Increasing Recycling for Organic Materials

Introduction

This paper recommends actions to increase recycling of organic materials. It is important to expand and strengthen the statewide system for organic materials closed-loop reuse and recycling. This means that leftover or excess organic materials become feedstock for new materials and products (such as compost and mulch) and are thereby diverted from disposal. The list of "organic materials" is extensive, but for this paper it applies to substances and products of biological origin that have the potential to be safely returned to the soil. These organic materials include, and this chapter is focused on, landscaping and yard waste, food waste, manures, crop residues, wood, soiled/low grade paper, and biosolids. Although countless additional materials and wastes of biological origin are generated, they are not always best suited for the closed-loop organics cycle. An example is high-grade office paper that can be recycled back into paper.

Organic residual materials have value and can provide many benefits when safely returned to the soil. When we dispose of organic material, this value is lost. As long as we continue to manage these materials as wastes, we are also wasting both economic and environmental protection opportunities. Important progress in organics recycling has been made during the past several years. The recommendations in this initiative build on past successes and leverage existing trends to make the necessary shift from viewing organic materials as wastes to an understanding of organic materials as feedstock for beneficial products. Partnerships between people in the organics recycling industry, local and state government, universities, public interest organizations and others are essential to moving forward toward the goal of recovering as many organic materials as possible.

The ultimate goal is for residual materials to go to the highest and best uses possible. For organic residual materials, the best use is determined by several factors, including local needs. Often, the best uses for organic materials are to recycle them through compost, land application, shredding, chipping, or other processes. However, when feasible, we should recycle materials of biological origin (such as clean office paper) into similar products in a closed-loop cycle.

Closed-loop recycling of organic materials can occur through two primary pathways:

- ✓ Transformation into soil amendment products such as compost or mulch (through organic closed-loop systems).
- ✓ Biological conversion to energy (non-incineration).

Building a closed-loop cycle for organic residuals was selected as one of the keys to Beyond Waste for four main reasons**:**

- Organic wastes represent a significant portion of current waste streams, approximately 30 percent of both residential and commercial wastes. Agricultural, forestry, and industrial operations also generate large quantities (Cascadia and Ross, pp. 6-8).
- The potential for beneficial use of organics is very high. Many organic materials are easily recycled into new products with demonstrated market value, and large areas of the state have both need and capacity to use these products.
- Washington is already significantly along the way toward establishing a viable organics cycle. A variety of materials including yard waste (in some regions of the state), biosolids, and paper are being recovered for beneficial use.
- Organics recycling provides significant environmental and human health benefits in addition to reducing wastes. Practices such as burning crop wastes, storing manures, and landfill disposal have the potential to affect air and water quality. Often, a more effective way of managing these materials is recycling through land application, composting, and anaerobic digestion.

A closed-loop organics cycle goes hand-in-hand with increasing green building, reducing the overall use of toxic substances, and eliminating hazards in moderate-risk wastes, other key starting points for the Beyond Waste Project. A few of the numerous benefits of a closed-loop organics recycling system include:

- ✓ Diverting materials from disposal saves landfill space and reduces overall impacts from disposal facilities.
- ✓ Organics diversion creates new jobs, both in organics recovery itself and also in other sectors such as landscaping and horticulture (Cascadia and Ross, p. 13).
- ✓ Adding organic matter to soils improves soil structure.
- ✓ Use of recovered organic products (mulch, compost, biosolids, etc.) reduces the need for chemical pesticides and herbicides that can pose threats to human health and the environment.
- ✓ Use of compost can reduce costs to agricultural producers (Rahmani, Hodges, Kiker).
- ✓ Application of organic products contributes to water conservation, as it increases soil's ability to hold water.
- ✓ Adding organic matter to soils improves water infiltration.
- ✓ Organics recovery holds potential for creating alternative energy (through biomass energy technologies such as anaerobic digestion) (Cascadia and Ross, p. 13).
- ✓ Organic matter can assist with carbon storage in topsoil so less is available as gas to contribute to the "Greenhouse Effect."
- ✓ Recycled organic products can be more effective for restoration projects than other products and materials.
- ✓ Application of compost can help to bind pollutants so they do not pollute water, which helps protect water quality and habitat (Marx, et al).
- ✓ Compost products can be used for storm water filtration.

Today's Reality

Recovery of organic materials in Washington State has grown rapidly in the past 20 years, driven by government focus on waste diversion and procurement of recycled products. Statewide, the recovery of yard debris has grown from almost nothing in 1988 to about 380,000 tons in 2002 (WDOE 2003-1, pp. 81, 85). This growth is a notable success story, and provides momentum to help recover even greater quantities of yard debris and other organics.

Similarly, recovery of biosolids from wastewater treatment plants has grown substantially in the last couple of decades. In the early 1970s, virtually all biosolids were disposed of in landfills or incinerated. Recovery of biosolids increased gradually to about 50 percent in the late 1980s, rising rapidly to the present rate of 80–85 percent recovery by the early 1990s (Dorsey 2002)

Currently, about 30 percent of what is disposed of in landfills and municipal incinerators is organic material (Cascadia 2002-1 and Green Solutions). In addition to these discarded organic materials, large but unmeasured volumes of other residuals are generated from agriculture, construction, and forestry; wastewater treatment; and food processing activities. These include manures, crop residues, biosolids, rendering and food processing wastes, sludges, and sawdust, to name a few. Estimates of agricultural manures and crop and harvesting residues, for example, total about 25 million tons per year (Cascadia and Ross, p. 6). Many of these materials are managed on-site, but many present increasing liabilities and challenges.

The following are brief discussions of the organic materials generated by key sectors of the economy, the recovery systems currently in place for each sector, and emerging trends in organics recovery.

Residential

Washington's residents generate large quantities of organic wastes at their homes. These include wastes such as grass clippings, leaves, brush and twigs, and food. Other compostable items include soiled paper (paper that is contaminated with food or other substances that make it not recyclable), clean lumber, and some textiles. Local waste studies indicate that these materials comprise roughly 30 percent of municipal solid waste (MSW) generated by the residential sector.

Local programs to collect organic wastes from residents have focused primarily on collecting yard debris from single-family homes. Such programs are in place in most urban areas, and usually offer both curbside collection and drop-off at transfer stations. King County has actually banned yard waste from being placed in residential garbage collection containers. Cities either provide collection services themselves, or contract for collection services.. The Washington Utilities and Transportation Commission (WUTC) requires the certificated collection companies to provide yard waste collection in unincorporated areas when counties specify yard waste collection services through their local solid waste plans. County residents in urban areas have the choice to either subscribe to collection services or to self-haul materials to drop boxes or other facilities. In rural areas, curbside collection services are less common, but in some areas drop-off facilities or private composters accept yard waste for recycling.

Commercial and Institutional

Businesses and institutions generate large quantities of yard debris and food wastes, primarily via landscaping activities, cafeterias, grocery stores, and restaurants. While the majority of these materials are disposed of, recovery of these materials is on the rise. Many facilities accept yard waste for composting at a reduced rate relative to the garbage tip fee. This cost savings provides an incentive for large generators to use this option instead of disposal.

Agricultural and Food Processing

Agricultural and food processing operations generate large quantities of organic materials such as manures, crop wastes, fruit pomaces, potato scraps, rendering wastes, and oils that are currently managed outside the existing solid waste infrastructure. Unlike the municipal solid waste stream, which is easy to sample, little reliable data is available on the quantities, location, and composition of agricultural organic residues.

Common handling methods include land application, burning, and on-site storage and disposal. Burning and stockpiling of agricultural residues have the potential to negatively affect air and water quality. The manufacture of strawboard for use in construction reduces the need to burn wheat field stubble, a significant benefit to air quality in wheat-growing areas of the state.

Construction and Forestry

Large quantities of wood waste are generated by constructing, remodeling, and demolishing buildings. In many cases this wood is coated with paints or stains, or infused with chemical preservatives. This type of wood is not currently compostable or recoverable for other types of organic processing. Clean wood, on the other hand, is occasionally recovered and ground to make wood chips for landscaping use. The infrastructure to recover wood has been in place since the mid-1990s in urban Puget Sound, and consists of transfer stations, sorting and recovery centers, and processing facilities. Similar systems have also been developing in other areas, helping to make recovery of construction and demolition materials (often referred to as C&D) one of the fastest growing sectors of the recycling industry (Cascadia 2002-2).

The forestry and pulp and paper industries also generate large quantities of wood-derived wastes. Sawdust is commonly burned for energy and also used as a compost feedstock. Forestry slash is usually managed on-site, but when burned it can create air-quality problems. Although not usually a solid waste concern, forestry practices should change to use slash material as a beneficial resource through on-site processing practices other than burning. In addition, large volumes of sludges are produced from wastewater treatment at pulp mills.

Goals: What Washington will look like in 30 years

Limited opportunities exist to reduce the generation of organic residual materials. Where appropriate, creating fewer residuals is a laudable goal. The future we strive toward is one that strikes a balance between, on the one hand, the production of organic residuals and their use in environmentally beneficial ways, and, on the other hand, the reduction in volume of residual materials that need to be managed at all.

Ecology envisions a "Beyond Waste" future society that views organic wastes as resources. Local businesses and society at large will create programs to capture organic materials (that otherwise

would be discarded as waste) due to their inherent value. These materials will be used to create beneficial products demanded by consumers. Wildlife habitat and water quality will benefit as a result of increased use of organic products. Most generators of organic residual materials will use those materials beneficially on-site. Washington's soils will be healthier. Demand for compost products will be high.

The following are 30-year goals for the Organic Materials Initiative:

- **Robust Markets**
  Robust markets have been established for organic-based products in all sectors of the economy. There is demand for high-quality organic products in the marketplace, from soil amendments and recycled consumer goods to green energy sources.
- **Closed-Loop Materials Management**
  Organics collection and processing is optimized. A network of businesses thrives on transforming residual organic materials into beneficial products. The quantity of organic waste is reduced through changes in industrial processes and on-site management such as composting. Organic residual materials are transformed into beneficial products according to highest and best use.
- **Society Supports A Sustainable Organics Cycle**
  Full organics recovery and beneficial use are the norm in Washington State. Businesses and governments incorporate full organics recovery into their decisions. Economic and regulatory incentives are aligned to support this system. Recycling and reuse of organics are efficient due to minimal presence of contamination or composite products in the system. Organic products are widely and regularly used to improve soil quality in urban, suburban, and agricultural areas.

The Action Plan

Short-Term Milestones

This initiative includes recommendations in several areas that, together, should yield significant advances in organics recycling throughout the state. To reach the 30-year goals described above, considerable progress must be made in the short-term. The following are milestones for the first five years of the Organic Materials Initiative.

Within approximately five years,

- ✓ State government and other large institutions use the organics recycling project at Ecology's HQ Building as a model.
- ✓ Best management practices for organics recycling at institutions are in use and at least six organics recycling programs are operating in large institutions and government agencies.
- ✓ Home composting programs are active and successful in every county.
- ✓ Closed-loop organics recycling goals and actions have been incorporated into several local-jurisdiction solid waste management plans.
- ✓ Effective incentives for encouraging organics closed-loop recycling have been identified and are being pursued.

- ✓ Performance-based product labeling requirements are in place for organic products that are sold or given away.
- ✓ Most people throughout the state are aware of the ongoing "healthy soils" program, and a significant percentage understands the benefits of healthy soils.
- ✓ One or more pilot projects using biomass energy technology are in operation to demonstrate the efficacy of capturing energy from organics.
- ✓ Implementation of an agreed upon strategy for increasing agricultural and industrial organics recycling is underway.
- ✓ Performance indicators have been developed to track and evaluate progress, and a baseline has been established for each of the indicators.
- ✓ A plan to address statutory and regulatory barriers to closed-loop organics recycling is widely supported.

Overview of Proposed Strategies

The single most critical element of the Organic Materials Initiative agenda is collaboration. It is widely recognized that no single entity, including the Washington Department of Ecology, is capable of influencing and implementing all of the actions needed to establish and maintain a successful system for diverting and recycling most of the organic residual materials generated. A strong and committed working partnership that includes experts from all facets of the organics world will become the linchpin of this organics agenda.

As with other Beyond Waste key initiatives, state government leading by example will provide many benefits and will be instrumental in advancing the closed-loop organics cycle. Another priority recommendation encompasses a look at the regulatory system to work toward elimination of barriers that hinder development of the organics cycle. In addition to regulatory barriers, the lack of labeling requirements and the presence of only minimum standards for recycled organic products constitute a huge barrier to the marketability and common acceptance of these products. This barrier will be addressed within the first five years as a priority. A deliberate and strategic expansion of research in key areas is another of the recommendations.

It is also essential to identify and acknowledge the benefits of reducing both wastes and the use of toxic substances. Some of the proposed research and demonstration projects should meet this need. The proposed "healthy soils" program will also assist with this. Valuing these benefits, even if they are not directly quantifiable, should help enable public sector decision-makers to expand closed-loop programs and services.

The larger effort to measure progress toward the Beyond Waste goals will include development of a performance measurement system and specific indicators related to the goal of instituting a statewide closed-loop organics cycle. In approximately five years, an evaluation should be conducted of the progress made toward the 30-year goals for organics. At that time, a second set of action recommendations should be proposed, and it should include the recommended actions still to be developed for the agricultural and industrial sectors. This second phase of implementation should include, as appropriate, the additional recommendations listed under Future Recommendations at the end of this paper.

It will be important to build on existing efforts in a few key areas during the coming years. The best opportunities to expand the closed-loop organics system right now seem to be present in the residential and government/institutional sectors. For this reason, several in the first set of recommendations aim to increase organics recycling in these sectors. Additional planning is needed to determine how to best improve and expand the closed-loop organic cycle for the agricultural and industrial sectors, and one of the priorities will be to develop a specific action plan and schedule for accomplishing that.

An important principle of the Beyond Waste action plan is to identify and influence leverage points that can ultimately bring about substantive change. The organics recommendations incorporate focusing on key leverage points that can advance the organics cycle in Washington. These include:

- **Government services and investments**
  Cities either contract for solid waste services and infrastructure (for example, Seattle, Vancouver, Bellingham), or have direct ownership (for example, Tacoma, Olympia, Spokane, Yakima). Service-level ordinances (counties and some cities) can serve to control what services are provided, and in turn what infrastructure exists to support those services.

  Municipal solid waste contracts dictate what services private haulers offer to generators, and what materials private processors handle. The periodic renewal of these contracts presents opportunities to include new organics recovery programs. Local solid waste management planning, which is updated regularly, provides a significant opportunity to both counties and cities to set goals for organics recovery and to specify services needed.

- **Prices and other economic drivers**
  These signals can help or hinder organics recovery programs. For example, high disposal fees can create incentives for generators to use organics recovery options, when those options provide cost savings. Tax breaks and other economic incentives can also encourage recycling ahead of disposal.

  Achieving cost-effective recovery programs is difficult and requires high participation rates, collection and transfer efficiencies, adequate processing capacity, established markets, and economies of scale (Cascadia and Ross, p. 21). Local governments have shown that yard waste collection from residences can operate cost-effectively, especially in the most highly populated areas. But systems in dispersed rural regions have more difficulty.

  While organics recovery and recycling programs may cost more than disposal of the materials in landfills or incinerators, the pricing of these programs nearly always takes into account only the up-front costs. The benefits of organics recovery and reuse are generally not included or even considered in the costing of these programs. Furthermore, these benefits have not even been quantified in many cases.

- **Planning for landfill closures**
  Seven out of Washington's eighteen current landfills that accept municipal solid waste from the public are expected to close by 2014 (WDOE 2003-1, p.119). These approaching closures may provide motivation for local governments to rethink their solid waste handling,

particularly as the closures may cause costs to increase. This change in practices may provide an opportune time to add organics recovery services.

- **Endangered Species Act and Water Quality Regulations**
  The decline of salmon and the deteriorating quality of rivers and streams throughout the state have focused attention on the role of soils in ecosystem health and the impact of the widespread use of fertilizers, pesticides, and herbicides in horticulture and agriculture on water quality. New regulations and practices to reduce these impacts provide opportunities for new applications of organic soil amendment products diverted from the waste stream. Opportunities to apply organic soil amendments, in turn, support investments in facilities to transform organic wastes into a valuable resource.

- **Sustainable Agriculture**
  The emergence of more sustainable farming practices provides another potential leverage point to spur interest in new organic management practices, on-site reuse of organics, and demand for soil amendment products.

Summary List of Priority Recommendations

The six priority action recommendations are on the list below, and more detailed explanations of each of them follow.

Recommendation ORG1	Lead by example in state government
Recommendation ORG2	Increase residential and commercial organics recovery programs
Recommendation ORG3	Improve quality of recycled organic products
Recommendation ORG4	Develop a strategy to increase industrial and agricultural organics recovery
Recommendation ORG5	Propose solutions to statutory and regulatory barriers
Recommendation ORG6	Develop new products and technologies for organic residuals

Priority Recommendations

Ecology recommends several action steps be undertaken in the next three to five years in order to reach the 30-year goals for an organics cycle in Washington State. If Ecology and its partners start now and work collaboratively, the actions described below will lead us toward robust markets, closed-loop materials management, and societal support for the system as a whole.

Recommendation ORG1 — Lead by example in state government

Statement of Action

Washington state government will lead by example both through organics recovery programs as well as through the purchase and use of more recycled organic products.

Specific Steps

✓ Maximize its procurement of recycled organic products, and its use of products that do not lead to contamination of organic materials.

- ✓ Implement on-site (or nearby) collection and processing of yard debris, food waste, and soiled paper at state government agencies. Develop best management practices for agencies and institutions for handling yard debris, food waste, and soiled paper.
- ✓ "Advertise" success of demonstration projects, especially links to environmental benefits and cost savings.
- ✓ Evaluate and propose appropriate incentives that will foster priority activities for organics recovery in the commercial and institutional sectors, and also within state agencies.

Background/Rationale

Government, at all levels, must show leadership in the management of organics. State government is positioned to play a leading role in achieving the Beyond Waste vision for organics. State government agencies must demonstrate successful organics management programs if businesses, other organizations, local and federal government agencies, and citizens are expected to do the same. In the next five years we need to focus on two areas of state government leadership: procuring recycled organic products, and establishing reduction and recovery programs for organics in all state agencies.

- **Procurement**

  State government has significant purchasing power. Strategic use of that purchasing power creates markets for products and healthy markets encourage competition, which begets better products, new technologies, and competitive pricing. Environmentally preferable procurement practices can encourage closed-loop organics recycling and can also benefit the environment by reducing consumption of virgin materials, reducing waste generation, and avoiding disposal costs. These practices can also increase the reuse of products. Such policies take environmental attributes of products and packaging into consideration before making purchase decisions. Including allowances for cost differentials in the state procurement practices will help increase market demand for recycled products. For organics, this affects the use of many chemical products, including pesticides and herbicides, and it also affects building and landscape decisions.

  For example, in the early to mid 1990s the Washington State Department of Transportation (WSDOT) began purchasing compost and mulch from recyclers for use in roadside applications. WSDOT was required by legislative action to procure these products, which in turn was responsible for kick-starting the yard debris recycling industry in Washington by increasing demand for the product. Today, "WSDOT and its road construction and revegetation contractors use approximately 20 percent of the compost produced and sold commercially in Washington State" (WSDOT, p. 13).

  Ecology will work with the Washington Department of General Administration, the Office of State Procurement (OSP), and the Interagency Sustainable Practices Network, using the authority of Chapter 43.19A RCW, Recycled Product Procurement, and other appropriate laws and regulations, to maximize recycled product procurement polices for state agencies. As part of this task, the goals in RCW 43.19A 050 should be updated (from 1998) and expanded to products beyond paper and compost. The standards of the Federal Biobased Products Preferred Procurement Program should be evaluated and considered for inclusion.

Local governmental entities also extensively use the state procurement office to purchase many of the goods they use. Ecology will assist the OSP to promote local government purchase of environmentally preferable products.

■ Recovery Programs

In the next five years, Ecology should work to develop recovery programs for food, yard, and paper wastes at all of its facilities. These programs should include a pilot composting program for food and soiled paper at the Ecology headquarters building in Lacey.

Based on its experiences, Ecology should develop best management practices for agencies and institutions for the handling of food, yard, and paper wastes. Ecology should work with the Governor's Sustainability Coordinator to institutionalize best practices and strengthen organics management, especially food and yard waste composting programs; elements of agency sustainability plans required by Governor's Executive Order 02-03 (Locke); and Ecology staff should provide focused technical assistance to agencies as they update their sustainability plans.

■ Demonstration Projects

It is essential for the promotion of organics recovery and reuse to have successful examples that will encourage other stakeholders, including public and private entities, to invest their time, effort, and money in new technologies. The programs instituted at state government facilities and other successful programs should help lead the effort to "advertise" demonstration projects to people within the institutional and large commercial sectors, and also to the public at large.

Education and technical assistance are essential to a successful transition to the full recovery of organics—to gain public acceptance for these changes, to provide the needed understanding of how to make those changes, and to create demand for the finished product. A tested and documented strategy for alleviating environmental problems, one that can save business and the public money and advance environmental stewardship, is generally well received and promotes participation. It can encourage interest and potential competition for business to "become green" as a promotional tool. In Massachusetts, a pilot full-scale commercial organics collection effort is being conducted to recover the large quantities of organic materials that can be used as feedstock for compost. Many of the state's largest grocery chains are participating, diverting roughly 8-10 tons of organic materials per week, per store. The cost differential is about 40 percent less than disposal, resulting in a total savings of about $10,000 to $20,000 per year per store (Goldstein). Using large potential end users and industry innovators for pilot and demonstration projects is an excellent means to promote products and encourage participation in "green technology."

■ Incentives

Incentives may be needed if we are to see an increase in organics recovery and recycling programs within the institutional and large commercial sectors. Economic incentives that should be researched include, but should not be limited to, tax exemptions and/or reductions for investment in organics infrastructure and use of organics, tax-exempt bond financing for investments, and "green" energy incentives for anaerobic digesters.

Recommendation ORG2 — Increase residential and commercial organics recovery programs

Statement of Action

Expand and increase organics recovery programs in the residential and commercial sectors, recognizing that opportunities differ between rural and urban areas of the state. Momentum from rapidly increasing organics recovery programs provides a strategic opportunity to measurably expand the organics system.

Specific Steps

- ✓ Research and develop a package of incentives to ensure the viability of organics recycling and recovery.
- ✓ Incorporate Organic Materials Initiative goals into local jurisdiction solid waste management plans.
- ✓ Support organics recycling through local level waste management contracting.
- ✓ Expand food waste collection and processing for residential and commercial sectors, to include developing Best Management Practices.
- ✓ Expand or implement home composting programs in every county.
- ✓ Develop an ongoing awareness and education program about the need for and benefits of "healthy soils."
- ✓ "Advertise" success of model projects, especially links to environmental benefits.

Background/Rationale

■ Incentives and Mandates

Incentives and mandates are powerful tools that can be used to shift the flow of organic materials from disposal to recovery and reuse. Unless waste generators and waste managers have an economic incentive or a mandate to change the current system, the flow of materials will likely continue toward disposal.

One of the first actions will be to research appropriate methods to leverage increased diversion of organic materials from the municipal solid waste stream, which consists primarily of residential and commercial wastes. Ecology should partner with local jurisdictions and the WUTC to define and oversee this research. Financial incentives for collection programs could include identifying current and potential mechanisms for variable can/collection rates that favor customers who separate organic materials for collection. It will also be important to evaluate how disposal fees can encourage organics diversion. In some areas, disposal of organics is currently cheaper than diversion, which creates a huge disincentive to recycling. A statewide incentive system is unlikely to be feasible given the variety of local solid waste collection and disposal systems and the laws that regulate them. The needs, capacities, locations, and economics vary from urban to rural areas, from smaller to larger jurisdictions, and from the western side of the state to the eastern side of the state.

In addition to or instead of providing incentives for organics diversion, mandates may be needed to reduce disposal of organic wastes into the municipal solid waste system. Mandates may include bans on the disposal of organic materials or mandatory source-separation of

organics. States that have instituted disposal bans generally agree that the bans have proven to be effective in achieving solid waste management goals (Fickes). Yard waste is currently banned from disposal in many local jurisdictions in Washington including King County and Seattle. Statewide bans exist in 24 states in the Midwest and East (Fickes).

Proposals for mandates should be carefully considered and appropriate alternatives need to be in place before they are implemented. For example, a ban on organics disposal without providing an organics collection system would leave customers without appropriate options for their organic residuals. The alternative systems need to be accessible, convenient, and acceptable to the waste generator.

The following incentives should be evaluated:

1. Tip fee increases
2. Tax exemptions for infrastructure investment and use of organics
3. Tax-exempt bond financing variable rate pricing or "pay-as-you-throw" rate structures
4. Green energy incentives for anaerobic digesters
5. Grants to local governments

- **Local jurisdiction infrastructure and services**

  State law requires each county and city in Washington to develop and maintain comprehensive plans for the proper management of solid wastes throughout their jurisdictions. These planning efforts present a key opportunity to help expand the closed-loop organics cycle through setting goals and planning for necessary infrastructure and programs to meet the goals. The preferred "Beyond Waste" future and the thirty-year goals for the five key initiatives (such as the Organic Materials Initiative) necessitate an evaluation of the local solid waste planning requirements. The actions and goals contained in this organics agenda should be incorporated into the local plans as part of this evaluation effort. This will result in local jurisdictions throughout the state planning for and helping to build an expanded organics system. Two important areas of leverage available to local jurisdictions are infrastructure planning and solid waste collection and disposal service levels.

  For cities, municipal solid waste contracts dictate the services that private haulers offer to generators, and the materials private processors handle. The periodic renewal of these contracts presents opportunities to include new organics recovery programs.

  Ecology should partner with local governments to identify upcoming contract renewals, and integrate contract decision-making with future investments in new facilities. The goal over time is to facilitate a timely, coordinated transition from the current system to one where all possible residual materials are recovered, leaving a very small percentage of discards as waste.

- **"Healthy soils" program**

  In the next five years, it is imperative to launch an ongoing statewide education and marketing program to communicate the value of healthy soils and the role of organic matter in maintaining them. An emphasis on programs that target natural gardening and integrated pest management should be stressed, as these practices decrease the use of chemical

pesticides. Promoting compost qualities to the general public can reduce the use of pesticides, herbicides, and water from domestic sources, thus improving soil and water quality, and increase the demand for compost products in the future. It is necessary for the public to be aware of the benefits of using compost. Ecology should encourage an organization with broad-based support (such as the Washington Organics Recycling Council) to lead the development of this program.

Recommendation ORG3 — Improve quality of recycled organic products

Statement of Action

For organic materials to continue to be a valued commodity, consumers must have confidence in the quality of recycled organic products. A number of actions are needed to address the quality of recycled organic products and thereby improve consumer confidence:

Specific Steps

- ✓ Identify quality barriers to marketability of recovered organic products, including sources of contamination. Propose strategies to address the quality barriers.
- ✓ Bring key producers and users together to develop product quality criteria that address marketability according to end use.
- ✓ Promote the use of labeling or information sheets for recycled organic products
- ✓ Evaluate the need for changes to standards for composted material in WAC 173-350-220.

Background/Rationale

In the regulatory arena, Ecology's recent implementation of Chapter 173-350 WAC includes specific provisions for compost facility requirements and compost quality standards. Additional requirements may be needed to assure quality and improve consumer confidence, and to provide consumers with the tools necessary to enable them to choose the appropriate product for their desired usage. Ecology should assess this need and develop a recommended approach and schedule for revision, as needed.

A coalition of organics experts should lead the effort to improve the quality of recycled organic products. Effective markets are still hampered by ongoing concerns about contaminants, content, consistency, and quality. For example, landscapers in King County feel that the quality and consistency of organics need to improve (Cascadia 2000). In a focus group, landscapers reported that some products labeled as "compost" are:

- Not fully composted.
- Excessively moist.
- Inconsistent in texture, composition, and particle size.
- Contain weed seeds, pathogens, metals, or other contaminants.

Clearly, one barrier to achieving a full organics cycle is the lack of consumer information or standards available to allow consumers to make informed choices about the quality, consistency, and content of the products they are purchasing. They need to be confident that they are getting what they pay for. A wide variety of compost and mulch products are offered in the marketplace,

with a corresponding wide variety of applications, without currently accepted standards by which consumers can judge the products.

Related to the above obstacle, feedstock contamination is a barrier facing processors in their goal to produce products that consumers trust. Although composting and other processing methods are very effective at breaking down many types of contaminants, many still withstand most processing methods. In particular, the recent concern over clopyralid shows that some pesticides can be very persistent. In addition, there is still the potential for feedstock to include physical contaminants such as plastics or metals or chemical contaminants such as heavy metals and dioxins.

Recommendation ORG4 — Develop a strategy to increase industrial and agricultural organics recovery

Statement of Action

Develop and begin implementing a strategy to increase closed-loop recycling in the agricultural and industrial (food processing) sectors.

Specific Steps

- ✓ Assess barriers, key leverage opportunities, and various approaches to increasing organics reuse and recycling in the agricultural and industrial sectors.
- ✓ Develop a set of specific actions and a proposed timeline for increasing organics recovery and recycling throughout these sectors.
- ✓ Advertise success of current projects, especially links to environmental benefits.
- ✓ Research and develop a package of incentives to encourage organics recovery in the agricultural and industrial sectors.

Background/Rationale

Several million tons of manures, crop residues, and industrial organic wastes are generated every year in Washington (Cascadia and Ross, p. 6). Although many of these materials are managed on-site through land application, burning, and storage, sometimes these practices raise air and water quality concerns. Composting and interest in biomass energy processes are increasing, particularly for recovery of agricultural and food processing residuals. The potential capacity is great for end use of recycled organic materials and products in several large areas around the state.

Setting targets and creating a timeline within which to work will provide the ability to make strategic decisions on which activities to focus time and resources. It may take a substantial investment of time and resources to make progress in the industrial and agricultural sectors due, in part, to the sheer volumes of materials, the existing barriers to progress, and the lack of adequate processing capacity and infrastructure.

A large number of organizations are involved in promoting agricultural and industrial organics recovery. These organizations and others, including Ecology, should collaborate on the development of this strategy.

Recommendation ORG5 — Propose solutions to statutory and regulatory barriers

Statement of Action

Identify, evaluate, and propose solutions to statutory and regulatory barriers for developing and sustaining a closed-loop organics cycle in Washington.

Specific Steps

- ✓ Research and identify statutory and regulatory requirements that inhibit the sustained development of a successful organics closed-loop system.
- ✓ Develop a proposal for addressing these barriers, leading to a regulatory framework that supports closed-loop organics recycling.
- ✓ Develop a process to resolve existing (and future) jurisdictional conflicts among state, local, and federal governmental authorities.
- ✓ Develop and institute a process for Ecology rule development and implementation that will provide clarity and consistency, and prevent overlapping or contradictory requirements.
- ✓ Propose, if appropriate, a hierarchy of highest and best uses for organic residual materials.

Background/Rationale

Currently, there are a number of regulatory agencies—at both the local and state levels—that have some oversight regarding parts of the organics collection and processing methods. Although regulations serve valuable functions, they can be confusing to navigate, or can actually be barriers to closed-loop recycling. In addition, individual regulations may be changed without a comprehensive look at how each change will affect the other applicable regulations.

Input from constituents and interested parties should be sought to identify these statutory and regulatory barriers and then to develop recommended resolutions. The goal is to be prepared to move forward with proposed changes at the end of the initial five-year implementation period for these recommendations.

Increased communication and coordination within and between agencies is also a critical issue now and for the future. A key step is to work with agencies to identify jurisdictional conflicts that exist or that could develop in the future between and within different agencies. Then, all parties involved should develop a process and schedule for resolving these issues. When the authority of a particular agency or division ends and another begins can create significant confusion, and at times can lead to duplicative or contradicting regulations.

The Department of Ecology's Solid Waste and Financial Assistance Program (SWFAP) and the Department of Agriculture provide an example of often confusing regulatory authorities. Solid wastes are regulated by Ecology under Chapter 173-350 WAC, and fertilizer is regulated by Agriculture under Chapter 16-200 WAC. If nutrient claims are made by the manufacturer, however, solid waste can be considered a fertilizer and can fall under the jurisdiction of both agencies. Similar dilemmas have been encountered when considering the proper regulation of various wastes and biosolids with fertilizer value, which are also subject to state solid waste and biosolids regulations (Chapter 173-308 WAC).

Intra-agency coordination (for example, between separate programs within a single agency, such as Ecology's Air Quality and SWFA programs) is of equal importance to interagency cooperation and communication. As noted above, SWFAP in Ecology regulates compost facilities, but the agency's Air Quality Program issues permits regarding air emissions from those same proposed facilities. The specific requirements stipulated by each program may prove to be contradictory. Concerted efforts need to be made both in rule development and in the implementation of those rules to provide clear, concise regulatory direction without overlapping or contradictory regulation(s).

Recommendation ORG6 — Develop new products and technologies for organic residuals

Statement of Action

Develop a strategy for researching and developing best practices, additional products, and new technologies for organics recycling.

Specific Steps

- ✓ Identify priority research needs for innovative new technologies and products that will help closed-loop organics recycling.
- ✓ Encourage and seek funding for specific projects that can serve as demonstrations and/or fulfill research needs, including biomass energy projects that involve closed-loop recycling of organic residual materials.
- ✓ Develop and promote best practices for organics collection and processing.

Background/Rationale

A group of experts should be convened to develop this strategy, including university researchers, farmers, entrepreneurs, representatives from the Department of Community Trade and Economic Development, Governor's policy staff, local government, and consultants.

Research

While great strides have been made in organics recovery and reuse in recent years, much remains to be done. Existing technologies and processes can be used to expand the organics cycle, but ultimate economic viability will rely on research and technologies that have not yet been developed or proven. Research provides a fundamental, structured procedure for discovery of new information on innumerable topics. Public financing of research is very important. Local research projects can have direct implications on the handling of organic materials (WDOE 2003-2), but may be ineligible for federal funding due to the nature, specificity, or timing of the investigation. Therefore, a flexible, state funding mechanism for research may be needed to provide resources for local projects. Data gathered from small projects can establish the groundwork that often enables the acquisition of additional federal funding (Johnson 2003).

A variety of technologies exist for recycling organics into bio-based products, but they are not commonplace in Washington State. Strawboard made from wheat stubble and compostable containers made from agricultural residue are examples of emerging industries with the potential to recycle significant quantities of organic materials. The state of Washington should seek to partner with research organizations such as the Northwest BioProducts Research Institute (NBRI),

where appropriate, to provide financial and technical support. NBRI is a publicly funded research organization seeking to find new and alternative products from organics.

Best Practices and Demonstration Projects

A compilation of best management practices should be prepared and made available statewide. The types and quantities of organic residuals, current infrastructure, transportation issues, and costs all vary substantially between eastern and western Washington as well as between counties in these two regions. Pilot projects using different collection methods and research into new processing techniques can provide valuable information on how to most effectively "close the loop."

The highest and best use of organic residual materials is the ultimate goal of a closed-loop organics cycle for Washington. In some instances, use of the organic materials to generate energy is the best use. Interest in producing energy from organic residuals has intensified and needs to be further researched to determine its long-term feasibility. Many experts cite biomass energy production (such as anaerobic digestion) as a promising future trend for large waste streams such as manures and agricultural wastes. That promise is due to three factors: their ability to handle liquid manures combined with other municipal and industrial wastes, their relatively low cost, and their ability to generate marketable products, including a fiber residual and energy. Demonstration projects should be pursued in this area, using technologies that involve closed-loop recycling or organic residual materials. Local and regional investments in energy infrastructure may provide opportunities for small, regionally based electricity generation through emerging biomass energy technology, which may help expand and diversify energy supplies creating local electricity from organic wastes. The recent electricity price peaks and continued supply uncertainty underscore the significance of this potential leverage point.

Future Recommendations

In five years, an evaluation should be conducted to assess the progress made toward creating an organics cycle in Washington, and the next phase of the implementation schedule should be developed. As part of that assessment, the additional recommended actions listed below should be considered and included, as appropriate, to make further progress toward the 30-year goals.

1. Product stewardship efforts, including the following:
   - Influencing the design of products made from organic materials to reduce or eliminate the use of toxic substances in the life cycles of the products.
   - Influencing the design of products made from organic materials to reduce wastes and to make them easy to disassemble and recycle. Products can be designed to be compostable or recyclable.
   - Encouraging design and development of biodegradable products. (An example of existing products is plates and flatware made from vegetable matter that can be composted with food scraps.)
2. Reduce or eliminate the use of toxic substances in organics, such as crops, landscapes, forests, etc.
   - This could involve increasing Integrated Pest Management (IPM) practices.

- This could also involve increasing the demand for products from organic farms and independently certified forests.

3. Continue Research and Development, in at least the following two areas:
   - Soil health and ecology is an area of soil science in its infancy. Continued research into soil health and its implications may provide incentives to both care for and improve soils through organics recycling. Compost and other processed organics are beneficial to soil health, which in turn supports a wide variety of plant, animal, and human needs. Widespread understanding of these benefits will help create an ethic of protection and improvement which can, in turn, sustain fundamental market demand for organics.
   - Reclamation of drastically disturbed lands continues to offer a significant environmental benefit and market for recycled organics. For example, piles of old mine tailings can be revegetated by using compost. Investigation of innovative ways to use recycled organics to restore these vulnerable and unproductive sites should continue.

Conclusions

To reach the 30-year goals, bold and visionary action is needed. The actions proposed in the first phase of implementation, or the first five years, consist primarily of efforts to build on or expand initiatives that are already underway or have been identified as needed by a significant number of key people working in the organics and composting fields. It is anticipated, and even expected, that this first phase of actions will not only be successful in increasing organics composting and use, but that it will also be instrumental in building awareness and demand for compost products.

Even so, aggressive action will need to continue for many years to achieve the long-term goals of the Organic Materials Initiative, including the development of new technologies and the redesign of products made from organic materials.

Implementation Plan for the Organic Materials Initiative

The following table shows when the recommendations from this initiative will be undertaken. This table is an excerpt from the Beyond Waste Implementation Plan, which can be accessed at http://www.ecy.wa.gov/biblio/0407034.html

Increasing Recycling for Organics Materials

Recommendations to Begin in First Year	Approach for Implementation	Recommendations for Years 2-5
ORG1 Lead by example in State government • Maximize procurement of recycled organic products at state agencies, • Identify procured products that interfere with closed-loop organics recycling; encourage use and development of alternatives. • Identify current purchases that could be replaced with recycled organic products. • Implement yard debris, food waste, soiled paper collection and processing at state government facilities. • Develop best management practices for composting food waste and soiled paper at institutions. • Design and install food/paper towel compost demonstration project at Ecology HQ building. • Advertise success of demonstration projects, especially links to environmental benefits and cost reductions. • Provide information on web about composting demo project and best management practices.	Ecology will lead this effort at first, in close cooperation with GA, OFM and other entities. Ecology will also incorporate GB and MRW initiative goals/recommendations as possible.	ORG1. (Remainder) Partner with state agencies and other large institutions to implement organics collection and processing programs ORG2. (Remainder) Healthy soils program ORG3 Improve quality of recycled organic products ORG5. Propose solutions to statutory and regulatory barriers ORG6. Develop new products and technologies for organic residuals ORG4. (Remainder) Develop plan to address barriers
ORG2 Increase residential and commercial organics recovery programs • Encourage local governments to incorporate organics initiative goals into local plans. • Produce statewide report of home composting and assess needs/opportunities. • Evaluate incentives used by other states; convene stakeholders for input on incentives. • Research existing collection contracts, identify opportunities for increased organics recycling in future contracts, and post model contracts on the Web.	Ecology will lead this effort and incorporate GB and MRW initiative goals/recommendations as possible. Ecology will lead these efforts in consultation with affected parties.	
ORG4 Develop a strategy to increase industrial and agricultural organics recovery • Assess barriers	Ecology will coordinate these efforts in collaboration with local government.	

Bibliography

Cascadia Consulting Group (2000). *Landscaper Focus Group Findings: Current Practices & Attitudes about Compost Use in King County*. Prepared for King County Solid Waste Division, December 2000.

Cascadia Consulting Group (2002-1). *Commercial and Self-Haul Waste Streams Composition Study: Final Report*. Prepared for Seattle Public Utilities.

Cascadia Consulting Group (2002-2). *Summary Report of the 2001 Survey of Washington State's Recycling Industry*. Prepared for King County Solid Waste Division.

Cascadia Consulting Group and Ross & Associates (2003). *Establishing the Organics Cycle in Washington State.* Washington State Department of Ecology Publication 03-07-028. Available at <http://www.ecy.wa.gov/pubs/0307028.pdf> accessed 5/7/04.

Fickes, Michael. "Banned in Boston (and a few thousand other places)." *Waste Age,* November 2002: 48–51.

Goldstein, Nora. "Massachusetts Makes Strides with Commercial Organics Composting." *BioCycle: Journal of Composting & Organics Recycling*. Emmaus, PA. 43.12: 26-29. December 2002.

Green Solutions. *Waste Composition Analysis for the State of Washington*, Unpublished report. Washington State Department of Ecology, June 2003.

Johnson, Kathy. Personal communication with EPA grant administrator, Office of Solid Waste and Emergency Response, Seattle, WA. 2003.

Locke, Governor Gary. "Executive Order 02-03: Sustainable Practices By State Agencies." Olympia, WA, 2002. Available at <www.governor.wa.gov/eo/exorders.htm> accessed 5/7/04.

Marx, Josh, et al. "The Relationship Between Soil and Water: How Soil Amendments and Compost Can Aid in Salmon Recovery." *Soils for Salmon* issue paper. King County Department of Natural Resources. Fall 1999.

Rahmani, Mohammed, Alan Hodges, and Clyde Kiker. "Analyzing Compost Economics." *BioCycle: Journal of Composting & Organics Recycling*. Emmaus, PA. 40.7: 66-69. July 1999.

Washington State Department of Ecology (WDOE) (2003-1). *Solid Waste in Washington State, Twelfth Annual Status Report.* Lacey, WA: Washington State Department of Ecology Solid Waste and Financial Assistance program, 2003. Available at <http://www.ecy.wa.gov/pubs/0307019.pdf> accessed 5/6/04.

Washington State Department of Ecology (WDOE) (2003-2). *Land Applications of Waste Fruit in Douglas County.* Unpublished report. Washington State Department of Ecology Solid Waste and Financial Assistance Program, Central Regional Office, Yakima, 2003.

Washington State Department of Transportation (WSDOT), Measures, Markers and Mileposts: The Gray Notebook for the quarter ending September 30, 2002. Olympia, WA: Washington State Department of Transportation, November 15, 2002. Available at <http://www.wsdot.wa.gov/accountability/Archives/GrayNotebookSep-02.pdf> accessed 5/6/04.