste and hazardous solid waste. (The state hazardous waste act defines the terms, *dangerous waste* [DW] and *extremely hazardous waste* [EHW].) Like the common use of the term *solid waste*, the term *hazardous waste* is referred to as the overarching term for the universe of DW and EHW.

The next subdivision of waste categories shows terms that have been defined in the law or the regulations quite broadly using risk or surrogates for risk (such as mobility of chemical constituents under expected conditions of disposal). These risk-based definitions in the law and regulations (highlighted in green) include:

- Inert waste
- Moderate risk waste
- Dangerous waste
- Extremely hazardous waste

There are two less significant definitions, *special waste* and *special incinerator ash*, that are risk-based and subsets of dangerous waste, but are limited to relatively few sources in Washington. These are shown in green under the Dangerous Waste column although technically they could be shown as part of the continuum of risk-defined wastes shown horizontally in Table 1. Also note that all of the remaining "nonhazardous solid waste" category outside of inert waste has no risk-based definition. This waste stream is bounded by the two terms, *inert waste* and *moderate risk/dangerous waste* definitions. As such, it is given the term *default-criteria solid waste*. Almost all of the waste covered by this plan falls into the category of default criteria solid waste.

The rest of this description will focus on default criteria solid wastes. To complement the horizontal listing by risk, under each risk category the table lists four general categories on the basis of the source/type of waste and a number of specific sources/types of waste for each of the four general categories. Legal definitions for both general categories and specific wastes are shown in red.[2] Other waste categories not defined in the law are shown in black.

The four general categories are:

A. Municipal solid waste This term is defined in the new rules as the combination of residential, commercial, industrial, institutional, and community-based sources although none of these source terms, except for industrial solid waste, are specifically defined further in either the law or in regulations, promulgated or proposed. (Examine specific waste terms: garbage, etc.)

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[1] The term solid waste is legally defined without mention of hazardous and radioactive waste. All solid waste that is not hazardous or radioactive should be referred to as non-hazardous, non-radioactive solid waste. Typically, those working in the field as well as the title of the Ecology **Solid Waste** and Financial Assurance Program refer to non-hazardous, non-radioactive solid waste as just plain "solid waste".

[1] Included are definitions in the proposed new solid waste rules, ch. 173-350 WAC.

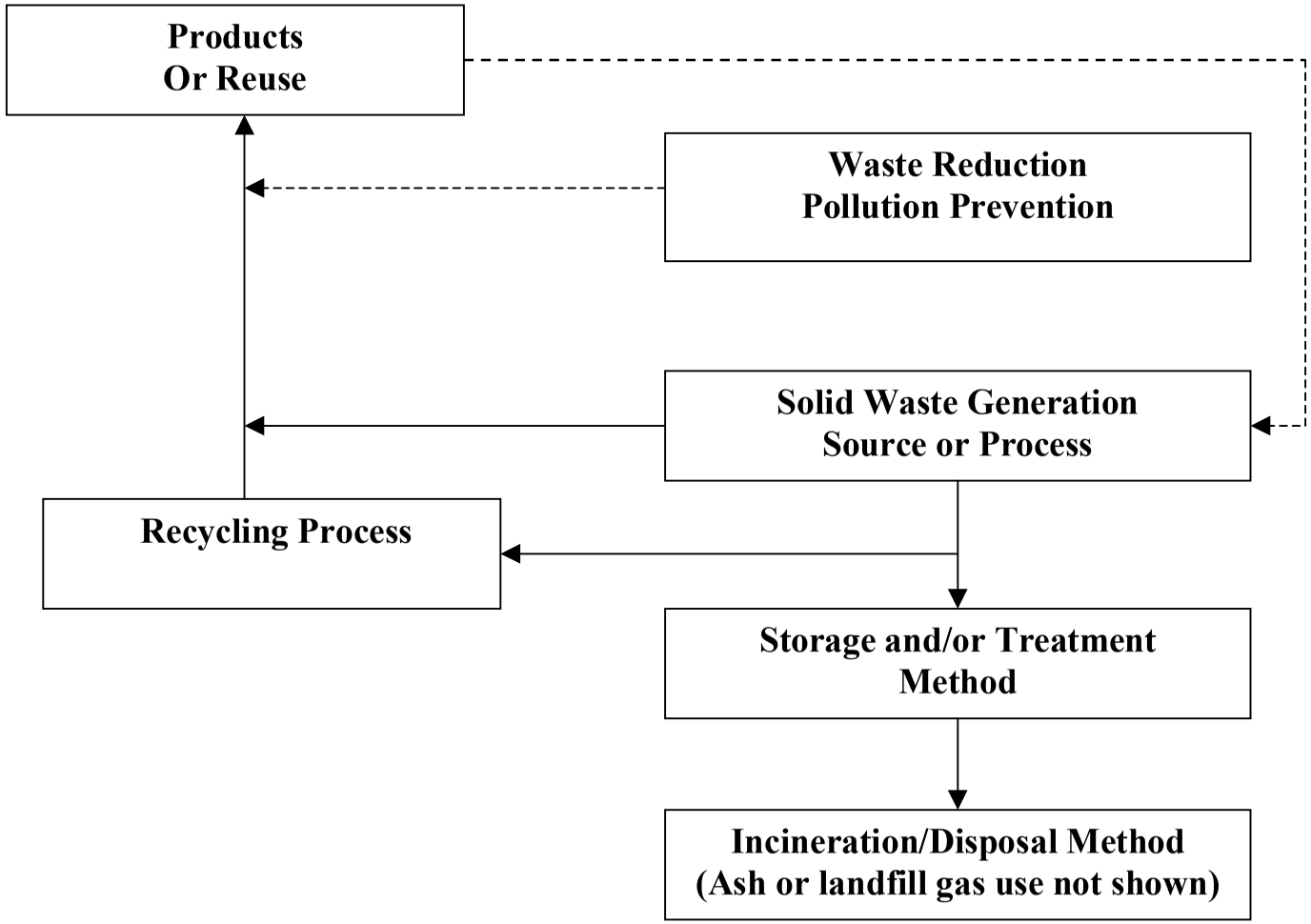
B. **Industrial solid waste** This term is defined differently in the newly-proposed Minimum Functional Standards for Solid Waste Handling, Chapter 173-350 WAC. The main difference is whether office waste and cafeteria wastes from an industrial source are included in the industrial solid waste definition. The former rules as promulgated do include these wastes while the latter proposed rules do not. (Insert ASTSWMO estimate of the amount of waste in this category.)

C. **Resource Use and Extraction Wastes** "Resource Use and Extraction Wastes" is an undefined term in the law and in the rules, but conceptually could be useful in developing approaches to planning for, reducing, and otherwise managing this category of solid wastes.

D. **Transfer Wastes** Transfer wastes have largely been ignored in discussions of how to apply the higher waste management priorities, and for this reason need to be identified as a category of waste for the solid waste plan's coverage. The disposal and handling of wastes such as contaminated sediments and contaminated soils also have the potential to transfer the environmental impact from one media to the next. Like "Resource Use and Extraction Wastes," the term is currently undefined in the law or the rules.

Figure 1

Elements of the Solid Waste Management System



What is the Universe of Generated Solid Waste?

	SOLID WASTE					
	Non-hazardous Solid Waste				Hazardous Solid Waste	
Risk Criteria (Read headings across)	inert	"Default criteria" solid waste		moderate risk	dangerous	extremely hazardous
Lists (Read down)	• Asphalt • Concrete • Masonry	**General Categories**	**Specific Types**			
		MUNICIPAL SOLID WASTE • Residential • Commercial/INDUSTRIAL • Institutional/Community	• GARBAGE • YARD DEBRIS • BULKY MATERIALS • WOODWASTE • BIOMEDICAL WASTE • WASTE TIRES • BATTERIES • USED OIL	• HHW • sqg	• UNIVERSAL WASTE • U, K, F AND P LISTS	• U, K, F AND P LISTS
		INDUSTRIAL SOLID WASTES	• Solvents • Spent catalyst • Plating wastes		• special waste	
		Resource Use & Extraction Wastes • Agriculture • Mining • Forestry • Oil and Gas Exploration • Fisheries	• AGRICULTURAL WASTE • Mine tailings • Slash piles • Drilling muds			
		Transfer Wastes • Cleanup & corrective action • Air & water treatment residues • Deregulated hazardous waste	• *CONTAMINATED SOIL & SEDIMENTS* • SEWAGE/BIOSOLIDS/SEPTAGE • Ashes/Combustion residues/ • Vactor • *COMPOSTED MATERIAL* • ASBESTOS • Petroleum Contaminated Soils		• special incinerator ash	
	non-radioactive solid waste				low level	high level
	radioactive waste					

All wastes within the light gray border are to be addressed in the Solid Waste Plan.
Items in UPPER CASE = definitions in existing law or rules that rely on listing of specific items or commodity types.
Items in lower case = definitions in existing law or rules that rely on criteria/characteristics.
Items in UPPER CASE ITALIC = proposed definitions in the new Minimum Functional Standards that rely on listing of specific items or commodity types.
Items in Times New Roman Font are "Default Criteria".

B. Quantities of Solid Waste and Current Handling Methods

To examine the amount of waste generated in the state and how it is currently handled, data was drawn from a variety of sources and combined in Table 2 (contained in Appendix A). The *Ninth Annual Status Report* provided most of the data shown in Table 2, including the 1999 Recycling Survey as shown in the Status Report. Table 2 includes, to the extent available, information about nonhazardous, nonradioactive solid wastes (as shown in Table 1)

Table 2 shows how the waste in Washington State is handled by showing the types and amounts of waste handled by various disposal methods, and the amounts handled through recycling and composting. Although data is missing or uncertain in many cases, this table provides a powerful tool for selecting materials or sources to focus on for further work in the future. The areas of uncertainty are also useful in pointing to sources and waste streams that may need closer examination in the future (contingent on goals and priorities for improved waste management).

II. What Data/Information Are Available and Needed?

The data that is currently available can perhaps be defined most clearly by the gaps in this data. As can be seen in Table 2, several key pieces of information are not available for specific handling methods and/or types of wastes. In addition, the discussion for Table 2 indicates a number of areas where the data is imprecise and/or adjustments and assumptions had to made to render the available data into a form useful for the state's current mission statement (i.e., a closer examination of waste generation). The larger gaps include:

- Reliable data on the types and sources of waste landfilled. Local reporting of waste types should be standardized to the extent possible, bearing in mind local constraints on record-keeping and other issues.

- Better data on statewide waste composition is needed, but a statewide study is not necessary. With additional fieldwork conducted in a few additional counties (most notably rural and Eastern Washington communities that are underrepresented by the available data), the data that is available from several communities can be combined to provide a reasonably up-to-date picture of the state's waste stream.

- Need better data on the actual materials that are included in the large amounts of "miscellaneous inert" (480,796 tons), "industrial" (240,961 tons) and C&D (282,349 tons) wastes that are being disposed of in inert/demolition and limited purpose landfills.

- A statewide estimate for waste reduction is completely lacking and sorely needed. A methodology for estimating the amount of waste reduction on a local basis (for use by counties and the larger cities) is also needed. It should be noted that a reliable direct measure has not yet been developed, and a set of indirect measures (such as measuring reductions in disposal) may end up being the best option for measuring waste prevented.

III. Legal Description of Definitions in Solid Waste Laws

Section I describes the gaps in legal definitions of not only the term *solid waste*, but also other terms in the broader solid waste universe. Table 1 also shows how specific listings of rather narrow waste streams have grown to meet the narrow needs of each amendment to the law. Collectively, these add up to a Swiss cheese texture of the law that impedes the common understanding of terms and regulatory approaches. This theme is carried forth for other terms not shown in Table 1 but which are in two current laws addressing solid waste as described in a paper prepared by the Solid Waste and Financial Assistance Program in 1996. This patchwork of definitions needs to be resolved. Appendix B contains a summary of the existing definitions, which has been extracted from that paper directly.

IV. What Waste Types Should the Plan Focus on and Why?

The universe of solid waste is large and multifaceted. As Table 1 shows, complex sets of regulations have evolved to assist in addressing different components of solid waste. As Table 2 shows, while there is clearly overlap among waste types, different types of solid waste have been managed in different ways. And there is a wide variety in the extent and reliability of data and information on many of the types of wastes and component materials.

Local government jurisdictions and state government have traditionally focused their attention on managing the wastes within the municipal waste stream, primarily residential and commercial. Until the past 15 years or so, managing these wastes meant overseeing and/or providing for collection and disposal in a manner that adequately protected human health and the environment. More recently, recycling, composting, land application, and waste reduction have been added to the management and oversight responsibilities of government. Some additional components of the solid waste stream have also been specially addressed as concerns about environmental and health impacts from disposing of or dumping them (batteries and used oil, for example) have surfaced. Additionally, technological advances and infrastructure investments have allowed more and more materials to be recycled, even further expanding the range of materials addressed and diverted from end disposal.

Significant progress has been made toward the state's mandated 50 percent recycling goal. Landfills and other facilities are more protective of human health and the environment than ever before. Local jurisdictions have done a good job overall of managing the municipal waste stream. And yet, much remains to be done.

The universe of solid waste is broader than municipal solid waste and the plan needs to reflect this fact, even though the plan may not be able to exhaustively set forth amounts, management facilities, and methods. The plan should recommend how that information should be collected.

As we look to the future, the need to create a solid waste system that is sustainable becomes clear. Existing methods, theories, and philosophies on sustainability point to the need to consider the impacts (including resource depletion, pollution, costs, etc) of all wastes and all phases of the life cycle of products. Pursuing a sustainable solid waste system requires looking beyond the waste that is sent for disposal at the end of a product's life. It also necessitates looking beyond the waste materials and sources that state and local solid waste programs have historically managed.

This does not mean that solid waste entities should manage or control this entire "universe" of solid waste. Rather, solid waste entities should determine how they and the solid waste system in place could contribute to preventing all types and categories of waste materials from being generated, to recycling as much as possible, and to properly disposing of what is left. This will probably entail seeking partnerships with generators and managers, and looking for ways to influence the handling and management of those materials.

Unfortunately, that entire universe is not known at this point in time. Nor are the complete environmental and human health impacts of the solid waste universe known. What is known is that wastes are created in every segment of our society at virtually every phase of activity. Wastes are generated in extraction, transportation, manufacturing, selling, and using products and services. These waste materials represent significant drains on our natural resources and they also contribute noticeably to the pollution on our land, in our waters, and in our air. The current (and increasing) levels of waste generation are taxing our resources at a rate that is not sustainable for the long-term. Not only do we need to acknowledge and pay attention to the complete solid waste system, but we also need to reduce as much waste as possible, as quickly as possible, throughout all components of the solid waste universe.

For the purposes of the state solid waste plan, it is recommended that solid waste be considered to include the following: all nonhazardous and nonradioactive solid waste categories and types shown on Table 1 of this paper. This includes inert wastes, municipal solid wastes, industrial wastes, resource use and extraction wastes, transfer wastes, and moderate risk wastes. It should be noted that moderate risk wastes will also be addressed by Ecology's Hazardous Waste and Toxics Reduction program, as will hazardous wastes. Radioactive wastes are addressed through Ecology's Nuclear Waste Program.

This revision to the state solid waste plan is important, as it will serve to guide the whole state's future solid waste system. With many resource and other limitations in place, it is essential that the plan recommendations be implementable by the various governmental and non-governmental entities that will be asked to carry them out.

It would be unreasonable to try to develop a comprehensive set of recommendations for every component of the solid waste universe in this solid waste plan revision. It will be necessary to prioritize needs, opportunities, and segments of the solid waste universe as part of the plan development process. The solid waste plan must balance the needs and opportunities of the current system with the needs and opportunities involved in creating a future system based on prevention and sustainability.

Because the existing solid waste system focuses primarily on the municipal waste stream, it is somewhat expected that plan recommendations will emphasize MSW. However, it is essential to also begin right away to look at the rest of the materials that fall under the definition of nonhazardous, nonradioactive solid waste. At a minimum, more fact-finding needs to be done to determine the following:

- What materials are generated that meet the definition of non-haz, non-radioactive, solid waste.
- How much of these materials are generated.
- How they are currently being managed and to what extent the waste management priorities are being followed with the materials.
- Existing authorities for management of these materials.
- Whether human health and/or environmental impacts occur as a result of the handling of the materials.

As this information is gathered and evaluated, we will begin to see the extent of any issues and/or problems that should be addressed. It will then be possible to prioritize these issues and to develop strategies for ensuring they are appropriately addressed. In addition to resolving problems, this information should provide the knowledge to explore opportunities for waste prevention.

All issue papers and the plan as a whole should recognize the full universe of solid wastes and address them as appropriate.

The regulations and laws need to engage the issue of inconsistent definitions caused by piecemeal modification of the solid waste laws. Ecology should be tasked with making recommendations to make such laws transparent, especially where such confusion discourages efforts to move up the waste management priorities.

APPENDIX A—Table 2

Table 2 contains the following columns:

Materials - the list of materials addressed in Table 2 is designed to be as broad as possible. Later recommendations in this issue paper narrow this list to the materials that should be targeted for the most attention in the future, but for now this table attempts to demonstrate the magnitude of all waste streams that could potentially be considered "solid waste." Hence, the list begins with the major components typically found in municipal solid waste (MSW), then alphabetically lists special types of wastes that are comanaged or separately disposed of (animal manures through sludges), plus litter and a few miscellaneous categories.

Total Waste Generated - the second column of Table 2 sums up the data shown in the other columns in an attempt to show the total amount of waste generated in the state. The only column that is not included in this total is the out-of-state waste imported into Washington, since the emphasis of this table is on waste generated in this state.

MSW Landfilled - the next two columns of Table 2 show the amount of waste sent to MSW landfills. This data was drawn from the *Ninth Annual Status Report* but was adjusted in a number of ways to provide data that can be used to assess the amount of waste generated in the state. First, the 1999 figures for the amount of waste landfilled were adjusted for wastes imported and exported. Note that part of the imported waste (21,060 tons) was industrial waste sent to a limited purpose landfill and so is accounted for in the column for Industrial Waste.

The adjusted figures for the amount of waste generated in the state, as shown in the *Ninth Annual Status Report*, are broken down into several general categories (MSW, demolition, industrial, inert, and commercial wastes) and several specific types (wood, sewage sludge, asbestos, petroleum-contaminated soils, and tires). Only a few of the specific categories are viewed as reliable (i.e., those where a regulatory requirement exists for accurate monitoring and reporting). The data reported for general categories and some of the specific materials are considered imprecise because these are subject to
local interpretation and variations in record-keeping abilities. Hence, the data for only a few of the specific wastes was retained as separate figures, including sewage sludge, asbestos, and petroleum-contaminated soils (PCS). This data could not be allocated to residential and nonresidential sources, and so is shown in Table 2 as bridging the two columns.

The adjusted data for the other categories (MSW, demolition, industrial, inert, commercial, wood, tires, and special/other) is considered imprecise, representing only a portion of the actual amounts of most of these materials and also suffering from cross-contamination and definition problems. Taking demolition waste as an example, we see that only a few of the MSW disposal facilities across the state are accurately tracking this separately because there is no regulatory requirement to track it and current disposal fees at many facilities are the same for demolition waste as for "regular garbage." Furthermore, any loads that are designated as demolition waste are likely "contaminated" with MSW to some extent. (These loads are often a mixture of waste, and there is no need for the disposal facility to monitor for this crossover as long as the load is going to an MSW landfill.) A similar monitoring and reporting problem clearly exists for industrial and commercial wastes, where these should represent approximately half of the waste stream but the figures for these wastes add up to less than 10 percent of the total. Given these issues, it was considered better to combine all of the data for the general categories of wastes and then use waste composition data to allocate the total figure by type and source of waste.

Waste composition data suffers from its own issues, not the least of which is that the most recent statewide study performed, the *1992 Washington State Waste Characterization Study* (the "1992 Waste

Characterization Study"), is now almost ten years old. Still, this approach is seen as the most reliable, and allows updated data to be inserted later should this become available. Using the data shown in the 1992 Waste Characterization Study, the total amount of MSW was first divided into residential and nonresidential sources, and then the breakdown of the residential portion was determined using composition data from this study. The breakdown of the non-residential waste stream was then determined by the difference in the residential composition and the composition of the total waste stream. Deriving the commercial figures from the difference in the total and the residential figures is somewhat atypical, but is necessitated by the form in which the data is reported by the 1992 Waste Characterization Study and should be as valid as more traditional approaches.

MSW Incinerated - the next column of Table 2 shows the amount of waste incinerated, as reported by the *Ninth Annual Status Report* (Table 6.3), minus the amount of waste imported from out-of-state to the incinerators (11,560 tons). The amount of ash (120,171 tons) is shown separately, with the remainder of the waste (329,953 tons) allocated to specific materials based on composition data from the 1992 Waste Characterization Study. The figures for specific materials in this column are intended to show the amount of materials consumed by the process, so the standard breakdown (from the 1992 Waste Characterization Study) was adjusted to show zero tonnages for those materials that end up in the ash (to avoid double-counting this mass). The figures were also adjusted to show the incineration of only wood waste (8,467 tons) at one facility, and an additional 6,256 tons of waste oil burned for heat recovery (from the 1999 Recycling Survey).

Industrial Wastes - this column is used for those waste quantities that are separately disposed of in inert demolition landfills, limited purpose landfills, and wood waste landfills. The standard breakdown as shown in the *Ninth Annual Status Report* (Tables 6.4, 6.5, 6.6, and 6.7) was used, and the only adjustment made was to subtract 21,060 tons of imported industrial waste. The resulting figures shown in this column include a large amount of "miscellaneous inert" (480,796 tons), "industrial" (240,961 tons), and C&D (282,349 tons) wastes, and these categories are not very helpful in examining alternative handling methods. In addition, the miscellaneous inert" and "industrial" waste categories should be included in the MSW subtotal for this column but are not, simply because of the way the table is structured.

Agricultural Wastes - agriculture is considered to be one of the four basic "resource use and production" activities (the others being mining, timber, and fishing), but is the only one for which data exists on the amount of wastes and so is shown here separately. The data for animal manures is considered fairly reliable, thanks to recent efforts by King County, but the only source for generation rates for crop residues was an old document from the state of California. The figure for crop residues, although quite large, seems too small in comparison to the figures for animal manure and for MSW. It is possible that waste generation figures used for crop residues were originally intended to be the incidental amounts of nonfood vegetative matter that is incidentally collected along with the target crops, and thus must be intentionally returned to the farmland or managed in some manner. Note that other wastes produced by agricultural sources (household refuse, pesticide containers, etc.) are assumed to be included in the figures for the amount of MSW landfilled and other columns as appropriate.

Other Resource Use and Production - data is lacking on the amount of wastes produced by the amount of waste generated by the fishing, mining, and timber industries, but these amounts are known to be enormous in some cases.

Transfer and Separate Disposal - this column attempts to note the waste tonnages that result from activities such as cleanup of contaminated sites, air and water pollution control methods, and other separate disposal programs such as hazardous waste disposal. Much of this data is not included in Table 2, although in many cases this is simply because time constraints prevented it from being fully researched and the data is presumed to be available from some source.

Out-of-State (Imported) Wastes - since the focus of Table 2 is on wastes generated in the state of Washington, out-of-state wastes are separately accounted for in this table. It should be noted that Washington exports almost four times as much waste as is imported into the state.

Recycled and Composted Materials - the first two columns under Diverted Materials shows the amounts of materials that are recycled and composted, as reported by the 1999 Recycling Survey. In most cases the materials could be assumed to be handled by
either recycling or composting and could be allocated accordingly, but two materials (food and wood) are handled by a variety of methods and so could not be allocated to one specific column. The data shown under Recycling includes some materials that are not normally counted in calculating the state's recycling rate, and this is in line with the intent of this issue paper to use as broad a definition of solid waste (and recycling) as possible.

Waste Reduction - no data is currently available on the amount of materials handled by waste reduction.

Table 2: Annual Waste Quantities in Washington State

January 30, 2001

Materials	Total Waste Generated in WA (1)	Disposed Wastes								Diverted Materials (7)		
		MSW Landfilled (2)		MSW Incinerated (3)	Non-MSW				Out-of-State (Imported)	Recycled and Composted	Other Beneficial Use (8)	Waste Reduction
						Resource Use and Prod.						
		Residential	Non-Res.		Industrial (4)	Agricultural	Other (5)	Transfer / Separate Disposal (6)				
Diapers	137,104	99,594	28,094	9,416					MSW = 261,779 (includes 18,487 tons industrial waste co-disposed with MSW)			Data Not Available
Food Waste	719,764+	277,183	324,036	44,336			Large (fish and ?)			74,209		
Glass	293,459	141,505	93,374	0						58,580		
Metals	667,777	184,467	155,767	0						327,543		
Paper	2,581,577	732,710	776,059	111,262						961,546		
Plastic	560,341	242,115	268,232	37,635						12,359		
Textiles	201,063	110,031	65,559	12,949						12,524		
Tires	12,934	5,867	5,867	102	473				2,228	625		
Wood Waste	832,530+	208,239	347,219	49,429	84,857		HUGE		21	142,786		
Yard Debris	947,839	338,296	55,080	29,009						525,454		
C&D;	748,784 (total, mixed C&D)				282,349							
concrete												
sheetrock		21,734	15,030	0						29,896		
roofing												
other		73,538	110,958	10,204					11,529	205,075		
Haz./Special;												
oil	14,144	1,231	199	6,361						6,353		
antifreeze	1,329+									1,329		
car batteries	17,132	1,949	0	0						15,183		
HH batteries	2,029	1,583	421	0						23		
HHW/SQG/HW	476,430	18,102	26,262	3,272				428,627 (9)	13,161	167		
Misc. (10)	413,846	240,127	151,386	22,234						99		
Subtotal, MSW	8,628,082	2,698,273	2,423,543	336,209	367,679			428,627	275,557	2,373,751		
Animal Manures	15,137,400					15,137,400						
Asbestos	14,515	12,966			1,549				478			
Ash and Dust	120,171			120,171								
Biomedical								Significant				
Biosolids	63,393+	62,290			1,103			Huge				
Crop Residues	8,293,500					8,293,500						
Industrial	240,961				240,961				21,060			Significant?
PCS	396,712+	370,610			26,102				3,652		Large	Significant
Radioactive	Large							Large				
Sludges	Significant							Large				

Table 2, continued

Materials	Total Waste Generated in WA (1)	Disposed Wastes								Diverted Materials (7)		
		MSW Landfilled (2)		MSW Inciner-ated (3)	Non-MSW				Out-of-State (Imported)	Recycled and Com-posted	Other Bene-ficial Use	Waste Reduc-tion
						Resource Use and Prod.		Transfer / Separate Disposal (6)				
		Resi-dential	Non-Res.		Indus-trial (4)	Agri-cultural	Other (5)					
Misc. Inert	480,796+				480,796		HUGE (mine tailings)					
Other	69,133				69,133							
Total	33,444,663+	5,567,682		456,380	1,187,323	23,430,900	HUGE	428,627+	300,747	2,373,751	Large	NA

Notes:

All figures are tons per year. NA = Not Available.

1. Total Waste Generated in Washington = sum of other columns, except waste imports.
2. Data from 1992 Washington State Waste Characterization Study, Table II-7, residential figures are a sum of single-family, apartment and residential self-haul data. Nonresidential figures were calculated as the difference between total tonnages and the residential figures. All figures are prorated based on current (1999) total waste tonnages of 5,111,463, which is the state's total waste amount sent to MSW landfills, 4,738,178 tons, minus waste imports (279,687 tons), plus waste exports (1,109,191 tons), minus tires, asbestos, PCS, and sewage sludge (as reported in the 9th Annual Status Report). The tire quantity shown is the amount reported separately (10,353 tons, as adjusted for imported amounts), plus the amount shown by the 1992 Waste Characterization Study, evenly divided between residential and non-residential sources (per more recent, local waste studies such as the Clark County 1999 Waste Stream Analysis.
3. Figures shown for the amount of waste incinerated are from the 9th Annual Status Report, Table 6.3 (461,684 tons), minus waste imports (11,560 tons), with the amount of ash shown separately (120,171 tons) and the remainder (329,953 tons) allocated to the typical MSW components (diapers through miscellaneous) based on the 1992 Washington State Waste Characterization Study. The waste composition breakdown was adjusted for an additional 8,467 tons of wood waste burned at one facility, the assumed recovery and recycling of 100% of the ferrous metals, and certain materials were assumed to end up in the ash amount (glass, non-ferrous metals, batteries, inert solids, sheetrock, and one-quarter of the other construction and demolition debris). The amount of oil includes 6,256 tons of oil burned for energy recovery, as reported by the 1999 Recycling Survey.
4. Figures shown are the wastes disposed of in inert/demolition, limited purpose and wood waste landfills, minus waste imported (21,060 tons) to these landfills (from the 9th Annual Status Report, Tables 6.4 through 6.8).
5. "Other resource use and production" consists of the mining, timber, and fishing industries.
6. "Transfer/separate disposal" includes cleanup of contaminated sites, air and water pollution control sludges, and separate disposal programs for medical waste, moderate risk wastes, and other.
7. Figures for "diverted materials" are from the 1999 Recycling Survey, as reported in the 9th Annual Status Report, Tables 5.1 and 5.2. Figures shown include materials not normally counted as recycled (from Table 5.3, except for oil burned for energy recovery, which is shown in the column for waste incineration).
8. "Other beneficial use" includes those activities that are not defined as recycling, composting, and waste reduction, such as thermal desorption and asphalt incorporation of petroleum-contaminated soil (PCS) that allows this soil to be reused or some manner. Note that landfarming of PCS is intended to be addressed as a waste reduction method in this table.
9. Hazardous waste quantity (428,627 tons) is a 1999 figure as reported by Ecology's Waste Summary Information as of July 2000 (Publication #00-04-034).
10. Misc = miscellaneous, for residential and non-residential MSW, this includes the minor components of typical waste measured by typical composition studies (rubber products other than tires, cosmetics, leather, and furniture), plus miscellaneous categories from those studies (typically a catch-all for pieces too small to be sorted during fieldwork for these studies).

APPENDIX B--Definitions in Solid Waste Management - Reduction and Recycling,

Chapter 70.95 RCW

Solid waste or wastes

"Solid waste or wastes means all putrescible and non-putrescible solid and semisolid wastes including, but not limited to, garbage, rubbish, ashes, industrial wastes, swill, sewage sludge, demolition, and construction wastes, abandoned vehicles or parts thereof, and recyclable materials." Chapter 70.95.030(19) RCW

Explanation: This definition makes no distinction between municipal solid waste and nonmunicipal solid waste, nor does it reflect the fact that hazardous waste is defined as a subset of solid waste in the Hazardous Waste Act, Chapter 70.105 RCW. This legal term for solid waste was first defined in the law in 1969 when disposal was the major management method. The Legislature added the term "recyclable materials" in 1989.

Disposal site

"Disposal site means the location where any final treatment, utilization, processing, or deposit of solid waste occurs." Chapter 70.95.030(6) RCW

Explanation: This definition dates back to 1969 and places landfills in the same definition as a "processing" facility or "utilization" facility. This all-inclusive definition makes it difficult for Ecology to exempt a utilization site (clean fill, etc.) from permitting even if the agency found little or no environmental or human health impact. Also it is unclear if the word "final" modifies all terms that follow or just the word "treatment."

Solid waste handling

"Solid waste handling means the management, storage, collection, transportation, treatment, utilization, recovery and recycling of materials from solid wastes, the recovery of energy resources from solid wastes or the conversion of the energy in solid wastes to more useful forms or combinations thereof." Chapter 70.95.030(20) RCW

Explanation: This definition also dates back to 1969 in the law. Like other definitions in the law, it is very inclusive, making it difficult to regulate some recycling activities and not others.

Recycling

"Recycling means transforming or remanufacturing waste materials into usable or marketable materials for use other than landfill disposal or incineration." Chapter 70.95.030(16) RCW

Explanation: This definition was added in 1989 in legislation as well to distinguish recycling of materials from incineration and landfilling. Note that the definition includes the term "marketable material" as opposed to "recyclable materials." It also may miss some recycling practices such as reclamation where usable materials were recovered from a waste material without "transformation" or "remanufacturing."

Recyclable materials

"Recyclable materials means those solid wastes that are separated for recycling or reuse, such as papers, metals, and glass, that are identified as recyclable material pursuant to a local comprehensive solid waste plan. Prior to the adoption of the local comprehensive solid waste plan, adopted pursuant to RCW 70.95.110(2), local governments may identify recyclable materials by ordinance from July 23, 1989." Chapter 70.95.030(15) RCW

Explanation: This definition was established in 1989 to define what materials would be subject to the planning process of the local comprehensive solid waste plan. The legislative concern was to insure that planning efforts helped to focus attention on the 50 percent recycling goal by 1995 set forth elsewhere in the law. Notice that recyclable materials are considered a subset of solid waste and the examples given relate to recyclable materials present in municipal solid waste. It is instructive to review Ecology's Annual Report Summary Table, containing a list of recyclable materials that are used to calculate progress in the state in meeting the 50 percent recycling goal. That was the focus during the legislative discussions that lead to modifying the law in 1989. The definition was also included to help sort out the conflict between franchised haulers and recyclers who were increasingly getting into the business of hauling recyclables to their facilities. As can be seen, the franchised haulers were given the residential portion of the recyclable material flow stream, while recyclers were given the commercial and industrial recyclable flow stream.

Solid Waste Handling

"Solid Waste Handling means the management, storage, collection, transportation, treatment, utilization, processing, and final disposal of solid wastes, including the recovery and recycling of materials from solid wastes, the recovery of energy resources from solid wastes or the conversion of the energy in solid wastes to more useful forms or combinations thereof." Chapter 70.95.030(20) RCW

Explanation: The legislature added the words, "including the recovery and recycling of materials from solid wastes, the recovery of energy resources from solid wastes or the conversion of the energy in solid wastes to more useful forms or combinations thereof" in 1989. This was done to insure that solid waste plans at the local level would include plans for recycling and energy recovery projects.

Disposal Site

"Disposal site means the location where any final treatment, utilization, processing, or deposit of solid waste occurs." Chapter 70.95.030(6) RCW

Explanation: This definition was an original, defined by the legislature in 1969 which helped define what universe of "sites" would need solid waste permits.

B. Definitions in Solid Waste Collection Companies, Chapter 81.77 RCW

Solid waste

"Solid waste means the same as defined under RCW 70.95.030, except for the purposes of this chapter solid waste does not include recyclable materials except for source separated recyclable materials collected from residences." Chapter 81.77.010(9) RCW

Explanation: A 1989 legislative revision separated residential from commercial and industrial recyclable materials for the purposes of determining who can collect and haul these materials.

Private Carrier

"Private Carrier means a person who, in his own vehicle, transports solid waste purely as an incidental adjunct to some other established private business owned or operated by him in good faith: PROVIDED, That a person who transports solid waste from residential sources in a vehicle designed or used primarily for the transport of solid waste shall not constitute a private carrier." Chapter 81.77.010(5) RCW

Explanation: This definition was added in 1989 to allow recyclers to transport commercially-generated and industrially-generated recycled materials as private carriers, reserving the residentially-generated recycled materials for the franchised haulers.

Solid Waste Collection

"Solid waste collection does not include collecting or transporting recyclable materials from a drop-box or recycling buy-back center, nor collecting or transporting recyclable materials by or on behalf of a commercial or industrial generator of recyclable materials to a recycler for use or reclamation. Transportation of these materials is regulated under chapter 81.80 RCW." Chapter 81.77.010(9) RCW

Explanation: This definition is similar to the "private carrier" definition above, giving recyclers the ability to pick up nonresidential materials without having to get a franchise hauler's license (i.e., as a private carrier).

THIRD DRAFT

Issue Paper #2
Overall Authorities, Roles, and Responsibilities

Introduction

Solid waste handling includes management, storage, collection, diversion, transportation, treatment, utilization, processing, and final disposal. It is governed by the laws and regulations of federal, state, and local governments. These laws and regulations create the legal framework defining jurisdictional roles and responsibilities. The U.S. Congress has typically left issues of solid waste management to state and local governments, and to date the federal role has been limited to setting the minimum regulatory requirements that the state must follow. Washington State in turn has assigned the primary responsibility of managing solid waste to local governments, where it is divided between the counties, the jurisdictional health departments (JHD), and the cities. The governmental roles and authorities are delineated in legislation, regulations, and agreements. These laws and regulations also affect the roles and responsibilities of private waste management companies.

County governments develop policies and procedures to manage solid waste primarily through their local comprehensive solid waste management plans (CSWMP). Cities can choose to sign onto the county CSWMP, or they can create their own plan. Counties can not directly operate their own collection services. This is provided solely by private collection companies, except in cities. Cities can choose to operate their own collection system or contract for services with private collection companies. The role of state government is to set environmental protection standards for design and operation of disposal facilities, to regulate the garbage collection industry, and to coordinate the overall system. Garbage collection regulation, focused on assuring collection services within county jurisdictions and establishing fair rates to customers, is delegated to the Utilities and Transportation Commission (WUTC). City collection activities remain unregulated by the WUTC, unless the city chooses to be regulated. Ecology reviews locally issued permits and solid waste management plans, defines minimum functional standards for solid waste facilities, and provides technical support and grants. Local health departments are charged with enforcing the environmental regulations through the issuance of permits for solid waste handling facilities and the regulation of the operations of these facilities. JHDs are also charged with enforcing ordinances governing illegal dumping. Private companies play a major role in collecting and hauling solid waste and, in some cases, operating transfer stations, landfills, waste-to-energy and composting facilities, and recycling facilities. Washington's goals for the proper management of solid waste also require that each individual recognize his or her role and responsibility in preserving our natural resources and protecting the environment and human health through their actions.

The Department of Ecology is delegated additional responsibilities as the lead-coordinating agency to assure that a comprehensive solid waste management system exists in the state. This system is to be described in the Washington State Solid Waste Management Plan. The plan is to identify solid waste management needs for the state to assure those needs are met for twenty years into the future. Table 1 provides a brief overview of solid waste management systems roles and responsibilities as established in 1970.

Purpose

The purpose of this paper is to develop a framework for continued discussion on the overall authorities, roles, and responsibilities for the solid waste management system in Washington State. This paper cannot provide a set of answers; rather, it must rely on the expertise of others to contribute their ideas to this basic framework. This is a seed paper more than any of the other issue papers that have been developed for this plan. It cannot be written without seeing what the collective wisdom of the individuals and organizations working on the other papers produce. Once the plan develops its final direction, this paper will become a keystone in holding and bringing together those missions and pushing them forward.

It is critical to note that there have been no assumptions made on who will fulfill what roles and responsibilities in a future solid waste system. We enter into this discussion with an open mind and an open palate, understanding the importance of examining everyone's role in an open and forthright manner.

Current status

There has been a gradual shift of responsibilities from the public sector to the private sector in the solid waste arena. There have also been changes in technology and various legal decisions that have impacted the operations of the solid waste system over the past decade. Rules need to be modernized and in some cases new rules developed to account for these changes and support the transitions where they will be happening.
The old rules mostly were written at a time when certainty and stability were key components of the collection and disposal system. Local governments, private haulers, and the local citizenry all knew what to expect. What change did occur was part of a slow evolutionary process. The rules did not anticipate planning for a handling system and assuring adequate disposal capacity in the dynamic times we see today. We appear to be moving to more flexible and efficient collection and transfer methods that need to respond rapidly to evolving technology and customer needs. And not only are technologies changing, but the very nature of what makes up solid waste today is fundamentally different from the composition of solid waste 20 years ago.

These changes in solid waste challenge us all, and we need to take a fresh look at how we will manage the solid waste stream. Our current solid waste management system is effectively meeting disposal needs while providing adequate protection of human health

and the environment. Planning for the handling of solid waste to date has been developed as a waste management system with the emphasis on disposal and, more recently, waste reduction and recycling. Curbside collection of recyclables is now commonplace, and major composting operations have become established, fed by large flows of yard and garden waste that were previously disposed of. Yet with all this effort, the disposed-of solid waste stream continues to grow. Recycling, while experiencing incremental growth, is not keeping pace with growing waste generation and is impacted by unstable markets and waning public interest. With this State Plan, we are looking to a major paradigm shift to begin to look at the system as a resource management system. However, it cannot be emphasized enough that we can not ignore the major investments that have been made in the existing infrastructure of the solid waste management system. We are facing the very delicate balance of needing to immediately plan for the short term to keep the existing system healthy, while developing a discussion on the future that is not necessarily constrained by the existing system. This plan must support current investments in the solid waste system while charting any future course. The existing system must be nurtured and bolstered to span the gap between operating the solid waste handling system of today to the resource management system of tomorrow.

The vision of this plan needs to be clearly articulated both short term and long. The plan needs to be anchored in the locally adopted plans. We need to provide direction; we need to define roles. We need to develop a collective vision and agree on it. We cannot waffle because what will kill the system is uncertainty. Ultimately, all levels of government, citizens, and the private sector must work cooperatively for this plan to succeed.

What we need to think about

Issue paper 2 was developed to help us begin to think about the following:

- Is existing legislation adequate to fulfill the state plan's mission statement and achieve those goals?
- What revisions or additions to current legislation are needed to fulfill the state's mission statement or achieve the state's goals?
- Does any current legislation serve as a good model for future legislation?
- What responsibilities identified in current legislation are not being carried out?
- What responsibilities haven't been identified and need to be?
- Are there potential authorities that could make the solid waste system more effective
- Where are the gaps and overlaps in authorities and responsibilities throughout the solid waste management system?
- Who needs to be brought to the table that isn't here now?

This follows up on similar thoughts from *The Washington State Solid Waste Management Plan, January 1991*. Among the many goals there are two that have particular relevancy here and should be revisited:

GOAL: State statutes provide each level of government with the authority needed to manage waste. Regulations and enforcement responsibilities are established by law and are clear, consistent, and workable. There is cooperation between all levels of government involved in solid waste management.

GOAL: Solid waste laws and regulations are clear, consistent, and workable and provide each level of government with the authority it needs to manage solid waste properly.

The plan identified some of the hurdles that needed to be overcome:

Lack of consensus regarding the degree or type of authority each level of government requires. A consensus must be reached regarding what degree or type of authority each level of government requires in order to properly manage solid waste. As the law now stands, the various levels of government, and various departments within a specific level of government, have varying degrees of authority, some of them consistent and clearly defined and some of them not. Once a consensus is reached on the degree or type of authority each level of government needs to effectively manage solid waste, the legislation required to support that structure may be determined.

Limited ability of jurisdictions to delegate authority. Washington is moving toward a regional approach to solid waste management. One consequence is that local jurisdictions may not have the resources to negotiate with or regulate proponents and operators of large regional facilities. In light of this, such a jurisdiction would be well served by the ability to delegate authority for solid waste management to an agency such as Ecology that is better equipped to exercise that authority. Solid waste management facility planning, siting, permitting, and development are all areas in which delegated authority might be needed.

Lack of clarity in terms of oversight and enforcement. The Institute for Urban and Local Studies, Eastern Washington University (EWU), prepared a study of the enforcement of solid waste laws and regulations in November 1990. The EWU study found that the enforcement provisions that do exist are often not stiff enough, and statutes and regulations are not interpreted consistently.

Difficulty in using statutes. Statutes are often difficult to use because solid waste provisions are found scattered throughout the RCWs. Ideally, these statutes would be brought together and organized within one or two chapters of the RCWs. A common set of definitions could be provided at the beginning, and each section could be arranged to define:

Which jurisdiction has authority in which circumstance?
Which jurisdiction is responsible for oversight and enforcement?
Which penalties are called for under particular circumstances?

Cooperation among all levels of government involved in solid waste management is essential to achieve this goal. Chapter 43.20.050 RCW, which deals with the powers and duties of the State Board of Health, is an example of a statute that establishes clear lines of communication and could serve as a model for solid waste management.

Strategies for Moving towards the Goal

As we determine where we need to move legislatively, an important consideration is how–via statute or through rule.

Legislation is policy setting and thematic in tone. Regulations are more specific and derivative of the general policies set down by the legislature

Pursuing recommendations legislatively would have some advantages. The legislature is increasingly requiring agencies to respond only to specific rule-writing authorization given in statute, rather than agencies writing rules under general authority in the law. Discussion at the legislative level would educate many as to the current issues that solid waste and recycled materials face. It could add to the conversation about industrial wastes being disposed of on the land and what appropriate regulatory mechanisms are.

These discussions would help reaffirm roles for Ecology and others. Legislation would benefit Ecology because the Agency is less likely to be sued over interpretations of the law. Given all the restrictions on passing regulations, in the end legislation may be administratively easier and cheaper for Ecology than trying to adopt a regulation without specific legislative direction.

The regulatory process has particular advantages related to the greater detail and more in-depth discussion that a regulatory agency like Ecology can engage in. This is to say that regulations allow for a wider discussion of the issue because Ecology is not constrained by new legislative definitions. Ecology can be more flexible in rule writing and responsive to comments during the rule writing.

The regulatory path also follows the experience of most other states having solid waste laws that leave the details to the rule-writing process. Ecology has experience with previous regulations and with other media (water and hazardous waste) doing this.

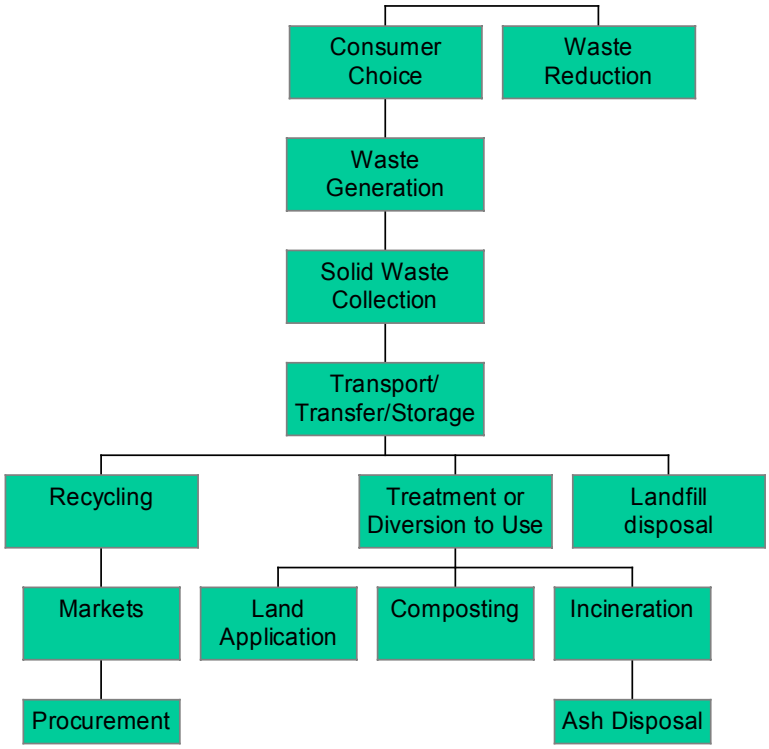
On the other hand, regulations have difficulty capturing the complexity of the world; they require constant interpretation and updating if they are not to become outdated and less usable. They also require knowledge on the part of the regulated community and others.

This plan also needs to be developed with a basis of authority. That is, the plan needs an approval process that goes beyond Ecology's internal structure. This Plan will gain credence if approved by an elected official such as the Governor.

Applying the Model

However, before we get to the point of how to pursue legislation, we need to identify a process for determining what legislation/statutes might be needed. The workgroup has developed a model and template that identifies regulators, actors, and influencers for both the current solid waste system and the future system we want to move to. The current system deals with generators and roughly looks like this now:

Illustration 1: Present Focus of Solid Waste Management Activities



We would like to develop a graphic model that identifies regulators, actors, and their influences for each step above and overlay it on this waste flow chart. We use the definitions below:

Regulator Roles: define what happens
Responsibilities: ensuring compliance

Actors Roles: the person doing the work – the implementor
Responsibilities: does it within the confines of the regulations

Influencers Roles: affect both the regulators and the actors
Responsibilities: varies based on the effect that they can influence (i.e. lobbyists, activists, local governments, elected officials, etc.)

And applying it to procurement, we developed the table shown as an example:

PROCUREMENT Vision for the future is:

- Virgin materials are on par with recycled materials (subsidies would be removed).
- Governments lead the charge (well, it would be really nice to have businesses/citizens leading the charge, but perhaps this is an intermediary step) through aggressive procurement and requirements in bids for use of recycled content materials/products, products of no/lower toxicity, and products that can be repaired/upgraded instead of disposed of.
- Specification language for recycled content, recyclability, reuse/repairability/upgrading, lesser toxicity are standard and used world-wide.
- Design and engineering of products become the most important phase of product development/manufacturing. Upstream is more important focus than downstream.
- Manufacturers that use highly toxic materials or build for throw-away use assess themselves a fee on each unit. The fees go into a fund that is dedicated to safe disposal and R&D for better design or recyclability.

	TODAY	**FUTURE**
REGULATORS	**Feds, Congress** (subsidies for virgin materials; import/export requirements/restrictions; lack of adherence to Procurement Stds.; regulations which may favor business over environment; regulations for consumer safety) **State/Local Gov't** (regulations which may favor business over environment) **International Governments** (through import requirements, consumer safety)	**Feds, Congress** (ensures level playing field for virgin & recycled materials in the marketplace; ensures adherence to Procurement Stds. for fed agencies and projects; regulations/taxes for costly (life-cycle) products; regulations/incentives for greener products, materials, practices regulations for consumer safety) **International Governments** (through import requirements, consumer safety)
ACTORS	**Manufacturers** (type of materials used, repairability, etc.) **Large Businesses** (with lots of buying power)	**State/Local Gov't** (regulations/incentives for greener products, materials, practices) **Manufacturers** (increases up-the-pipe design/engineering improvements, etc.) **Large Businesses** (with lots of buying

		power uses Environmentally Preferred Purchasing Stds.)
INFLUENCERS	**Consumers** (limited purchasing power and limited advocacy) **Advocates** (limited focus/resources, more pressing issues) **State/Local Gov't** (regulations favoring businesses--not environment; lack of adherence to Procurement Stds.)	**Consumers** (desire to preserve resources/environment purchase differently) **Advocates** (focus on new issues) **State/Local Gov't** (adheres to Procurement Stds.; regulations or taxes for costly (life-cycle) products; regulations/incentives for greener products)

Who is involved in Solid Waste

In our examination of the solid waste system, it is important to remember the players involved in the current system. The list below is by no means complete, but we provide it to help the reader recognize that there are many players, and some of them aren't obvious

- Haulers
- Customers (residents, businesses)
- Generators
- City and county governments
- Ecology
- State elected officials
- Washington State Patrol
- Jurisdictional health departments
- Department of Agriculture
- Department of Licensing
- Department of Revenue
- Economic Development (state and local)
- CTED
- Landfill owners
- Primary manufacturers
- End markets
- WUTC
- State Department of Health
- MRW Organization
- TSD
- Medical waste handlers
- Landowners (private and public)
- Coast guard
- Air agencies
- Waste air and land organizations
- Transportation groups
- Federal government

- U.S. Congress
- The rest of the waste industry
- Commercial and retail
- State Board of Education
- Office of Superintendent of Public Instruction
- Recyclers
- Distributors
- Retailers
- Manufactureres
- State General Administration
- Ecology
- State Department of Natural Resources
- State Pollution Control Hearings Board
- Local ire departments
- Local planning and zoning
- Wash State Parks and Recreation Commission
- State SWAC
- Local SWAC

Table 1: Solid Waste Management System Roles and Responsibilities Established in 1970

Jurisdiction Activity	City Public Works	County Public Works	County/ Jurisdictional Health Department	Private Collection Companies	Ecology	UTC
Curbside Collection	Can own and operate collection services or contract for private services	Can not own or operate collection services		Operate collection franchises in unincorporated areas and contracted services in cities		
Collection regulation						Regulates private collection companies' activities in unincorporated areas only
Transportation	Can operate own or contract for private services	Can transport wastes from county-owned collection sites (transfer stations) to county-owned disposal facilities.		Operate franchises in unincorporated areas and contracted cities		Regulates private collection companies' activities in unincorporated areas only
Collection and transportation regulation	UTC does not regulate cities. Cities can establish their own systems or contract with private companies for services					Regulates private collection companies' activities in unincorporated areas only
Disposal	Can own and operate landfill disposal facilities	Can own and operate landfill disposal facilities		Can own and operate landfill disposal facilities		
Solid Waste Facility Regulation					Establishes environmental protection standards	
Disposal Regulation					Establishes environmental protection standards	
Planning	Can write own plan or opt into county plan	Must write county plan			Must write state coordinated plan	

Issue Paper # 3
Litter and Illegal Dumping

I. Introduction and Purpose

Litter and illegal dumping have been significant problems in Washington for many decades. In addition to being eyesores, littered and illegally dumped materials pose threats to human health, safety, and the environment. Litter and illegal dumps degrade neighborhoods and communities; reduce property values, pollute streams and natural areas, cost taxpayers and property owners millions of dollars a year to clean up, pose safety hazards, and leave a poor impression on the many tourists visiting the state. Thousands of litter and illegal dumping complaints are filed each year with various local and state government agencies.[1] Even so, the broader public perception seems to be that litter is not a huge problem. A survey of state residents revealed that only 38 percent of Washingtonians see litter as a significant problem facing the state. In addition, a certain amount of public litter seems to be tolerated, or people have become immune to the problem. Much of the litter and illegal dumping is hidden or in remote areas, making most residents unaware of the extent of the problem or the pollution and health threats it poses.

Many individual and societal factors lead to littering and illegal dumping behavior. At first glance, we may be inclined to view the litter problem as one of individual irresponsibility. However, as our society has highly valued convenience and mobility, business has presented an amazing array of convenient but expensive options for everything from fast food breakfasts to products with nonreusable parts. The sheer numbers of disposable items in our society gives the impression that throwing things away is a right.

For littering and illegal dumping to stop, behavior, belief systems, attitudes, and values must change. People must learn that littering is a problem and that it is a socially abhorrent behavior. The desirable behavior, proper disposal, must be taught and reinforced.

Different behaviors will call for different approaches. The behaviors associated with littering that need to change are:

- Deliberate Littering – intentional littering, without regard for what may be culturally acceptable or lawful in the U.S. In other words, these litterers may know that they shouldn't litter, but do it anyway.
- Negligent Littering – litter created by careless, lazy behavior such as not tarping a load, not tying down materials correctly, leaving papers on the dash that could fly outside when the window is rolled down, etc. Sometimes negligent littering behavior is due to ignorance about proper procedures, such as securing loads.
- Accidental Littering – litter created by a sheer unconscious act. For example, when a tissue falls out of someone's pocket without his or her knowledge.

[1] In 1998-9, 3,363 complaints were tracked by local government agencies under grant-funded enforcement efforts. Data from Ecology's Coordinated Prevention Grant (CPG) database.

Twenty-two million pounds of litter accumulate on roadways and public areas in Washington each year. This includes 260 million cigarette butts, 415,000 pounds of paper packaging, and the equivalent of 88,400 passenger car tires. Litter cleanup programs throughout the state have been greatly expanded and increasing amounts of litter and illegal dumps are being cleaned up. And yet the problem is still here. It appears that we will never be able to "clean it all up."

We want our state to be free of litter and illegal dumps. The 1998 Legislature enacted Second Substitute House Bill 3058, an act relating to waste reduction, recycling and litter control that establishes a zero litter goal for Washington.

The purpose of this issue paper is to review the current litter and illegal dumping problem, to portray a scenario in which litter is eliminated, and to recommend potential short-term and longer-term strategies that should be evaluated for possible inclusion in the state solid waste plan.

II. Current Status

(A). Background

State, local, and private litter cleanup efforts have been in place for decades. The Ecology Youth Corps (EYC) program began in 1975 and has played a major role in cleaning state and interstate roadways. EYC scaled back its efforts in the early 1990s due to funding reductions. The visible roadside litter became noticeably worse. The extent of the state's illegal dumping problem has also been perceived as worsening.

Attention to Washington State's litter problem was brought to the forefront in 1997, with the formation of a Litter Task Force. The task force was composed of representatives from state agencies, local governments, businesses, and the Legislature.[2] The Litter Task Force's objective was to evaluate Washington's litter collection and prevention activities. Several recommendations were made for improving the existing system and moving toward a standard of zero litter throughout the state.

The Litter Task Force recommended that Ecology coordinate the design and implementation of a statewide litter prevention campaign. The Task Force cautioned that "brochures, leaflets, and press releases do not constitute a prevention campaign,"[3] and advocated that a system to measure the effectiveness of the campaign be implemented and linked to overall tracking of litter pickup results. The Task Force encouraged Ecology to involve state agencies, local governments, and [litter] tax-paying businesses in both the planning and implementation of the campaign.

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[2] Litter Task Force participants: House of Representatives, Senate, Department of Corrections, Department of Ecology, State Parks and Recreation Commission, Department of Natural Resources, Department of Transportation, State Association of Counties, State Association of Cities, Coors Brewing, Lewis County Health Department, Washington State Recycling Association, Washington Food Industry, Washington Refuse and Recycling Association, Washington Soft Drink Association, and Longview Fibre Company.

[3] Keeping Washington Clean – Litter Prevention and Pickup Recommendations to Washington State Legislature, p. 19.

These recommendations were presented to the 1998 State Legislature and incorporated into Chapter 70.93 RCW, the Waste Reduction, Recycling, and Model Litter Control Act (WRRLCA). Several significant changes were made. First, the Department of Ecology was put in a lead-coordinating role, becoming accountable and responsible for managing allocations from the Waste Reduction, Recycling, and Litter Control Account. Second, the definition of litter was expanded to included illegally dumped materials. Third, the law specifies that WRRCLA monies should be divided as follows: 20 percent for local government cleanup programs, 30 percent for Ecology's recycling programs, and 50 percent for litter cleanup by state agencies.

It is impossible to know the extent of the illegal dumping problem in our state. While illegal dumps are discovered every day, no one is sure how much of the problem they represent. Illegal dumping generally occurs in remote and/or hidden areas. Nonetheless, local and state officials are highly concerned about illegal dumps and believe that illegal dumping is on the rise.

The following is a partial list of hazards that people (especially children) experience when they come into contact with illegally dumped materials. When reviewing this list, bear in mind that playing in junk or garbage may be appealing for children. A Seattle King County Health and Environmental Investigator has seen children building forts in the middle of illegally dumped debris. The forts were made from broken and filthy furniture, plywood pieces, auto parts, refrigerators, tires, buckets, etc, which could easily cause physical harm if the forts collapse or there are nails in lumber. Also, as often as children's hands are in their mouths, it is not hard to picture how exposure to almost any material can easily occur.

1) Exposure to acid and lead from broken batteries: When the level of lead in a child's blood gets high enough, permanent neurological damage occurs. Ingestion is the main mechanism of conveyance of lead into people. Groundwater or soil contamination with lead, followed by ingestion of the contaminated water or soil is an example of how lead can get into a person. The above mentioned Health and Environmental Investigator says he sees crushed batteries "all the time."

2) Exposure to chemicals: Abandoned methamphetamine labs may have hazardous chemicals dumped on the ground, the by-products from the process of making the drug.

3) Exposure to solvents or other hazardous materials: Buckets and barrels of various solvents and other hazardous wastes are regularly dumped. In addition to contaminating soil, surface water, and/or ground water, children can experience exposure by inhalation or through skin contact. Skin contact can result in toxic materials being absorbed through the skin, burns from acids or bases, and/or ingestion.

4) Exposure to other dangerous regulated materials such as asbestos: These materials are often inconvenient and expensive to dispose of; therefore they are regularly dumped. Children playing in the area can break up material containing asbestos, inhaling the dust. Asbestos causes lung cancer, among other diseases.

5) Exposure to sharps: Again children playing in a dump area are subject to potential disease transmission. A needle that was previously used by an infected person can

transmit the hepatitis B and C virus. This virus can live up to two weeks inside of a needle given optimal surrounding environmental conditions. AIDS can also be transmitted by sharps, although it does not live long outside the human body. Also, playing with sharps, along with the availability of syringes and needles, has been shown to contribute to drug abuse.

6) Exposure to motor oil: The oil may contain heavy metals, not only contaminating children but also soil, surface water, and ground water.

The list is endless. Theoretically whatever is hazardous could be dumped and discovered by children or adults. Broken TV screens contain lead and fluorescent tubes contain mercury, both of which are seen regularly dumped on the ground. These examples point to why it is so crucial that we commit to cleaning up illegally dumped wastes quickly and work to prevent future dumping.

(B) Existing Programs and Activities

State Government

Cleanup

In the late 1990's the Department of Ecology spearheaded efforts to clean up more litter than ever before. The Ecology Youth Corps was expanded to include median crews and more summer youth crews were deployed. Ecology partnered with the state Departments of Corrections and Natural Resources to deploy inmate and community service crews across the state. The Washington State Department of Transportation (WSDOT) expanded the volunteer Adopt-a-Highway program to include paid contractors. The Community Litter Cleanup Program was established to provide funding to local governments to clean litter and illegal dumps in their communities. Between 1997 and 1999, cleanup quadrupled to a total of 4 million pounds of litter and illegally dumped materials being picked up annually.

While cleanup removes litter from the environment, it does little to positively change the behavior of the thousands of people who litter (other than those whose attitudes are changed by serving on a litter crew).

Enforcement:

Chapter 70.93 RCW sets minimum fines for littering and illegal dumping and encourages local governments to adopt ordinances similar to the provision of the state law. Most enforcement of litter laws is carried out at the local level by police departments, sheriffs' offices, and health departments. The Washington State Patrol issued approximately 3900 littering citations each year in 1998 and 1999. Data quantifying the extent to which litter laws are enforced statewide is unavailable.

The Litter Task Force recommended that the Legislature and Ecology encourage Washington State Patrol and local governments to enforce litter laws and that local penalties "be set at levels sufficient to provide meaningful incentives for compliance." In the litter survey, both focus group and telephone survey participants endorsed the use of fines and community service to curb littering behavior

Prevention

Chapter 70.93 RCW provides Ecology with guidance for a litter prevention campaign. The law directs Ecology to encourage, organize, and coordinate all voluntary local antilitter campaigns to focus the attention of the public on programs of this state to remove litter. It also directs Ecology to develop statewide programs by working with local governments to stimulate and encourage research and development in the field of litter control.[4]

Local Government
Several active litter prevention programs are already in place at the county level.

For example, Lewis County Environmental Services Division, Sheriff's Department and private landholders formed an Illegal Dump Task Force. Joining with the local CrimeStoppers organization, the task force established a Dump Stoppers program, where people are encouraged to call a toll-free number and report illegal dump activity. Callers are eligible for rewards of up to $1,000 for information leading to an arrest or filing of charges. The county is now able to determine the perpetrator in about 47 percent of cases.

The increased incidence of illegal dumping and the resulting financial burden has led many property owners to block access to their property. This is especially true in rural areas. The intent is to prevent recurring illegal dumping by blocking vehicle access. This has not been a welcome solution for some groups, such as hunters, 4-wheel enthusiasts, and partygoers who have enjoyed access to the property but often leave behind their garbage. Educating the public each time a rural area becomes blocked is important as well. The King County Solid Waste Division staff works with the property owner to prevent a recurrence each time an illegal dumpsite is cleaned up.

Some of the larger timber companies have made a variety of arrangements with citizens for help with debris cleanup in exchange for access. Over the last 10 years these agreements have become increasingly more common. Ironically, the probability is the majority of people involved in these recreational activities are not the ones illegally dumping.

Private and Nonprofit Efforts
Other private and volunteer activities include the WSDOT Adopt-A-Highway Program. Through the program, volunteer groups "adopt" sections of interstate or state route and become responsible for cleaning them several times each year. WSDOT provides safety training and equipment to the groups, then gathers filled bags and disposes of them. WSDOT is also piloting a program where paid work crews clean sections of adopted highways. The sponsoring businesses provide the funds in exchange for their names appearing on Adopt-A-Highway signs.

These efforts are very important and have improved the situation dramatically. However, litter and illegally dumped materials are almost always redeposited in areas after they are cleaned. Litter crews frequently reclean the same areas several times each year. Unfortunately, cleaning up litter and illegal dumps after the fact is not fixing

[4] RCW 70.93.200.

the problem. It is clear that prevention of these activities is the key to making progress toward zero litter. It is time to supplement cleanup with prevention efforts.

The Litter Survey, published in 2000, confirmed once and for all that the zero litter goal could not be reached through cleanup alone. Statistics from this survey show that despite the massive cleanup effort, litter crews may be only addressing a small part of the problem. The survey estimated that 16 million pounds of litter accumulate on state roadways while another 6 million pounds accumulate in selected public areas.[5] Litter cleanup crews cannot keep pace with the rate at which litter accumulates; to do so would prove prohibitively costly.[6]

(C). **Barriers to addressing the problem**:

1. Perception. According to the 2000 Litter Survey, only 38 percent of Washington residents see litter as a problem facing the state of Washington. The general public does not see much of the litter and illegal dumping problem because much of it is not all visible from the roadways and much of the illegally dumped material is in remote, forested, or hidden areas.

   Some people even believe that they are helping to create jobs for youth by littering in public areas. Many think it's government's job to clean it up. These perceptions need to change to make serious progress on prevention. People who live, work, and play in Washington need to know that it is everyone's responsibility to keep our state litter-free.

2. Funding. The Waste Reduction, Recycling and Litter Control Account provides $5 to 7 million each year for state and local agencies to address litter and illegal dumping. While this funds a high level of cleanup activity, it is not enough to clean everything up. Very little funding has been available recently to work on prevention, yet it must be the highest priority. In addition, the existing tax on various materials considered to be part of the litter stream does not completely correspond to what is actually being littered and illegally dumped. It is inconceivable that enough money would ever be available to clean up all the litter and illegal dumps, and certainly not to keep public areas clean! Litter and illegal dumps represent an underfunded mandate to government. Unlike many issues and problems that government addresses, this one is totally preventable and does not even need to exist.

3. Lack of Resources. Local governments are responsible for illegal dumps, with a minimal amount of help from state government. Limited resources are available to address this large and costly problem.

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[5] In the study, roadways included interstates, state highways, and county roads. Public areas included state parks, county parks, Fish & Wildlife recreational access areas, Dept. of Natural Resources trailhead and campgrounds, and highway rest areas.

[6] Ecology spends 5-7 million dollars to cleanup an estimated 4 million pounds each year – only 25% of the estimated 16 million pounds found on state roadways and not including the amount found in public areas.

4. Difficulty of enforcement. While many people support the use of enforcement, studies show that few states are able to enforce littering laws effectively for two reasons: lack of personnel available for such a low priority issue and difficulty "catching" offenders in the act.[7] Additional challenges of enforcing litter and illegal dump laws include:

   A. Many jurisdictions do not have enough funding to properly run an enforcement program.

   B. It is extremely difficult to catch illegal dumpers, as they are careful to avoid situations where there will be witnesses.

   C. Many agencies that enforce illegal dumping and littering have numerous other enforcement responsibilities that are higher priorities. For example, police/sheriff, zoning code enforcers, and even health department personnel may have more imminent health or safety hazards or even crimes to address, generally with very limited resources.

   D. Even when an illegal dumper is caught, sometimes the law and/or authority are not strong enough to do much. This may be due to lack of political will or weak or overworked legal support (to write notices of violations, follow up, etc.).

   E. Sometimes the authority to pursue illegal dumpers is spread unevenly among many local agencies. An example is when one agency has jurisdiction over health nuisances, another over zoning violations from unpermitted dumpsites, a third governs construction and demolition waste dumping, and yet a fourth addresses dumping on only the property owned by or overseen by the jurisdiction itself. This makes it very difficult to effectively take enforcement action. In addition, even if a person witnesses an act of illegal dumping, he/she may not be able to easily locate the right entity with which to register a complaint.

   F. Illegal dumping fines are not necessarily directed to the right person. Ideally, they should be paid by all involved parties, especially the dumper and whoever paid them to dump (the generator), if applicable. Since these people are hard to find, often the only party being fined is the landowner.

   G. Many local jurisdictions don't have a collection system in place to pursue unpaid fines.

   H. Undercover surveillance or sting operations to catch dumpers can be effective but they require significant resources, commitment, and training, generally not available.

[7] Comment taken from "Proposed Litter Control Plan," from Pennsylvania's Litter Task Force.

III. Strategies for Moving Toward the Goal

The goal of zero litter is ambitious and may seem unrealistic, considering the current volume of litter in our state. Funding and attention to date have tended to emphasize cleanup. Emphasizing the prevention of litter makes much more sense for our state's health, environment, resources, and aesthetics.

It is likely that making the change to emphasize prevention will initially require additional funds. However, we can begin immediately to build on many of the strengths of our current litter programs and the information from contemporary research while we simultaneously develop long-range goals. The following section describes a two- to five-year prevention strategy that will help make progress toward the ultimate goal.

Comprehensive Litter Prevention Strategy

To be successful, a litter prevention strategy needs to change the behavior and attitude of litterers–to prevent the act of littering from occurring.
The first step is to identify what behavior should be changed and for society to agree on a goal. In this case, the goal is for people to stop littering and illegally dumping.
The second step is to teach people what both the desirable and undesirable behaviors are: properly disposing of waste versus littering and illegally dumping.
The third step is to modify behavior by enforcing the message through incentives or punishments.
The fourth step, an ongoing action, is to continually update and reinforce the antilitter message.

As the lead agency on litter and illegal dump issues, Ecology has developed and has begun to implement elements of the statewide prevention strategy. Full implementation of the strategy will depend on commitment and involvement of other state agencies, local governments, and the private sector.

State agencies, local governments, and businesses should:
1. Share information about litter and illegal dumps as well as their campaigns, successes, failures, educational materials, etc.
2. Develop, prioritize, and implement prevention activities in a collaborative fashion.
3. Work to secure funding for prevention activities.
4. Analyze alternative taxing structures to determine best approach to maximize consumer awareness of litter costs.
5. Identify performance indicators to measure the impacts of prevention activities.
6. Encourage expansion of active local-level litter prevention programs, to instill community pride and a sense of stewardship.
7. Review successful litter prevention programs from other states and countries and their applicability to our state.

The basic tenets of a litter prevention strategy must include the following elements:
- Media and education to raise awareness, reinforce messages, and teach appropriate behavior.
- Enforcement to curb behavior.
- Ongoing cleanup activities.

Media and Education Element

Recommendations from the litter study state that the first step of a litter prevention strategy should be a general awareness campaign to educate the public about what constitutes littering and littering behavior. Implementation of themed messages or slogans can prove successful as evidenced by the "Don't Mess With Texas" campaign which has resulted in more than a 70 percent reduction in roadside litter over a ten-year period. The Texas campaign demonstrates that an antilitter campaign is not a one-time activity. The public will need constant reminders of the negative financial, environmental, and social impacts of littering.

One of the main recommendations of the litter survey is to develop a long-term, broad-based litter *awareness* strategy and campaign that focus on the extent to which litter and littering behavior can create a significant problem in the state. Ecology has just procured a contract with a firm that will develop an awareness campaign. While available funding for this at $200,000 is very limited, it is a significant first step.

Securing the funding necessary to design and implement a broad-based media campaign may be challenging. (The "Don't Mess With Texas" campaign costs about one million dollars a year to produce and purchase airtime.) Securing funding at state and local levels and securing business sponsorship will be crucial to the success of the campaign. In addition the state, local governments, and business must collaborate to find creative ways to disseminate the antilitter message in the most efficient, effective, and cost-effective way. Once the messages and themes are developed, there are many mechanisms that can be used to get the word out.

Enforcement Element

Before recommending specific enforcement actions, Ecology will lead an effort working with state agencies and local governments to conduct an evaluation of the current enforcement system and the extent to which it is being used. The evaluation will include:

- Identifying applicable statutes.
- Researching the legal system (how are violations processed).
- Surveying local jurisdictions to see if ordinances are in place (Chapter 70.93.200 RCW and Chapter 70.93.097 RCW).
- Summarizing the content of local ordinances.
- Quantifying the enforcement rates of state laws and local ordinances.
- Investigating enforcement mechanisms used by other states.
- Recommending changes to current system.

Based on the results of an evaluation of the enforcement system, the following ideas, options, and activities may be considered:

1. Enforcement programs should pay for themselves.
2. Raising the minimum fines for littering and illegal dumping through legislative change.

3. Revising the enforcement process to ensure “pass-back” of part of the fine to provide incentive for enforcement and create additional funding for cleanup.
4. Ensuring enforcement processes include fines as well as community service (on litter crew) options.
5. Researching the possibility of “deputizing” citizens or government employees to bolster enforcement activities. Explore the option to contract out personnel to carry out enforcement provision of the chapter (Chapter 70.93.050 RCW).
6. Working with law enforcement agencies to encourage enforcement of existing laws (notes on ticket pads, presentations at police academies and other training sessions).
7. Posting signs stating fines
8. Working with law enforcement agencies to have a dedicated time set aside for special attention to litter law violations. Such times could be considered litter awareness weeks, during which time violators would be highlighted in the media.
9. Working with local newspapers to list litterers in crime stopper sections.
10. Continuing to support funding mechanisms for solid waste enforcement at local levels.
11. Using hidden cameras at illegal dump hotspots to try to catch offenders.
12. Instituting a litter hot line to report observed litterers.
13. Providing rewards or bounties for reporting illegal dumpers.
14. Establishing a collections system for unpaid fines that may include collection agencies and/or small claims court.

<u>Ongoing Cleanup Element</u>

Maintaining currently active programs (Ecology Youth Corps, The Community Litter Cleanup Program, and Adopt-A-Highway) will be key to keeping Washington litter free. The more people involved in such cleanup programs, the more people there are to carry the antilitter message.

Additional cleanup activities should be considered as part of the litter prevention strategy, including expanded promotion of Adopt-a-programs, maximizing offender and community service work crews, antilitter slogans on litterbags, and even a statewide cleanup day.

IV. The Future Model

The Litter Task Force and the State Legislature set the goal of having Washington become litter-free. This is consistent with the move toward sustainability and eliminating the concept of waste. In the future, littering and illegal dumping will be significantly reduced and will be considered socially abhorrent.

When this goal is reached, here is an idea of what it might be like.

People in Washington consider themselves to be stewards of the earth. They take responsibility for keeping their surroundings free of litter. Communities take pride in keeping their natural surroundings healthy and beautiful. Incentives are in place for not littering and penalties for littering are prohibitive. New residents are quickly informed of

the repercussions of littering with driver license renewals, apartment rentals, or house purchases.

Waterways in the state are healthier and free of illegally dumped materials and toxins. Roadways, communities, recreation areas, and other public places are clean and safe. Tourism is flourishing.

The cost of litter is borne by the consumer and litterer. Taxes formerly collected from manufacturers, wholesalers, and retailers are now provided through collected fines and point-of-sale charge on items, which historically have been disposed of on roadsides or illegal dumps. Funding mechanisms are reviewed regularly, as is the progress toward zero litter statewide. Programs are evaluated and changed as necessary to ensure solid progress continues to be made toward the ultimate goal.

Education, awareness, and enforcement programs receive adequate funding and are very effective at preventing almost all litter. Strong disincentives to illegal dumping are in place and are working well. Most of the state's illegal dump sites have been cleaned up and they are remaining clean. Recreation areas previously closed to the public because of illegal dumping are being reopened.

Litter crews (Ecology Youth Corps, Adopt-A-Highway) work in coordination with ongoing media campaigns and school curriculum developers to keep the issue of litter in the public eye. They focus almost entirely on prevention, with very few resources allocated to cleanup.

V. How to get There

The three-pronged strategy that is beginning to be implemented represents a good start to move toward prevention and reducing the magnitude of the littering and illegal dumping that occurs in Washington. As this two- to five-year strategy is implemented, it is important to evaluate its effectiveness and to be committed to making midcourse adjustments as needed. This should involve thorough measurement of changes, assessment of progress, evaluation of any appropriate alternatives, and updating of the strategy so that it continually lays out activities for at least five years ahead.

The two-to five-year strategy should include an assessment of the existing funding mechanisms that provide resources at the state and local level, including the state tax that funds the litter account. Particularly for illegal dumping, tax sources do not match the problem sources.

In addition, a longer-term strategy needs to be developed, one that may not contain as much detail as the existing strategy, but that can provide an overall roadmap for getting to a litter-free state. Because the zero litter goal is quite ambitious, it is important to look farther ahead and establish milestones and a projected timeframe for making Washington litter- and illegal dump-free.

Issue Paper #4
Collection

Introduction

Transportation connects the hubs of the infrastructure network for the solid waste collection system. Solid waste is usually transported from a point of generation to a point of disposal. The extremely broad legal definition of solid waste includes unusual categories like swill, sewage sludge, demolition and construction wastes, abandoned vehicles, recyclable materials, dangerous waste, moderate risk waste, medical waste, and others. This general characterization requires us to consider a wide range of transportation and collection activities. Collection occurs when the generator of the solid waste hires someone else to transport the solid waste to either a disposal site or a processing center. In the state of Washington, collection of any and all legally defined solid waste is a regulated activity. When a generator brings their own waste to a disposal site or processing center ("self-haul"), this is classified only as transportation, not collection, and is not regulated. Regulation of solid waste collection varies by where the solid waste is collected, by whom it is collected, and what kind of solid waste is collected. The issues surrounding transportation and collection focus on the variations in regulatory schemes, and the environmental effects of transportation.

Background

The long-term trend toward consolidation in the collection industry reflects the legislative intent to provide uniform services to all citizens of the state. This consolidation and the advent of private control of landfills by the companies providing the collection services have changed the dynamic of county oversight of disposal activities. Several urban and rural counties address these trends in their local solid waste plans.

The most significant change in the collection industry in recent years has been the implementation of curbside recycling programs, and a migration toward expansion of the offered range of services. With the initiation of recycling programs, the collection industry has seen a vertical integration of companies, while the general public has experienced a fracturing of services at curbside. Historically, it took only one collection truck to gather solid waste. Today, there could be as many as three vehicles servicing each home or business -- garbage, yard waste, and recycling -- thereby increasing the production of air pollution while collecting the same amount of waste.

City Control of Collection System

Background

City controlled collection systems provide solid waste collection services to a large percentage of the state's residents. Within their municipal boundaries, cities can control solid waste collection service levels, rates, and operations. Options available to them include: contracting directly with a private collection company to provide solid waste or residential recyclable materials collection services; or providing these services with city equipment and employees. If the city does not

actively control all or part of the system, control remains under the Utilities and Transportation Commission (UTC) as described below. For example, the City of SeaTac contracts for residential recyclables collection, but the UTC sets rates for garbage collection. A city may, by ordinance, impose a licensing fee, franchise tax, or tax on gross receipts of the solid waste collection company.

Non-residential recycling services are an exception in the solid waste collection system because the Revised Code of Washington states that commercial, industrial, and drop-box recycling services are not solid waste and will be regulated in our state under the motor carrier provisions of Title 81.80 RCW. The Federal government preempted states' right to regulate motor freight rates, routes and services in 1994 under the FAAAA. Although cities may enter into non-exclusive contracts with service providers, local businesses may choose to make other collection arrangements.

The issues that are important to city control of the solid waste collection system include mandatory collection, annexation and incorporation of UTC-granted authority, service level ordinances, and rate structures.

Mandatory Collection

One frequently used tool to increase collection participation is a mandatory collection ordinance covering all or part of a city's incorporated boundary. Mandatory collection means that all businesses and residences must subscribe to and pay a minimum fee for collection even if they do not use the service. Mandatory collection spreads the cost of service across a greater population and increases efficiency of the system. It is believed this reduces illegal dumping and protects human health and the environment.

Cancellation of UTC-Granted Authority

The Commission took action to promulgate rules to implement a new statute adopted by the legislature in 1997 that describe how city annexation and incorporation affect solid waste certificates. If a city or town annexes or incorporates property, city or town supervision of solid waste collection begins when the city or town notifies the UTC. Notification must have occurred before the UTC will cancel the certificate of the associated company. After the contract expires, which must be at least seven years, the city or town may offer service themselves or contract for service with another company.

Service Level Ordinance

A city may adopt the service level ordinance established by its County government. This ordinance typically defines the types and extent of collection service to be offered residential and nonresidential customers in the county. Adoption of service level ordinances can provide (1) guaranteed minimum collection service levels for residential and nonresidential customers; (2) access by the county and cities to some collection system information; and (3) enhanced coordination between UTC-certificated collection companies and county and city contractors.

Rate Structures

Cities that contract for solid waste collection can establish rates for collection services. Most cities have adopted variable rate structures that charge customers for extra cans of garbage based on the cost of providing the extra service. Many cities, including Seattle, Redmond, Auburn, and Issaquah, have opted to establish incentive rate structures that set prices **primarily** upon the

number of cans that each household uses rather than the cost of providing service to each household. For example, the City of Seattle charges twice as much (100% more) for two-can service as for one-can service. In these cities, the households that generate less garbage are financially rewarded, while those that generate more garbage are penalized.

County Control of Collection System

Background

A county may exercise limited control of solid waste collection services in unincorporated areas through the comprehensive solid waste management planning process. One tool to accomplish this is through the adoption of a service-level ordinance. Service-level ordinances can establish the types and levels of services to be provided to both residential and nonresidential customers

Waste generators in the county have the choice of either subscribing to collection services provided by their UTC-certificated company or self-hauling to a permitted disposal or transfer facility. Generators can self-haul solid wastes to transfer stations or other processing and disposal facilities.

Statutory restrictions in RCW 36.58.040 state that counties may not operate a solid waste collection system. In addition, RCW 81.77.040 prohibits any person from operating as a solid waste collection company without a certificate from the UTC.

A county may also control collection activities by establishing solid waste collection districts. (RCW 36.58A.030) Within such a district all residences and businesses are required to subscribe to and pay for collection services; the UTC regulates the private service provider and the collection rates. Whatcom County is the only county in the state that has implemented a collection district. Solid waste collection districts are generally limited to unincorporated areas of a county, although with consent from the legislative authority of a city or town, collection districts can include areas within the corporate limits of the city. If a county were to form such a district, the UTC would be required to investigate whether the existing certificated collection companies were willing and/or able to provide collection services. If the existing certificated collection company could not or would not provide the service to the satisfaction of the Commission, then the UTC could issue a certificate to another collection company. If no company is found, a county could provide collection services itself. Within an established solid waste collection district, a county may acquire certificate rights by purchase or condemnation.

Except in the circumstances stated above, the county is prohibited from managing or operating solid waste collection systems. This raises issues around items that are not typically collected curbside such as bulky waste and moderate risk waste. Other issues important to counties include self-hauler use of transfer stations, service level ordinances, and drop box collections.

Bulky Waste Collection

Regardless of the availability of curbside solid waste collection, residents occasionally have large items for disposal that are not picked up at the curb. Furniture, large appliances, and remodeling debris are examples of wastes that residents must either self-haul or arrange to have picked up and transported for disposal. In most areas of the state, there are not enough convenient and economical alternatives to self-hauling bulky items. The UTC has recently issued several certificates to serve this need, and expects to issue more in the future.

Counties have sponsored special collection events to remove bulky or hard to recycle materials. These events have either been designed to have residents place large items curbside for a collection company to pick up or offer residents an opportunity to deliver bulky items to a designated collection site. Special event collections are generally conducted one or two days per year, which limits their convenience to residents. Additional review of this issue should be incorporated into the State Plan.

Moderate Risk Waste (MRW) Collection

The term moderate risk waste was created by revisions to Washington State's 1986 Hazardous Waste Management Act (Chapter 70.105 RCW). Simply put, MRW is a combination of Household Hazardous Waste (HHW) and Conditionally Exempt Small Quantity Generator (CESQG) waste. Waste normally thought of as MRW includes: used oil, oil-based paints, pesticides and flammables.

HHW is old or unwanted products from residences that exhibit any of the characteristics of hazardous waste. They may be toxic, corrosive, ignitable, reactive, persistent or carcinogenic, but they are exempt from state dangerous waste regulations.

Businesses that generate less than 220 pounds per month or less than 2.2 pounds of extremely hazardous waste at one time and meet certain minimum management and reporting requirements are conditionally exempt from state and federal hazardous waste regulations. These businesses are termed "Conditionally Exempt Small Quantity Generators".[i]

Moderate risk wastes have the potential to cause a variety of problems for human health and the environment. Evidence shows that when MRW is mixed with the normal wastes from households and small businesses, worker injuries and damage to collection vehicles and transfer stations increase. MRW entering a landfill can affect the liquids that leach through the waste causing damage to landfill liners, complicating the treatment of leachate or passing untreated into the environment.

In Washington, cities and counties are establishing fixed facilities and periodic collection events or round-ups to keep MRW out of landfills. During the 1990's, Ecology provided technical assistance and financial aid through grants to local governments to establish permanent fixed facilities. The success of these efforts can be seen in the fact that by 1999, there were 47 fixed MRW facilities operating throughout the state and another 7 projects in the planning phase. The number of MRW collection events reached a high of 125 for the state of Washington in 1994, and has steadily declined to approximately 65 per year in 1999 due to the establishment of permanent collection facilities.

The types of moderate risk waste that are collected are expanding. Some MRW collections are also accepting mercury-bearing wastes and used electronic devices. Fluorescent and high intensity lamps contain small amounts of mercury and are commonly disposed of in municipal solid waste. The 550 million lamps currently used in the United States will discharge thirty-five tons of mercury into the atmosphere. Similarly, discarded electronic devices use components that contain one or more of the following substances: mercury, lead, cadmium; embedded batteries; polychlorinated biphenyls (PCBs) and other toxic substances. Clark County reports that televisions, computers, monitors and other electronics are 0.62% by weight of the total waste stream.[ii]

The difficulties associated with accepting mercury-bearing waste or used electronics include: a lack of storage space; identifying and sorting usable or valuable items; the extreme toxicity of mercury

waste even in very small amounts; and a lack of clear consistent commodity specifications. These issues will need to be examined and new collection and management strategies developed to properly recycle or dispose of these items. One collection option may be on-call household pick-up of MRW, but this could be inefficient and expensive.

Self-hauler Use of Transfer Stations

Residential and non-residential customers who choose to bring their waste or recyclables to a transfer station themselves are referred to as self-haulers. In Jefferson County, for example, self-haul accounts for 38% of the overall waste received at the transfer station.[iii] Although these figures include some large commercial customers that self-haul their own wastes, the State Plan should conduct more research in this area to see if this applies statewide. The challenge with self-hauling is to balance the needs of self-haulers with those of the local collection companies. Self-hauling activities can cause additional traffic and congestion at a transfer station. This congestion can cause delays in service for the private collection vehicles that are hauling large loads. It also can increase capital costs for transfer station upgrades to provide more off-loading space. There are two alternatives for managing self-haul activities: (1) implementing mandatory curbside collection, and (2) improving collection service for bulky and extra waste.[iv]

Implementing mandatory curbside solid waste collection requires a county to establish a solid waste collection district, and a city must pass a mandatory collection ordinance. Several cities have instituted mandatory collection within their jurisdictions. The rationale for this action is to minimize illegal dumping and littering, to distribute the costs of recycling and solid waste management equitably among all residents, and, in some counties, to reduce self-hauler use of transfer stations. Many residents oppose mandatory collection because it limits their right to choose how they dispose of their waste. In areas with mandatory collection, there has been minimal study on the relationship between mandatory collection and the amount of self-haul activity.

Reducing demand for self-haul service over time may help reduce capital and operating costs for transfer facilities. Also reducing self-haul reduces private vehicle trips and helps to lower air emissions. Methods for improving services are necessary to provide options for self-hauling residents and businesses.

Drop Box Collection

Many rural collection systems rely on customers to self-haul their waste to a centralized drop-off container, called a “drop box.” A typical station consists of uncovered 30-50 cubic yard capacity drop boxes. Often smaller collection boxes are available for recyclables. Operating hours vary with the needs of the surrounding residents. Drop boxes are periodically removed and the waste is taken for recycling or to a landfill for disposal. The design of the station may vary but the principle of self-hauling garbage to a central collection point remains the same.[v]

Drop boxes offer an economical method to collect waste from a wide area of dispersed households. Locating the stations is often problematic because of resident’s objections. Like transfer stations, drop boxes operate under solid waste operating permits issued by jurisdictional health departments, and include requirements for containment of stormwater or wastewater.

Rate Structures

Counties can influence rate design though service level ordinances. One of the more important options in this case is requiring haulers to use a rate that encourages participation in recycling by setting the combined fee for garbage and recycling lower than the fee for garbage alone. This issue paper proposes calling this type rate a "discount rate", to distinguish it from other types of rates. Discount rates are currently used in a few counties, and can take slightly different forms. For example, one form of this rate that is used (in Pierce County) is to provide a rate for recycling and garbage collection combined that is $1.00 lower than garbage alone.

In addition to encouraging people to commit to recycling, discount rates also lead to "embedded rates", where the cost of recycling is embedded in the fee for garbage and thus does not appear to participants as an extra fee. The disadvantages of discount rates include: reinforcing the myth that recycling "pays for itself;" there is no enforcement to ensure that people actually recycle; and the rates are not tied to volumes and so are not the best incentive for waste reduction. In the absence of better incentive or volume-based rates, however, discount rates are relatively easy to implement and can provide a significant level of motivation for recycling.

Legislation was introduced in 2000 and 2001 to allow counties, through the comprehensive planning process, to work with UTC to establish incentive rate structures. Proponents point to studies that show that incentive rates, such as those in effect in Seattle, are effective in increasing recycling participation[vi] Opponents question the conclusions of these studies and believe that large households are unfairly penalized.

Collection vehicles may be equipped with scales, so those customers can be charged by weight disposed instead of container capacity. A weight-based rate structure could more accurately reflect the costs per household and eliminate distortions in rates caused by the increasing use of compactors by waste generators.

Utilities and Transportation Commission Control of Collection System

Background

Since the early 1900's, the Washington Utilities and Transportation Commission (UTC) has regulated the transportation of property (including nonresidential recyclable materials) for hire over public roadways under the provisions of Chapter 81.80 RCW. The Washington legislature recognized in 1961 that garbage collection service should be treated differently from other transportation because it has public health impacts, and decided that it should be available to all residents of the state at rates that were fair, just, reasonable and sufficient. The legislature adopted statutes that are codified as Chapter 81.77 RCW, directing the UTC to supervise and regulate for-hire carriers of solid waste that use motor vehicles over the highways of the state.

Chapter 81.77 RCW requires a company to obtain a certificate from the UTC declaring that public convenience and necessity require, or will require, establishment and operation of a collection service in a specific area. These Certificates of Public Convenience and Necessity require proof that a company is fit, willing, and able to provide service, specify categories of solid waste that can be collected and identify the usually exclusive geographic area in which a company can operate. The certificates are often referred to as "G certificates" or "G permits." As part of its legislative mandate, the UTC audits these companies to set fair, just, reasonable and sufficient rates, requires

proof of adequate insurance, supervises operational safety of both equipment and employees, and requires the company to file annual reports with the UTC.

The UTC recognizes and regulates the collection of all categories of solid waste, including, but not limited to, garbage, refuse, construction and demolition debris, biomedical waste, hazardous waste, and residential source-separated recyclable materials. Most certificates issued by the UTC allow collection of all categories of solid waste. However, some certificates are limited to specific portions of the waste stream. Recyclable materials regulated by the UTC under Chapter 81.77 RCW are limited to residential source-separated recyclables. The UTC also regulates other special categories of solid waste, such as biomedical waste, as required by state law. The UTC makes decisions about these categories of solid waste on a case-by-case basis. (WAC 480-70-050) Solid waste collection from federal government facilities has historically been either self-hauled to transfer and disposal facilities or contracted directly with a private service provider. The UTC grants certificates for contract service.

The provisions of Chapter 81.77 RCW state that new certificates will be issued in areas currently serviced by another certificated collection company (also called a carrier) only if that company will not serve to the satisfaction of the UTC. However, some overlap among service areas exists because solid waste collection companies in business in 1961 were grand-fathered by Chapter 81.77 RCW. The statutes provide that these certificates are a property right and can be purchased, leased, or acquired from existing certificate holders. Only the UTC can cancel a permit. Carriers must obtain UTC approval to abandon service, and the UTC will consider the public interest before making a decision.

The UTC establishes collection fees (rates) for certificate holders on the basis of operating costs and capital investment. Every certificated collection company is required to file a tariff with the UTC, showing rates and charges applicable to the collection, transportation, and disposal of solid waste in its service area. The UTC may approve, modify, or deny the requested rates. Certificated companies cannot alter their rates or charges without UTC approval. The UTC requires certificated collection companies to follow UTC regulations set forth in Chapter 480-70 WAC and to provide minimum levels of solid waste collection and recycling services pursuant to local solid waste management plans and municipal ordinances. Service between transfer stations or disposal sites is exempt from UTC regulation.

Recyclable Material Collection

The collection of recyclable materials from nonresidential generators is regulated somewhat differently than the collection of general solid wastes in the State of Washington. The Federal Aviation Administration Authorization Act (FAAAA) of 1994 pre-empted state or local regulation of transportation companies (also called common carriers) in terms of where they operate, the services they provide, how much they charge, and what kinds of property they can transport. At that time, the legislature delegated safety inspections for most common carriers to the Washington State Patrol. The UTC retains the responsibility to issue permits and verify insurance for common carriers. Common carrier permits issued under the provisions of Chapter 81.80 RCW include authority to collect nonresidential recyclable materials. The self-hauling of recyclable materials by generators to recycling centers, transfer stations or other locations is not regulated.

Because rates for nonresidential recycling are not regulated, it is also almost completely market driven. The cyclical nature of recyclable markets means that the costs of service are relatively

stable, but the value of the collected materials vary considerably from year to year. When markets are low, some businesses – particularly small businesses or businesses not in an urban core area – find it uneconomical to subscribe to recycling services. Some cities that contract for commercial garbage collection, such as Redmond, have included a "safety net" recyclable collection as an embedded fee in their contracts. Companies are free to use another recycling service if they choose. Other cities, such as Seattle, have allowed small businesses using can service to be considered as equivalent to households, and thus eligible for residential recycling programs. Although state law prohibits the UTC from setting rates for unregulated portions of a company's business, which would include commercial recycling, a company can certainly provide an unregulated service to the same business they serve under regulation. The system has to be voluntary.

Private carriers, as established in Chapter 81.80 RCW, are exempt from regulation. Private carriage involves the collection and transportation of a commodity (or commodities) by either the commodity generator or the commodity user, if the collection and transportation activity is incidental to the overall or primary business of the generator or user. For example: a large manufacturing facility that self-hauled its cardboard to a local recycler would be considered a private carrier. Recycling firms that collect their own materials for further processing and marketing are also considered private carriers.

Biomedical Waste Collection

Biomedical waste is defined by Chapter 70.95K RCW. The regulation of some biomedical waste transportation is pre-empted by 49 CFR. Jurisdictional health departments, local municipal ordinances, and the Utilities and Transportation Commission regulate the (for-hire) collection of biomedical wastes. Properly contained and packaged biomedical wastes must be collected and transported by a certificated company, following UTC regulations. The biomedical waste may be disposed of at an approved biomedical waste handling facility, although it often ends up directly in a landfill.

Biomedical regulations are not well defined in State rules and regulations. Reporting of all biomedical waste generated and disposed is not required by state law. While regulations may require all biomedical waste to be properly packaged and labeled, there is no tracking system to verify that the regulations are being followed. Companies that transport biomedical waste under UTC supervision must have emergency spill response plans, and they must train their drivers in safe handling procedures. In addition, they can only transport biomedical waste that has been properly packaged and labeled.

Sharps, or needles, present special management and packaging problems. Companies that specialize in sharps pick-up most often use the "red bag." It is a heavy-duty, lined, red vinyl bag, about 14" long by 12" high, that can be filled approximately 4" to 5" deep. It works very well, is durable and easily recognized. For businesses and residents that do not use specialized transportation, Ecology recommends that sharps be placed in a sealed PET two-liter soda bottle before disposal to prevent puncturing during handling and disposal. The American Dental Association (ADA) recommends encapsulating sharps in plaster of paris, and some haulers say that small, lined cardboard boxes are the most reliable. A clear packaging requirement needs to be developed that can be agreed upon by all parties that protects anyone that may come in contact with the waste.[vii]

Rate Structures

The UTC performs rate design for regulated areas of the state that conforms to the policy set by the Generic Garbage Case, Dockets TG-2016 et al - 1988. The Waste Not Washington Act, Chapter 431, Washington Sessions Laws, includes modifications to the statutes, directing haulers regulated by the UTC to "...use rate structures and billing systems consistent with the solid waste management priorities set under RCW 70.95.010 and the minimum levels of solid waste collection and recycling services pursuant to local comprehensive solid waste management plans" [RCW 81.77.030(6)]. RCW 70.95.010(10) states that "steps should be taken to make recycling at least as affordable and convenient to the ratepayer as mixed waste disposal." The UTC's cost-of-service model was upheld by the King County Superior Court Case 94-2-25014-1, which stated that only the UTC has the authority to design rates in the areas it regulates.

Environmental Effects of Transportation

Vehicles are the largest source of air pollution in the United States. The EPA report "Inventory of U.S. Greenhouse Gas Emissions" states that transportation sources contribute thirty-one percent of carbon dioxide emissions from fossil fuel combustion. In 1996, sixty percent of the cancer risk from air pollution in King County was attributed to mobile sources. Although they are a small percentage of the total, trucks that transport solid waste and recyclable materials are part of the problem. Because landfills also produce greenhouse gases, the impacts of additional transportation of solid waste must be balanced with the benefits of avoided disposal in the State Plan. In addition, the State Plan should evaluate alternative fuel conversions of transportation vehicles.

The relationship of transportation to Product Stewardship also raises some issues. Product Stewardship is an environmental management strategy that means whoever designs, produces, sells, or uses a product takes responsibility for minimizing the product's environmental impact throughout all stages of the product's life cycle. If products are designed to be returned to the manufacturer for recycling or for disassembly and re-use of valuable components, that will require a delicate balance between reducing transportation demand and expanding collection options. The State Plan should explore the intricacies of this relationship.

Improving Vehicle Efficiency

Garbage and recycling collection trucks would have fewer detrimental effects on the environment by using cleaner fuels and more efficient engines. Internal combustion gasoline and diesel engines are the largest source of greenhouse gas emissions. Waste Management, Inc. implemented a fuel conversion program in the San Diego area to lower the exhaust from their trucks and then traded air emissions tax credits with a power company.[viii]

The need for an efficient, non-polluting power source for vehicles has led the U.S. Department of Energy to sponsor intensive programs to develop alternative power sources.[ix] Targeting efforts on innovative fuel cells has led to the development of prototype vehicles using hydrogen as the fuel source. Hydrogen fuel can be obtained from fuels such as natural gas, methanol, or petroleum. Hydrogen combined with oxygen in a controlled environment reacts electrochemically and

produces electricity. Heat and water vapor are the only by-product from the fuel cell electrochemical reaction.

Engines are being developed that use fuel cells. The engines are being designed to meet the performance criteria of current gasoline combustion engines, including driving distance requirements. Ballard Industries has produced four generations of passenger vehicles, including a transit bus, using fuel cells.[x] The State Plan should encourage local governments to work cooperatively with haulers to examine the use of alternative fuels for collection trucks. Supporting this effort could include making state grant money available for implementing federal level research and testing on the use of alternative fuel trucks on collection routes.

Co-collection of Solid Waste

Alternative collection models are now being explored by many communities to improve operating efficiencies and reduce transportation costs. Several of these models offer opportunities to remove additional recyclable or compostable materials from the waste stream and reduce environmental impacts caused by trucks. Local governments should consider co-location of facilities as a factor in reducing collection costs and fuel usage (with or without co-collection), to help haulers operate as efficiently as possible.

As discussed above, garbage, yard waste and recyclables from households are usually picked up in separate trucks. New trucks are available that have two or more compartments so two or three different materials could be collected with one trip. Split compartment trucks are an option for commingled collection of yard and food waste for transport to processing facilities.[xi] Commingling of compostables into one collection compartment while using the second for garbage is another option. This option would require a receiving facility that could manage two different waste streams. For co-collection to be efficient, the collected materials must be transferred at the same point or very near each other, which imposes limitations. Co-collection also assumes the same collection frequency for materials, which may not be the most efficient strategy. These restrictions may make co-collection more feasible for rural collection where processing facilities could be located near each other.

Take-Back Opportunities

There is increasing interest in developing systems where everyone involved in the life cycle of a product, from the manufacturers to the users, share responsibility for the costs of handling the product at the end of its useful life. One way to encourage this practice is to provide a means for collecting products that can be reused or recycled. Some stores have started “take-back” programs, where customers can return used products to the store where they purchased them. Many automotive shops recycle and will accept used motor oil. In addition, lead acid batteries have resale value.

In assessing the total environmental costs and benefits of take-back options, it is important to consider the related transportation and other infrastructure costs. While there are benefits to be achieved from reduced extraction and transport of virgin materials, there are also additional costs, including fuel usage and air pollution emissions that can result from a less efficient collection system. Take-back systems need to be designed to maximize back-haul activities and minimize the distance to processing facilities.

Summary of Recommendations for Inclusion in the State Plan

- Develop clear packaging requirements for sharps that will protect anyone coming into contact with them, and can be agreed to by all parties.
- Develop clear and consistent regulations to adequately deal with biomedical wastes, including wastes from veterinary offices.
- Provide public education on proper methods of handling and disposing of biomedical wastes.
- The plan should explore the intricacies involved in the assumption that we can have both increased take-back programs and also reduced transportation simultaneously.
- Examine use of alternative fuels on collection trucks: Encourage local govts to work cooperatively with haulers on this.
- Examine collection issues associated with MRW, especially mercury-bearing wastes and used electronics.
- Develop mgmt strategies to properly recycle or dispose of them.
- Reduce demand for self-haul services over time to help reduce capital and operating costs for transfer facilities.
- Provide other options for self-hauling residents and businesses.
- Develop efficient and affordable services to pick up and dispose of bulky wastes.
- Counties and cities should work with collection companies.
- Cities, counties and the UTC should employ rates that encourage recycling and other aspects of long-term sustainability.

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[i] "Solid Waste In Washington State: Ninth Annual Status Report", Washington State Department of Ecology-Solid Waste & Financial Assistance Program, Publication #00-07-037, December 2000.
[ii] "1999 Waste Stream Analysis", Clark County Department of Public Works, prepared by Green Solutions, June 2000.
[iii] Jefferson County Comprehensive Solid Waste Management Plan , Jefferson County Department of Public Works, prepared by Green Solutions, October 2000.
[iv] "Draft 2000 Comprehensive solid Waste Management Plan", King County Department of Natural Resources-Solid Waste Division, April 2000.
[v] "Kitsap County Comprehensive Solid Waste Management Plan", Kitsap County Department of Public Works-Solid Waste Division, December 1999.
[vi] "It's Not the Seattle Stomp anymore! (parts One and Two), The Monthly UnEconomist, Sound Resource Management, Vol. 1, Nos. 3-4, Sept. – Oct. 1999 (available in .pdf format at no charge at www.zerowaste.com)
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[viii] McMullen, Cheryl. "Web site fosters emissions trading." Waste News, November 6, 2000.
[ix] "Fuel Cells and Alternative Fuels", Los Alamos National Laboratory Transportation Website, January 2001.
[x] "Ballard Products-Transportation Applications", Ballard Power Systems, Inc. Website, January 2001
[xi] "Seattle's Solid Waste Plan: On the Path to Sustainability", City of Seattle-Seattle Public Utilities, August 1998.

Draft
Issue Paper 5
Waste Disposal Reduction and Avoidance

Introduction and Purpose:

For the first time in human history, we are extracting material from the planet at a rate it is not capable of replacing with natural processes. We are beginning to run an environmental deficit. And the source of that deficit is the historical collection of the choices we have made throughout our history. These choices have been biased toward the extraction and use of virgin materials and the subsequent disposal of unusable, sometimes toxic products manufactured from these extracted resources.

As more and more people come to recognize that this dynamic is not sustainable into the future, we have been developing a new, more nature-friendly industrial ethic. *Industrial ecology, natural systems thinking*, and *sustainability* are some of the more popular terms that attempt to describe this new ethic.

What they all have in common is a recognition that we can't continue to meet our basic physical and more complicated psychological needs within the standard industrial model that characterized our last millennium on the planet. We possess the technology to destroy our species and the environment that sustains it. We also possess the intellect and are developing the technology to save it. And that's what the new industrial ethic is all about, focussing on our power to save the complex ecosystem that makes our existence possible.

This chapter is one small piece of an effort in Washington to recognize that dependence of our industrial system on the underlying natural system. It deals with the disposal end of this unsustainable model. We are coming to a realization that disposal is one of the clearest signs of the danger inherent in straying too far from more our own natural organic model for resource use and reuse.

That's why the new concept, *zero waste*, is being offered as a model for us to begin guiding our industrial ecology back toward a more natural cycle. The pantry is running low while more and more unexpected company shows up every day, and there is no grocery store to call upon. We must grow our own survival in the garden where we live.

With that reality in mind, Washington has embarked on this ambitious effort to redirect our industrial mindset to a more sustainable, more natural system. In this document, we examine that critical divergence from nature's way, the production of unusable, often toxic waste.

The authors of this issue paper are under no delusions. We can expect to be responsible for the managing the waste from our linear production systems for generations to come. The solid waste planning process of which this issue paper is part does not expect to eliminate solid waste in the near future.

Still the authors believe we must begin today to define a new way of doing business with each other. We must find new ways of meeting our physical, emotional, psychological, and spiritual needs without jeopardizing the ability of future generations to meet their needs and to do so with the natural resources on hand. This general description of a new industrial ecology, which most of us call "sustainability," is what drives this latest solid waste planning process. It provides the framework for analyzing waste disposal and other aspects of our waste-generating industrial system.

The authors believe that the current system for managing solid waste is not environmentally, economically, or politically sustainable long-term. The authors also agree that the best chance to craft a more sustainable system is to engage a broad spectrum of industry stakeholders, government regulators, solid waste managers, waste service consumers, and taxpayers in an open discussion of alternatives.

It is not the purpose of this paper to develop or catalog research to support or discourage any particular technology, strategy, policy, or procedure for managing solid waste now or in the future. The purpose instead is to provide a context for the larger public discussion to follow in the state planning process. This and the other issue papers will help to ensure that the planning process results in a truly innovative road map that leads to an entirely new approach to waste, one that leads to a sustainable future.

Status: Problems, Barriers, and Opportunities

Problems

The solid waste management system in Washington today is like systems all over the globe, a linear one. We extract materials from the earth's crust, mix in energy we also extract from the earth, and produce goods and services that can not be returned to the earth without using even more materials and energy. This linear process was highly successful in raising us above subsistence to what most in the world would consider an incredible luxury. But it does so at an ever-escalating cost, one that neither nature nor we can continue to bear.

Linear thinking has limited our capacity to deal with waste. To address the problems we created with our linear industrial model, we developed yet another linear industry, waste management, and attached it to the end of our amazing industrial machine. For a relatively short while it appeared to improve our situation. New waste management technologies were able to mask the effects of our industrial values on the natural system. Some prophylactic technologies were able shield us from any direct consequences of the growth of useless, and sometimes toxic, biomass that we call waste. But now we are reaching the technical limits of this adaptation. We are proving the truth of the axiom: "If you do what you always did, you'll get what you always got."

The focus has been on separating us from our waste. We have tried to focus on reducing environmental and health risks through technological advances in disposal facility designs, segregation and separate handling of various components of the waste stream, and the seeking out and development of opportunities for reduction in the volume and toxicity of the waste stream. However, even our best containment technologies have limits. For instance, current landfill standards are designed to contain leachate and manage landfill gasses for 20 years, but just 20 years. Experts concede that within that time horizon some landfill liner systems will inevitably fail. In the long run, we can neither run nor hide from the consequences of our choices.

We are running low on linear options. Our determination to separate us from our waste has limited our options for dealing with waste. The planet is getting crowded. We are running out of suitable places to put waste or safe technologies to process it. It's becoming increasing difficult, therefore, to place it "out-of-mind." Landfills that meet technical requirements in Washington and elsewhere are becoming fewer and more difficult, time-consuming, and expensive to create and put at the end of our production paper. Incineration is becoming problematic. Due to health and environmental concerns, citizens are resisting the siting and construction of more such facilities.

Segregation and recycling have often become sequestration, storage, and/or downcycling. As a state, Washington has spent tremendous amounts of time and money trying to promote separation of recyclable or otherwise useful materials from the solid waste stream prior, sometimes even after, disposal. But success of these programs rests on factors outside the control of the waste management systems. The

availability and desirability of these materials rises and falls with supply, usually tied to production, successful marketing and consumption of products, and completely out of the purview of solid waste management systems.

It remains for us as citizens to set public policies, define workable strategies and employ appropriate technologies to move away from a system that generates, then treats or disposes of, wastes. We won't get there by focussing on disposal. But we also can't get there without addressing some of the immediate concerns surrounding waste disposal.

Barriers:
There are several key barriers to reducing or avoiding waste disposal.

There's money in trash. Waste disposal is a very large and, in some cases, lucrative industry. This doesn't create much incentive for those who thrive in the business of managing our trash to participate in its reduction or elimination.

Most things are made to become trash. The vast majority of products, especially consumer items, are not designed to be recycled or reused. Very often, the safest and most cost-effective option for handling these materials is disposal.

Trash isn't seen as a real problem. For many members of the public, the problems inherent in current waste disposal practices are mostly invisible. It becomes an out-of-sight, out-of-mind situation. What most Washington citizens know about disposal is that they leave their trash at the curb each week and somebody they pay comes to take it away: end of problem.

Opportunities:

There are several opportunities presented to us to address these barriers to change. Some are technological, some are regulatory, and many are economic. In addition, the growing body of data about the dangers of unimpeded waste disposal and the transformation of this data into useful information is beginning to raise public awareness.

Consumer awareness is rising. More and more citizens at younger and younger ages are beginning to see the impact of wasteful practices on our shared environment and on poor or minority populations who lack the financial resources or political clout to keep our trash out of their back yards.

The science of disposal has for 100 years been focused on moving, packing away in landfills, or burning our waste more efficiently. The general idea is to lock it away or transform it into a different problem, a smaller problem, or somebody else's problem.

Landfills can become waste treatment, energy recovery, temporary storage, and organic and inorganic recycling facilities. Recent research is showing that landfills don't necessarily have to be permanent, single-use repositories of solid waste. The Environmental Protection Agency (EPA) is funding research into alternatives such as bioreactors that seek to turn landfill waste into beneficial compost with residual materials accessible for mining and reuse. These bioreactors would become, in effect, waste processors, turning most of it back into a useful organic product and reducing the rest to a much smaller mass, extending the life of the landfill. Landfills would be able to use the same space repeatedly. And in many cases, materials stored in landfills due to lack of markets could be reclaimed and sold as markets developed, a concept known as "landfill mining."

Significant portions of the consuming public and the producing industrial sector are coming together to accept that waste is an avoidable failure of our industrial system. More than ever the public seems prepared to accept the notion that we can't continue to simply throw things away, that the environment is degraded to their own detriment by this disposable society ethic.

This growth in public awareness has led to public acceptance of, and often demand for, environmental regulation. This offers us a unique opportunity to combine science-based analysis with technology and public policy to effectively move us in an entirely new direction when it comes to waste disposal. This public willingness to begin accepting responsibility for problems wrought of our waste generating systems should be exploited to gain a foothold on the waste disposal problems while we can.

Vision for the Future

We must begin to build a better future now. The notion of an "industrial ecology," where natural processes can serve as models for industrial/commercial processes is rapidly gaining acceptance within industry as well as the general public. This development is driven largely by consumer expectations created through years of public education and intensive efforts to reduce the impacts of waste generation and disposal through public action and the application of technology. We must not squander this opportunity to leverage public willingness to "own the problem."

It starts with the planning process. To capitalize on the public's willingness to begin dealing with Washington waste disposal problems, we can look to the state's planning process, of which this paper is one small part. The planning horizon for Phase I of this effort is the next 20 years. It is clear to the authors that we will continue to need to dispose of our waste through some sort of organized system during this time. We are keenly aware that the plan for the next 20 years must work with the current practices to ensure an approach to our waste management that is sustainable environmentally and economically. It's important in Phase I that we focus on practical alternatives to our current system that can help us to prepare for development of the still larger vision for 2020 and beyond.

To create effective changes, much work will have to be done far upstream of disposal in areas of product design and packaging, producer responsibility and consumer choices and behaviors. As part of the larger process, other participants in the early stages of the planning process have developed other issue papers looking at these other key elements to a long-term solution.

This issue paper is focussed more narrowly on assessing issues around what is commonly thought of as the "end of the pipe" in the waste stream--disposal. This may not seem as intriguing as struggling with the more global "head of the pipe" issues, such as product design and producer responsibility, but it's every bit as important to address and offers opportunities for quick results with minimal changes in industry and public behavior. This paper also emphasizes some of the larger volume and more problematic disposal options, particularly land application (often a part of beneficial reuse) and incineration (a method of volume and, sometimes, toxicity reduction).

POTENTIAL STRATEGIES FOR PROGRESS

In exploring the system as it exists and options for the future, the authors of this paper feel it is best to zero in on key strategies and techniques. The team suggests looking at these alternatives first:

1. **BENEFICIAL USES for specific waste streams as alternatives to disposal.**
2. **BANS on landfilling or incineration of specific materials.**
3. **WASTE SEGREGATION for diversion into recycling or reuse systems.**
4. **ADDITIONAL PROCESSING of wastes prior to disposal.**

AREAS TO ASSESS FOR EACH STRATEGY:

For each strategic category, it's important to address some or all of the following issues, as they are appropriate:

- **Technical feasibility:** Can or does the technology exist and does it present any technical challenges?
- **Economic impact:** What does this strategy cost or what economic impacts can we anticipate, and how should we assess these?
- **Environmental restoration, preservation, and protection:** What is the impact of the existing or proposed strategy on efforts to restore, preserve, or protect environmental quality of the state, earth, air, and water?
- **Public Acceptance:** Will the public accept a strategy that may work but may also have a negative public image due to its basic technology or potential for negative results?
- **Social/Environmental Justice:** Who bears any environmental, health, or economic risks from the externalized, often unacknowledged costs of waste disposal on neighboring communities?
- **Regulatory fairness and consistency:** Does the strategy involve regulation that is applied fairly to all parties involved in that strategy, or does it create unfair advantage for some over others?

This issue paper will not select any specific strategies or try to suggest that this list of strategies is all-inclusive. It is not an exhaustive analysis of any of these strategies or the issues that may surround them.

Instead the authors suggest we can still think of the future of waste disposal in terms of these strategies and their associated issues as a good start to a better understanding of how we got to where we are and how we might take a new direction from here.

The remainder of this issue paper will describe the four strategies at the top of this section in the context of technical feasibility, economic impact, environmental restoration and protection, public acceptance, social and environmental justice, and regulatory fairness and consistency.[1]

1. Beneficial Use as a Strategy:

Beneficial use in Washington State goes beyond the narrow regulatory definition in state law that describes an exemption from regulations that would otherwise ban the application of a particular set of wastes to farm or forest land. While this exemption process is certainly an option for avoiding outright disposal, it doesn't begin to encompass all the beneficial uses to which waste products can be put.

Land disposal and incineration for energy recovery get extensive coverage in this discussion because they are used extensively in Washington and handle a significant share of the waste generated in Washington. [2] As such, these approaches to waste disposal also draw considerable attention from waste management professionals, regulators, and concerned citizens, which is another good reason to focus on them initially.

- **Technical Feasibility of Beneficial Use:**

Land application is only one type of beneficial use. It is the practice of adding the by-products of agricultural, industrial, or municipal activities to the soil of forestlands, agricultural fields, or other lands at prescribed agronomic rates. The distinction from disposal here is that a waste from one process is used directly to accomplish some beneficial result for the soil. Since land application limits the amount of mechanical processing that needs to be done to a waste and mostly involves transporting the waste to a destination other than a landfill and only some additional care in application, it is seen as a relatively easy and attractive alternative to landfilling.

Applying waste materials to agricultural land simply to avoid a higher cost for landfilling or incineration, however, doesn't reduce disposal; it merely relocates it . . . to an uncontrolled environment. And if it's not done at agronomic rates with materials compatible with the soil's organic mix, it may actually render arable agricultural or forestland useless for growing food or trees in the future. So care needs to be taken in judging when it is and isn't feasible to use land application as an alternative to disposal.

If properly selected and applied, waste materials from another process can become part of the site and these wastes can become part of the physical/chemical/biological character of the site without harming the environment or polluting the land. Applied waste that fits the legally allowed definition also can serve as a fertilizer (if it's certified by Department of Agriculture as such), as a liming agent, or soil amendment. If it gains status as a registered fertilizer, the waste is no longer considered a waste. It is a fertilizer or soil amendment.

These materials may also stimulate microbial activity, enrich the soil with plant nutrients (nitrogen, phosphorus, potassium), adjust pH to a beneficial range, enhance soil water storage capacity, prevent surface erosion when used as a mulch, etc. This beneficial reuse of by-products is generally done on sites that have a moderate to high level of management. The sites or by-products are often regulated.

Contamination with toxic materials or environmentally damaging materials is a technical concern as well. In some cases, yard waste has been treated with pesticides and the residue levels are extremely high.

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[1] Some strategies may not be affected by each of the particular issues listed in this document at all or to the same extent as others. In those cases, discussion of a particular issue may be only lightly touched upon in the text.
[2] *Washington State statistics on volumes landfilled and incinerated to be added here.*

Construction/demolition material may contain lead paint or creosol residues. As long as the source material is not contaminated and does not contain pesticide residue the need for regulation is negligible. And the return of these organic materials to the environment is still seen as a positive move away from linear thinking about waste.

Organic materials originating from urban areas, for instance, can return to urban areas for land application in parks, public building landscapes, and street landscapes. The organic material can also go to single/multiple family dwellings when the final product is packaged for sale. The remainder of the organic materials from urban areas can be shipped to rural areas for land applications.

Some waste also can serve to improve the mechanical and hydraulic character of the soil where it is used (for instance, waste tires used to stabilize steep banks).

Energy recovery is another type of beneficial use for waste. Combusting solid waste in waste-to-energy facilities as a fuel with minimal processing, known as mass burn, or processing it before being directly combusted as refuse-derived fuel are also beneficial uses. Each of these technologies presents the opportunity for both electricity production as well as an alternative to landfilling.

Major technical issues for waste-to-energy include meeting air quality requirements, safe disposal or reuse of ash and other by-products, and *(if wet cooling towers are used)* the consumption of large amounts of water for cooling purposes. Regulations require that waste-to-energy plants use advanced emissions control and monitoring technology, and continually update to new technology. A major concern is avoiding a mere transfer of risk and associated risks from one media, solid waste, to another, air pollution.

Recent technological advances include specialized systems for removing mercury, particulate, and acid gases and combustion improvements, which help to mitigate dioxin formation. These requirements to implement environmentally beneficial technology are expected to continue long into the future and need to be taken into account.

Some problematic wastes become less so when removed from the disposal chain. Used tires are an excellent example of a waste type that is considered a nuisance in landfills and can be expensive to incinerate, where air regulations even allow that to happen. If segregated and diverted ahead of disposal, waste tires can find their way into an increasing number of recycling or refuse-derived fuel applications (again, where air and solid waste permitting allows).

When not diverted they present unique challenges to landfill and incinerator operators. In landfills, they can tend to "float," working their way up and through daily cover. Biodegradation of tires can be slow and under the right conditions can generate abnormal levels of heat and even spontaneous combustion in landfills.

Beneficial use through land application, waste-to-energy processes, or diversion into other direct applications are not only feasible but practiced every day throughout the United States and within Washington State.

The technological challenge is in maximizing the opportunities for beneficial uses by ensuring that such uses truly are beneficial. From that point, the problems with beneficial use today are the same ones that will follow it into the future--public acceptance and regulatory support.

- **Economic Impact of Beneficial Use:**

In order for beneficial use to contribute to a more sustainable and less linear system of waste disposal reduction and avoidance, it must be capable of economically supporting itself or bear sufficient public perception of benefit to earn public financial support.

To the extent that truly beneficial uses can be identified for large-volume by-products that would otherwise be filling our landfills, the potential economic impact on the producers and consumers of those by-products could be very significant.

Land application, waste diversion into fuels, and reuse of demolition materials on site each has potential environmental benefits and risks. Inappropriate land application may render soils unsuitable for agriculture or silvaculture or even cause environmental pollution capable of migrating off the land application site.

The economic impact on the surface when looking at removing organic material from the waste stream and diverting it into land application looks positive. But there are some setbacks.

In most cases, additional containers are needed to segregate the organic materials. Equipment is needed to chip/mulch the material. Facilities are needed to compost the material and prepare it for land application. Packaging and packaging equipment may be necessary if the final product is sold or given away to the public. Lastly, the final product must transported to the land application site.

How will all this be paid for? Can the final product be sold? Is the final product cost effective when compared to commercial fertilizers?

Designing, permitting, building, and maintaining waste-to-energy facilities can significantly impact a community's economics. Arduous financial planning must be done to successfully implement this type of solid waste system. Once implemented, waste-to-energy facilities can realize the sale of recyclable materials, steam, and electric power as sources of municipal revenue, thus mitigating at least some of their cost of operation and maintenance.

- **Environmental Restoration, Preservation, and Protection and Beneficial Use**

Almost by definition, we can assume that a beneficial use contributes to environmental protection by keeping waste out of the soil except where it can actually improve it. And if waste can be used to replace fossil fuels yet to be extracted from the earth's crust without endangering air or water quality, so much the better.

The land appliers' argument for beneficial use through land application is that a mainly organic waste stream is a good choice for land application because it will either add nutrients to the soil or humus. The addition of organic materials to the soil will reduce the need for commercial fertilizers and lower water usage. Plant growth in these areas should be more vigorous and less susceptible to insect damage and disease.

Beneficial use as a tool to promote sustainability needs to demonstrate its benefits more clearly over time. Arguments in favor of land application and incineration need to move beyond the economic benefits to the waste producer to show the environmental benefit to the land where waste is applied. This may only be accomplished by monitoring soil conditions over extended periods.

Energy generation from waste needs to be closely monitored to ensure that it's not simply transferring a waste from one form (solid waste) of potential pollution to another (air pollution), if it is to make significant contributions to reducing or avoiding waste disposal.

Special care needs to be taken to ensure that proposed applications truly are beneficial and are not used to disguise low-cost land disposal.

- **Public Acceptance of Beneficial Use**

The public generally accepts the concept of beneficial use. It's in the application that advocates of the concept encounter problems. A claimed beneficial use may be viewed by neighboring property owners as anything but beneficial to their own property by way of feared losses in property value from public perceptions of environmental degradation that might result from inappropriate land application.

This is especially true where the waste stream in question might previously have been managed as hazardous. The public's conception of bioreaction as an acceptable treatment technology often is not as well developed as their knowledge of the history of environmental contamination. Consequently, the public often reacts to a perception of threat to drinking water or air quality regardless of the actual level of threat.

The public acceptance of beneficial use may be as much or more of a challenge in the future than demonstrating the long-term benefit. Public education, frequent reporting of results, and demonstrations of benefits to consumers will all need attention to ensure that beneficial use becomes a generally accepted, even routine strategy for reducing or avoiding waste disposal.

- **Social/Environmental Justice and Beneficial Use:**

The fear of detrimental health effects from the land disposal or incineration of by-products of industrial processes can go well beyond an individual neighbor's concern and become a social justice issue. We've seen this in cases where residents of neighborhoods adjacent to incinerators have organized to oppose them based on the claim that their neighborhood was targeted as a location because of perceptions of economic/social powerlessness.

It may also be a concern where the alternate use is perceived by neighbors or workers as a threat to drinking water. There's also the potential for nuisance odors from some technologies.

Due to urban sprawl throughout the Northwest, the land available for beneficial land applications will be mostly in rural areas as well as state and federally owned land. How can anyone justify a policy of beneficial land application of urban generated waste on rural or state/federal lands? Should policy dictate that urban communities set aside land to be used for beneficial land applications?

In the end, it may be that the regulatory process and the planning process for these facilities need to explicitly commit to addressing these concerns at the beginning of the decision-making process, rather than after the fact. Social and environmental justice concerns need to be at the forefront of any decision-making about the application of beneficial use technologies in any given environment.

- **Regulatory Fairness and Consistency in Beneficial Use:**

It's important that any beneficial use be accessible to all producers of a waste by-product and all potential recipients of the by-product who meet the technical and regulatory requirements for reuse of the by-product. This is known as the level-playing-field argument in regulatory circles. No producers or users

of by-products ought to be awarded unfair advantage over competitors by virtue of willful noncompliance with regulations or unfair/biased application of a rule by the regulating agency.

The U.S. Department of Energy has labeled waste-to-energy technology as a major part of a plan to reduce greenhouse gases in the U.S. Repeated testing of waste-to-energy emissions by federal, state, and local governments has shown that waste-to-energy plants generate power cleaner than those fueled by oil and coal. In addition waste-to-energy's dramatic volume reduction means that combustion ash requires about 10 percent of the landfill space needed for raw garbage.

Waste-to-energy facilities are required to install pollution controls, as well as monitoring equipment. They are also required to analyze both emissions and ash samples regularly and to report results of continuous emissions monitoring to environmental regulatory authorities. Consequently, more scientific research data, including environmental and health impact studies, exist for waste-to-energy facilities than for any other disposal method.

In summary, beneficial uses for our wastes are out there and identified, often in response to problems with standard disposal, often for economic reasons. The opportunities for beneficial use to substantially shrink the size of our waste disposal challenge are certainly here in front of us. Exploiting those opportunities may reduce or avoid waste disposal will require thorough and consistent demonstration of true environmental (not just economic) benefit. The environmental benefits will gain the public's acceptance of any beneficial uses and allow expansion of the concept to more elements of the municipal waste stream in more locations throughout the state.

2. Bans on Landfilling and Incineration as a Strategy:

Before we propose bans, we have a responsibility to identify at least some feasible alternative methods to dispose of selected waste streams. This will allow the economic and logistical issues to be addressed and decided upon before a ban goes into effect. The reason is that bans must reach well beyond the waste management system, stepping upstream, sometimes to product design and manufacture. While this may be the ultimate answer to a waste problem presented by a product, pursuing this resolution may be beyond the resources of any one or group of participants in the solid waste system. In terms of disposal, bans can be difficult to enforce and may not be the least-cost route to the desirable end.

- **Technical Feasibility of Bans:**

The technological hurdles can be overcome prior to the issuance of a ban. And a ban might have to go hand-in-hand with regulation regarding the alternate handling, processing, and land application of a waste stream. Bans should be the last action taken on waste stream not the first. The feasibility of any ban, of course, continues to be the availability of other options for dealing with the banned waste. So the real question with bans becomes the technical feasibility of alternatives to disposal for wastes targeted for banning from landfilling or incineration. This can be highly problematic for some types of hazardous waste for which the only known effective, high volume handling is incineration.

Disposal bans prohibit specific materials or categories of materials from being disposed of by landfilling, incineration, or other waste disposal methods. Bans can take the form of excluding materials from collection (not allowed in a garbage can at a home or business) or banning them from a transfer station or landfills. There are examples of bans from around the country and internationally as well. One nearly universal ban for instance is the banning of liquid waste from municipal solid waste landfills.

Disposal bans are common for items with hazardous components such as batteries. They are also frequently used in the United States to exclude yard waste. Disposal bans in other countries also frequently include common recyclable material such as paper and metal. Bans on materials such as paper are not as common in the United States, though they do exist. Many states have, or are considering, implementation of disposal bans, including Wisconsin and North Carolina.[3]

For other examples of where disposal bans are being used, it would be useful to look at their efficacy in the Capital Regional District in Victoria, British Columbia, which currently bans newspaper, mixed waste paper, and cardboard. They are considering expanding the ban to additional materials. There is also a disposal ban in place for the Greater Vancouver District in British Columbia.

Finally, the entire province of Nova Scotia bans most commonly recyclable materials such as paper, glass, and metal as well as organic material such as yard and food waste.

Research on bans needs to include the potential for, and challenges to, increasing the processing capabilities in the local area for the increased amounts of material diverted due to bans. For materials such as fluorescent lighting tubes, which have recently been "banned" from disposal, we need data to show what the experience has been as far as options for businesses to dispose of them properly.

- **Economic Impact of Bans:**

In a large urban area where the benefits of recycling outweigh the associated cost of recycling, a ban could be imposed to increase the flow of the targeted materials into the recycling loop. In a rural area, where the economics may swing the other way there could be exemptions.

Disposal bans have economic impacts that reach well beyond the collection and disposal infrastructure. For bans to succeed, it's important to measure the subsequent or projected entrepreneurial activity surrounding the collection and alternative processing of banned materials.

This approach already has measurable economic costs as generators pay ever-increasing fees for alternative disposal of banned waste.

Recycling is one area that may be affected by disposal bans. The economic impact of disposal bans will extend to the costs of disposal and recycling for both consumers and businesses as well as local governments charged with the responsibility for handling solid waste. Consumers not already recycling may face increased personal costs in terms of the time and effort to separate waste at the source for redirection into recycling. Transporting recyclables to a drop-off center if a convenient curbside program is not available are another cost to consumers of municipal waste services. And even where a curbside program is available, a consumer will have to pay an additional charge. The consumer may or may not see a decrease in their garbage bill because of ban-driven recycling, depending on how their rates are structured and how much waste they currently produce.

Businesses may see an increase in internal labor costs if additional janitorial work is involved in collecting recyclables. Business will also have to educate their workforces and possibly invest in additional recycling collection containers. Just as in the case of consumers, business may or may not see a corresponding decrease in their garbage collection charges.

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[3] *Research on the technical feasibility of disposal bans should include the following: "Statewide Material Disposal Bans and Recycling Requirements in the Northeast Recycling Council States," March 22, 2000. New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island and Vermont.*

The benefits and costs to local governments who bear the costs and the responsibility for handling municipal solid waste should also be explored. Costs for recycling may fall due to economies of scale as larger amounts of material are diverted for collection, but there may be additional costs in the form of enforcement.

Bans may dramatically reduce the amount of waste going to a landfill which will make it more difficult to get the revenue necessary to operate the landfill for the material still needing disposal. Research should also be undertaken to determine whether bans increase or decrease the quality of material collected in recycling programs, thus affecting their costs.

Future research should also include looking at the savings on landfill disposal space due to the bans. What landfill operators refer to as "airspace," the total cubic yard capacity of a permitted cell or landfill, has skyrocketed in the last decade. This cost has escalated as a result of federal regulations, banning some materials and, more important, requiring liners, leachate collection, gas collection and monitoring systems, and detailed closure plans that include long-term well-monitoring agreements.

Disposal bans can extend the useful life of landfills by reducing the rate at which this ever more costly airspace is consumed. It also helps by reducing the exposure to potential clean-up costs when the bans divert wastes that can become toxic cleanup targets (the original rationale behind landfill bans).

The original intent of landfill bans had little to do with steering the economics of disposal. They were conceived as a broad stroke attempt to prevent pollution of landfills and the development of toxic cleanup sites from municipal solid waste landfills.

The unintended indirect effect of encouraging economically efficient use of airspace is one reason that bans can be effective in reducing waste disposal. While they reduce volumes going to landfills, the saving of airspace also reduces cost and allows the extension of operable life that makes bond funding of construction and closure more feasible.

In other words, landfill bans can serve the purposes of those most invested in perpetuating the current waste management system while at the same time encouraging reduced waste disposal. This can only help us along the way in reaching for a zero-waste future.

- **Environmental Preservation/Protection and Disposal/Incineration Bans.**

There are likely to be large environmental benefits to banning increased amounts of material from landfills and (as warranted by evidence) incinerators. Increased recycling is one likely fallout from increasing landfill bans. Current research and modeling from the U.S. Environmental Protection Agency (EPA) suggest that recycling results in large decreases in greenhouse gases and other forms of pollutants. The benefits come from the lower fossil fuel requirements for making goods from recycled items than from virgin material.

Future research should include whether there are similar large benefits from diversion of organic material from landfilling and incineration *(e.g. diversion of yard waste into composting systems)*. The benefits could include reduced water and fertilizer requirements for crops and lawns when compost made from diverted organic material is applied. Corresponding and offsetting environmental costs should also be explored such as the effect of pesticide and herbicide residue in the compost used to grow crops.

- **Social/Environment Justice and Disposal Bans:**

Before we enact bans, we need to consider the social and environmental justice impacts of them. Do bans unfairly impact one community over another? Where alternative disposal methods for a particular targeted waste are not currently available, bans may simply relocate the disposal and associated risks from one host community to another. Disposal may be done illegally or its permitted location moved from a more prosperous and politically active community to a more disadvantaged and politically powerless community or to a less densely populated but nonetheless vulnerable community.

In banning materials from landfilling, it's important to understand what will become of the banned materials in lieu of landfilling and to be sure the alternative is not worse than landfilling, especially as it may impact surrounding communities.

- **Regulatory Fairness and Consistency of Bans:**

Convincing arguments have been made that the environmental benefits of landfill bans far outweigh the costs. Others argue that landfill bans have spurred technical innovations as part of the search by generators for legal and environmentally safe alternatives. Equity, however, requires that bans are carefully planned and fully explored and alternatives developed prior to implementation.

Regulatory fairness and consistency is likely to be related to how the bans are structured and enforced. Research into these issues should include discussions with both local governments and businesses in communities who have bans to see what the fairness and consistency issues are.

This strategy is a key element of federal regulation today designed to eliminate the potential, already realized in so many locations throughout the U.S., of landfills to become toxic cleanup sites. We should not lose sight of the fact that this environmental objective is being achieved through regulation more than market forces. This places an added burden on regulators to see that the environmental and economic costs of achieving this environmental security is shared fairly amongst all the parties involved.

3. Waste Segregation:

Segregation is an important step in reducing or avoiding waste disposal. An entire waste industry segment has developed to address some of the challenges inherent in achieving efficient and effective waste separation. What makes or breaks segregation as part of waste disposal reduction is the ultimate reusability of the segregated/diverted material. This issue is only touched upon in this section, as we expect it will be explored thoroughly in other portions of this report.

- **Technical Feasibility of Segregation**

Often, one manufacturer's waste is another manufacturer's valuable component. This is an arena with significant potential for reducing the need to dispose of some wastes. In this case, some materials may not really become wastes in the conventional sense.

Today, there are formal and informal exchanges of waste materials that avoid waste disposal altogether. Most of this exchange is occurring at the larger industry level, especially with industries that require large inputs of chemicals or process additives that may be by-products of another manufacturing process.

Segregation of these materials early in the disposal process and efficient location and movement to alternative uses is they key to making segregation a tool for tremendous potential reductions in waste disposal.

We know that segregation at the source of waste generation can be made to work in the case of residential recycling systems. And we've seen it work in industry, especially where this source segregation results in waste disposal cost savings.

For construction waste, it becomes a matter of segregation with some additional processing to remove inorganic material. For demolition waste, more processing is required to segregate the organic materials. Each of the above examples will require additional processing such as chipping/mulching and composting prior to land application. In any case, the technology exists today to remove these materials from the waste stream and into a land application program.

Much more needs to be done in the future to encourage mindsets, especially in the small business sector, that will recognize, and see as significant to them, ways to separate and divert parts of their waste streams for disposal. This may mean concerted industry-specific campaigns, market development for uses of segregated waste products, and development of new processing infrastructure.

- **Economic Impact of Segregation**

Segregation, especially for high-volume wastes is a strategy that bears a lot of promise. For food and other organic wastes, there are multiple opportunities and methods that can be promoted in the entire chain of waste generation to avoid disposal.

Supply and demand issues (what to do with a by-product supplies when demand at the other end of the exchange narrows?) are the difficult ones that need to be addressed head on if increased segregation is to be one method of achieving reduced waste disposal. The challenge can be deciding how to create a dynamic and truly effective exchange with large and adaptable markets of sellers and buyers.

Does the waste targeted for separation and diversion pose an environmental threat in its current condition? If not, is segregation and diversion a policy to minimize the volume of waste going to landfills/incinerators? If this waste is hazardous how must it be treated prior to beneficial land application?

- **Environmental Preservation/Protection and Segregation**

To the extent that segregation is directed at moving materials from disposal into recycling, reuse, or energy recovery, it can make a significant contribution to protecting and preserving our environment. Segregating toxic and carcinogenic materials from disposal chains into production feedstock turns waste into product and gets away from the linear model of accumulating wastes in ever scarcer repositories. In this respect, segregation is a key player in the effort to move to a zero-waste future.

- **Public Acceptance of Segregation**

The public already has demonstrated its acceptance of segregation at the more intimate personal level. Every time a bottle, can, or newspaper finds its way to the recycle bin instead of the trashcans in our homes, we are voting to segregate our waste.

This sentiment may be harder to visualize as we start to move into the arena of large waste producers with significant volumes to segregate at significant cost to the waste generator. In most cases, this won't be a

clearly evident public cost, as most such producers will reside in the private industry sector. Nonetheless, to the extent that any additional financial burden of segregation is passed on to ultimate consumers, it's necessary to ensure that those added costs can be justified by environmental results.

As long as segregation can be shown clearly to benefit the environment, to preserve and protect it at a reasonable cost to the end consumers or goods and services, public acceptance will continue to be there for it.

- **Social/Environmental Justice Aspects of Segregation**

Where segregation occurs and how and where further processing of segregated materials occurs may have social/environmental justice aspects. Segregation has the potential to stimulate new industry where additional processing is needed. Here we may want to look at opportunities to stimulate the economies of economically depressed areas by directing that additional processing or even the original segregation into these depressed areas.

On the other hand, it's important that toxic and otherwise hazardous wastes that are segregated from a larger waste stream not be dumped or otherwise directed into communities less capable than others of defending themselves from such an environmental assault.

- **Regulatory Fairness and Consistency and Segregation**

Regulation that addresses segregation usually does so in the context of defining it as recycling, sham recycling, a step in treatment, processing, or disposal that is occurring outside the established solid waste utility system.

Thinking of segregation as a necessary step to reducing waste disposal and a process distinct from disposal or recycling and deserving of separate analysis will be a significant regulatory challenge. Descriptions of legally allowed segregation are integrated into numerous regulations dealing not just with solid waste, but also with hazardous waste, air quality, and water quality.

It will require a significant shift in the regulators' perspectives to see segregation as a legitimate, significant, and independent strategy for reducing waste disposal. Future research needs to examine whether or not, in fact, it makes sense to deal with segregation separately from recycling or disposal regulations. And if it does make sense, how can we use regulation to create enthusiasm for increasing segregation where it is most effective--at its source.

4. Additional Processing:

- **Technical Feasibility of Additional Processing**

Once a waste stream has been reduced by segregation, it should have a final disposal destination. For the waste stream chosen to go to landfills, the material should be reduced to the smallest volume possible. In many cases, incineration is the best method to accomplish this. In other instances, shredding, compacting, or a combination of both is the best option.

- **Economic Costs of Additional Processing**

Although the equipment to accomplish reduction of the waste stream through additional processing often is expensive and its maintenance costs may be high, the result is the most efficient use of landfill space.

This benefits the environment by using less airspace and it avoids costs by extending the life of existing landfill cells, deferring the need to add more increasingly expensive airspace.

Unless this additional processing results in a by-product with a significant value for reuse, additional processing is likely to have a significant economic impact on the generators of these wastes. Economic costs will be measured in the costs of designing and operating these additional processes, while economic benefit will likely be measured in the avoided costs of disposal as a hazardous waste.

Nonetheless, the additional costs for processing at some point will be passed on to the consumer, who will ultimately chose to reduce his waste stream by recycling, home composting, and smart buying. This should hurt no specific group, as all consumers will pay equally based on how much they throw away.

- **Environmental Preservation /Protection and Additional Processing:**

Additional processing of waste may have its highest yield in addressing environmental preservation and protection goals and the subsequent actions required to achieve these goals. Its most immediately obvious application would be to reduce the toxicity of a waste prior to its disposal. Through bioremediation, neutralization, vitrification, and other technologies, waste streams that are currently too toxic to human health or the environment for safe disposal may be rendered inert or at least moved safely within parameters for safe disposal.

- **Public Acceptance of Additional Processing**

Where additional processing reduces the toxicity and/or ultimate cost of waste disposal, the public can be expected to support it.

- **Social/Environmental Justice and Additional Processing**

The social and environmental justice aspects of additional processing are likely to surface at the point where that additional processing bears some health or environmental risk within the process itself or where the ultimate disposal of processed waste occurs. It will be important in the future to ensure that the cost of additional processing not fall disproportionately on any population in Washington State. Location of processing and ultimate disposal, therefore, needs to consider this concern.

- **Regulatory Fairness and Consistency and Additional Processing**

The operating assumption about additional processing is that it is intended to reduce the environmental risk represented by the waste being processed. It makes sense that reducing environmental risk should, where possible, be accompanied by reduced regulatory burden in the subsequent processing of this same material.

Principal areas of regulatory concern and work will be in the area of setting criteria to determine when and under what circumstances additional processing constitutes unsafe or uncontrolled treatment of potentially toxic wastes. Once these rules are defined and distributed and mechanisms for enforcing them put in place, processing that falls outside these definitions needs to be allowed to occur unimpeded by further regulation.

-END-

Issue Paper #6
Waste Reduction

Introduction and Purpose

After careful study, it has been determined that Washington's existing waste management infrastructure does not satisfy legislative intent outlined in Chapter 70.95 Revised Code of Washington –*Solid Waste Management, Reduction & Recycling.*

Waste Prevention (also known as waste reduction or source reduction) is this state's priority because it is understood to be the safest and most cost-effective means to manage waste. Waste prevention reduces or eliminates garbage and toxic materials, reducing the need for local or state government to manage them.

To achieve legislated intent, a closed loop system must replace Washington's current waste management system. This summary will assist this state's efforts to reach that goal by providing:

- A historical overview.
- A summary of how solid waste affects human health, environmental health, and this state's economic health.
- A summary of how waste prevention is a solution to the impacts listed above.
- An outline of Washington State's current waste management infrastructure.
- Direction as to how this state can achieve a closed-loop system.

The primary focus of this paper is on municipal solid waste (MSW). The committee recognizes that there are other wastes to consider such as industrial, agricultural, inert, etc. It is important to include these wastes when discussing moving towards a closed loop as this evaluation continues in the year 2001.

Waste Prevention Defined

"Waste prevention" is defined as an activity that prevents generation of waste or the inclusion of toxic materials in waste, including:

- Reusing a product in its original form.
- Increasing the life span of a product.
- Reducing material or the toxicity of material used in production or packaging.
- Changing procurement, consumption and purchasing, or waste generation habits to result in smaller quantities or lower toxicity of waste generated.

There is an ongoing misunderstanding about the difference between waste prevention and recycling. Waste prevention avoids the creation of waste, whereas recycling is when materials are collected and processed to make a new product, such as pop bottles being used as a feedstock for park benches. People interchange the words, causing confusion and undermining the effort to prevent (reduce) waste.

Background -History

In the early 1980s, the Washington State Legislature adopted solid waste management priorities. These forward-thinkers realized that waste reduction should be the top priority, followed by recycling, then incineration, and landfilling as the final resort. In 1989, the legislature passed the Waste Not Washington Act, which emphasized waste reduction and recycling as integral parts of the state's solid waste management system. The new priorities held waste reduction as the top, and the most important, waste management strategy. The act emphasized source separation as the preferred waste handling strategy for what remained. Recycling was identified as second priority, and preferred method for handling this remaining waste. The new law then placed landfilling and incineration as equal disposal methods, with disposal of source-separated wastes being preferred over disposal of mixed wastes.

The act strongly emphasized the importance of waste reduction, stating: "Waste reduction must become a fundamental strategy of solid waste management. It is therefore necessary to change manufacturing and purchasing practices and waste generation behaviors to reduce the amount of waste that becomes a governmental responsibility."

What prompted an update to Chapter 70.95 RCW in 1989? "Continuing technological changes in methods of manufacture, packaging, and marketing of consumer products, together with the economic and population growth of this state, the rising affluence of its citizens, and its expanding industrial activity have created new and ever-mounting problems. . . ."[1] These trends continue today.

Washington has experienced a tremendous period of economic expansion. This growing economy correlates with growth in per capita waste generation due to increased purchasing and use of goods. While source reduction and recycling programs have diverted significant quantities of waste from landfilling and incineration, the amount of waste requiring disposal has continued to increase.

In 1999, citizens and businesses in the state of Washington generated approximately 6,637,618 tons, or 6.32 pounds per person per day. This figure represents a 5 percent increase in total tons since 1989, when the Waste Not Washington Act (Chapter 70.95 RCW) was enacted. If not for the moderating effect of increased recycling and, in part, to lightweighting of materials over time, the waste levels would be higher.[2]

Impacts of Solid Waste

Issue Paper #10 has more detailed information on the true costs of solid waste. To illustrate the benefits of waste reduction, however, some of the major impacts of Solid Waste are listed below:

1) Pollution-

a) Toxic Materials

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[1] Chapter 70.95.010 RCW

[2] There has been a movement from glass to plastic containers. Aluminum cans are lighter then they once were.

Many pollutants are released by the extraction and processing of raw materials. Some of these pollutants are known to be carcinogenic or toxic to humans, and some have effects, such as acid rain, that are harmful to natural habitats. In addition, for many new and high-volume usage chemicals, the long-term effects are unknown. Extensive life-cycle analyses find overall emissions to all environmental media to be lower when we use recovered rather than virgin materials.

Chemicals that persist in the environment and bioaccumulate in the food chain are of particular concern for environmental quality. Heavy metals such as mercury, lead, and cadmium build up in soils, water, and animals. The U.S. Environmental Protection Agency (EPA) and the Department of Ecology have called for elimination of persistent, bioaccumulative, toxic chemicals (PBTs) from release into the environment.[3]

Chronic health effects may result from repeated, long-term exposure to highly toxic products such as automotive solvents, oil-based paints, or pesticides. Chemicals may be stored in the body's fatty tissues and accumulate over time, causing liver or kidney damage, central nervous system damage, cancer and birth defects, paralysis, sterility, and suppression of immune functions.

Exposure doesn't just occur from direct contact with the chemicals. Depending on their solubility and mobility (the likelihood of moving into our surface water or groundwater), exposure may occur from improper use and disposal of chemicals or by penetrating landfill liners.

b) Air Pollution

There is increasing scientific consensus that greenhouse gases (GHG), composed primarily of water vapor, carbon dioxide, methane, and nitrous oxide, are emitted through human processes, such as the burning of fossil fuels, and influence global climate patterns. Shifting climate patterns could lead to major environmental changes. A recent study conducted by New Jersey to inventory their greenhouse gas emissions showed that 6 percent of their gas emissions were from landfill gas and 3 percent were from resource extraction.[4] This report also identifies waste management as one of its top five strategies to reducing greenhouse gases.

Global climate change has been linked to a significant increase in extreme weather events in recent years, resulting in tremendous property damage.[5] Losses went from an estimated $18 billion in 1990 to $92 billion in 1998.

2) Natural Resources and Habitat Degradation

a) Depletion of Natural Resources

As the human population continues to grow, demand for natural resources grows as well. From 1970 to 1991, worldwide consumption of forest materials grew 44 percent, metals 26

[3] www.epa.gov/pbt, www.watoxics.org
[4] New Jersey Climate Change Action plan, January 2000
[5] Northwest Council on Climate Change- "Climate Change 101"

percent, nonmetallic minerals 39 percent, and nonrenewable organic chemicals 69 percent.[6] The ecosystem destruction that goes along with such high levels of resource extraction further degrades other natural resources such as fish and wildlife. Furthermore, proven reserves of some nonrenewable minerals such as tin, lead, and zinc will be depleted in less than 20 years.

For every 100 pounds of product manufactured in the United States, about 3,200 pounds of waste are generated, according to Paul Hawken, author of *The Ecology of Commerce* and co-author of *Natural Capitalism*. Hawken says that industry moves, mines, extracts, shovels, burns, wastes, pumps, and disposes of four million pounds of material in order to provide one average middle-class American family's needs for a year. Robert Ayres, the inventor of the term "industrial metabolism," has analyzed the flow of materials in the manufacturing process. His conclusion: 94 percent of the materials extracted for use in manufacturing become waste before the product is even made. Eighty percent of what's left becomes waste within six weeks of use.

b) Habitat Degradation

Habitat is frequently degraded with storm water run-off, which is contaminated by pollutants such as household hazardous products. Rainfall picks up pesticides and fertilizers used in yards and antifreeze and motor oil spilled on driveways and washes them into local streams and rivers. The U.S. Geological Survey (USGS) found that pesticides commonly sold in the Puget Sound area for use on lawns and gardens contributed to the occurrence of several pesticides in urban streams. Twenty-three pesticides were detected in water from urban streams during rainstorms; the concentrations of five of these pesticides exceeded limits set to protect aquatic life.[7] Pesticides and fertilizers also leach into groundwater and can result in pollution of nearby water bodies or drinking wells.

More obvious degradation occurs during the resource extraction phase of a product's life. Mining, drilling, and deforestation require disturbing the natural environment and habitat for various species.

c) Scarring Our Landscape

i) Deforestation-
In the last 50 years, Washington State has lost more than two-thirds of its old-growth forests.[8] Twenty-six million trees are cut each year to produce Sunday newspapers for our country.[9]

ii) Landfills and Incinerators
Landfills and incinerators are the primary methods of solid waste disposal in the state of Washington. In the last 20 years the regulations and technology used in these disposal methods have improved to decrease their impact on the environment. Even with these improvements it is difficult and expensive to site and build new landfills. People often do not want landfills or incinerators in their communities because of the problems

[6] State of the World 1995
[7] Voss et al., 1999; Bortleson and Davis, 1997
[8] "Our Changing Nature: Natural Resource Trends in Washington State", WA St DNR
[9] 50 Simple Things You Can Do To Save The Earth

associated with them. For more information on the impacts of landfills, please refer to issue paper # 9.

iii) Litter and Illegal Dumping

This state's recent focus on litter and illegal dumping through the Community Litter Cleanup Program has brought to our attention that litter and dumping pollutes our environment, degrades this state's beautiful landscape, and reduces property values.

Benefits of Reducing Solid Waste-

1) Preventing Pollution

a) Reduces Toxic Emissions

Waste reduction is a highly effective strategy for reducing all the categories of health risks and pollution resulting from virgin material extraction, processing, use, and disposal. Through reuse and prevention, the demand for resources is reduced, along with all the associated environmental impacts of their extraction. The use of alternative products to household chemicals is another way of keeping toxic materials from our environment.

b) Improves Air Quality and Reduces Greenhouse Gas Emissions

Local waste diversion, through source reduction and recycling, can reduce GHG emissions in several ways:

- Emissions associated with waste disposal, particularly landfill methane emissions, are avoided.
- Emissions associated with resource extraction are avoided altogether, and those associated with material production are avoided or reduced.
- Emissions from management of municipal solid waste (landfills, transport, processing) are reduced.
- By reducing the need for wood products, more trees and vegetation are available to absorb excess CO^2.
- Dealing with waste on a local level through reuse or on-site recycling such as composting reduces the need to transport materials to landfills and to process materials.
- Organics are a leading source of landfill gas emissions and by composting them, returning carbon to the soil, you avoid emissions. (One-half of the organic material's mass is lost during composting. It is converted to CO^2, H^2O, Nitrogen compound, etc.)

2) Contributes to Habitat Maintenance

Waste reduction is clearly the most efficient and cost-effective way to conserve precious natural resources.

a) Supports Tourism and Cleaner Economic Development

Washington State is known for its natural beauty and outdoor activities. These are two of the main reasons why millions of people come to Washington each year. Promoting resource conservation through waste prevention contributes to the preservation of Washington's environment.

b) Decreases Toxicity of Landfilling or Incineration

Reducing toxic materials in landfills assists in keeping leachate from being hazardous and contaminating our environment.

c) Reduces Litter and Illegal Dumping

The waste reduction mindset helps decrease the damage posed by litter and illegal dumping.

3) Reduces Direct and Indirect Ccosts

Many costs stemming from environmental and human health problems are “hidden” and paid by Washington citizens in indirect ways. These indirect expenses are therefore less apparent or harder for Washington citizens to identify. Examples are litter taxes, subsidies to extraction industries, fees for funding hazardous waste cleanups, human health costs, and costs arising out of global climate change. Other costs of waste are realized with household purchases, waste disposal fees, and home insurance. Costs of waste are external from the product and not internalized.

Reducing waste prolongs the lives of our existing disposal facilities. This saves taxpayers and local governments the expense of building new facilities or long-hauling waste to Eastern Washington or Oregon. After facility closures, the owners must monitor the environmental impacts, which can be costly. Reducing waste reduces the liability local governments and taxpayers have in case of landfill failures in the future.

Household purchases such as groceries, which often are heavily packaged, contribute large volumes of waste to our landfills. Individually wrapped single servings may cost 25 percent to 400 percent more than larger packages for the same amount of food or beverage. The most apparent cost for this excess packaging is in the consumer's monthly trash bill, but consumers also pay for packaging when they purchase the packaged product.

Many businesses have reduced their costs by preventing waste. Businesses in the Northwest and across the nation have documented their savings from waste prevention. A few examples: A Corvallis, Oregon, software company reduced its packaging by 68 percent and saved $21,000 a year. A company that operates hospitals in the Portland area saved more than $250,000 a year by reusing and reducing supplies and by reducing paperwork. A Seattle-area product distribution center saved nearly $150,000 in its first year by reducing and reusing transport packaging.

4) Creates Employment

Reuse and repair are not only a top priority in waste reduction. Research has shown that the best opportunity for creating more jobs per tons of material recovered. Each step a community takes to add value to materials recovered from the waste stream means more jobs and more local self-reliance. Decreasing waste by seeing it as a feedstock and cycling all of our used resources back into the economy will support community economic growth and create jobs. In a recent report done by The Center for Watershed and Community Health it is estimated that for

every 100,000 tons of waste diverted from the waste stream, 65.2 recycling processing jobs, 224.6 recycling manufacturing jobs, and 509.8 reuse jobs are created.

5) Benefits Social Programs

Many charitable organizations support social programs by collecting and selling used materials. These include Salvation Army, St. Vincent De Paul, Goodwill, Deseret Industries, and Habitat for Humanity, just to name a few of the larger ones. Seattle Goodwill, for example, provides thousands of hours of free educational classes and employment training programs to hundreds of people every year. More than 95 percent of the funds needed to operate these programs come from the revenues from Goodwill's thrift stores.[10]

Current Status

In order to move towards the closed-loop infrastructure envisioned for the future, it is important to understand what the current situation is. Following are the issues with greatest potential to reduce both the volume and toxicity of waste.

Reuse Outlets

Situation-
Currently, reuse outlets contribute greatly to our state's waste reduction efforts. For example, in the 1998-99 fiscal year, Seattle Goodwill received 9,756 tons of donated materials.[11] There is an upsurge of visibility for reuse outlets and charitable operations, such as Goodwill, Salvation Army, etc. The market for quality reusables has become competitive. Organizations like Value Village and consignment shops are thriving. In recent years we have seen an increase in for-profit and nonprofit building materials resale stores. Habitat for Humanity has opened retail stores to sell the donated materials that they can't use for their projects. People are seeing the value of quality, older items. Television programming such as the Antiques Roadshow and Martha Stewart's program have made reuse stylish, improving its image.

Some counties have partnered with reuse outlets, setting up donation stations at landfill entrances in order to divert reusable materials from the landfills.

Barriers-
- There is a trend of people misusing reuse outlets as garbage dumps. Costs of dealing with hazardous materials dumped have risen. In 1999, it cost Seattle Goodwill approximately $40,000 to dispose of hazardous waste left at its stores and donation stations, according to Goodwill staff.
- Charities that accept household items must dispose of a significant portion of those donations because the items are broken, stained, or unusable. One reason for this is that the quality of furniture, clothing, and other items is lower than in the past. Particle board has replaced quality wood products and it isn't cost-effective to repair low-quality items. The expense of waste disposal threatens the existence of reuse outlets.

[10] Seattle Goodwill website, http://www.seattlegoodwill.org/
[11] Seattle Goodwill website, http://www.seattlegoodwill.org/

Opportunities-

- California has a state program of grants to local governments for reuse programs; perhaps that would work in Washington.
- Reuse is easy to measure, by weight or by estimated worth of items.
- A large amount of material is and could be diverted through these outlets.

Waste Exchanges and Swaps

Situation-

Waste exchanges are another effective waste reduction method. The internet has assisted in making it easier to connect a waste with a potential user, keeping the material from being disposed of and saving businesses and the public money through reduced disposal costs, or reducing the need to purchase new items or feedstock. The Industrial Materials Exchange (IMEX), a well-known exchange based in the Seattle area, lists a wide variety of materials. In 2000, their website received 6,000 hits/month. In 1999, they had 673 listings and 160 exchanges that resulted in a $341,000 savings. (Figures provided by King County). The Washington Department of Ecology has recently taken over administration of another exchange called Reusable Building Materials Exchange. It is available for local governments that are interested in having it in their community.

Some hazardous collection facilities have set up "swap shops" for the public to reuse materials instead of disposing of them. Some rural areas have set up mini-waste exchanges at their landfills for swapping. An award-winning example of this is the "Take It or Leave It" exchange for household items at the transfer station on Lopez Island in San Juan county.

Barriers-

- Liability issues for hazardous materials

Opportunities-

- This approach has significantly more potential and more application in the residential sector.
- Numbers of transactions, visits to web sites, etc., can be tracked.
- Web-based exchanges connect people throughout the state and get a lot of exposure.
- There are many established exchanges. Getting them to work together would maximize exposure.
- Gives people options to find and get rid of used materials.
- Although web-based exchanges need monitoring and maintenance, the administrator isn't involved with the exchanges.

Toxic Materials

Situation-

There are many sources of toxic materials. There is toxic waste that is produced through processes of extraction and manufacturing, which typically do not end up in the municipal solid waste stream. Toxic materials that may end up in the MSW stream are household hazardous waste, toxic materials in products, and other sources such as medical waste.

The current approach to reducing the toxicity of waste is through education and outreach to businesses and the public about alternatives to hazardous products and how to properly handle waste, not on designing toxic materials out of products. However, in many jurisdictions the main focus is on the collection of these materials. Managing hazardous waste is costly. Permanent collection facilities and other collection programs are expensive, and education on the alternatives can become a lower priority.

Electronic products, such as light bulbs, computer circuit boards, and CRTs (cathode ray tube monitors) are increasingly entering municipal solid waste streams. They contain hazardous materials, toxic materials, and heavy metals such as lead, mercury, and cadmium. King County alone estimates over 335 thousand personal computers will be discarded by year 2005; this number includes neither computers in storage nor business computers.

Waste sorts show that there is a lot of medical waste in the MSW, including mercury. One education effort underway to reduce medical waste is the Medical Industry Waste Prevention Roundtable (MIRT), which is funded by King County and EPA (and also supported, in other ways, by Ecology and others): http://dnr.metrokc.gov/swd/bizprog/waste_pre/medical.htm

Barriers-

- The chemical industry resists new labeling requirements for pesticides and other household chemicals.
- Products are being designed with toxic materials.

Opportunities-

- Public health issues, particularly as they pertain to children, motivate public interest and action in reducing and managing toxic wastes.
- Improved labeling may help consumers to make better-informed choices toward alternative products.
- Ecology's electronics disposal team is researching recovery, reuse, and disposal programs for toxic and nontoxic components of electronic products. King County has a project for reuse and recycling of used computer equipment.
- There are national, regional, and state organizations, such as the Northwest Product Stewardship Council, working on product stewardship and designing toxic materials out of products.
- Potential substitutes for toxic components are being explored.
- The design stage could be the most effective place to reduce toxicity of waste.
- Master gardener programs help educate about environmentally friendly gardening techniques.

Construction and Demolition Debris

Situation-

Construction and demolition debris makes up 30 to 40 percent of the solid waste stream (although construction and demolition waste is not always considered MSW). It is estimated that 80 percent of the buildings that will be standing in 2020 haven't even been built yet. There is a lot of potential for a reduction in MSW within the construction industry. In recent years, large corporations have moved into Washington communities, tearing down existing structures

in order to build new stores that meet their marketing needs. This results in a tremendous amount of waste.

Recently more attention has been paid to the possibilities of recovering useful materials from this waste. As mentioned in the reuse section, there is an upsurge of reuse outlets collecting and accepting building materials from contractors and the public. These building material reuse efforts are sometimes undermined by other governmental initiatives such as prevailing wage laws, which can drive the cost of salvage to a point that it is no longer financially feasible to divert large quantities of this material to reuse.

There are many organizations promoting design innovation that reduces the amount of waste produced during construction as well as reuse building materials on-site.

Barriers

- The "gift of public property" laws conflict with the donation of surplus materials from public facilities.
- Prevailing wage requirements on Government construction sites seriously limit the amount of material that can be salvaged and reused. Prevailing wage for laborers in the Seattle area is around $25/hour on government jobs. When required to pay this level of wage, material salvagers are forced to cherry-pick only the most valuable materials and let a lot of other materials be disposed of because the retail value of the material can not support the prevailing wage labor rate.
- There are conflicts between material reuse and hazardous chemical laws (lead-based paints, asbestos removal, chemical reuse).
- Many of our building standards and codes don't always allow for design innovation, material reuse, and alternate material selection.

Opportunities

- Many for-profit and nonprofit organizations are becoming aware of the financial opportunities to salvaging and reselling building materials.
- Buildings can be designed and constructed in a way that significantly reduces pollution to all media and can be done at a cost savings.

Organics

Situation-

Waste characterization studies for three counties (Thurston, Snohomish and Clark County) show that organics comprise 17 percent, on average, of the municipal solid waste stream. A large percentage of this is food waste. There is a huge potential for a reduction in MSW if organics reduction efforts are increased.

For the purpose of this paper, we consider composting as waste reduction when it is dealt with on site. If organics are collected and composted in a centralized location, we consider that recycling. Methods that would be considered waste reduction are home composting (including worm bins), mulching, and grasscycling (leaving grass clippings on the lawn). Getting people to deal with their organics on-site is a more sustainable approach that eliminates the problems of siting a centralized location, and all the associated problems such as odor control. Not everybody has the space to do on-site composting and the next best option in centralized composting. Please refer to issue paper #11, Recycling for more information about composting.

Barriers-

- All citizens don't have the space to home compost.
- On-site composting of food waste may encourage rodents and pests.
- Physical ability (strength and mobility) can prohibit people from composting at home.
- Organic waste streams are sometimes contaminated with pesticides and other chemicals.

Opportunities-

- Organics has a lot of potential for showing the interconnectedness with other issues such as water quality and salmon habitat. With the interconnectedness come dual solutions and partnerships.
- Home composting eliminates a lot of problems, such as greenhouse gas emissions and odor problems associated with centralized compost facility.
- Addressing food waste would make a serious dent.
- Great potential exists for partnerships, with manufacturers of mulching mowers or water utilities to get environmentally preferable products to the people at a discounted price.

Paper Waste

Situation

Paper waste, to include corrugated boxes, other paper packaging, writing and printing paper, newspapers, books and magazines, and paper consumer goods, makes up the highest percentage of municipal solid waste, at 39 percent before recycling and 32 percent after recycling.[12] Waste from advertising mailings (direct mail) alone is estimated at 5.4 million tons, or 2.4 percent of all municipal solid waste (Direct Marketing Association estimate for 2000).

From this data we can determine that recycling is only making a small dent in this waste and there is a large potential to reduce paper waste through waste prevention efforts.

Barriers

- Double-sided printing is rarely done in offices, even though duplex printers and duplex printing attachments are now commonly available.
- In the U.S., companies have the right to send anyone advertising mail, and it is up to the recipient to try to get off lists. Many companies that send advertising mail make it difficult, if not impossible, for consumers and businesses to get off their mailing lists. In some European countries and Canadian provinces, companies must get consumers' permission before they send them advertising mail.
- Unnecessary paper packaging is common, such as boxes for toothpaste tubes and boxes for some breakfast cereals. Unfortunately, much of this packaging is made from recycled paper, and eliminating it would hurt the recycled paperboard industry.

Opportunities

- E-mail and computer networks have helped reduce office paper, and the potential exists for much greater reduction.

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[12] U.S. EPA, 96- http://www.epa.gov/epaoswer/non-hw/muncpl/factbook/internet/mswf/gen.htm#4

- Double-sided printing is becoming easier and more efficient, thanks to a new generation of printers and copier/printers.
- Mandates from top-level management in companies and agencies can greatly increase the percentage of double-sided copying and printing in offices.
- Because unwanted mail, or "junk mail," is so unpopular with consumers and businesses who receive it, government agencies receive strong support when they launch programs to deal with this problem.

Measurement

Situation-
The state has not adopted any agreed-upon method of measuring waste reduction. Local governments are being held responsible for coming up with measurement methods (through the solid waste management plans), but they typically can't figure out how to do that and so it becomes a point of frustration for many. Some communities, when they institute a program, measure participation by how many mulching mowers are bought, etc. It is difficult in most cases to associate their education efforts to a direct reduction in municipal solid waste. Reuse is easier to measure but there has been no effort to quantify it statewide. When using per capita information one must consider that it also includes business waste and a community with more industry is going to have a higher per capita rate. The EPA and organizations have put together some models that could provide direction on this issue.

Barriers-
- No current model exists because there are conflicting ideas about how to measure.
- Not currently measuring business and residential waste separately.

Opportunities-
- EPA and other organization are attempting to develop models for measurement.
- Many reuse programs have measurable results.

Incentives

Situation-
We all know that people react and make changes when it makes financial sense. Individuals and commercial businesses can see savings by reducing their disposal fees. Washington is ahead of the nation because in many states garbage services are included in citizens' taxes. Costs are not seen and motivation to reduce waste is low. Washington communities that have gone to a variable can rate structure or weight-based collection systems have been able to see a reduction in waste disposal. In some communities these incentives, as well as options for less frequent collection, are not well publicized.

Manufacturers pay for their preconsumer wastes and it can be financially beneficial for them to implement waste prevention measures. Once their product is purchased, however, they are not responsible and therefore they have no perceived incentive to design with waste prevention or recycling in mind. Taxpayers and citizens are paying for the waste. Manufacturers are not.

Barriers-
- True costs are not being paid

- A reduction in disposal fees is the only incentive commonly being used.

Opportunities-
- Rate-based incentives, such as options for less frequent service, or prepaid bags, have been effective at encouraging waste reduction through financial savings.
- Commercial waste separation into wet and dry can help businesses see what portion of their waste they pay most for and encourage waste reduction.
- Users should pay up-front, instead of public paying at end of the product's life.

Funding

Situation-
Waste reduction is an unfunded mandate. It was identified as the top priority for managing waste, yet there are no funds available to specifically address this mandate. State and local funding competes with other waste issues such as managing household hazardous waste and recycling programs. Funding does not reflect legislative priorities.

Barriers-
- Funding for waste reduction programs is reliant on disposal fees, so if programs are successful there is less money to support the continuation.
- Communities use existing funds towards the easiest thing such as recycling or household hazardous waste collection because these are the easiest to report.

Opportunities-
- Some funding may be available as part of greenhouse gas reduction programs.
- Internalizing true costs of products reduces or eliminates unfunded garbage mandates.

Public Perception/Mindset

Situation-
The information age overwhelms the general public with massive amounts of data. The effort and commitment required to sort through this information, to the material that is relevant to one's situation, is phenomenal. Waste reduction/prevention is just one subject among the plethora clamoring for attention.

In 1998, U.S. advertising topped at $200 billion, a 24 percent increase from the $161.5 billion spent in 1990 (McCain-Erickson US advertising volume reports). The average amount spent by the advertising industry in 1998 to reach one household was $1,987 (The Overspent American, Juliet Schor). Local governments and nonprofit organizations are combating these messages of consumption. To many, it seems like a losing battle. Most people want to make the right choices but aren't given the products and resources to help. In a 1995 survey by the Harwood Group, 82 percent of those surveyed agreed that most of us buy and consume far more than we need, while only 15 percent disagreed.[13] Our society equates consumption with success, e.g. the more I can afford to buy, the more successful I am. We are bombarded with messages from television, radio, and print stating that if we only buy this new thing, we will be happy.

[13] Center for a new american dream-http://www.newdream.org/yearning/

Education has been the primary approach of state and local government to promote waste reduction. Many programs have been developed. For example, "Waste Free Holidays" and mulching lawnmower discount programs are two innovative waste prevention projects coordinated by King County. For smaller governments, however, waste reduction education has ended up on the back burner because it is hard to show results and justify the money being spent when, in the minds of elected officials, there are more important things to focus on.

Barriers:

- There is no perception of a crisis. People think there are plenty of landfills and resources.
- Contemporary society equates buying a lot of products with success, focusing on quantity of goods purchased, as opposed to quality.
- The general public confuses recycling with waste reduction/prevention efforts.
- Life-cycle costs are not factored into products that are made, packaged, and sold.
- The few eco-labeling programs that exist aren't very visible, and some deal primarily with recycled content products.
- Waste prevention is not glamorous. Waste prevention education campaigns compete with high-powered marketing efforts.
- Contemporary society runs at a very fast pace. Disposable and single-serving convenience support this pace.
- No incentive exists for disposal companies to encourage reducing waste, because they make more money when people produce more trash.
- Finding environmentally preferable products require incredible persistence, if they can be found at all. Consumers are driven by convenience and don't have patients search for these products or ability to judge their attributes.

Opportunities:

- Nonprofit organizations can educate about voluntary simplicity and overconsumption.
- More government agencies can attempt to address consumption issue.
- Waste reduction efforts are gaining momentum in Washington State and the Northwest, and Ecology can capitalize on this as an advertising opportunity.
- Educating consumers that reducing consumption and lifestyle changes have positive effects on many different environmental concerns.

Packaging and Disposables

Situation-
Packaging and containers comprise approximately 30 percent of the Municipal Solid Waste stream (U.S. EPA). Local waste characterization studies show that packaging and containers make up 20 percent by weight of MSW. In addition, the trend toward convenience and single serving containers results in packaging that represents a significant percentage of the weight and the cost of the product inside.

The 1989 Washington Legislature established the Packaging Task Force to reduce the volume, weight, and toxicity of packaging. The legislature's premise was that reduction or elimination of packaging waste could only occur *in the product and packaging design phase*, a phase

controlled by manufacturers and, sometimes, distributors, retailers, and consumers.[14] After packaging becomes garbage, it is too late to reduce waste. Therefore, the legislature directed that a majority of members of the Packaging Task Force should be from business and industry with minority representation from state and local governments and environmental and consumer groups.

Under contract with the Department of Ecology, the Washington Retail Association (WRA) developed, and over sixty percent of Washington retailers (measured in dollars) implemented, voluntary packaging guidelines. The guidelines included voluntary, “stretch” goals for package reduction and recycled content.

Currently, there is no effort underway to monitor any progress on this, or determine if retailers are still implementing the guidelines.

Convenience of disposables cannot be overlooked with this highly mobile society. Disposables have become an important means to improve sanitation and prevent the spreading of germs. Disposables have also helped increase mobility--disposables make it a lot easier to be transitory. All of this together has helped us enjoy the privilege to "simply throw it away."

Many companies profit from light-weighting. Through packaging initiatives from 1992 to 1997, the amount of aluminum used in a beverage can was reduced by 45 percent (EPA website).

Many European countries are leading the way by setting up incentives to encourage environmentally friendly packaging. For instance, beginning in April of 2001, Denmark will implement a green tax on packaging, based on a new life-cycle assessment. The new system, in which the tax rate is determined from the rating of each material on an environmental index, will ensure that the most environmentally-friendly packaging types, such as cardboard, are taxed at a lower rate than more damaging materials.

Barriers-

- Businesses say consumers drive the market but consumers need to have an easy way of determining what the best choices are.
- There has been a lot of work in this area done in the past, but there hasn’t been anything to sustain the effort, or to motivate businesses to keep up with implementation.
- Business opposition.
- Lack of political will.
- Government agencies don’t have the expertise to tell companies how to package their products.

Opportunities-

- European countries are leading the way on this issue. Companies that sell their products in foreign markets already have to comply with European packaging regulations.
- Partnerships with national organizations, such as the Alliance for Environmental Innovation.
- Bans on selected disposables.
- Government agencies can set packaging standards.

[14] See letter from Representative Art Sprenkle, 1989.

Durability

Situation-
Many products are becoming less and less durable. They are not built with repair, reuse or long life in mind, which makes repair cost prohibitive. Most of the time it is less expensive to dispose of the old and buy new. Fewer producers are setting up long-term relationships with their customers, and are not giving long-term warranties on their products. More electronic parts and products aren't built with repair in mind. For example, simple parts that may be minor to fix are embedded in a part that is more expensive to replace. This makes the cost of labor and replacement parts high.

The business community says consumers are driving the market, wanting cheaper products, which in turn means less quality. Higher-quality products have longer lives, and therefore cost less for the consumer in the long run, but true costs of products are hidden. For those who want to buy quality and do the right thing it is becoming more and more difficult to know what the right choices are. Education only goes so far, if the positive environmental choices aren't available or consumers aren't motivated to make sound choices.

Barriers-
- Companies are not paying for the end-of-the-life costs of products and are making more money when products don't last.
- True costs of products are externalized.
- Consumers are not getting the true cost information about products when they purchase.

Opportunities-
- Consumers can drive the market with their purchasing choices.
- Government agencies can move product stewardship forward with education about voluntary options. (Please refer to product stewardship issue paper.)
- Government has the authority to implement regulation.

The Future- A Closed-Loop System

Envision the future where we have moved away from managing waste, and waste is used as a resource, a feedstock for production. Government, industry, and the public will have joined forces in order that everything had a life-cycle plan. This life-cycle plan would make certain that product would be part of a closed loop system.

Waste prevention is the key to achieving this vision. Washington State must place a greater emphasis than we have in the past on preventing waste from being generated. In 1989, Waste Reduction was legislated as the primary means to "manage solid waste" because waste not generated in the first place does not need to be managed—costs and impacts of waste management are avoided altogether. Even though waste reduction was legislatively mandated there has never been a comprehensive approach to implementation. There are a variety of reasons why this is true but many in the waste industry recognize this to be the case. Washington State needs to build on the momentum generated in the 1990s and make waste reduction the top priority. This will result in a closed-loop system.

Therefore, Washington State must strive to create a closed-loop system, focusing on the following:

1. **Shift in program and system design**
Instead of landfills, we would have reprocessing centers. There would be incentives for nonprofits or for-profit businesses to rebuild and repair. Each product would have a life-cycle plan.

Businesses would reinvent themselves. They would see the advantage of having long-term relationships with their clients, where their products would be leased instead of owned. The system would be set up so there would be financial reasons why producers make more money providing quality products, versus selling a large quantity of low-quality products.

2. **Mindset shift**
Quality of life and happiness would not be associated with how much stuff each individual possesses. There would be a shift in people's mindset. They would see materials at the end of their lives as resources, not waste. In order for waste reduction to be successful, people need to reexamine their consumption habits.

This shift towards a closed-loop system would require that everybody take responsibility for reducing waste. No segment of society can be expected to do it all. Manufacturers would have to take responsibility for the products that they design and produce. Individuals would need to make thoughtful choices. Government would need to provide guidance and set examples for businesses and the public.

3. **Product design and producer responsibility**
When a product is developed, producers will consider the life of a product and the products life-cycle costs. Products would reflect their true costs. Product durability would be a priority. All products would be designed so that they could easily be returned to a process, as feedstock for the same or another product (recycled or remanufactured).

Working to Achieve the Vision

Washington State must step forward and become a leader again by advocating and supporting innovative policies that further waste prevention and bring these issues to the attention of the public and media.

In the past there has been a haphazard approach to waste prevention. We have learned that to truly succeed, we need a more comprehensive strategy for moving us toward our common vision. We believe that if Washington commits to the strategies outlined below, that we should see huge reductions in both the toxicity and volume of waste.

Even though this discussion focuses on municipal solid waste, please do not disregard how current production industries, along with their processes' resulting industrial waste, are integral parts of this state's current waste management system.

Waste prevention is everyone's responsibility and so we should develop a broader approach that addresses the whole universe of waste and identifies actions and initiatives that allow all sectors to participate. Industry assuming responsibility will be vital in the next stage of planning

because their cooperation is essential to move us toward our vision of waste management in the future.

It will be important to further examine our current waste management infrastructure and refine the changes that have been recommended in this study to maximize waste prevention. The three key components to reaching a closed-loop system are:

1. Shift in program and system design.
2. Mindset shift.
3. Product design innovation and producer responsibility.

Many of the issues are not tied strictly to Washington State. Some solutions are going to be found in partnerships with other states and national organizations that have similar goals. This requires the Department of Ecology to become more involved and visible in some of the many national efforts in waste prevention, producer responsibility, and toxic materials reduction.

Strategies-

1. **Promote product stewardship**- "Product stewardship is a principle that directs all actors in the life cycle of a product to minimize the impacts of that product on the environment. The concept is unique because of its emphasis on the entire product system. Under product stewardship, all participants in the product life cycle--designers, suppliers, manufacturers, distributors, retailers, consumers, recyclers, and disposers--share responsibility for the environmental effects of products." This will encourage further development of closed-loop systems. (Please see the issue paper #7 on product stewardship for examples of businesses that have implemented such programs.)
   This would include:
   - Set waste reduction standards and consider financial incentives for manufacturers to achieve those reductions through product redesigns.
   - Support voluntary agreements. Consider legislation if the voluntary approach does not work.
   - Work on a regional and national level, establishing partnerships.
   - Consider connecting manufacturers to their environmental impact in all reviews, ratings, and applications for financial support or tax relief.
   - Encourage development of product designs with closed-loop elements.
   - Internalize full costs of product life-cycle impacts.
   - Use government buying power to push product stewardship.

2. **Require government in-house waste prevention programs.**
   - Conduct a multisector paper reduction campaign.
   - Encourage reuse of surplused items.
   - Focus purchasing power of state agencies to promote environmentally preferable products and services that maximize waste reduction.

3. **Promote construction and demolition reuse and reduction-**
   - Provide support for online building materials exchanges and reusable building material collection at transfer stations.
   - Expand partnerships with the construction industry.
   - Promote building design and construction techniques that reduce waste.

- Examine public policies that may inhibit deconstruction and reuse.
- Examine how urban planning can effect an increase in construction and demolition waste.
- Use government buying power.
- Expand reuse and recycling infrastructure.
- Support nonprofit organizations, such as the U.S. Green Building Council and Northwest Ecobuilding, that encourage sustainable building initiatives..

4. **Conduct waste prevention education programs that focus on consumer purchasing practices-**
    - Conduct a citizen survey to determine public perception. This information would help education programs focus their messages and target audiences.
    - Create market demand for environmentally-friendly products and services. Life-cycle cost analysis and eco-labeling could help make it easier for consumers to make the right choices.
    - Maximize and promote programs that educate about overconsumption.
    - Emphasize waste prevention in schools.
    - Consumers need to know why they should reduce waste and feel that something really can be done about it, feel empowered.
    - Get credible, consistent information out to public, leaders, business, etc.

5. **Establish incentives that promote waste reduction**
    - Collectors should implement commercial class stratification, such as wet/dry, or restaurant/office/other. This would help businesses more easily identify which waste streams are costing them the most money, and which waste reduction activities would benefit them financially. (An office may establish office paper reuse and double-sided printing policies; a restaurant may decrease portion sizes.)
    - Collectors should provide options for less frequent service, such as once per month or every other week so that people who reduce their waste significantly can realize savings at the curb.
    - Collectors should provide unscheduled or on-call service options, such as prepaid bags, so that people who reduce their waste significantly can realize savings without needing to self-haul their waste.
    - Different ways to tax should be considered, such as taxes where users pay up-front rather than the public paying at the end of the product's life.

6. **Promote material exchanges and reuse networks targeting building materials, industrial waste, etc-**
    - Consider state grants to local governments for reuse programs.
    - Examine how to better link existing programs, getting them to work together.

7. **Expand on-site composting programs-**
    - Promote food and yard waste home composting.
    - Promote composting programs for small businesses, institutions, and schools.

8. **Washington State should agree on a waste reduction measure as our standard**
    - Ecology should do further study on standard measurement methods. Agree on and set a waste prevention measure as our standard.

- Recommend a "performance-based" standard, where assumptions of success are made based on activities conducted.
- Consider establishing waste generation or waste disposal target rates, which King County now uses in its draft comprehensive solid waste plan. These types of rates include waste prevention (a recycling rate does not).

Conclusion-

Once the above-outlined strategy is utilized to prompt a shift in program and system design as well as a shift in public mindset, a closed-loop product system–as opposed to a waste management network–should result. Life-cycle analysis will be used for production resulting in product stewardship. No longer will government or the public at large have to handle the liability that garbage imposes.

Product stewardship is a tool for reaching our ultimate goal of a closed-loop system. Without industry involvement up-front at the design stage, government will continually be looking for ways to manage wastes that are difficult to recycle or reuse or are harmful to the environment.

In addition to this active involvement of the private sector, the public must also embrace waste prevention. It is the role of government to assist and guide both the private sector and the public in preventing waste, which ultimately benefits all sectors of society.

Issue Paper #7
Product Stewardship

Introduction

In 1989, the Washington State Legislature enacted the Waste Not Washington Act to address the need for innovative ways to manage solid waste. The legislative findings for this act (codified in Chapter 70.95.010 RCW) included:

(1) Garbage volumes keep rising due to technological changes, economic and population growth, and the rising affluence of our citizens.
(2) Traditional methods of disposing of solid wastes in this state are no longer adequate to meet the problem.
(3) Solid waste recovery and/or recycling plans that can address our limited resources, energy shortages, the local economy, and the environment are needed.

As a result of these directives, local governments implemented recycling programs that have diverted significant tonnage of materials away from the landfill and back into the economy. Now these programs are mainstream in many communities. However, the state's top waste management priority, waste reduction, has not been realized.
The social, economic, and demographic trends noted in Chapter 70.95.010(1) – (3) RCW have continued. Washington State's population continues to expand, the demand for commercial and consumer products and the pollution and waste resulting from product production continues to grow, and the amount of waste sent to the landfill continues to increase despite aggressive recycling programs. The issues surrounding the long-term responsibility for closed landfill management and remediation, and the management of public land and other natural resources, continue to become more complex.

As we look to the future, it is important that we develop innovative approaches to effectively address our charge under the next legislative finding in Chapter 70.95.010 RCW :

(4) Waste reduction must become a fundamental strategy of solid waste management. It is therefore necessary to change manufacturing and purchasing practices and waste generation behaviors to reduce the amount of waste that becomes a government responsibility.

The waste reduction strategies we choose must take into consideration a wide array of public policy issues, including those relating to public health and safety, natural resource management, environmental protection and solid and hazardous waste management. These strategies will demand safeguarding public health and the environment, while ensuring a healthy and competitive economy.
Product stewardship is an innovative approach that can measurably help the state achieve economic profitability and efficiency while moving toward a sustainable resource management system. It is an approach that is consistent with and supports the legislative priorities and goals

as set forth in Washington State's Solid Waste Management Act (Chapter 70.95 RCW) and Hazardous Waste Management Act (Chapter 70.105 RCW).

Defining Product Stewardship.

Product stewardship is an environmental management strategy that means whoever designs, produces, sells, or uses a product takes responsibility for minimizing the product's environmental impact throughout all stages of the product's life cycle. Product stewardship strategies and initiatives are already underway in the United States and abroad and appear in many different forms, tailored to address specific issues and needs. Examples of product stewardship practices include:

- **Design for the Environment -** Product manufacturers reduce environmental impacts by using materials and processes that result in the least environmental impacts. Examples include designing products that contain recycled and/or recyclable materials, designing products to be easily disassembled to reuse parts, using low or no toxicity materials and using production methods that conserve energy and resources.
- **Product Take-back** - A system whereby consumers can return used products for reuse and/or recycling. This system could be funded through a stakeholder partnership or solely by the manufacturer. When the manufacturer shares in the costs of managing the products, they are more likely to consider design and materials changes that will reduce recovery costs and reduce environmental impacts.
- **Offering the Product as a Service (Leasing)** - In many cases the consumer may not be interested in owning a product, but wants the service the product provides. For example, consumers may not want to own the plastics and glass in a television set; rather, they want the service--viewing of TV programs--that the television set provides. Companies that lease their products have a greater incentive to design more durable, lasting products that can be reused or recycled cheaply and efficiently.

Product stewardship recognizes the need for industry, government, and consumers to jointly promote the development and use of consumer products that pose no–or increasingly fewer–health and environmental impacts. It encourages manufacturers to design products with fewer toxics, and to make them more durable, reusable, and recyclable. Product stewardship also affords manufacturers the opportunity to look at all of the impacts associated with a product and its packaging–including energy and materials consumption, air and water emissions, the amount of toxic materials in the product, worker safety, and waste disposal–and to take increasing responsibility for the end-of-life management of the products they produce. The challenge is to move beyond disposal and to facilitate a paradigm shift toward "zero waste" and "sustainable production."

A successful product stewardship strategy can:

- Reduce the volume of material landfilled or incinerated,[1] thus reducing health and environmental impacts[2] while also alleviating the underfunded mandate that many local jurisdictions are faced with by reducing their waste management costs.[3]
- Reduce the toxicity of products.[4]
- Reduce the demand for raw materials.[5]
- Encourage manufacturers to take increasing responsibility for the life-cycle costs associated with the products they produce providing product feedback and an economic incentive to innovate, reduce, and recycle.[6]
- Reallocate costs. Currently, state and local government, along with taxpayers and ratepayers, assume most of the direct costs associated with disposing of or recycling used products, as well as any health and environmental costs associated with the improper use, storage, or disposal of these materials. Product stewardship would add product manufacturers, retailers, and consumers to the list of who pays.[7]
- Encourage businesses to develop strategies and implement changes that not only minimize environmental impacts but that enhance product efficiency and profitability–without additional regulatory direction or oversight.

Product Stewardship in Action

Product stewardship activities have been happening for over a decade, and product stewardship programs continue to emerge and mature around the world. One of the first and most well-known programs is the German Green Dot packaging program. It encountered some early difficulties, but has evolved over the years and is now not only successful in significantly reducing waste, but is also profitable.[8]

Product stewardship is practiced widely in Europe and Asia. In the U.S. it is starting to come of age. There are a number of manufacturers–individually and in partnerships–who are successfully implementing product stewardship. Technical and policy groups have also formed to help support and promote product stewardship, including the Center for Clean Products and Clean Technologies at the University of Tennessee, the National Product Stewardship Institute at the University of Massachusetts, and the Northwest Product Stewardship Council here in the Northwest.

As a policy tool that facilitates sustainable production, product stewardship is still growing and improving. There are numerous examples of well-established and innovative programs that illustrate the practical application of product stewardship that can seem difficult to understand. The examples below have been selected to exemplify different product stewardship strategies.

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[1] RCW 70.95.010(8)
[2] RCW 70.95.101(2)and 70.105.007
[3] RCW 70.95.010(4)
[4] RCW 70.105.150(1)
[5] RCW 70.95.010(3)
[6] [RCW 70.95.010 (2) and RCW 70.95.010(4)
[7] RCW70.95.010(4)
[8] Manufacturer's Responsibility: Case Studies and Options for the U.S., Science Applications International Corporation for NY City Department of Transportation, August, 1998

All of them effectively reallocate costs and provide a feedback mechanism that results in design and production innovations.

Electronics and Electrical Appliances

Design for the Environment and Product as a Service (Leasing)

In 1990 the **Xerox** Corporation instituted a program which incorporated end-of-life considerations into product development. Under this program, Xerox established a system to refurbish leased equipment for reuse, remanufacture, or for salvaging of parts and material recycling.

The program has led to design innovations that recapture maximum value and minimize waste. Design changes include a reduction in the number of different plastic resins, reduced use of hazardous materials, innovative fasteners which allow machines to be efficiently disassembled, and redesign of parts for use across product lines.

Xerox also uses life-cycle costing so that residual value is factored into the model of total product costs. In order to minimize life-cycle costs, a more expensive material may sometimes be used up front if it increases recovery value at the product's end-of-life.

This program has resulted in the recovery of millions of pounds of metals and plastics and in the remanufacture of 30,000 tons of returned machines. In 1997, it saved the company $40 to $50 million. The success of this program depends on well-established communication between design and asset recovery engineers.[9,10]

Some computer manufacturers including **Dell** and **Gateway** have substantial corporate leasing programs. When the used equipment is returned to the manufacturer it may be re-leased, disassembled for parts, or sold to secondary markets. Dell markets their "Asset Recovery Program" as a service to large customers who are upgrading their systems on a regular basis. The customer is freed of the costs and hassles of disposal. Dell manufactures all their computers for serviceability, disassembly, and reuse. The design of the equipment makes refurbishing and reclamation of parts easy.

Whatever the original motives of the program, the net result is product stewardship to the extent that the costs of end-of-life management are incorporated into the cost of the product. This has led to design changes that minimize these costs.[11,12]

Product Take-back - Negotiated Agreement

In October 2000, **Sony Electronics** and **Waste Management, Inc**., announced the launch of an electronics recycling program in Minnesota, the first of its kind in the U.S. Through this program, Sony brand electronics and personal-computer equipment is accepted free of charge at

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[9] EPR: A Materials Policy for the 21st. Century, Bette Fishbein, INFORM, Inc., 2000
[10] WasteWise Update. Extended Product Responsibility, EPA October 1998
[11] Ibid
[12] Dell webpage www.hp.com/us/en/biz/services/asset_005.htm

sites owned by Waste Management Inc. This program is a five-year recycling agreement that enables the take-back of all Sony electronic products in Minnesota, making Sony the first manufacturer in the U.S. to be part of such a recycling initiative. In the past two years, Waste Management, through its Asset Recovery Group, has opened a network of eight e-scrap facilities across the country that sort and recycle more than 60 million pounds of e-scrap per year.

This program is the outcome of a product stewardship policy developed in 1999 by **Minnesota's** Office of Environmental Assistance, and a pilot electronics recovery program initiated by the State, Sony, and Waste Management.[13]

This recycling program successfully reallocates end-of-life management costs from local government and taxpayers to manufacturers. For this to be truly product stewardship the program costs will need to be incorporated into the cost of the product, and Sony will need to consider design and material changes that will not only reduce recovery costs, but reduce environmental impacts.

Product Take-back - Mandated

In **Italy** a 1996 waste management decree required industry to develop take-back programs for washing machines, televisions, and computers. In 1997, Italy also began a take-back program for refrigerators–a "joint responsibility" model with government funding collection centers and producers paying the costs of recycling.[14]

In **Japan**, product stewardship legislation for electric and electronic equipment was passed in May 1998. Implementation was required by 2001. Initially, take-back of refrigerators, air conditioners, TVs, and washing machines will be required, with the possible expansion of the program later to include other products.

Unlike the European countries, which preclude end-user fees for take-back, Japan is permitting industry to cover its actual costs by charging end-users for the service. Japan's Ministry of International Trade and Industry estimates the fees as follows: $37 per refrigerator, $30 per air conditioner, $22 per TV, and $18 per washing machine. Japanese manufacturers are running pilot collection and recycling projects in anticipation of the product stewardship mandate.[15]

The **European Union's** Draft Directive on Waste Electric and Electronic Equipment requires recovery and recycling goals, and removal of heavy metals and hexavalent chromium from electronic products. It seeks to establish design and labeling standards to make recovery easier. The E.U. circulated a first draft of the directive in April 1998. The directive covers a very broad range of electric and electronic products, including household appliances; communications, information, and lighting equipment; clocks; toys; and electric shavers.[16]

The challenges and benefits of these programs are yet to be fully learned. In anticipation of implementation, products have been redesigned for easier disassembly and recycling, and

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[13] Minnesota Office of Environmental Assistance webpage www.moea.mn.us
[14] Fishbein in Pollution Prevention Review,1998 Op Cit
[15] Fishbein, What Does it Mean? Where is it Headed? Op Cit
[16] Fishbein in Pollution Prevention Review, 1998 Op Cit

collection infrastructures are being tested. The costs of managing older equipment, which was not designed for recovery, will pose a significant problem.

Carpet

Product as a Service (Leasing)

The carpet manufacturer **Interface** has incorporated product stewardship into the way it does business with its Evergreen leasing program, carpet maintenance service programs, and 100 percent recyclable product. This program evolved from internal employee initiative and the leadership of their CEO.

Under the original program launched in 1995, the producer was responsible for purchasing, maintaining, and replacing the carpet tiles over the period of the lease, and recycling them at the end-of-life. The program has been redesigned over the years to make it more economically competitive. The goal of sustainable business management has led to considerable experimentation and innovation in the company.[17]

Other carpet manufacturers such as **Milliken** and **Collins and Aikman** (C&A) also have take-back programs and refurbish used carpet. Milliken's Earth Square carpet line is refurbished through a process that cleans the once-used carpet with water only and then the clean carpet is reprinted. Milliken claims this is a 3-step process versus the 39 steps required to recycle carpet. C&A specifically guarantees that a carpet will never be landfilled or incinerated. Recovered carpet is remanufactured into a 100 percent recycled-content carpet backing.[18]

Product Take-back - Negotiated Agreement

The Midwestern Workgroup on Carpet Recycling, a joint project of the states of Minnesota, Iowa, and Wisconsin, was tasked with the development of a product stewardship solution for discarded carpet that does not rely on government financing. Workgroup participants included carpet and fiber manufacturers, NGOs, recyclers, and local governments. Carpet was selected, at least in part, because of the innovative programs already in place in the industry.

The workgroup agreed to the creation of a third party organization--sponsored and organized by manufacturers--to negotiate and implement a program to eliminate land disposal and incineration of postconsumer carpet and to establish goals for recycling, reuse, and procurement.

A Memorandum of Understanding was signed in January 2001 by the Carpet and Rug Institute and the Minnesota Office of Environmental Assistance to move forward with carpet product stewardship efforts. The workgroup identified reuse and recycling rates as the primary emphasis for the negotiated outcomes discussions. Other things to be negotiated include recycled content in carpets and government procurement.

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[17] Fishbein, EPR: A Materials Policy for the 21st Century, OpCit
[18] Ibid

Hazardous Materials

Product Take-back - Mandatory

British Columbia has established an innovative take-back program for unused paint, used oil, flammables, and other hazardous materials. Legislation required manufacturers to establish a recovery system, but left it up to them to design the most efficient and manageable system. The industry created a nonprofit organization to manage these materials. There are now over 100 collection depots located throughout the province and a central processing facility operated by an industry supported organization.

The **Rechargeable Battery Recycling Corporation** (RBRC) is a third-party organization established by battery manufacturers in 1994 to collect and recycle used nickel-cadmium (Ni-Cd) batteries. Founding members include **Panasonic, Sanyo, Eveready, SAFT** and **Varta Batteries**. RBRC was formed as a cooperative partnership between industry, government, and consumers after laws in several states imposed (or proposed to impose) a variety of battery management standards. Rather than deal with the burden of multiple, nonstandardized rules, RBRC pushed for national battery management standards, which resulted in the Rechargeable Battery Management Act of 1996. A fee is paid by member firms to RBRC based on the weight of battery sold or incorporated into a product. This fee completely funds the system that collects used batteries and returns the valuable recovered materials to the battery production market.

The program accepts batteries from over 20,000 retailers and other consolidation points for recycling. Its goal is to recycle 70 percent of used Ni-Cd batteries by 2003. The result of this program is a reduction in the amount of Nickel and Cadmium entering the waste stream.[19,20] RBRC has now expanded its program to include small sealed lead-acid, nickel-metal-hydride, and lithium chemistry batteries.[21]

Packaging

Product Take-back Requirements

In **Germany**, a 1991 law required manufactures to pay for collecting and recycling packaging materials. The packaging law requires that retailers "take back" primary packaging at the point of sale and recycle it outside the municipal waste management system. Manufacturers responded by creating the Duales System Deutschland (DSD) or “Green Dot” program. The DSD is a nonprofit company that licenses its logo--the green dot--for a fee. Packages bearing this symbol are collected, sorted, and directed to recyclers by the DSD. Fees are based on the material type and weight of the package and are paid by the "filler"--usually the owner of the product brand name.[22]

Other European countries soon followed Germany’s lead, and in 1994 the **European Union** developed a directive on packaging to create consistency between national laws.

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[19] EPA Waste Wise Update, Op Cit
[20] RBRC webpage www.rbrc.com
[21] Ibid
[22] Ibid

Initial challenges included an oversupply of recyclable packaging which overwhelmed the existing recycling infrastructure, and use of the Green Dot by companies who had not paid the licensing fee. Changes in the fee structure and funding mechanism have made the system economically sustainable, and in addition, there was an overall 11% reduction in packaging generation during the first four years. Costs have been reallocated to the products, and to the consumers that buy them, away from municipal waste management costs.[23]

Critics argue that the system puts too much emphasis on recycling and end-of-life management and not enough on source reduction and reusable packaging alternatives.
A more recently developed program in **Denmark** addresses this criticism. The program has been restructured so that fees are based on life-cycle impacts rather than recyclability alone. This new idea is now being incorporated into the **European Union's** Integrated Products Policy.

Vehicles

Design for the Environment

Led by Germany's producers, European vehicle manufacturers have been planning for the advent of end-of-life vehicles (ELV) since the early '90s, redesigning their vehicles for disassembly and recycling. Strategies include increasing recycled content, reducing the number of plastic resins, labeling plastics, marking parts to permit draining of fluids (so recycling feedstock is not contaminated), and using fasteners that facilitate disassembly.
In fact, vehicles are an excellent example of how product stewardship can have an impact on product design.

In **Sweden**, legislation was passed in 1996 requiring product stewardship for vehicles. In a joint project with the International Institute for Industrial Environmental Economics at Lund University, the Swedish car industry developed a proposal to implement the requirements that also promotes product innovation. Under this system, all car manufacturers pay a uniform fee that is charged with the sale of a new car. The fees are paid into a centralized fund. Each car manufacturer negotiates an agreement with authorized dismantling and recovery companies regarding the handling of worn-out vehicles. When the time comes to scrap a car, the last owner hands in his car to an authorized receiving facility where the car is scrapped according to the methods specified by the car industry and the minimum requirements specified by the authorities. Costs are covered from the car producer's fund share. End-of-life management is thus free of charge for the car owner.[24]

Even in the United States, where no product stewardship policies are in place for ELVs, marketing goals and the desire to preempt product stewardship legislation can lead to design innovations. For example, members of the voluntary Vehicle Recycling Partnership (which includes Chrysler, Ford, and General Motors) are working on design changes that would make it easier to recycle discarded vehicles.

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[23] EPR. What does it mean? Where is it Headed?, Bette Fishbein, in Pollution Prevention Review, Autumn, 1998
[24] Case Study of the Swedish Automobile Take Back Requirement, Thomas Lindhqvist and Eric Ryden, Lund University, 1998

The Vehicle Recycling Development Center (VRDC) is a joint research project of **Chrysler Corporation**, **Ford Motor Company,** and **General Motors Corporation** formed in 1991 to develop automotive recycling technology. The VRDC is managed by the Vehicle Recycling Partnership, one of the United States Council for Automotive Research research teams. Other collaborators in the VRDC include the Automotive Recyclers Association, the American Plastics Council, and the Institute for Scrap Recycling Industries. Since becoming fully operational in January of 1994, the center's efforts have focused initially on the areas which account for the bulk of the 25 percent of the vehicle yet to be recycled--fluids and plastics.[25]

The results of the research should lead to car redesign that will increase reuse and recyclability of automobile components.

Product Take-back - Mandate/Negotiated Agreements

The **European Union** directive on ELV is still evolving. The current draft holds manufacturers responsible for take-back and mandates recycling rates of 80 percent and 85 percent ,respectively, for vehicles that go on the market after 2005 and 2015. Recovery targets are 85 percent for 2005 and 95 percent for 2015.

A number of countries with product stewardship policies for vehicles already in place have recycling and recovery targets similar to those under consideration by the E.U. Both **France** and **Germany** have negotiated ELV take-back agreements with industry, and Germany passed legislation in 1998 to facilitate enforcement.

The above examples are only some of the many existing product stewardship programs. The number and quality of programs and participants from all sectors show that product stewardship is by no means an untried or unviable approach, but rather one of the most important and successful new strategies for environmental protection and sustainable production.

Opportunities and Challenges

Our planet cannot sustain the current level of economic growth and at the same time maintain a healthy environment. We are living well beyond the earth's carrying capacity at the expense of the environment. If we are to maintain our current standard of living, our primary economic goal must be to use our resources more efficiently. Improving resource productivity is a challenge however, because the economies of the United States and other industrial societies were established under the belief that resources were limitless. Many layers of government policy, economic incentives, and traditional practices encourage waste and discourage the efficient use of resources. The value of these wasted resources is enormous. We have an opportunity to gain much by treating wastes as resources and reducing the inefficiencies supported by our current economic system. Product stewardship is one environmental management tool that can move us

[25] USCAR webpage www.uscar.org/techno/vrp1.htm

toward resource efficiency; however, there are many challenges as well as opportunities in its implementation.

Human Health and Environmental Protection

Opportunities

Protection of Land, Air, and Water: Product stewardship leads manufacturers to consider the entire life-cycle impacts of a product and its packaging. This includes energy and materials consumption, air and water emissions, the amount of toxic materials in the product, worker safety, recyclability, and waste disposal during product design. These considerations will lead manufacturers to take increasing responsibility for impacts of that product. By integrating sustainability principles and resource efficiency into our consumer culture, we can begin a transition away from the end-of-pipe practice of waste disposal toward a process that maximizes recovery of resources, eliminates toxic materials, and prevents pollution to all environmental media.

Product Stewardship Reduces Risk to Human Health: Currently, local government programs are educating people about ways to reduce their use of toxic and hazardous materials and are offering some level of collection for moderate risk wastes (generally hazardous wastes generated by households and small businesses). Despite efforts to handle the hazardous wastes differently and apart from solid wastes, some quantity of moderate risk waste does inadvertently end up in landfills around the state. Additionally, some people continue to misuse and improperly store or dispose of hazardous products.

A well-developed product stewardship strategy can facilitate the development of a waste management system that is more protective of human health and the environment. Product stewardship should provide manufacturers with an economic incentive to reduce the toxicity of the products they make. This benefits human health by reducing exposure to toxic materials for every person that touches the products including the workers who manufacture them, the consumers who use them, and the workers who recycle or dispose of them.

Challenges

Pressing Environmental Impacts Are Not Understood or Accounted For: Waste problems cut across all environmental issues, resulting in resource depletion and pollution of air, land, and water. It is understood that waste disposal contributes to pollution. What is not well understood is that waste has upstream environmental impacts as well, and these impacts dwarf pollution resulting from waste disposal.

- **Current Waste Reduction and Recycling Programs Aren't Enough:** Traditional waste reduction and recycling programs aren't enough to relieve the full life-cycle impacts of product development, use, and disposal. Although waste reduction is the state's priority waste management strategy and has had some impact on consumer choices, per capita generation of waste has increased. Waste reduction efforts as they are now employed cannot compete with the increase in the quantity and complexity of municipal solid waste (MSW) produced in Washington.

- Recycling, although not the state's highest priority waste management strategy, has been the focus of many local and state programs. Although a lot of progress has been made, the recycling rate has not increased in the last four years. The greater effort required to remove additional recyclables from the MSW, poor market conditions, and increasing MSW generation are all roadblocks to increased recycling.

Economic Issues

The generation of waste and pollution represents economic inefficiency, lost resources, and a long-term economic burden for communities required to manage, treat, remediate, detoxify, or control these wastes.

Opportunities

Lifting Taxpayer Burden: The true cost of managing materials at the end of their life is seldom reflected in the costs of producing the materials. The result is that the taxpayer, rather than the producer or user of the product, must pay for some of the product development, use, and disposal costs of the product. Product stewardship approaches shift the burden from the taxpayer to those that produce and use the product.

Solving Environmental Problems at a Profit: Transitioning to a new solid waste system based on principles of sustainability and resource conservation can solve environmental problems at a profit. There is enormous opportunity for saving both resources and money through increased efficiency. According to Paul Hawken, Amory Lovins, and Hunter Lovins, "it is conceivable that as much as one-half of the entire [U.S.] GDP is attributable to some form of waste." Waste costs the economy money and eliminating waste thus potentially offers a sum of cash that could be devoted to other purposes such as relieving local governments of the burden of financing and managing the waste disposal system.

Product Stewardship Encourages Business Innovation: Product stewardship is a tool for creative capitalism and an opportunity to encourage business innovation. Many companies have found that extending responsibility to additional stages of the life cycle resulted in product innovations that saved money through more efficient manufacturing. Taking back products provides the producer with feedback about product inefficiencies and other problems that can drive positive product design with built-in incentives to do so. Case studies documented by the University of Tennessee, Center for Clean Products and Clean Technologies, showed that focus on end-of-life management for refrigerators and computers led the manufacturers to reduce the number of parts and the number of materials used in the products, resulting in cost savings. The focus on designing for disassembly to simplify recycling also led to faster and cheaper assembly during manufacturing.

Waste as a Resource: Many business and academic leaders are recognizing the benefits of treating waste as a resource instead of "trash." Case studies published by the University of Tennessee's Center for Clean Products and Clean Technologies demonstrated that cost savings have sustained many take-back and recycling initiatives employed by industry. Some companies in the electronics industry have discovered that they can make money by recovering and reusing valuable components and recycling high-priced metals.

Customer Loyalty: Some product manufacturers see product stewardship techniques such as upgradability and product take-back as a means to increase customer satisfaction and loyalty. If a computer is easily upgradeable, it is more likely that the customer will remain loyal to the brand. If the problem of what to do with the computer when it is no longer wanted is resolved by the producer, the customer is more likely to consider purchasing a new computer from the same company. There is also an opportunity to attract new customers for those companies that can market the "green" attributes of their products and their overall company ethic.

Product Stewardship Infrastructure Can Create New Jobs: Product stewardship has the potential to create new jobs because much of the infrastructure will be labor intensive. Activities that protect, conserve, restore, and enhance natural resources and biological systems while creating jobs improve the long-term strength of Washington communities.

Challenges

Change in Economic Infrastructure to Incorporate Product Stewardship: The full cost of a product, including waste management systems, must be recognized and shared by all who benefit from product development, consumption, and appropriate waste management. This is a complete departure from our current system where product development costs are kept separate from municipal waste management costs.

Funding for Current Waste Management System Relies on Waste Generation: Our current system is funded by the disposal of waste, which creates a disincentive to eliminate or reduce waste.

Industry Not Receiving Appropriate Price Signals: Industry is in the prime position to make decisions about resource efficiency investments but under the current system they do not receive the right price signals. Price signals are absent or inaccurate because of government subsidies and resource giveaways for extractive industries, costs of inefficiency that are externalized, and failure to compensate those who find efficiencies. If producers are not responsible for their products from cradle to cradle, they have no incentive to design the product or the recovery system.

Reliance on Virgin Materials: Extractive industries argue that cheap resources are essential to our economy and that removal of extractive subsidies will have severe economic impacts. Their argument rests upon the viewpoint that virgin material production is fundamental to all economic activity and has no competitors. Although this may have been true at the beginning of the industrial revolution, today world economies do not rely solely on extraction of resources still left in the earth and forests.

Infrastructure Development: The development of appropriate infrastructure for collection, storage, and handling of end-of-life products will be very challenging and will require comprehensive thought to avoid piecemeal approaches that will lack effectiveness and efficiency.

Price and Convenience Drive Consumer Choices: The majority of consumers are motivated by price and convenience and to a much lesser extent by sustainability concerns. There is a perception that internalizing the life-cycle cost of a product will result in higher prices for consumer products and will negatively affect the ability to move product stewardship efforts forward.

Consumer Demand or Effective Marketing Influence: Some challenge that business will move on the issue of product stewardship only when the consumer asks for it. This is contrary to advertising techniques which bombard consumers with messages that influence purchasing decisions contrary to product stewardship. The question arises: Are consumer demands driving product development or are product advertising messages driving consumer demand?

Regulatory and Policy Issues

Opportunities

Avoiding Costly Regulation: If a manufacturer is not emitting dangerous substances it will avoid regulation and thus have an advantage when competing with companies contending with regulations. This reduces cost for the regulated and the regulator.

Challenges

Current Rules and Regulations Impede Product Innovation: Existing industrial standards, procurement specifications, building codes, and other rules often impede innovation. Examples include:

- Facility-based environmental regulations focus company resources on compliance and downstream improvement.
- Some hazardous waste regulations could make it more difficult to implement take-back programs.
- Antitrust laws can make it difficult for companies to cooperate on initiatives that may optimally require an industrywide solution.

Avoiding a Patchwork of Policy and Regulation: Current product stewardship efforts by different states could create a potential patchwork of policy and regulation. Several states have introduced or are planning legislation and guidance for the management of products at the end of their useful lives. Some of these are voluntary programs, others are mandatory, and they may require different methods of handling, disposal, and tracking. Product stewardship programs must account for regional differences while avoiding a patchwork of policies and systems that reduce efficiency and effectiveness. States and industry may find it advantageous to work together to avoid creating a patchwork of regulations for industries. Areas for regional cooperation could focus on developing a regional product stewardship policy, creating a uniform regulatory environment for materials moving between states for reuse or recycling, creating and strengthening regional markets for recycling or reusing products, and consistent national labeling standards.

Prescribed Product Stewardship Goals May Stifle Innovation: Some approaches to product stewardship can be seen to stifle innovation. Although some product stewardship strategies command a uniform approach to be followed by all participants, a balance must be achieved between the need to be uniform and allowing industry to come up with creative solutions. Performance-based product stewardship goals developed with industry involvement may help overcome this challenge.

Difficulty in Establishing Responsibility: There are many potential partners in implementing product stewardship. Business, retailers, consumers and state, local, and federal government all have a responsibility in the system. But establishing who is responsible and to what degree will have to be negotiated and will be challenging.

A Vision of the Future

The following imaginary speech has been constructed to help conceptualize the future that product stewardship initiatives hope to bring about. Believe for a minute that the following speech will be delivered on Earth Day 2050 by your granddaughter. The occasion is the opening of a time capsule buried on her college campus on Earth Day, 2000.

It has been 50 years since this capsule was buried. Though increasingly invisible to us now, there has been a substantial shift in the accepted thinking of our economy and society. It was once assumed that businesses made things, consumers bought them, and then governments and taxpayers paid to throw the unwanted remains in a pit. This sounds odd to us now, in a world where the producer-consumer relationship extends from a product's conception through its death and reincarnation. Government's role today is largely as a servant to this relationship, leveling economic playing fields so that producers and distributors of goods ***prosper*** from their environmental decisions, rather than finding themselves at a competitive disadvantage.

But consider this. In the fifty years before this capsule was buried, our society witnessed rivers that burned from their polluted burden, increasing rates of pediatric asthma, a puncture in the earth's ozone layer, the extinction of several animal species, and human cancer clusters surrounding electronic manufacturing sites. Yet better judgement and business innovation came to pass on these issues and, more broadly, on the wasting of natural resources and the use of toxic materials in general.

Weaning ourselves over the past 50 years from the successes and spoils of the industrial and information revolutions did not come easily. When this time capsule was buried in the year 2000, such progress seemed as impossible as the removal of lead from computer monitors, the elimination of mercury from fluorescent lights and kids sneakers, and the triumph of fuel cell technology over internal combustion engines. Few dreamed that local governments and taxpayers could be alleviated of the financial burden of waste disposal costs, and instead the costs of environmental protection would be incorporated into the cost of each product. Few hoped for an economic playing field where producers would have financial incentives for improving the life-cycle environmental design of their products.

But a clever economic restructuring of our economy evolved in the first two decades of the twenty-first century that harnessed private sector ingenuity and put it to work in the service of environmental protection. Certainly local and state government continued to play a role in providing some of the infrastructure for this system, but the funding came from manufacturers and consumers rather than from a rate base. And disposal costs to the public and businesses all but disappeared.

The first item out of the time capsule today is a document outlining the four principles of what was then called "product stewardship." These principles were adopted by the state of Minnesota, a pioneer in early U.S. product-oriented policy development. Common sense business practices now, these principles were not integral to product design 50 years ago. The principles stated simply that the economic structure of the exchange of goods in the marketplace should inexorably result in:

- The conservation of resources.
- The minimization of waste.
- The minimization of production toxicity and hazardous constituents.
- The reduction of costs to government to manage products no longer useful.

Long ago local governments and taxpayers covered the costs of handling products that reached the end of their useful lives. Manufacturers at the time had little reason to worry about the environmental design of those products, their recyclability, or their toxicity. Manufacturers never saw the products again.

But once environmental-costing and product take-back schemes came to the fore and business had an economic incentive to minimize waste and toxicity, the ingenuity and power of the marketplace took over, and further government regulation became superfluous.

For example, look at this next item. This CD player relied on tangible, plastic media and is incompatible with today's world-standardized, self-upgrading operating system. Furthermore, it was virtually impossible to disassemble, contained twelve plastic resins, utilized lead solder, was shipped in petroleum-based cushioning, contained mercury in the backlight, and required toxic batteries. I imagine CD players are as archaic to us now as so-called "wax cylinders" and "eight track tapes" are to my grandpa.

Even if the manufacturer had taken this device back at the end of its life, there would have been little to do with it. No surprise then when, in 2020, after manufacturers agreed to assume responsibility for environmental design and end-of-life product management, the shape of such devices changed dramatically. When industry had an incentive to design products for the environment, innovation flourished and our current Product Reincarnation Policy framework began to take hold.

It makes sense when you think about it. Why did neighbors ever have to pay a waste management rate that charged them to cover the costs of throwing out something they did ***not*** buy, but their neighbor did? Why at one time did businesses unhesitatingly include in the price of their product the costs for raw materials, land acquisition, worker safety, and consumer safety

compliance, but not include the cost of properly handling the product at the end of its life or using less toxic materials?

We have come a long way in 50 years. Products no longer have warning labels on them, both computer mice and rodent mice are biodegradable, and I do not need to fear for the health of the workers who make my children's toys or the workers who take those toys at end-of-life and remanufacture them into a value-added product. To paraphrase a long forgotten academic who spoke so presciently at the end of the twentieth century, waste must indeed equal food.

Recommendations

- The State Solid Waste Management Plan should endorse product stewardship as an important and perhaps preferred waste management tool, and should include clearly articulated product stewardship principles
- The State Solid Waste Management Plan should lay out a process and timeline for the development of a statewide product stewardship policy.

The State Solid Waste Management Plan should endorse product stewardship as an important waste management tool, and should identify specific product stewardship principles.

Product stewardship Principles define the general goals and expectations of product stewardship and provide the framework for development of a product stewardship policy. The principles drafted by the state of Minnesota or the national Product Stewardship Institute could be used as a model. The following principles are from Minnesota.

1. All parties who have a role in designing, producing, or selling a product or product components assume responsibility for achieving the following goals:

a) Reducing or eliminating the toxic and hazardous constituents of products and product components.
b) Reducing the toxicity and amount of waste that results from the manufacture, use, and disposal of products.
c) Using materials, energy, and water efficiently at every stage of a product's life cycle, including product design, manufacture, distribution, sale, use, and recovery.

2. All purchasers and users are responsible for reducing the amount of toxicity and waste that result from their use and disposal of products and for using products in a manner that conserves resources.

3. The greater the ability of a party to influence the life-cycle impacts of the product, the greater the degree of responsibility the party has for addressing those impacts.

4. Parties responsible for addressing environmental impacts of products have flexibility in determining how to best address those impacts.

5. The costs of recovering resources and managing products at the end-of-life are internalized into the costs of producing and selling products, so that those costs are not paid for by government.

6. Government provides leadership in product stewardship in all its activities, including, but not limited to, promoting product stewardship in purchasing products, making capital investments in buildings and infrastructure, procuring services, and ensuring products are recycled or properly managed at the end of their useful lives.

The State Solid Waste Management Plan should lay out a process and timeline for the development and adoption of a statewide product stewardship policy.

The Department of Ecology should provide the leadership necessary to facilitate the development of a product stewardship policy that would establish a process for selecting products, setting targets, establishing timelines and developing strategies that will move Washington toward greater product stewardship. The State Solid Waste Management Plan should lay out a process and timeline for the development and adoption of this policy. The policy should address the following elements:

Selection of Priority Products

Most product stewardship programs target a specific product or material because all products and materials require different resources and involve different stakeholders. It is recommended that Ecology work with local governments to develop criteria and then select priority products.

The selection of priority products should be coordinated closely with other states, the Northwest Product Stewardship Council, and the National Product Stewardship Institute. A unified effort among many states will be more productive than isolated efforts. The states of Minnesota and Oregon have used the following criteria for selecting priority products for their states. The products selected must demonstrate one or more of the following characteristics:

- Contain toxic or hazardous constituents.
- Be banned by statute or rule from disposal within MSW;.
- Pose a threat to the safe or efficient operation of a solid waste facility or the solid waste system.
- Place significant economic burdens on the state or political subdivisions for end-of-life management because there is a significant amount of the product in the waste stream or because the nature of the product makes it difficult to manage in the existing integrated solid waste system.
- Possess significant potential for increased reuse and recycling.

Creation of stakeholder groups to develop product stewardship programs for priority products

The policy should provide a timeline for the formation of stakeholder groups for each of the priority products. The following stakeholders should be included: manufacturers, processors, end-users, retailers, nongovernmental organizations, consumers, state and local governments, and EPA. Roles should be identified for each stakeholder.

Development of Product Stewardship Implementation Plans

Stakeholder groups will be tasked with the development of product stewardship programs for each. The group will be required to define the roles and responsibilities of all the stakeholders, to set goals, and to develop a strategy and schedule for achieving those goals. The group will be required to come up with a program plan within a specified period of time, and the program must be designed such that end-of-life management costs are not borne entirely by governments.

Methods for Tracking and Evaluating Progress

The State Solid Waste Plan should require a mechanism to evaluate the effectiveness of product stewardship implementation programs. Lessons learned from this evaluation process should be factored into each new product stewardship initiative. In addition to assessment of product initiatives and their effectiveness, regular evaluation of the product stewardship principles, processes, and measurement tools that these initiatives are based on or driven by should be performed.

Roles and Responsibilities

The state product stewardship policy should identify who will be responsible for the elements describe above. The State Solid Waste Management Plan should designate the Department of Ecology as the lead for facilitating the development of the product stewardship policy. Ecology should coordinate the effort, ensuring that all stakeholders are invited to participate in the process and that work to develop product stewardship policy and programs is coordinated regionally and nationally.

ISSUE PAPER #9—LANDFILLS

I. INTRODUCTION AND PURPOSE

The primary means for final disposal of solid waste is landfilling. Landfills around the state (and even in other states) provide the final resting place for excess materials, things with no value or simply no other place to go. Of the measured portion of solid waste generated in Washington that is not recycled, 91% goes to some type of landfill. [1]Stringent landfill design, construction and operation standards are in place to protect soil, surface and groundwater, air and habitat from degradation. Today's landfills are state-of-the-art and are as protective of human health and the environment as we can possibly make them.

While various levels of state standards have been in place for landfills for nearly 40 years, in retrospect it is clear that they were not always protective enough of human health and the environment. Before statewide landfill standards were in place, some local health jurisdictions around the state were already regulating landfills. These older landfills, while no longer operating, have not gone away. Some of these sites have left a pollution legacy behind for future generations. Local officials believe that many sites have yet to be discovered.

Washington is in a period of transition between the landfills of the past and present to landfills of the future. Prior to 1970, there were over 1,000 older landfills operating as documented from an Ecology survey. By the mid-1980's, there were 250 operating landfills. Since 1991, the number of active Municipal Solid Waste (MSW) landfills in the state has dropped from 45 to 22.[2] This downward trend is expected to continue. The primary reasons for this are considered to be:

(1) current landfill siting and design standards,
(2) the cost to meet the siting and design standards,
(3) the standards resulting in higher construction, operation and closure costs,
(4) lack of available capacity in urban areas resulting in long haul of solid waste from urban areas to large private landfills in rural areas and,
(5) considerable costs of constructing and operating small landfills for rural communities resulting in long haul from these communities to large private landfills.

Appropriate sites for landfills are difficult to find, especially on the wetter western side of the state. Landfills are not being developed to serve individual jurisdictions but to serve a more regional scale. As an example, the Roosevelt Regional Landfill in Klickitat County handles municipal solid waste from 32 counties in the state and numerous areas out of the

[1] *Solid Waste in Washington State- Ninth Annual Status Report*, Publication #00-07-037, Washington State Department of Ecology, December 2000,
[2] Ibid.

state.[3] Waste is long-hauled, either by truck or by train, to the facility. It is a privately owned landfill and has 71% of the state's existing sanitary landfill capacity.[4]

The trend toward large regional landfills that involve long-haul transport of waste has emerged in response to regulatory and market conditions. It was not necessarily a policy goal for the state. As the trend continues (King County plans to long-haul after its Cedar Hills Landfill closes in 2012, for example), it is important to continue to evaluate the human health, environmental and economic impacts of longhauling. Given that we are still reliant on landfills for end disposal, and will be for some time, it is our responsibility to ensure that disposal is managed in the most protective ways possible. Ideally, the state should encourage taking ownership of the solid waste we generate as individuals within our local communities whenever possible. Regardless of where our waste ends up, we all share collective responsibility as stakeholders of the state's waste management. This discourages the "out-of-sight, out-of-mind" mentality and encourages waste reduction and recycling.

The past decade of moving to longhauling is raising questions about the immediate cheapest way to dispose of waste versus the long-term cheapest disposal. Another question being raised is about how long-haul impacts other parts of the solid waste system, such as recycling or other waste reduction efforts. These questions should be addressed in the state solid waste plan.

This issue paper describes the problems and opportunities for addressing closed and existing landfills, based on minimizing risks to human health and the environment. It also lays out principles for future landfilling.

II. CURRENT STATUS, PROBLEMS AND/OR BARRIERS AND OPPORTUNITIES

Identify Landfill Sites

Each county in the state of Washington has a legacy of abandoned, closed and active landfills. Many of these landfills were developed prior to the full recognition that there were potential health and environmental risks associated with the method of disposal employed at the time the landfill was active. Regulations were developed to be more protective of human health and the environment. Landfills were designed with more safeguards as society and solid waste managers gained a greater understanding of the science of waste management. For example, today's regulations require identifying and tracking existing and future landfills.

Some of the closed and abandoned sites are not being evaluated due to lack of funding and lack of consistent regulatory oversight. Also, sometimes just collecting data on a site leads to liability and burdensome lawsuits that can further deplete limited funding

[3] Ibid.
[4] Ibid.

sources. The potential cost to investigate the impacts and implement a cleanup plan could also strain the financial resources of those potentially liable parties (PLPs).

A strategy for identifying and assessing the closed and abandoned landfills needs to be developed because of increasing pressure for development and the need to protect human health and the environment.

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Challenges to Identifying and Tracking Past, Present and Future Landfills:

- Records often unavailable or incomplete.
- Liability concerns
  - Not notifying property owner sooner
  - Misidentifying location of landfill
- Location of domestic wells in relation to property boundaries (chapter 173-160 WAC)
- Deed Notifications and Restrictions have been inconsistently applied
- Disclosure laws that differ for residential and non-residential use (RCW 64.06.010 and –020)
- Diminishing land for redevelopment

Strategy for Identifying and Tracking Landfills:

- Locate and review files
- Conduct site visits to confirm location
- Notify all current owners that have confirmed or suspected landfills located on their property
- Educate the owners on the potential impacts of the landfill
- Identify all domestic wells located within 1000 feet of the landfill property boundary
- Develop GIS map to locate parcel and wells
- Provide information to local planning departments
- Review any existing data
- Record deed restrictions, as appropriate
- Prioritize sites for further investigation

Site Ranking

Ecology's Toxic Cleanup Program (TCP) evaluates sites, including landfills, using the Washington Ranking Method (WARM) as a primary tool to prioritize sites. Sites are ranked from 1 to 5 with 1 as the highest priority. TCP does consider other factors when setting priorities to select sites that Ecology staff will work on. Other factors are listed in TCP policy number 340 and include contaminant pathways, listing on the National Priority List, resource commitments of Ecology, pre-paid agreements with Ecology, public concern, and potentially liable party readiness, to name a handful. A site does not always have to be ranked a 1 for Ecology to work on it.

Ecology also provides grants to local health jurisdictions through the Remedial Action Grant program to assist with initial investigations of potentially contaminated sites and to make recommendations on the ranking of contaminated sites through Ecology's site hazardous assessments (SHA) program. In some cases the health jurisdictions may not perform a SHA on landfills if they feel there is a conflict of interest (such as they permitted them, operated them, or county pays staff salaries). Such sites would therefore default back to Ecology to rank.

Once a site is ranked, it is placed on the Hazardous Sites List (see TCP policy 330A). This list is updated every six months. As cleanup activities progress at sites, the ranking does not change but the current status of remedial action may change, depending on the level of investigation, interim actions, and cleanup actions conducted at the site. TCP also has a policy on removal of sites from the hazardous sites list (see TCP policy 330B). Additionally, there is an interest in modifying the Model Toxics Control Act (MTCA) language to allow landfills to obtain a No-Further-Action (NFA) designation.

In Ecology's Northwest Region alone (a 7 county area) there are about 200 closed and abandoned landfills of which 69 are on Ecology's SIS list and 20 have been ranked. Of the ranked sites, 8 are actively being worked on under formal orders (2 under Superfund) and 3 are in the voluntary cleanup process. There are also 2 landfills that are not ranked but are in voluntary cleanup process. Because of the number of sites and limited funds to conduct site characterization to evaluate human health and environmental impacts at all sites, it is hard at one point in time to prioritize landfills for cleanup activities.

Investigations and Cleanup

The MTCA Process: In the introductory paragraph of a Department of Ecology Focus Sheet published about the Model Toxics Control Act (MTCA) it is stated: "The Cleanup of hazardous waste sites is complex and expensive. In an effort to avoid the confusion and delays associated with the federal superfund program, the Model Toxics Control Act is designed to be as streamlined as possible. It sets strict cleanup standards to ensure that the quality of cleanup and protection of human health and the environment are not compromised. At the same time, the rules that guide cleanup under the Act have built-in flexibility to allow cleanups to be addressed on a site specific basis."

Although the intent of MTCA was to improve upon the cumbersome Superfund process, the intent has not been fully met. The complexity of fully characterizing each contaminated site under MTCA has inspired some jurisdictions to request that their sites be processed under Superfund to avoid the MTCA process.

There are three approaches to cleaning up landfill sites:

1) Formal MTCA process
2) Voluntary cleanup with some input from Ecology TCP program
3) Independent with possibility of local health agency's direction through the solid waste permit corrective action process

Presumptive Remedies: There have been enough remedial investigations and feasibility studies completed on numerous sites to actually streamline the process. For most contaminated landfill sites, there are only a limited number of possible cleanup technologies (presumptive remedies). The value of spending millions of dollars on studies needs to be evaluated. Many potentially liable parties are willing to clean up these sites but the prospect of spending several million dollars and five years studying the site before ever applying a remedial action is daunting at best.

Landfills are not complicated and remediating a site as soon as possible is in the best interest of the public. Landfill cleanup and closure standards remedies should be established outside of MTCA. Federal, State and local funding on the cleanup of landfills needs to be a priority so as not to further jeopardize human health and the environment.

Grants for Public Entities: Obtaining funding for the RI/FS investigations and cleanups is very difficult for public entities. Ecology funding for old landfill cleanup is tied to a MTCA order if using a remedial action grant. A standard RI/FS analysis under a formal order will cost an average of $2 million.

Private Vs Public Cleanups: Private entities can choose independent cleanup outside the regulatory framework and save significant short-term monies by cleaning up the site to prevent HH/E impacts without consulting Ecology. The risk is that Ecology may not approve the cleanup and the private entity could be held liable for additional cleanup and/or liability at a later date.

Public entities are less willing to take any risks. Cities and counties have a stronger commitment to protect public health and the environment. It is the duty of the municipality to protect human health and the environment. Municipalities typically see old landfills as too risky to the public to ignore. Municipalities are desirous of remediating the site as soon as possible, but typically have funding problems.

III. THE FUTURE WE WOULD LIKE TO SEE

Goal

Protect Human Health/Environment (HH/E): It would be great if landfills in the future would not be needed. Landfills by their very nature are solid waste storage vessels for our future generations to manage. Landfills are necessary and they are the current state-of-the-art method by which many of our communities currently manage the solid waste that is not reused or recycled.

Keeping this in perspective, all aspects of landfills should be designed and managed to the utmost of our abilities. Future landfills need to be designed to be better managed and more protective of the environment. Closed and current landfills need to be reassessed periodically for new methods in order to minimize HH/E impacts.

Assess Risk

Define the Nature and Extent of Environmental Impact: Landfills are risky propositions. Proper management of risk requires an understanding of the nature and extent of their effects on the environment. At a minimum, ground water, surface water, soil, and air must be monitored for contamination. Appropriate pollution control devices should be installed if contamination is occurring. Landfill owners and operators should be proactive in demonstrating that the beneficial use of the surrounding environment media (air, water, soil) are protected.

Landfills may pollute the air. As solid waste is decomposing in a landfill, methane gas and other hazardous gases are generated. Methane gas is a green house concern because it's impact is four times the level of carbon dioxide. Additional monitoring and quantification of the other hazardous gases is necessary for a risk assessment and design of pollution control devices. Gases need to be treated or the landfill should not be allowed to continue to operate.

Prioritize Sites: Closed and abandoned landfills need to be assessed as to their risk to the environment and prioritized for pollution control devices if needed. Local health agencies are the archive keepers of the information. Sufficient level of detail is needed in order to prioritize sites in the counties and within the State.

With limited local and state funds available to address the old closed landfills, governmental agencies need to work together and prioritize the cleanup. By prioritizing the cleanup, all parties involved will aggressively assess the risks and plan to minimize those risks in an orderly responsible manner.

Cleanup Process

More Flexibility to MTCA: The cleanup process needs to be streamlined for some of our older landfills. Several sites closed prior to the promulgation of the Minimum Functional Standards for Solid Waste Handling in 1985 are regulated under the Model Toxics Control Act, WAC 173-340 if they show contamination above cleanup standards. The good news is that the proposed MTCA revisions appear to have some new language that will provide greater flexibility and more site-specific tools. These changes appear to provide mechanisms to more clearly define the cleanup process at older landfills. MTCA and landfill regulations should be periodically updated to provide current tools for protecting human health and the environment and incentives for contamination to be controlled and cleaned up.

Proposed changes to MTCA include the ability to use monitored natural attenuation when appropriate. The rule also has provisions for area-wide designation of groundwater for a beneficial use other than drinking water where appropriate and protective. The risk assessment as well as fate and transport models have been updated so that they are more specific to the characteristics of the site. These models attempt to consider variations among different areas on the same site or can be updated when conditions change due to

on-site or off-site remedial actions. The full benefits of these changes will be tested and proven when they are applied in the "real world".

More One-on-One Ecology Oversight: Landfill owners should be able to rely on the regulatory agencies as technical experts that can guide operation, closure and cleanup activities along an efficient pathway. Ideally, oversight could be provided at an owner level rather than on a site-by-site basis.

More Funding for Ecology: Ecology programs need to be better funded to provide focused and consistent regulatory oversight. If needed, Ecology should have resources to contract out for cleanup review while maintaining oversight.

Use of Grants: Grant programs should be tailored so that complete cleanup actions can be done as opposed to not providing sufficient funding for all phases of the project (investigation to remediation to long-term operation and monitoring). Alternative initiatives should be offered to streamline the cleanup process and reduce fear of the unknown.

Redevelopment Opportunities Incorporated with Cleanup

Open Arms to Developers: The MTCA process needs to incorporate an open arms approach for developers willing to invest in landfill sites for redevelopment. It is vitally important that developers believe the cleanup process will actually end in a reasonable amount of time and that the costs will be definable. There are too many good development opportunities that are easy to do without taking on an environmentally challenged site. To that end, the process must be environmentally sound, reviewed rapidly, worked on without risk of changes in rules during the process, and financially attractive. For those sites that complete the Cleanup Action Plan, consideration should be given to eliminate future cleanup cost liability. Consideration should be given to helping with the cost differential of developing a contaminated site versus a non-contaminated site through an incentive program.

Promote Interim Cleanup Action: The Interim cleanup process should be aggressively encouraged through a proactive partnership as a mechanism that promotes cleanup sooner than later. To that end, grant funding should be expanded to fund interim actions. The possibility of including the private sector as an eligible grant recipient if there is a public benefit should be evaluated. Perhaps the regulatory agency cost to the PLP could be greatly diminished or eliminated based on an expedited timetable for cleanup. The review of plans must also be sped up. Time is of the essence when preventing environmental damage. An important deterrent to moving the cleanup process along is the potential moving target of cleanup standards. MTCA or CERCLA should agree on a cleanup standard at the beginning of the process to eliminate the cost of uncertainty.

Indemnify Local Government and Private Sector in Providing Financial and Technical Assistance: A method to grant indemnification should be investigated. This would allow the process to move along in a more cost efficient and expedited manner. The need to get the best possible plan (RI/FS and cleanup action plan) in the process as

rapidly as possible without the cloud of liability or litigation for participants providing assistance. Delay causes environmental damage and adds cost to the redevelopment.

Future Landfilling

Trends in Landfilling: The present trend is toward regional and privately owned landfills. These landfills present a needed solution and welcome opportunity to communities that for a variety of reasons cannot site their own landfills. However, as regulations continue to escalate, the economy of scale at the smaller community level becomes prohibitive. Communities are economically forced to move away from management of their own waste stream. Future regulatory requirements must maintain balance. Risks cannot be eliminated and too much concern on the side of safety can result in costly overkill. Where possible communities should have incentives and be encouraged to continue management of their own waste streams. The State is challenged to manage both the HH/E risks and the dwindling resources of local waste management.

Reduce Waste and Source Separate Waste: An integrated approach to assuring capacity for the future is dependent on learning new habits and new ways of looking at old problems. However the only real solution for the future is to address the source of the problem through prevention. In the future, waste materials will be seen as a societal responsibility from their manufacturing, consumption, recycling and ultimate disposal. It will take leaders of vision and courage to address the manufacturing process itself. It will take an informed and motivated public to provide a climate of respect for natural resources and environmental goals. The best way to prevent future landfill related problems is to examine what we put into the landfill in the first place. What should and what should not be put into the landfills need to be evaluated.

Future Landfills Will Be Designed To Be Better Managed and More Protective of HH/E: We must ensure that future generations will not live in a world that is substantially more degraded than our own. We have learned from the mistakes of past landfilling practices and we continue to learn from the technological successes of present landfills. New regulations address improvements in the design, operations and environmental monitoring of landfills based on our history and experience. The solution is not simple, as the problems are enormous in size and magnitude. Present and future liability is of paramount importance and vital to the impact on the environment. Future waste management will be concerned with any contamination that might be released and pose an environmental or public health threat.

Regulatory Implementation

Follow Through On Deed Notification Or Restrictions – Past and Present:

- Once a list of landfills has been developed there should be a review of the deeds to ensure that site-specific conditions have been noted based on real rather than implied risks and appropriate zoning.
- For those parcels that do not have deed restrictions, local property owners should be contacted through the jurisdictional health departments (JHD).

Adoption Of Revised State Regulations On Local Level:

- As required in the WACs, local ordinances should adopt amended regulations related to landfills.
- For those landfills that are not included in revised regulations, new ordinances should be developed to ensure that the appropriate notifications and deed restrictions are applied.

Develop Closure Checklist That Is Circulated to Various Agencies:

- This list should be developed by the regulatory agency to ensure that all closure requirements are met.
- The completed checklist should be filed with the assessor's office and is intended to provide notification to future owners/developers of the landfill-related actions taken on that parcel.

Maintain Local Authority Over Regional Landfills:

- Develop local expertise and resources by maintaining local authority
- Continue to use Ecology in the role of an "inside" consultant to JHD
- Provide a financial mechanism that allows for Ecology to provide the level of oversight that is generally needed

IV. POTENTIAL WAYS TO GET THERE-TYPES OF BARRIERS, STRATEGIES, TOOLS, APPROACHES AND MECHANISMS

Redevelopment Opportunities/Funding Alternatives for Old Landfills

New technologies and economic incentives are providing new tools to address old landfills and closure of landfills in the future. Development opportunities and more specific, as well as less invasive, remedial technologies are available today that can make remediating these old landfills economically less burdensome. This changing industry can also extend community benefits of operating and maintaining landfills long after closure.

New opportunities are arising from a real estate market where industrial properties are limited due to the restrictions set forth from the Growth Management Act. Additionally, the fact is that residential neighborhoods are butting up against old landfills. Once our landfills were located in some remote place far from human activities. Today however, these closed landfills are rapidly becoming the vacant lot next door to us.

Developing landfills for open space, industrial, and where appropriate, commercial uses may provide new opportunities to get people to pay attention to some of these sites. Across the state, closed landfills are being developed into ballparks, golfing ranges, maintenance yards, retail centers, port facilities and industrial developments.

Developer As A Partner: Developers can assist in providing funds for some or all of the closure and remediation costs. There are landfills closed prior to 1985 that may need additional remedial measures, yet funding is not available or the risk of assuming liability

is too great. Keep in mind that we are not saying that abandoned sites are the newest economic engine, obviously, any developer will agree to assume the closure costs for a reduction in the purchase price. But there is a second potential benefit if the developer is qualified to ensure that the human health and environmental are protected in the future. This new ownership can transfer the future liability with the purchase agreement.

Taking this a bit further, maybe it is time to design new landfills so that they can have a second life. The second life could continue to benefit the nearby communities in a new way. Perhaps it is time to link future development with existing sites – to design a landfill closure plan that accommodates a second use. As an example, a landfill cap can also be an asphalt parking lot or a vegetative landfill cover can provide a green space to walk the dog. This type of partnership can provide independent funding for closure and remediation costs. This can greatly reduce capital cost normally incurred by the historic owner(s) or public agency maintaining custodianship.

Through partnerships between public and private entities, abandoned landfills or landfills closed in the future can have a second life providing economic growth and possibly enhance the pride of communities. No longer do people need to live next to "an old dump" but a development that is a place of community gatherings for recreation or work. If there is flexibility and support from regulators, and a willingness to make it work from both the business and public interest sides, there is a chance to extend the useful life of landfill sites that support vital communities well into the future.

Regulatory Flexibility

Update Regulations Periodically: MTCA and solid waste regulations should be periodically updated to be effective in the state of the art protection of human health and the environment while streamlining the process to encourage the control and cleanup of sites.

Streamline Voluntary Cleanup Program: The expertise housed in Ecology's Toxic Cleanup Program is considerable. Ecology should consider working with project managers for the PLPs and some of the key consulting firms that have worked on MTCA sites to develop a list of cleanup alternatives that could be used for voluntary cleanups. Ecology staff input would be critical to having a successful outcome and would help mitigate the uncertainty surrounding the final Ecology approval that is important in voluntary cleanups. Spending more time on the remedial action and monitoring for effectiveness would fulfill many of MTCA's original intentions.

Public Involvement: Another important element in MTCA is public involvement. Early public participation is sometimes an effective tool in streamlining public involvement and is a key factor in making substantial decisions and progress at a site. The public originally intended that MTCA facilitate expedited cleanups of contaminated sites. We should heed that mandate and look for ways to improve the process in a cost-effective manner. Public Participation Grants are also available through Ecology to encourage

such public involvement. Information about these monies should be consistently shared with project managers.

Improve Dispute Resolution: To keep MTCA projects moving on schedule, a constructive dispute resolution process should be developed. The Ecology site managers have an enormous burden of responsibility to carry, as do the project managers for the PLPs. An appointed liaison between the parties could help communicate or help manage the dispute resolution process. The Toxics Cleanup Program is understaffed presently, which does not help move through an already tedious process.

Landfill Compilation Project

We must acknowledge the importance of addressing the closed and abandoned landfill sites around the state. Although our existing solid waste management system requires a significant amount of resources to operate and maintain, we must create a way to locate, assess and clean up threats to human health and the environment posed by these sites. It would be unwise to assume that these sites can wait until we have the time and resources to address them.

A compilation project could be contracted with organizations such as Solid Waste Association of North American or the Municipal Research and Services Center of Washington to collect the information. Another alternative would be to provide funds at the local level to catalogue these sites. The level of detail would need to be discussed and agreed upon.

A strategy could then be developed once the files are reviewed and site visits are conducted to confirm the location. Notification and education to current owners on the potential impacts from the landfill would be recommended. Use of GIS to locate domestic wells within 1,000 feet of the landfill property and other GIS overlays to assist in prioritizing for further investigations would also be recommended. The information should also be provided to the local planning departments and if appropriate, recorded on the property deed.

Taking Responsibility For Your Own Waste

Individuals, businesses, communities, and regions should be encouraged to take responsibility for their own wastes, and also for the impacts caused by those wastes. Jurisdictions that long- haul MSW to a regional landfill for end disposal are aware that they can't ever rid themselves of their liability responsibility, despite the fact that they are sending waste to a permitted state-of-the-art facility owned by a private waste management company. Similarly, people and organizations everywhere should be held responsible for the waste they generate and its impacts.

When consumers buy products, they also essentially "buy" the waste involved in manufacturing, transportation, selling, using, AND disposing of those products. People, communities, and regions should be encouraged to be accountable for the impacts of their

solid waste choices. Communities and regions should manage as much of the waste prevention, recycling, composting, land application and end disposal as they can within their own areas and resources. This will help to promote the awareness and accountability needed to make important progress toward the vision of sustainable communities in Washington.

Financial Assurance

Landfill owners are required to establish and maintain specific funds adequate for covering closure and post-closure costs. To avoid recreating the expensive legacy of closed and abandoned landfills that we face today, it is imperative that these funds are in place, adequate to cover the expected costs, and remain available for every landfill in Washington. This issue should be included in the scope of the state plan, for both the short-term and the long-term.

What Should And What Should Not Go Into Landfills

We should strive to reduce the amount and toxicity of materials going into landfills. An immediate priority should be to maximize our waste reduction efforts to stop creating waste to the extent possible. This is consistent with the top priority in state law for handling solid waste. After waste has been reduced to the extent possible and recycled to the extent possible, then what is left must be disposed of properly.

The state solid waste plan should address maximizing waste reduction and should also look at what materials should and should not be disposed of in landfills. Nationally, many jurisdictions have enacted bans on the landfilling of certain materials, such as cathode ray tubes (CRTs) and yard waste. Revision of the state plan presents a prime opportunity to examine this issue and to determine what is appropriate for landfilling and what is not, primarily on a human health and environmental impact basis.

About Issue Paper 10

This brief description was prepared to provide a sense of what, in part, is forthcoming from the Issue Paper 10 working group. Issue Paper 10 is scheduled to be completed in late March. The following discussion provides a conceptual sketch of a key topic on which the working group and contractor have spent substantial effort. This topic will be developed in more detail and other topics such as barriers to recycling are planned for the final document.

A Key Issue Paper 10 Topic: Relationship between Sustainability and Solid Waste Costs

The concept of sustainability is explained at a conceptual level by a process called "The Natural Step," originally developed in Europe. The Natural Step provides an internationally recognized strategic approach to achieving sustainability. It delineates a set of guiding tenets, called "system conditions." The four system conditions for society to be sustainable can be paraphrased as follow with commentary and implications for solid waste management in italics:

(1) Limiting or eliminating certain substances from being extracted from the earth's crust, or closed-loop use of those substances, to prevent adverse effects on living organisms and ecosystems.
This condition addresses problems such as global warming due to extraction and use of hydrocarbons, toxic metals, and mineral substances released into air, land and water. It is easy to see solid waste connections to this system condition. Materials that are extracted from the earth to make products which are subsequently disposed of can violate this system condition.

(2) Limiting or eliminating certain persistent substances created by humans.
This condition addresses problems such as persistent bioaccumulative toxic chemicals and endocrine disrupters that have become widespread in the environment. Some persistent chemicals are a part of the MSW stream.

(3) Avoid destructive manipulation of the natural ecosystems.
This condition addresses the problems such as declining biodiversity, overharvesting, natural systems carrying capacity, and habitat preservation. Pollutants generated from the management and disposal of solid waste can add to this problem.

(4) Use resources efficiently, minimize wastes, to equitable support human needs.[1]
This condition is a guiding principle that addresses the general need for humans to be conservative in the use of resources in order to retain a planet that can support our species in the long-term. This also has direct policy implications for population growth and the global distribution of natural resources for the global human community. This speaks directly to the pollution prevention and waste reduction aspects of solid waste management.

Support for sustainability is evidenced in Dept. of Ecology's mission statement. The mission statement has three goals. The third goal is to: "**Support sustainable communities and natural resources.**" This agency goal makes a direct connection between sustainability, the 4 system conditions of The Natural Step, above and local "communities and natural resources." At the local level this includes solid waste management. In the context of solid waste, system condition

1 includes closed-loop recycling, or the concept of integrating solid waste back into the economic, natural or human systems. Similarly, system condition number 4 stresses using resources wisely and to minimize waste. For solid waste this includes waste reduction and recycling. Nature fulfills these sustainability system conditions by using outputs (potential wastes) from one part of an ecosystem as an input (feedstock) to another part of an ecosystem, creating little or no waste. Some use this fact to advocate for a "zero waste" goal or strategy for human production systems and for solid waste management. The concept of zero waste may seem on the surface to be too idealistic and fanciful. However, a zero waste goal has been applied by leading industries in the US and elsewhere for some time.

For example, in the 1980s E.I. duPont de Nemours & Company (DuPont) expanded the corporate mission from zero injuries to "zero waste, zero emissions, and zero injuries." This changed mission has resulted in reducing toxic emissions by 74%, cutting solid waste generation in half and reducing its overall environmental costs by $200 million per year. At DuPont, zero waste is not an absolute but rather a way for management and workers to think and to drive competitive innovation. DuPont's CEO says that "We are on a journey to transform DuPont into a sustainable growth company, one where we increase societal value while decreasing our environmental footprint."[2] DuPont is not a sustainable company but they are consciously and deliberately moving in that direction.

In the sustainability discussion above, it is unclear how to measure or assess how far we are from sustainability in the management of solid waste. Reducing waste is certainly the right trend. How can the concepts and principles of sustainability be connected to the everyday realities of solid waste planning and management?

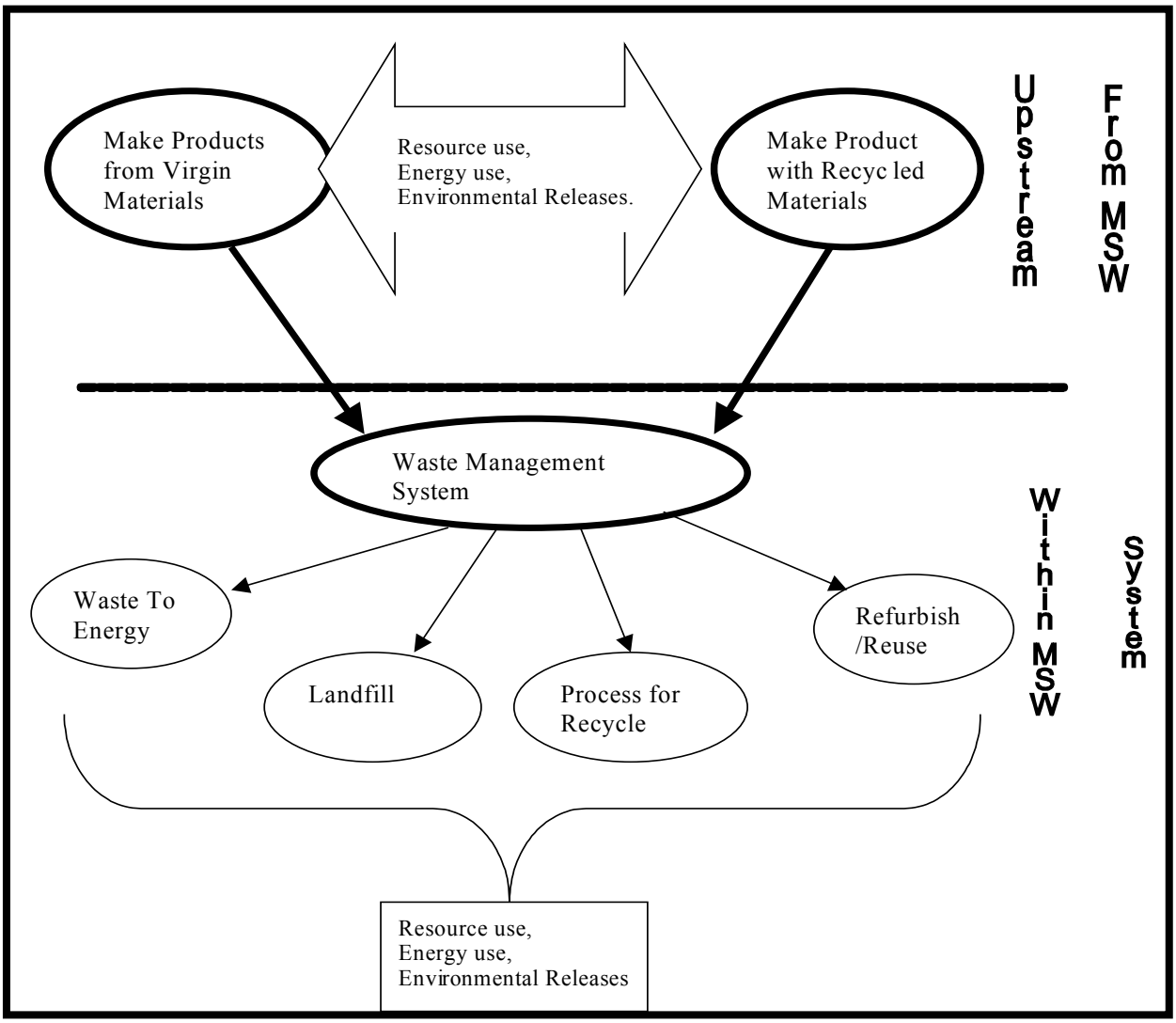
Solid waste is typically managed by using traditional cost-benefit analysis, whether in the private or public sector. These traditional cost-benefit analyses provide solid waste managers with data to make informed decisions. There is a significant gap between traditional cost-benefit analysis and an alternate method of analysis that includes all of the cost-impact factors that support sustainable solid waste practices. In fact, <u>there are no existing analytical methods that make a direct connection between current solid waste management practices and the evaluation of sustainable solid waste practices</u>. However, there is an increasing body of research, policy exploration, and new analytical methods that have been designed to at least partially fill this gap[3,4].

Industries and governmental organizations have developed methods that extend the scope of the traditional cost benefit analysis system towards sustainability. One of the most widely used of these methods is called Life-Cycle Assessment (LCA). LCA involves the compilation and evaluation of the inputs and outputs of materials and energy and the associated environmental impacts directly attributable to a product throughout its life cycle. An important part of the LCA is the Life-Cycle Inventory (LCI). The LCI is typically the first phase of a Life Cycle Assessment, and involves compiling and quantifying the material and energy inputs and outputs for a given product system throughout its life cycle. LCI data now exist for a significant number of products and many of their associated inputs and outputs of materials (including emissions of environmental pollutants) and energy.

The second, and more difficult, phase of an LCA is the Life Cycle Impact Assessment. This is the phase of a life cycle assessment that is aimed at understanding and evaluating the magnitude and significance of the public health and environmental impacts caused by emissions of environmental pollutants documented during the life cycle inventory phase of the assessment. The LCA expands the scope of traditional cost benefit analysis of solid waste methods to include a more comprehensive estimate of impacts before (upstream) and after (downstream) the normal bounds of the solid waste management system, as indicated in Figure 1. These impacts may be monetary, public health, environmental, or societal. Once the system-wide impacts are quantitatively estimated, an estimate of the cost of each impact can sometimes be developed. For example, upstream impact comparisons can include the use of recycled versus virgin materials in manufacturing products. Downstream impacts may include estimates of the amount of greenhouse gases released from choosing different disposal methods.

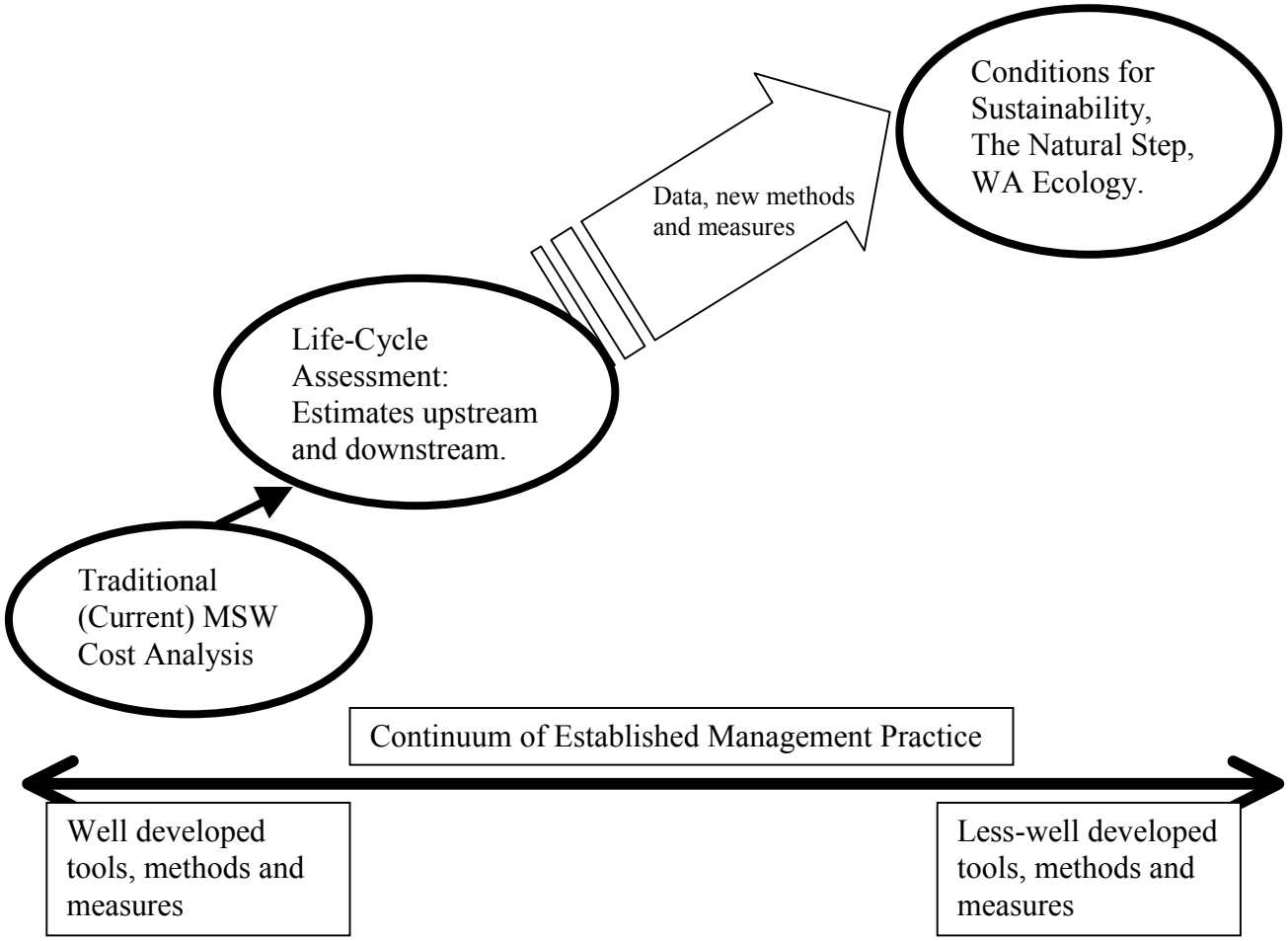
Of course, the costs (or benefits) of some impacts can be estimated with more precision and certainty than others; for example, health effects are not easily measured. In addition, different sectors of society (e.g., businesses, and urban or rural communities) may benefit more or less from different scenarios. In different cases, the mix of where significant costs are borne and where benefits are achieved, will vary. Who is impacted (by costs and benefits) and by how much, will vary based on many factors. This issue paper will explore the use of LCA with a limited case study of residential single-family curbside recycling in Washington using readily available data.

Figure 1
Life Cycle Inventory (LCI) and the Waste Management System



The data to support estimates of a comprehensive LCA and LCI are not yet available for some parts of the MSW waste stream. For instance, there is little data available regarding upstream impacts for organics recycling alternatives. Figure 2 shows the progression from traditional solid waste analytical methods towards the principles and conditions of sustainability. There is a need to develop new methods, tools and measures to evaluated sustainability in the context of the solid waste management system.

Figure 2
Evolution of MSW Analytical Methods Towards Sustainability



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Issue Paper #11
Recycling

Introduction

Purpose Statement: This paper will examine factors that affect local recycling programs and recommend strategies for improving the state's recycling rate.

In the third *Washington State Solid Waste Management Plan* issued in 1991, the primary focus was on achieving the aggressive goal of recycling 50% of the municipal solid waste stream by 1995. The recycling goal was established in the "Waste Not Washington Act of 1989". When the plan was issued Washington State was recycling 28% of its solid waste. As a result, significant public and private entities invested in the recycling infrastructure statewide. The recycling rate steadily increased each year and achieved a high of 39% in 1996. The recycling rate has since dropped to 32.4 %. Factors contributing to this drop included: increased waste generation, poor Pacific Rim markets, a drop in recycling participation by waste generators, and lost funding for education and awareness programs.

Recycling programs are planned and implemented at the city and county government level. Recycling efforts in Washington State therefore vary by location as a result of several factors including: population size, economies of scale, climatic differences, distance to markets, costs to market recyclables, and market availability. The extent of recycling and types of recycling programs available to the state's citizens tend to have general geographic similarities that can be viewed for planning purposes as regions. A state's solid waste plan needs to consider the regional characteristics of rural west, rural east, urban west, urban east, and central Washington. When examining regional factors the method of improving recycling efficiencies will vary greatly. A "one size fits all" approach to recycling will not work.

RESIDENTIAL RECYCLING

Background

Residential recycling in Washington has been a great success and is available to most households statewide 2.5 million tons of recyclable materials were collected in 1996.Since the enactment of the "Waste Not Washington Act of 1988" cities and counties have developed a variety of strategies to collect recyclable materials. The most common collection methods are curbside and buy-back

centers/drop-boxes. As residential recycling programs mature we need to study and evaluate collection methods, participant motivation, and marketing strategies to continue to increase recycling rates. Sharing new information and data to help local governments plan and improve residential recycling program becomes imperative to increasing collection efficiencies and sustaining citizen participation.

Strategies for Reaching Our Goal

Studies that are designed to discover what barriers may exist for jurisdictions wishing to improve their residential recycling (single and multifamily) collection programs should be encouraged and supported. Increased capture rates would be the result of improving collection efficiency and convenience of collection for existing materials and/or new materials. There have been local jurisdictions in Washington that have significantly improved the amount of material collected by changing their collection methods, including the cities of Olympia and Tacoma. RCW 70.95.010 requires Ecology to "monitor curbside collection programs and other waste segregation and disposal technologies to determine, to the extent possible, the effectiveness of these programs in terms of cost and participation, their applicability to other locations, and their implications regarding rules adopted under this chapter."

Recycling program studies should be designed to verify or disprove the existence of perceived barriers and to identify other circumstances not currently thought of as barriers to improvement. Such barriers may be financial, regulatory, political, logistical, or community based (such as lack of processing/marketing capabilities or interest/commitment of population). Ecology should support these studies and help to disseminate the findings.

Periodic statewide surveys should be conducted of all jurisdictions and private recyclers, with the intent of getting information from all levels of the collection system. Ecology regional recycling coordinators would be used to partner with local government staff and industry staff to seek out in-depth information. Communities could apply for assistance to implement pilot studies that would attempt to improve existing recycling programs with the goal of increasing program yields using Coordinated Prevention Grants (CPG). A support group comprised of personnel from local governments and recycling companies who have successfully implemented collection strategy improvements would be available to the participating jurisdictions.

The pilot study would evaluate whether or not the perceived barriers are real barriers. This will help to focus efforts to dispel perceived barriers and address real barriers. By developing and implementing program changes, the group should be able to identify real barriers. Finally, next steps to eliminate the identified barriers would need to be recommended.

In counties that have mandatory recycling participation, there is no incentive for recyclers to increase the quantity or quality of materials collected, seek out the highest end use for any particular commodity, or to attempt to sell their material at the very highest market price. The Utilities and Transportation Commission (UTC) requires companies to pass the extra revenue from the sale of the material back to the customers because the UTC already allows the company to make approximately a 10% return on their investment in their recycling program. Companies that collect residential recyclables in the UTC-regulated areas of the state with mandatory recycling programs pass on all of the extra revenue from the sale of the recyclables directly to their customers through a recycling "commodity credit" adjustment on their residential recycling collection rate. The value of the commodities is reviewed each year and a commodity credit adjustment is made to the residential recycling collection rate. In most cases, there are many marketing options for recyclers when selling their recyclables. Creating a revenue-sharing program where recyclers are allowed to retain a certain portion of the revenue received from the sale of the recyclables would encourage recyclers to collect more, and to seek out the best and highest end uses for recyclables collected in curbside recycling collection programs. Recyclers should provide a plan showing how they will use the money they retain to increase recycling around the state. This would also benefit other areas of recycling all the way "down the food chain," creating a more stable recycling market.

The private sector would retain 30% of the revenue from the sale of recyclables in any given year, and the remaining 70% would be returned to residential customers served throughout the state. The effectiveness of revenue sharing should be evaluated after a three-year implementation period. In order to participate in the program, haulers will be required to submit a plan to WUTC and local government to demonstrate how they will use the revenues to increase recycling. An annual report will also be submitted by participating companies describing the effectiveness of their recycling efforts.

The Legislature should pass a law allowing rate-setting jurisdictions to set residential rates for regulated franchise haulers that are consistent with the incentive rate structures established in comprehensive solid waste management plans. After passage of the above ordinance, counties and cities should consider establishing residential collection rate structures through their comprehensive solid waste management plans that provide strong incentives for customers to reduce their level of garbage collection service and encourage customers to participate in waste reduction, recycling, and yard waste collection programs. When establishing these rate structures, counties and cities must coordinate with the UTC to show how these rate structures will impact consumers, and coordinate with solid waste collection companies to ensure that consumers receive individual notice of the potential changes to their rates.

Commercial Recycling

Background

In 1997, Washington's recycling rate declined by 6%. Most of this decrease occurred in commercial recycling, particularly involving paper. Commercial recycling is primarily provided to companies that generate large amounts of high value materials. When markets for these materials decline, purchases of these commodities are discontinued and the recycling rate declines dramatically. Other factors affecting commercial recycling include reductions in funding available for local governments to provide technical assistance to businesses and the high cost for a city to provide commercial recycling services.

Strategies for Reaching Our Goal

Reliable, convenient and affordable recycling services need to be available to all businesses. Currently, very few businesses that generate small amounts of recyclable materials have easy access to collection services. Unlike residential recycling federal courts have determined that commercial recyclables are a commodity and they can not be regulated by state or local governments. Businesses have the right to sell their recyclables to the highest bidder. Private recyclers purchase the high value materials but not lower value items. A city may choose to contract for commercial recycling collection or collect it themselves, but they can not require businesses to donate their recyclables to the city instead of selling them. As a result they may be left with low quality materials that can not be sold for enough money to cover the program costs.

Funding commercial recycling programs that serve all businesses and collect a broad range of materials is the largest hurdle for local governments. Establishing taxes or fees may be a logical approach but is generally politically unacceptable. Other funding mechanisms to provide businesses with recycling options need to be researched and promoted to local governments. Several mechanisms that cities may consider are: determining whether the consolidation of residential and commercial collection service in service contracts would be more cost-effective, determine whether a progressive commercial rate structure would promote waste reduction and recycling.

Local jurisdictions should focus on assisting small businesses to recycle. Partnerships between local governments and service providers need to be formed. Working together they can provide increased technical assistance to small firms. Local governments should also explore, with their service providers and the Washington Utilities and Transportation Committee, including small-business recycling services as part of their residential collection programs to

improve efficiency and cost effectiveness. Local governments may assist businesses in their efforts to promote recycling by:

- Encouraging local government officials to aggressively pursue all means for diverting commercial recyclables from the waste stream, considering market conditions, by using local regulatory options.
- Creating partnerships between local government and chambers of commerce to provide technical assistance to businesses where commercial recycling is available. Such programs would ensure that businesses are aware of available recycling services and are educated regarding the importance and benefits of recycling.
- Using existing organizations, such as WSRA, WRRA, Washington Association of Cities, and Washington Association of Counties to encourage and promote commercial recycling throughout the state.
- Encouraging legislators to educate their local constituents, chambers of commerce, and businesses about the importance and benefits of commercial recycling.
- Requiring franchised garbage haulers to disseminate information about recycling opportunities, especially those for paper and cardboard, to their commercial customers.
- Providing direct economic incentives to commercial generators based on reducing the amount of recyclables being disposed.

Increase diversion of commercial recyclables, such as paper, through local regulations. If voluntary measures are unsuccessful at achieving higher diversion of recyclables from the commercial waste stream, local jurisdictions could consider more mandatory approaches. One approach that has been used in other states (i.e., Wisconsin, Massachusetts) and provinces (i.e., Ontario) is disposal bans. For example, local jurisdictions could ban the disposal of commercial paper or cardboard. Businesses would be compelled to recycle their paper, instead of disposing of it. This approach has been used to increase the diversion of yard waste from residential customers in King County. Another approach that has been used in Portland, Oregon is requiring businesses to file a one-page recycling plan with the city. It's up to the businesses to find a user provider. If a commercial customer does not file a form, City staff contact the customer and help the business set up a recycling system. Staff may also visit businesses to inspect recycling systems. Businesses that refuse to comply may be subject to a $500 fine.

Organics

Background

Organic wastes have not been clearly defined, and therefore pose a unique problem in the waste stream, and they present special Strategies for Reaching Our Goal for recycling. All plant or animal matter can be composted: yard wastes, vegetable scraps, cotton, wool, paper, animal wastes and wood are all compostable, given the right conditions and enough time. These wastes will decompose whether we leave them out in the yard or place them in a landfill. In a landfill, as they decompose they produce methane gas, which can explode under certain conditions, and they react with other waste material to create a toxic leachate. By composting and other processing, organic material can become a valuable resource as a soil amendment.

While organic wastes can be recycled through composting or processing, they continue to be a major portion of the municipal solid waste stream. Potentially recyclable organic materials with the greatest disposal tonnages across all sectors are: food, wood, cardboard and mixed wastepaper.

Agriculture is the largest industrial waste producer in eastern Washington and most of their waste is organic. Agricultural wastes are being handled in a variety of ways. The most common handling methods for agricultural wastes are: land application, composting, illegal storage in piles, and disposal in landfills. Unfortunately, only small amounts of agricultural waste are composted. Since agricultural wastes are outside the current definition of MSW, data is therefore not routinely collected.

Strategies for Reaching Our Goal

The first step in maximizing organic material recycling is to conduct an **organic waste characterization study** that would identify the types and amounts of organics currently being disposed, where those materials are being generated, and their potential for recycling. Specific waste streams to be addressed include commercial food, food processing, yard, agricultural, land-clearing debris, and construction. Data should be used to establish a baseline of current qualities of organic materials being disposed in landfills and this information should be used for establishing goals for recovery. These data, along with development of costs associated with space utilization of organic materials in landfills, would allow a value to be attributed to developing alternatives and an understanding of the true cost of landfill disposal.

A statewide policy of **zero yard waste disposal in urban zones**, as defined in Counties Comprehensive Solid Waste Management Plans, should be imposed,

for all yard waste generated, including the residential and commercial sector, within the next ten years. This aims at making better use of yard waste as compost for land application, thereby contributing to soil conservation and contributing to waste reduction in our landfills. Alternative means for managing yard waste (best management practices) should be incorporated into the state's solid waste law, such as curbside collection of yard waste, green waste drop-off sites, grinding, mulching, or composting programs. Local governments should then be encouraged, in their solid waste planning processes, to determine if implementing zero yard waste disposal within five years is appropriate for their community. After the implementation of the local solid waste plan and alternate methods for managing yard waste, the local government should determine what quantity of yard waste continues to be disposed in landfills. If an amount remains, then a zero yard waste disposal policy should be implemented. Local jurisdictions will be able to apply to Ecology for an exemption, following the implementation of alternate methods for managing yard waste, based on circumstances such as unavailability of alternatives, funding concerns, market constraints, or other reasons. In addition, an exemption will be granted to jurisdictions having successful yard waste programs if five percent or less of the total disposed municipal solid waste stream is yard waste, as shown by a waste characterization study.

As Ecology makes **beneficial use determinations** for the use of organic materials, the analysis and data demonstrating beneficial and/or undesirable constituents/characteristics of specific products should be shared with the public. Ecology should develop standards for acceptable use of organic products and track volumes of material reused. This information will be significantly more valuable if it is tracked with other readily available data that are already being collected by other state agencies. For example, the data could be reported with a parallel report of croplands under tillage, statewide fertilizer use (in tons of nitrogen), acres of new urban development, urban arterial projects planned, etc.

Ecology must **increase communication, coordination, and integration** of organic material programs be encouraged to enhance the understanding of organics and the role they play in pollution prevention, stormwater management, water conservation, agricultural production, and materials recycling. This should be accomplished through an Ecology-formed organics cross team where staff and experts from a broad range of government and private sectors, including water quality, solid waste, agriculture, wastewater, soil science, and other relevant interests, regularly communicate and seek Strategies for Reaching Our Goal to integrate programs. The cross team would include, but not be limited to, representatives from the Departments of Ecology, Agriculture, Health, and Trade and Economic Development, the Washington Organic Recycling Council, local governments, the soil conservation service and conservation districts, agriculturalists, environmental groups and organizations, and universities. The responsibilities of the cross team will be to review and evaluate beneficial use

determinations, identify and recommend methods for overcoming regulatory barriers and overlap, and promote the use of organic products.

Ecology should **research** new processing methods and technology for organic materials. Pilot projects that scientifically demonstrate the benefits of organic soil amendments are an example that could help to define best management standards for use of organic materials. Research should be followed by **public education** to gain their understanding and support for organic recycling. This would include schools, Master Recycler/Composter programs, and landscapers and developers using science-based curricula, as well as broader public education.

Education

Background

The 1991 *Washington State Solid Waste Management Plan* focused on public education as a key component of successful implementation. Education remains a key to maintaining or increasing a recycling program. Participants in waste reduction and recycling efforts need to build an understanding of the environmental and economic value of recycling, what may be recycled, and how to recycle. Funding for statewide education and promotion have declined as recycling has become an established part of the state's waste management system. Centralization of educational materials that can be shared by counties and cities has been discontinued causing less populous counties to reduce their public outreach.

Strategies for Reaching Our Goal

Sustainable recycling education and outreach strategies need to be developed that will continue to promote positive waste prevention, reduction, and recycling behaviors. These objectives can only be attained through **long-term, consistent outreach activities**. Local governments currently have responsibility for teaching their residents about waste prevention and recycling, and should continue to hold this responsibility. However, since the resources of local governments vary considerably, there is also a role for Ecology in helping to maintain a basic level of awareness among all Washington citizens. The role of educating residents in each county/city should remain predominantly at the local level.

In rural communities, education and outreach programs reflect the local availability of services, such as curbside and drop-off Strategies for Reaching Our Goal, long-term potential of programs, distance and costs to markets, limited staff and funding. Rural communities have to carefully choose issues that can be

incorporated into an educational program. In addition, rural communities have to invest in maintaining their current recycling efforts with little or no extra time or resources available for expanding educational efforts. Some specific rural challenges include promoting curbside collection when it is not provided locally, or the difficulty of expanding school presentations when there is a recycling staff of one. In the short-term, rural counties need to continue to promote current programs, while long-term they need to change the disposal behavior habits of the public with environmentally integrated, consistent community-wide messages, programs and collection strategies. The state legislature must come to the aid of the regions in need of help, as well as acknowledge the regions that succeed in progressive residential recycling.

The future of solid waste management in Washington State should continue developing and enhancing progressive solid waste management outreach and education programs throughout Urban Western and Urban Eastern Washington. At the same time, there should be increased assistance to the Rural Eastern, Rural Western and Central regions of the state that are forced to deal with the most barriers to their education and outreach programs.

Solid waste management programs are currently developed by local jurisdictions. Often local governments find themselves restricted by a lack of resources and would benefit from a "clearinghouse" from which they could gather information and ideas to implement within their jurisdictions. An **information/education clearinghouse** on Ecology's web site should be created that will provide scanned downloadable copies of Ecology and local government printed materials about recycling. This will allow local governments to expand their education and outreach programs, by maximizing use of existing materials. The clearinghouse should include programs allowing adaptation and printing of the materials to suit any recycling programs' needs. This clearinghouse should also be coordinated with existing information to avoid duplication of efforts. Currently, Ecology utilizes staff resources on both the east and west side of the state to gather and disseminate information on construction and demolition recycling. Ecology should provide the resources needed to develop tools that will support local governments unable to develop their own construction and demolition recycling programs. Efforts should be made to ensure local governments are made aware that these resources exist.

Partnerships between the public and private sector are needed to increase resources for more sustainable programs, thereby increasing the state's recycling rate. A coalition of local governments, waste management associations, environmental interest groups, recyclers, and other interested parties, should be formed to focused on methods of waste prevention and recycling. These partnerships should leverage, to the maximum extent possible, the resources of the participating groups. Local governments should have the option of using the statewide outreach campaign in support of their ongoing programs. Coordination with planned events, such as America Recycles, Earth

Day, the Northwest Green Building Coalition workshops, and the WSRA annual meeting should be encouraged.

Franchise haulers should provide information on the full range of recycling and garbage services and methods and programs available to recycle and reduce solid waste being provided to their residential and commercial customers. Franchise haulers should be encouraged to work with the local governments to ensure information is being provided in the most effective and efficient manner possible.

Construction & Demolition Recycling

Background

In 1996, the EPA estimated that 196 million tons of building-related construction and demolition (C&D) debris was generated in the United States. That equals approximately forty percent of the municipal solid waste stream. C&D waste has historically been collected, transported and disposed of largely by private sector solid waste management companies. If the companies only transport C&D waste, they must have a certificate from the UTC. The majority of the materials were disposed of in demolition waste landfills. Currently, few studies have been conducted on the C&D waste stream, so there is little information on the specific composition of the waste, who generates what quantities, and how much is being recycled. In addition, more information is needed about the extent to which mixed C&D waste can be recycled, the facilities needed to process C&D for recycling, and existing and potential markets for recyclable C&D. These data are key to developing a C&D management system that maximizes reuse and recycling.

Strategies for Reaching Our Goal

The State of Washington currently oversees over $250 million of construction each year. This presents an important opportunity to take a leadership role in promoting buildings that perform better, are healthier for occupants, and that cost less over the life of the building. The **state can encourage recycling by requiring job-site recycling and/or reuse** of materials, including consideration of costs and benefits, on all state-funded building projects. The state should include contract language to require recycling and/or reuse, unless contractors demonstrate that, on that job, the costs of recycling exceed disposal costs and other benefits on an individual material basis. Specifications for construction waste management that require job-site recycling have been developed by King County Department of Natural Resources and Seattle Public Utilities, and can be used as models. Minimum requirements of the specifications should include waste management plan, implementation strategies, and reporting requirements.

Minimal reporting of on-site recycling should be required to ensure accountability for recycling rate progress and cost tracking.

The state can demonstrate national leadership, by **adopting sustainable building standards and developing guidelines for state-funded building projects**. The sustainable building standards and guidelines will support the state's long-term goals specific to energy efficiency, water conservation and quality, conservation of natural resources, indoor ecology, growth management, and livable communities. Specific to recycling, conservation of natural resources encourages the implementation of waste reduction practices, recycling on the job sites and in the occupied building, and the use of recycled-content products and locally manufactured products. A building rating system called Leadership in Energy and Environmental Design (LEED™), has been adopted by a number of federal agencies, states, counties, and cities and could serve as a starting point for the development of Washington's guidelines. The standards and guidelines should be developed using a multi-interest collaborative process, to build public and private sector support.

The state should require the use of cost-effective recycled-content building materials in state-funded building projects. The Washington State Department of General Administration should expand the procurement guidelines for cost-effective recycled-content products to include building products and materials. Currently, General Administration uses the minimum recycled material content(s) for products and materials as indicated in the current issue of the U.S. Environmental Protection Agency (EPA) product standard (EPA's Comprehensive Procurement Guidelines (CPG)). The CPG contains a category for building products and materials.

Building-related waste disposed of or recycled should be a separate category in a statewide waste characterization study. This will provide a better measure of the recycling rate specific to the building industry. A first step would be to examine the relative proportions and volumes of each major category within a "typical" C&D waste stream. Examples of major categories might include asphalt, wood, masonry, metal, vinyl, insulation, drywall, and so on. A second consideration could be factors influencing the type and quantity of wastes. Some examples are commercial versus residential, custom versus tract housing, rural versus urban, construction versus demolition, local C&D tipping fees and so on. A third level of analysis might include analysis of representative waste streams to determine the proportion of hazardous or problem characteristics in C&D waste. It would also help to determine the types and amounts of materials available for reuse or recycling. This is a critical step in developing markets for reclaimed materials.

A limited number of C&D waste characterization studies have been done by other states (Florida and Vermont), or organizations (the National Association of

Demolition Contractors and the US Army). Using pre-existing data from these studies could cut costs.

Market Development

Background

Market development is integral to the cycle of recycling, which begins with collection at a residence or business, transport of products to a processor, selling of a specific commodity for reuse, and the purchase of that item and its productive use. However, without a concentrated, long-term effort to ensure that markets exist for recycled materials, the use of recycled products is subject to sporadic market demands. Developing and improving markets reduces ratepayers' costs, creates jobs, protects resources, and fosters innovation, and moves our economy toward a more sustainable environment.

The State of Washington has spent significant resources in the past on market development but has reduced the funds to effectively market recyclable products. A statewide effort is needed with a focus on market development that would directly benefit local businesses, promote economic development where most needed, and implement lessons learned from past efforts. Currently, the state and its industries spend significant resources creating markets for products such as agricultural and manufacturing products; the same commitment should be made to recycled commodities.

Strategies for Reaching Our Goal

The development of long-term and sustainable markets for recycled products should be integrated into the Department of Community Trade and Economic Development's (CTED) mission and with its ongoing market development efforts. The State Legislature should redefine CTED's mission for marketing recyclables. CTED would then be directed to prepare a marketing plan with an implementation schedule. The implementation plan would determine how to effectively and efficiently accomplish the following:

- Coordinating the promotion of recycled materials with other state economic development activities.
- Comprising a range of commodities, such as paper, glass, tires, plastics, compost, wood waste, and other organic materials.
- Based on the shrinking Pacific Northwest end use market for mixed paper dedicating resources to explore and develop new and expanded market Strategies for Reaching Our Goal for mixed paper in support of all the municipal recycling programs that have engaged their citizens in the recovery of mixed paper.
- Enlisting the support of programs within CTED and other state agencies.

- Addressing and removing regulatory barriers for the marketing of recycled materials.
- Focusing on both marketing of recycled products and economic development Strategies for Reaching Our Goal (i.e., attracting sustainable businesses to rural communities).
- Prioritizing efforts based on commodities where the greatest need exists and for areas within the state where the greatest economic development impact will be made.
- Working with local governments, cities, counties, port districts, and school districts to develop markets for recycled materials.
- Coordinating research, development and implementation activities with local universities, agricultural extensions, and the private sector to manage the technical issues related to developing and expanding recycled product use. This will require a sizeable pool of available and flexible funds that can be leveraged with other resources (federal, private sector) to address research, development, and implementation barriers.
- Sharing data within state agencies to maximize resources and understanding of the existing recycling Strategies for Reaching Our Goal and businesses in the state (i.e., Ecology's recycling hotline).
- Maximizing resources by providing opportunity and encouraging industry groups and private sector businesses to participate and partially fund market development efforts.
- Researching existing models in other states and countries for examples on how to implement market development efforts, partner with private industry, and maximize available resources (i.e., Recycling Council of British Columbia, State of New York's market development program).

Development of an implementation plan to integrate marketing of recycled materials into the mission and implementation of CTED will require funding. Funding for implementation of the plan will be dependent on its outcome. Funding for implementation of the plan will be provided in part by leveraging other resources (federal, private sector) to address research, development, and implementation barriers. Development of guidelines and goals for purchasing of recycled-content products will require time from existing CTED, GA, and/or other agency procurement staff.

Many recycled-content products are cost-effective and should be purchased, yet barriers still exist that affect the ability of our recycling programs to close the loop. State agencies and local jurisdictions have enormous buying power and, by increasing their purchasing of recycled-content products, have the ability to make those products more cost-effective and provide leadership to the private sector**. The State should revitalize the purchasing of recycled-content products by:**

- Setting progressive requirements and/or goals for state use of recycled and environmentally preferable products. This will include:

  - Providing specific guidance and information on buying and performance of recycled materials (not just a blanket message to buy recycled)
  - Adding a recycling and procurement goal to CTED and GA's performance measures
  - Convening workshops for other state agencies to emphasize need, approach, and process for recycled product purchasing
  - Promoting the economic preference given for purchasing recycled materials
  - Promoting the buying power to purchase recycled content materials at competitive prices through the state government purchasing pool
  - Logging recycled materials in a resource book for use by purchasing agents and updating this log annually, with an opportunity for qualified vendors to include products on the list
- Focusing on specifications, RFP and RFQ processes, contractor selection and contract negotiations to remove barriers to recycled products and provide incentives for utilization by contractors and service providers to the state.

DATA COLLECTION & TRACKING

Background

With the strong emphasis on waste reduction and recycling, methods are needed to monitor performance. Since 1985, Ecology has tracked statewide performance against the 50% recycling goal. There are numerous areas where that information can be better managed to provide timely and accurate reporting to local jurisdictions, state government, and the citizens of Washington.

The state also needs to gather more information about solid waste streams outside the traditional municipal waste stream focus of the last major solid waste legislation in 1989. The best opportunities for further waste reduction, recycling, and diversion are in the construction, demolition, land clearing, and agricultural sectors of the economy.

Strategies for Reaching Our Goal

Opportunity waste streams (construction, demolition, land clearing, and agriculture) will need some level of **waste characterization** to determine their composition and beneficial use opportunities. Waste characterization is necessary for efficient market development and more sophisticated management strategies for these waste streams.

Continuous **monitoring of the waste stream** is necessary to measure progress towards waste management goals and to provide information for policy changes in light of changes in technology markets. Currently, the state monitors only disposal and recovery of the municipal solid waste stream. Our knowledge of

construction, demolition, land clearing, agricultural, and industrial waste streams is very general. This incomplete information makes policy choices very difficult.

Market assessment information is another part of organized solid waste management. Market conditions dictate the smooth flow of materials through the recovery and treatment systems for the state's solid waste system. More comprehensive tracking and modeling would greatly assist in identifying policy goals for our solid waste management.