

Marion County

Solid Waste System Assessment Report 2016



“Managing Waste as a Resource”

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Solid Waste System Assessment Report 2016

Section I.0 - Introduction

In 2010 Marion County prepared a comprehensive update of the Solid Waste Management Plan (SWMP). This plan adopted a set of actions with recommendations to advance the programs and services towards meeting the goals for managing solid waste as a resource and reducing the amount of waste disposed in landfills. Since the 2010 SWMP was adopted, the county, cities, and the private service providers have continued to make progress towards achieving these goals. However, there have been several events and other factors outside the control of the County that could impact decisions for managing the county's waste in the future. These include;

- 1) The state adopted regulations that set a new statewide recovery goal of 55%. For Marion County the goal is 64% by 2025. The goal for the Metro, Eugene and Salem areas is higher to offset lower recovery rates expected from rural areas.
- 2) Jurisdictions outside the County have entertained options for managing solid waste that include, delivering waste to the Covanta Energy from Waste Facility (EFWF) – assuming the plant is expanded.
- 3) A growing number of communities throughout the county are considering new technologies for managing waste as a resource
- 4) There have been advances in technology to process waste to recover more materials and reduce waste disposed in landfills.

Five years have elapsed since the SWMP was last updated. Considering recent events that have impacted the options for managing waste, Marion County wishes to review the status of the current waste management system and identify areas where the plan might be revised to address future needs.

I.1 Purpose

Given recent changes in state law and other events, Marion County requested a focused examination of the solid waste system.

The purpose of this 2016 assessment report is to update estimated waste generation projections, and determine what impacts this may have on current facilities. Another purpose is to review current trends and technologies and establish what actions the County and its partners should consider in order to address these changes. This effort will be used to identify issues and discuss actions that should be considered in order to maintain the quality and effectiveness of current programs and services.

The assessment is being conducted with limited budget and timeframe. Therefore, the results of the assessment will be to identify issues or strategies that will need additional evaluation to determine the cost effectiveness and full impact to the system.

I.2 Approach

In order to complete the solid waste system assessment in a timely manner the assessment scope included the following tasks:

1. Review the current wastes quantities and projections from the 2010 SWMP and update the waste generation projections based on the latest data.
2. Identify any changes in regulations and local and regional actions that could impact the waste management system.
3. Review the condition of the existing facilities and identify any deficiencies and needs related to the ability and capacity to handle the projected waste stream.
4. Review recent trends and the status of alternative technologies to consider if these strategies might be considered to meet the long term needs of the system.
5. Issue a set of findings and identify further actions to address these needs.

Once the current waste quantity data and initial assessment was completed, a presentation was made to a joint meeting of the Board of Commissioners (Board) and the Solid Waste Management Advisory Council (SWMAC). With input from these groups, this final report was prepared.

Section 2.0 - Waste Quantities and Updated Projections

One of the primary objectives in completing the 2016 assessment is to review waste generation and disposal quantities over the past five years to determine what impacts they have had, if any, to the solid waste system. This includes reviewing the recovery rate and trends over this period as reported by the Oregon Department of Environmental Quality (DEQ).

2.1 Historic Waste Quantities

At the time the 2010 SWMP was completed the County had experienced a steady increase in the amount of waste generated. Between 2000 and 2007 when the latest data published by DEQ was available, the total waste generated within Marion County grew from 356,130 tons per year to roughly 500,000 tpy (tons per year) or about 6% per year. This growth in waste generation was impacted by two primary factors;

- 1) Increase in population.
- 2) Steady growth in the Gross National Product (GNP) during that period.

Although population in the county grew at a rate of 1.3%, the economy experienced a growth in the GNP rate of 3% to 5% for this period. Thus, Marion County, as with many parts of the country, experienced an increase in waste quantities.

Despite the increase in the total waste generated, the County realized a substantial growth in the recovery rate during this period. As reported by DEQ the recovery rate increased from 43.6 % in 2000 to more than 58% in 2009. This includes a 6% credit for waste reduction/prevention and compost education programs. The increase was a result of adding new services and programs to reduce waste and recycle more materials. During this period curbside collection of source separated recyclable materials was expanded to serve every household in the county; and, curbside pickup of yard debris in the urbanized areas was provided. In addition, compost facilities upgraded their operations to accept food waste. During this period the County also maintained a comprehensive promotion and education program.

The table below shows the waste stream data from 2000 to 2009, and the increase in total waste generated in pounds per person per year. It also presents the per- capita disposal and recovered for the period.

Table 2.1 - Historic Waste Stream Data (2000 -2009)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Solid Waste Generated	356,130	386,007	402,741	398,785	428,776	481,723	509,383	499,004	456,613	419,207
Total Solid Waste Disposed	218,841	194,190	197,699	211,510	225,430	242,809	245,214	247,331	217,172	200,420
Total Material Recovered	137,289	191,817	205,041	187,275	203,346	238,914	264,168	251,673	239,441	218,787
Per-Capita Gen. (#/person)	2,489	2,678	2,770	2,697	2,875	3,191	3,324	3,210	2,902	2,637
Per-Capita Recovered	937	1,331	1,410	1,267	1,364	1,582	1,724	1,619	1,522	1,376
Per-Capita Disposed	1,552	1,347	1,360	1,430	1,512	1,608	1,600	1,591	1,380	1,261
*DEQ Recovery Rate	43.6%	55.7%	56.9%	52.9%	53.4%	55.6%	57.9%	56.4%	58.4%	58.2%

*Includes a 6% credit for waste reduction/prevention programs.

It is important to note that during this period, there was an increase from 43.6% to more than 58.2%, including the 6% credit, representing a 35% increase in the recovery rate. The increase in the recovery rate offsets the increase in the waste generated. This is a direct result of the expansion of recycling services between the years of 2000-2009.

Since the 2010 SWMP was completed, the amount of waste generated in the county has decreased. As shown in Table 2.2 and the corresponding graph the annual per capita generation rate decreased from 3,324 pounds per year to 2,637 pounds per year. Therefore, annual waste quantities decreased 15% from 509,383 tpy to 432,217 tpy or about 2% per year. This is largely due to the change in the economy, since the population during this same period is estimated to have increased by an estimated 30,000 people.

Table 2.2 - Historic Waste Stream Data (2010 and 2014)

	2010	2011	2012	2013	2014
Total Solid Waste Generated	413,717	430,916	420,356	432,217	443,108
Total Solid Waste Disposed	205,923	195,332	191,947	193,571	204,991
Total Material Recovered	207,794	235,584	228,409	238,646	238,117
Per-Capita Gen. (#/person)	2,612	2,711	2,625	2,679	2,719
Per-Capita Recovered	1,308	1,482	1,426	1,479	1,461
Per-Capita Disposed	1,305	1,229	1,199	1,200	1,258
DEQ Recovery Rate *	56.2%	60.8%	60.3%	61.2%	59.74%

Graph 2.1 - Waste Generation Rates (2005 to 2014)

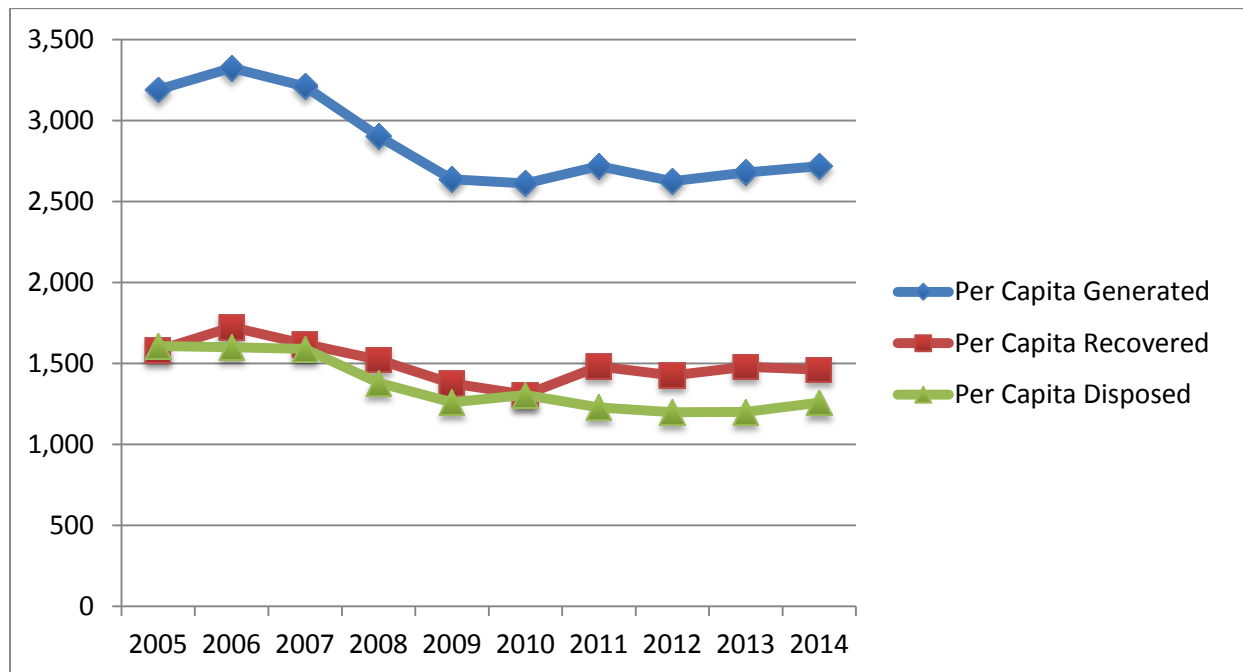


Table 2.3, provides a recap of the period between 2009 and 2014. In summary, the amount to total waste disposed in 2014 was relatively the same in 2009.

Table 2.3 - The Total Waste Stream (2009 and 2014)

	2009	2014
Solid Waste Generated	419,207	443,108
Solid Waste Disposed	200,420	204,991
Material Recovered	218,787	238,117

However, Marion County recovered and recycled about 20,000 tons more in 2014 than in 2009. This can be attributed to having a well-managed waste reduction and recovery program and comprehensive and successful recycling programs carried out by all service providers.

2.2 Waste Projections

This assessment updates and evaluates the amount of waste that may be generated over the next fifteen years. These estimates are based on available population projections in conjunction with recent data on how much waste is disposed and recovered on an annual per capita basis.

Updated Population Projections

The State of Oregon population forecast was updated by the Oregon Economic Administration as of March 2013. These forecasts take into account the 2010 updated census data and are based on a number of demographics and local economic conditions. Below are the projected population figures through 2030 for Marion County. The projections are listed in five year increments so the average annual increase is presented in the adjacent column.

Table 2.4 - Marion County Population Projections

Year	*OEA Population Projections	Annual Growth Rate of Increase
2000	286,300	-
2005	302,913	1.16%
2010	315,335	0.54%
2015	331,643	1.07%
2020	355,189	1.93%
2025	381,098	1.45%
2030	406,612	1.34%

*According to *Forecasts of Oregon's County Populations and Components of Change, 2010 – 2050*, prepared by the Oregon Office of Economic Analysis, released on March 28, 2013.

The population projections will be used in conjunction with waste generation data to estimate future waste quantities for planning purposes.

Estimated Waste Quantities

To estimate the amount of waste that might be generated in the future, the assessment uses per capita generation rates reported by DEQ over the past nine years. DEQ is responsible for compiling the data and producing a report for each county in Oregon. As such, the agency provided the most accurate data showing how much is recycled and diverted from landfills to compute the recovery rate.

Likewise, DEQ produces a similar report on how much is disposed at landfills from each county based on information provided by these disposal sites. The total waste generated by Marion County is the sum of the quantities recovered and the quantities disposed. This data is then divided by the population to arrive at the generation rates.

Table 2.5 shows the per capita generation rate has decreased from 3,324 pounds per capita per year in 2006 to 2,719 in 2014. During this period the generation rate reached nine year lows in 2009 through 2012 before starting to increase as the economy shows some recovery. Over the past nine years the disposal rate decreased consistently, while the recovery rate went down slightly but has increased since 2009. In the table below the average per capita rates over the past nine years are presented.

Table 2.5 Historic Annual Pounds per Person Rates

Year	Total Solid Waste Generated	Per Capita Generated	Per Capita Recovered	Per Capita Disposed
2006	509,383	3,324	1,724	1,600
2007	499,004	3,210	1,619	1,591
2008	456,613	2,902	1,522	1,380
2009	419,207	2,637	1,376	1,261
2010	413,717	2,612	1,308	1,305
2011	430,916	2,711	1,482	1,229
2012	420,356	2,625	1,426	1,199
2013	432,217	2,679	1,479	1,200
2014	443,108	2,719	1,461	1,258
Average	447,535	2,838	1,492	1,346
Ave. w/out 1Recession Years	459,739	2,910	1,539	1,371

In making future estimates, using the full nine years of per capita data will show lower projected waste quantities. This would be a result of basing such projections on lower economic growth. If on the other hand the GNP would experience growth similar to the mid 2000's, the amount of waste generated could be much higher.

To make waste quantity projections for this 2016 Assessment Report a range is used. The OEA population projections are multiplied by the latest per capita generation rates for 2014 to produce a low estimate. Using the average over the past nine years was a consideration. However, it includes three to five years of a significant recessionary period that could skew projections to be understated. This would be acceptable for financial planning as it would be conservative.

However, this data may not be realistic in considering future facility needs to ensure appropriate infrastructure is available. For these reasons, the assessment of future waste quantities for an

¹ Numbers calculated based on averages excluding the years 2009, 2010, and 2011.

upper level used an average for the period that excludes the three years from 2009 to 2011, during the recession. This data is shown on the last line of Table 2.5.

Table 2.6 presents the results of using the 2014 data to produce the low estimates and the average per capita data for the past nine years minus the three years of recessionary data.

Table 2.6 - Waste Stream Projections (High Low Estimates) Tons per Year

Year	Waste Generated		Waste Recovered		Waste Disposed	
	High	Low	High	Low	High	Low
2015	482,541	450,869	246,908	242,265	221,538	208,603
2020	516,800	482,879	264,438	259,466	237,266	223,414
2025	554,498	518,103	283,727	278,392	254,573	239,711
2030	591,620	552,789	302,723	297,030	271,617	255,759

The total waste Marion County reported for 2014 according to DEQ was 443,108 tons. As the above table shows, the amount of waste generated in 2025 (the ten year planning horizon for this report) could range from 518,103 tons to 554,498 tons. These projections do consider that over a ten year period a small recession may occur but also reflects perhaps somewhat normal growth in the economy.

The projections shown in Table 2.6 are used in Section 5 to discuss future impacts to the solid waste system and identify facility requirements and needs. It will allow the county, and its partners that are responsible for delivering services, to consider strategies for managing the waste in the future.

Section 3.0 - Review of Existing Facilities and System Performance

This section of the report reviews the current solid waste management system infrastructure. This entails a review of the condition of the different facilities and determining if there are any deficiencies or needs. Another part of this assessment provides a review of how the system is meeting the goals of the county and current statewide mandates.

3.1 Waste Reduction and Recycling

The County has adopted the state hierarchy to establish the priority means for managing solid waste. This hierarchy clearly shows the priorities to reduce waste, reuse materials, recycle, compost, convert to energy and finally dispose remaining waste in landfills. Marion County has long been a leader in establishing and maintaining one of the highest recovery rates in the state. Since 2009 the overall recovery rate has increased from 58.2% to 61.2%. This number does

include a 6% credit towards the recovery rate for providing a full range of promotion and educational programs.

Table 3.1 - Marion County Recovery Rate

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014
DEQ Recovery Rate	57.9%	56.4%	58.4%	58.2%	56.2%	60.8%	60.3%	61.2%	59.7%
W/O 6% Credit	51.9%	50.4%	52.4%	52.2%	50.2%	54.4%	54.3%	55.2%	53.7%

This information shows the county has made steady progress to recycle more materials through 2011. Even when the economy experienced slow growth, between 2010 and 2014, the County maintained a consistent recovery rate. However, if the County and its service providers do not expand services and programs, the recovery rate will most likely stay flat.

3.2 Review of Existing Facilities

The solid waste system in Marion County consists of collection, transfer, waste recovery, recycling, household hazardous waste, composting and disposal facilities and services.

3.2.1 Transfer Stations

There are two transfer stations that operate in Marion County. The Salem–Keizer Recycling and Transfer Station (SKRTS) and the North Marion County Disposal Facility (NMCDF).

SKRTS is located southeast of Salem off Highway 22. The site is owned and operated by Capitol Recycling and Disposal under a contract with the County. In 2006, more than 31,000 tons of solid waste was delivered to SKRTS.² In 2011 the total amount of waste delivered was less than 26,000 tons; however in 2015, the amount of waste was almost 37,000 tons, which is the most waste received in the past ten years.

Solid waste received at SKRTS is transferred to the EFWF for processing. In addition to the solid waste, a full range of recyclable materials is accepted at SKRTS. Recyclable materials are transported to the Marion Resource Recovery Facility (MRRF). As discussed, the reduction in the waste between 2007 and 2013 is largely a result of economic conditions. However, in the past two years the amount of waste has increased to pre-recession levels.

SKRTS is a key facility in the Marion County solid waste system. It provides a convenient location for customers in the south part of the county, and offers full recycling services for these

² Marion County Department of Solid Waste Management 2010

constituents. Therefore, as the waste stream grows and with the current capacity of the EFWF, more waste may need to be long hauled to Coffin Butte. If so, the SKRTS facility may become a larger part of transporting waste to Coffin Butte or elsewhere outside the county.

Recyclable materials brought in by the public include: lead acid batteries, mixed paper, compost, cardboard, “greyboard”, food, beverage containers, glass, electronics (including, stereos, computers, phones, cell phones, printers, TVs, microwaves, plastic rigid containers #1-7, and latex paint). In addition, yard debris and wood waste are segregated and transported to a commercial composting facility for recycling. Also, the County’s Household Hazardous Waste (HHW) facility is located at SKRTS.

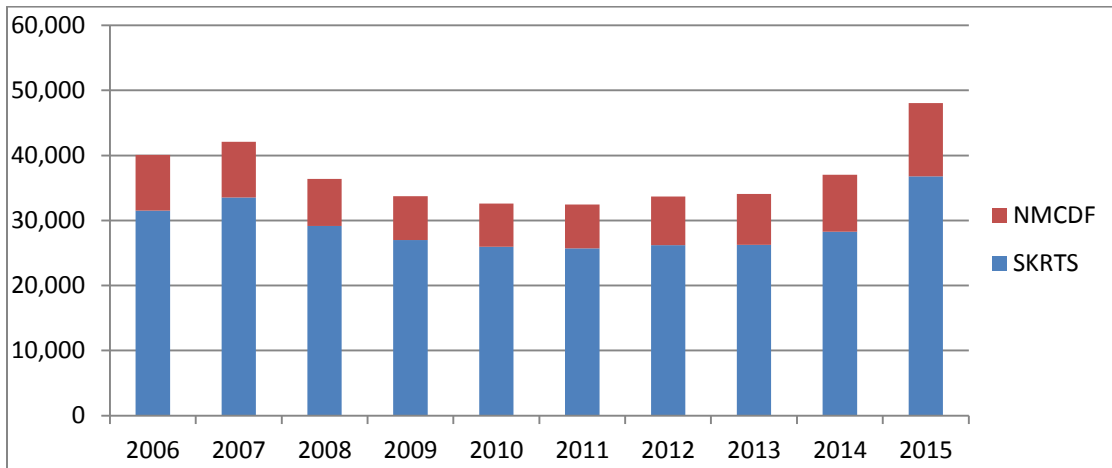
The North Marion County Disposal Facility (NMCDF) is a smaller transfer station owned and operated by the County that serves the northern-most portion of the county. NMCDF consists of a series of elevated tipping bays that allows cars and trucks to dump waste directly into drop boxes. The drop boxes are transported to the EFWF. The facility also includes a drop-off area for source separated recyclable materials as well as for commingled recycled materials that are transported to Woodburn to be processed.

Similar to SKRTS, the amount of waste received at the facility has remained fairly constant over the past ten years. Although in the past two years there has been a slight increase to quantities recovered before 2008. Table 3.2 presents the annual waste quantities received at the two transfer stations.

Table 3.2 - Transfer Station Tonnages

Transfer Station	2006 Tons	2007 Tons	2008 Tons	2009 Tons	2010 Tons	2011 Tons	2012 Tons	2013 Tons	2014 Tons	2015 Tons
NMCDF	8,559	9,467	7,269	6,742	6,635	6,751	7,472	7,837	8,734	11,242
SKRTS	31,542	33,546	29,145	26,975	25,943	25,698	26,198	26,259	28,278	36,798
Total	40,101	43,013	36,414	33,717	32,578	32,449	33,670	34,096	37,012	48,040

Graph 3.1 – Transfer Station Tonnage



To accommodate future waste quantities, some capital improvements may be needed at transfer stations. It is suggested that an evaluation of both these stations be conducted to determine what improvements would be required in the future.

In summary, the current transfer stations have adjusted to manage the projected waste quantities near term. However, within ten years, if more materials need to be long hauled, some investments may be needed to accommodate the long haul to Coffin Butte.

The amount of waste long-hauled will be dependent on the following:

- 1) Waste processing and material recovery facilities are expanded.
- 2) The EFWF is expanded and other technologies are built.

3.3 Processing and Recycling Facilities

There are many private firms and volunteer organizations that participate in the programs to recycle materials from the county's waste stream. This section describes the primary facilities that receive, process, and market materials produced from collection services.

Garten Services Inc.

Garten is a private, nonprofit organization providing many services to the community and work for adults with disabilities. Garten operates a MRF that processes and markets recyclables from non-commingled collections throughout the county. The facility accepts grades, sorts, bales, and ships mill-ready recyclables through its 120,000-square foot processing facility. It receives materials in package lots and in bulk from throughout the county and the state, and has shipping access for eight trailers and four rail cars. It currently collects, processes, and markets the following materials:

- corrugated cardboard

- newspaper
- multiple grades of office and printing papers (including books and magazines)
- mixed papers and paper packaging (including “greyboard,” aseptics, and milk cartons)
- plastic films (polyethylene)
- all clean, rigid plastic containers (bottles, tubs and trays)
- aluminum and tin cans
- color separated glass containers
- electronics for refurbish and recycle
- household batteries

Garten receives its recyclable materials from various sources. It has held the State of Oregon recycling contract since 1976 and also collects from counties and municipalities. Garten also partners with area businesses to collect single sourced and commingled recyclable materials. These sources include local collection companies, private businesses, state and local government offices both inside and outside the county, smaller independent recyclers and franchised collection companies throughout the state.

In 2014 Garten made a significant investment in new equipment as part of the existing materials recovery system in order to process commingled recyclable materials delivered by in-county or out-of-county collection companies. The new sorting equipment was part of a federal Economic Development Administration (EDA) grant and City of Salem grant to expand Garten’s recycling capabilities. New equipment includes an OCC screen and a screen to separate fiber and containers for further processing. Presort and fiber sorting platforms were installed along with a new baler and in-feed conveyor. The new sort line allows Garten to process 15 tons per hour, or about 30,000 tons per year. Having commingled material processing capacity at the Garten plant would eliminate the need for Marion County haulers to transport to, and rely on Material Recovery Facilities (MRF’s) in the Portland area.

All paper delivered to Garten is processed to ensure that the quality meets purchasing mill standards and is shipped in unit loads directly to mills in Oregon, other areas in North America, and the Pacific Rim.

Electronic recyclables delivered to Garten are also processed. Garten serves as an aggregation center for a number of sub collectors in the region. It holds the State of Oregon contract for Electronics Recycling. The facility handles all electronics materials collected at Marion County transfer stations, collects materials from state, county and city offices as well as private businesses and individuals. Employees dismantle computers and other E-waste bi-products to recover materials and to safely ship the residual to other markets for further processing and recovery. Garten also refurbishes computers for resale in an onsite store and online. In 2015, Garten processed 3,872,000 pounds of electronics and diverted them from the EFWF. About 45% of the E-waste is from SKRTS and NMCDF and the remaining materials come from other sources.

Marion Resource Recovery Facility (MRRF)

Marion Resource Recovery Facility (MRRF) is owned and operated by the Mid-Valley Garbage & Recycling Association, a cooperative of the eight franchised collection companies in Marion County. The collection companies that own the MRRF are proactive in the community to promote waste reduction, reuse and recycling. They work closely with Marion County's staff to coordinate certain aspects of the county's recycling education and collection programs. The facility is located west of I-5 off the Brooks exit on a 5.5 acre parcel with a 36,000 sq. ft. building that house processing equipment and a sorting line. The facility currently serves three primary functions.

The first function of the MRRF is to process Commercial and Demolition (C/D) waste material for recovery of wood, metal, cardboard, paper, concrete and other items. In addition, the MRRF removes items such as gypsum wallboard that can cause emission concerns at Covanta's plant. MRRF reports that it can sort 150 to 200 tons per day of C/D waste and select commercial loads at this facility. Certain commercial loads are delivered to MRRF if they contain large amounts of cardboard, wood, metal or other products that can be readily recovered. The loads the MRRF currently receives for sorting typically do not contain putrescible (food waste) materials.

The facility layout allows trucks to dump onto a tipping floor where large bulky materials can be both mechanically and manually sorted. This is accomplished using mobile equipment such as excavators and backhoes that have been specifically designed for this type of operation. The remaining material is loaded onto a conveyor, where wood, corrugated cardboard, metal and other materials can be sorted and marketed. The facility is set up primarily to process C/D waste and select high graded commercial waste. In addition, the MRRF operates a wood grinder that takes the recovered wood and grinds it up into chips and sends them to a local lumber mill.

The second function of the MRRF is to receive loads of source separated recyclables that are collected by the individual haulers within Marion County and consolidates them into specialized trailers for transport to market. For instance the MRRF consolidates materials such as commingled curbside recyclables, cardboard, mixed organics, wood chips, gypsum and other items into specialized walking-floor trailers. By accomplishing this, it allows the collection vehicles to get back on route quicker and lowers overall vehicle miles traveled in our community and on our highways.

The last function of the MRRF is to receive loads of garbage that would normally go to Covanta for energy recovery when waste material generated within Marion County exceeds Covanta's demand. For instance, in past years when EFWF was at capacity, the collection companies had to re-route their garbage trucks to another disposal facility (i.e., Coffin Butte Landfill or Riverbend Landfill). This was challenging as the collection companies incurred additional time and expense to haul individual loads of garbage out of Marion County to a landfill. In 2008, Marion County and the Oregon Department of Environmental Quality revised the MRRF permit to allow for the receipt of putrescible waste materials for reload and consolidation to a landfill in large specialized trailers. This allowed the drivers to get back on route reducing system cost as

well as additional vehicle miles traveled on our roadways. The MRRF also provides an additional resource to divert loads of residual waste, after material recovery has occurred, to Covanta's EFWF when they require additional volume. In essence, the MRRF has the ability to easily consolidate loads of both recovered and waste materials for more cost effective transportation to their final destination.

The MRRF is proven to be a key component in the waste management and recovery system to effectively consolidate, process, and recover material generated in Marion County. The MRRF currently consolidates and processes more than 110,000 tons per year of waste and recyclable materials through the facility. Other jurisdictions have expanded MRF's by adding equipment to process additional waste streams and recover more recyclable materials. If the MRRF in Marion County were expanded it could potentially recover items such as food waste and other organic materials that still make up a large percentage of the county's waste stream.

3.4 Organics Management / Composting

Organics processing and recycling is a significant component of the Marion County solid waste system. In total about 50,000 tons of yard debris are recycled each year. Franchised haulers collect another 5,000 to 6,000 tons of source separated food waste from commercial customers. The food waste and yard debris are transported to compost facilities. There are two facilities that provide organics processing and compost services to Marion County.

NW Greenlands – Recology Oregon Compost, Aumsville (ROC)

NW Greenlands (ROC) located on Aumsville Hwy in Aumsville, has been serving the community for more than twelve years. NW Greenlands has been owned and operated by Recology, a leading recycling and resource recovery company, since 2008. The site currently processes approximately 30,000 tons of yard trimmings, municipal organics/ food waste, and land clearing materials each year. ROC uses a bio-covered aerated static pile with negative air and bio-filters to optimize the composting process and produce high quality compost while reducing VOC emissions that may affect neighboring communities. ROC has capacity to handle additional organic materials that might be recovered from the Marion County waste stream.

Pacific Region Compost (PRC)

Pacific Region Compost (PRC) is located ten miles north of the City of Corvallis on Camp Adair Road. It is owned and operated by Valley Landfill, which also owns and operates Coffin Butte Landfill. PRC was established in the early 90's to provide a beneficial use for wood and yard waste. The site is approximately 30 acres and has the capacity to process 120,000 yards per year. In 2010, PRC installed an aerated static pile system and became the first compost facility in Oregon to be permitted to accept residential and commercial food scraps, allowing Corvallis to become the first community in Oregon to collect residential and commercial food scraps. PRC currently receives organic material from the following counties; Linn, Benton, Polk, Lincoln, and Marion. The site is permitted to accept green waste and all types of food waste and does have some capacity to accept additional materials.

One option to increase the overall recovery rate for the county is to collect more food waste from select generators. Preliminary data presented in the 2010 SWMP suggested that there are about 40,000-50,000 tons of food waste and mixed organics in the commercial waste stream. Additional waste characterization data is needed to verify how much is recoverable, but food waste/organics represent a targeted material for increasing recycling in the county. Having two local facilities that can potentially manage this material presents an opportunity for Marion County to consider ways to increase recovery of organics.

Browns Island Compost Facility

The County owns and operates a compost facility at the Browns Island Landfill site. This is a smaller facility that largely handles green waste and brush delivered by County Parks and Public Works Operations. Materials are ground up and composted. The final by-product is used by County Public Works and Parks Department for their use at County owned facilities.

Waste Disposal

The majority of material received at the EFWF and the Coffin Butte Landfill is mixed residential and commercial waste referred to as MSW, while most of what is received at the Brown's Island Landfill is construction/demolition debris (including drywall, asphalt, fiberglass, brick and concrete). Individual self-haulers deliver small quantities of MSW to Coffin Butte and Riverbend Landfills.

The majority of Marion County's MSW that is not recycled is processed at the EFWF to produce electricity. The ash residue is the second largest component of the total waste stream. The management and disposal of this ash is regulated differently than MSW. Incinerator ash is considered a special waste. Special wastes also include industrial waste, hazardous waste, infectious wastes, sludge and septic tank pumping, tires, and recycled waste. Each special waste category has its own characteristics and handling requirements.

3.5 Energy from Waste Facility

The Covanta Energy from Waste Facility (EFWF) began operation in 1986. Covanta Energy, formerly Ogden Martin, operates the facility under a contract with Marion County. The plant is designed to burn approximately 550 tons of municipal solid waste per day, or about 185,000 tons per year. The facility converts the energy released during combustion to electricity which is sold to the Portland General Electric Company. The EFWF reduces the total volume of waste by 90%. In previous years ash residue was disposed at NMCDF where it is buried in a lined landfill cell. However, since 2015 the ash residue is now taken from the EFWF directly to the Coffin Butte Landfill to be used as an alternative cover material.

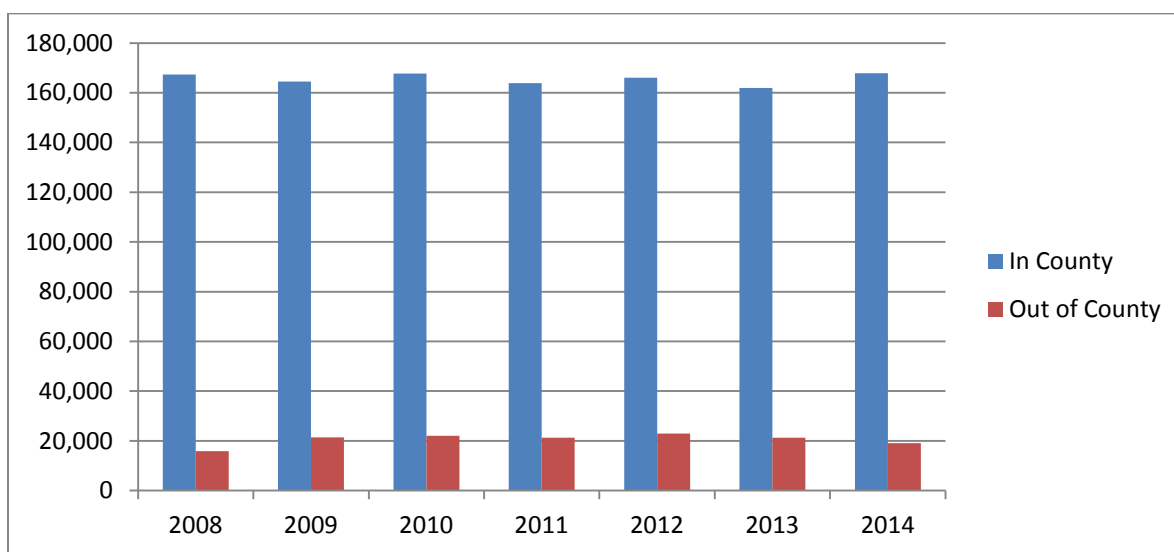
In general, there are sufficient quantities of solid waste from Marion County to supply the plant at peak capacity on an annual basis. During certain times of the year when waste volumes were

lower, small amounts of waste were brought in from outside the county. The EFWF waste data is presented in Table 3.3 and Graph 3.2.

Table 3.3 - EFWF Waste Tonnage³

EFWF Waste Tonnage	2008 Tons	2009 Tons	2010 Tons	2011 Tons	2012 Tons	2013 Tons	2014 Tons
In County	167,370	164,438	167,711	163,888	166,093	161,886	167,860
Out of County Waste	15,916	21,332	22,031	21,258	22,922	21,230	19,024
Total	183,286	185,770	189,742	185,146	189,015	183,116	186,884

Graph 3.2 - EFWF Waste Tonnage



In 2014, there were 19,000 tons of wastes from outside the county that were disposed at the EFWF plant. This includes about 7,000 tons of special waste that are desirable to be destructed by the thermal process. The bonds for the EFWF were paid off in 2011 and the plant is in good operating condition. Through the 29 year operating life of the plant, Covanta has implemented an ongoing maintenance and equipment replacement program. Updates to the air handling system have ensured the plant meets or exceeds all federal and state air quality standards.

3.6 Landfill / Disposal

Landfill disposal is part of every solid waste system. There are different types of landfill facilities that are designed and permitted to handle different waste streams. The primary type of landfill is one that is designed to dispose of Municipal Solid Waste (MSW). In Marion County, the only landfill permitted to accept MSW is the backup cell at the North Marion County Disposal Facility. The backup cell (Cell 5) hasn't been used to date but continues to be retained for future use. All

³ 2014 Annual Report, Marion County Department of Public Works, Environmental Services Division.

MSW generated in Marion County must either be delivered to the EFWF or taken to landfills outside of the county. Waste in excess of the EFWF's capacity is hauled to Coffin Butte Landfill (sometimes referred to as Valley Landfill) in Benton County. Small quantities of MSW generated in Marion County are also disposed of at Riverbend Landfill in Yamhill County; these quantities are not reported back to Marion County. There are two landfills in the county that are permitted to accept limited types of waste. North Marion County Disposal Facility accepts ash from the EFWF, and the Brown's Island Demolition Landfill receives certain types of construction and demolition debris.

3.7 North Marion County Disposal Facility (NMCDF)

The NMCDF is located two miles north of the City of Woodburn. The facility is owned and operated by the county. Until 1998, the landfill accepted small quantities of MSW. Presently, this site is only accepting reject ash residue from the EFWF that does not meet Alternative Daily Cover (ADC) requirements. The County also maintains a lined landfill cell for MSW at NMCDF. This cell acts as a backup disposal option for the EFWF, if it were not available for some length of time outside of scheduled down time.

The landfill encompasses a total of 94 acres and had received an average of 140 tons of ash residue per day. Each ash landfill cell is designed with a bottom liner to prevent precipitation that enters the cell from migrating into the groundwater.

In recent years, the county has mined old ash buried at the site and processed it to recover metal. After processing the ash it was transported to Coffin Butte Landfill where it was used for alternative cover material. Recently, the metal recovery project at NMCDF has ceased operations and Covanta has since modified its ash handling system at the plant to remove a higher percentage of metal at the source. The ash residue is then transported directly to the Coffin Butte Landfill rather than to NMCDF.

The result of mining ash at NMCDF has left the county with a partially completed Cell 4 that now has capacity for about three to four years of ash residue assuming 48,000 tpy. In the event ash cannot be used at Coffin Butte it is possible that Cell 4 can be reactivated to manage ash residue. The county also has Cell 5 that has not been constructed that may have ten years of capacity. Having a back-up facility capable to continue safe and efficient disposal of ash is desirable. Leachate from the ash cell is transported to Finley Butte Landfill for a beneficial on-site use.

Given the recent course of events regarding ash disposal, Marion County and Covanta should engage in developing a long-term coordinated plan to ensure appropriate facilities are maintained.

3.8 Brown's Island (BI) Demolition Landfill

The BI Landfill is permitted to accept only inert demolition waste. The landfill primarily receives gypsum wallboard and asphalt roofing from private haulers in Marion County. The facility also receives roofing tiles, ceramics, bricks, concrete, and other inert materials. Some plastics materials such as PVC and vinyl products are accepted to remove this material from processing at the EFWF. Since there are no liner systems installed at BI, the landfill is restricted from accepting all other types of waste.

Between 2009 and 2012, waste quantities received at Brown's Island were more than 30% less than the preceding years. Recently, the amount of waste received increased to pre-recessionary levels, although in 2015 it was more than 50,000 loose cubic yards which is unusually high. The Marion County Environmental Services Division provided updated projections that indicate the landfill has the capacity for about 300,000 cubic yards of space. Assuming a worst case scenario that it will average 50,000 yards of loose material and considering a compaction ratio of 2:1, the site life is estimated to be between 12 to 16 years. The division routinely completes an aerial survey to monitor the fill rate and remaining capacity.

Based on current projections there is sufficient capacity in Brown's Island to handle inert waste generated in the county. The facility is an important part of the solid waste system since it offers a proper disposal site for waste that cannot be processed at the EFWF and the waste does not need to be transported outside the county. There is no immediate need to develop an alternative if and when Brown's Island closes. But starting in 2022, the county should re-visit the long term options for managing inert waste in order to have sufficient time to implement alternatives if needed.

3.9 Coffin Butte Regional Landfill

Coffin Butte Regional Landfill (Coffin Butte) is a 700-acre site north of Corvallis in Benton County, operated by Republic Waste. Located about 30 miles from Salem, Coffin Butte accepts waste from four counties, including waste in excess of the capacity of the EFWF in Marion County. Table 3.4 shows the amount of the County's waste disposed in landfills over the last eight years. Coffin Butte reportedly has capacity for at least 30 years with a potential for expansion. It is only one of three other landfills located west of the Cascade Mountains that is permitted to accept municipal solid waste (MSW). Two of these landfills are privately operated. One is Riverbend Landfill operated by Waste Management outside of McMinnville. The second is the Dry Creek Landfill in Medford. A third landfill is owned and operated by Lane County south of Eugene.

Table 3.4 - Marion County Municipal Solid Waste Received at Disposal Sites (in (tons)⁴

Landfills Disposal	2008 Tons	2009 Tons	2010 Tons	2011 Tons	2012 Tons	2013 Tons	2014 Tons	2015 Tons
<i>Brown's Island Demo</i>	7,536	5,634	5,131	5,537	5,752	6,171	6,500	8,311
<i>Coffin Butte</i>	52,344	44,648	41,363	37,590	34,821	35,294	41,259	*42,000
Total	59,880	50,282	46,494	43,127	40,573	41,465	47,759	*50,311

In eastern Oregon and Washington there are several landfills with many years of capacity. The closest is the landfill in The Dalles, Oregon about 100 miles from Marion County.

Section 4.0 - Changes in the Solid Waste Industry - Trends and Technology

4.1 Introduction

In this section changes in Oregon regulations adopted since the 2010 SWMP was completed are discussed. In addition to new regulations and recycling goals there are recent trends and technologies in the solid waste industry that have occurred over this period. These recent events are intended to update information that may be useful as Marion County considers future needs of the solid waste system.

4.2 Background

Regulations governing solid waste management are ever changing and technology continues to evolve. In the past five years, several states and local governments have demanded that more materials be recycled or diverted from landfills. The move to increase recycling goals is, in some cases, driven by the acknowledgement that landfills are large contributors to greenhouse gas emissions, while in other communities elected officials are simply demanding that more materials be recovered. The Oregon legislature passed Senate Bill 263 (2015) that increases the statewide recovery goals 55% by 2025.

To accomplish this goal, larger urbanized areas such as Portland (Metro), Salem and Eugene will be required to achieve higher recovery rates to offset lower rates expected from smaller rural areas. The new rules call for counties to add new programs to recover materials from commercial waste and target food waste as a recovered material.

⁴ 2007 and 2014 Marion County Public Works – Environmental Services Annual Reports.

*Estimated amounts

In 2014, California adopted new regulations targeting recovery of materials from commercial waste stream and has set new goals for jurisdictions to achieve 75% recovery of materials by 2020. Cities such as Seattle and Tacoma, Washington have also established recovery goals of 70% by 2025. By setting these new goals it is forcing communities to evaluate expansion of programs to recycle more materials and to consider application of alternative technologies.

The solid waste industry continues to adapt technologies to process and recover resources from the waste stream. Some of the pressing trends to transform waste to energy appeared encouraging as a result of higher energy costs between 2009 and 2013. These efforts have been tempered a bit since energy prices have recently retracted. The overriding theme of new regulations is not only to reduce waste disposed in landfills but a desire to manage waste as a resource. In order to achieve the new goals, it requires more effort to recover available recyclable materials and recover food waste and/or the mixed organics in the mixed waste stream.

The 2010 SWMP included a comprehensive update of alternative technologies and a review of the EFWF. This assessment includes a brief overview of the status of alternative technologies currently in operation.

4.3 New Regulations

Oregon Senate Bill 263 (2015) contains an update to the waste prevention, recycling requirements and recovery goals for each waste shed throughout the state. As stated by DEQ, the measure was motivated by the fact that many high value materials are still discarded in landfills and the need to reduce overall contamination of recovered materials to improve their market value. This legislation has included several elements that may impact Marion County's solid waste system. The new elements are as follows:

1. Adds four new recycle opportunities to the list of programs for jurisdictions to consider;
 - a. Food waste collection from residential customers.
 - b. Commercial recycling for businesses generating large amounts of recyclable materials.
 - c. Recovery of materials from construction and demolition sites by source separating recyclable materials.
 - d. Collection of food waste from large commercial generators.
2. Ensures that tenants of multi-family and commercial properties have opportunities to recycle by 2022.
3. Updates waste recovery goals to be achieved by 2025. Marion County's goal is 64% by 2025.
4. Eliminates the 6% credit for waste prevention, reuse and/or home composting programs.

There are no direct penalties for not meeting the new goals. However, DEQ will monitor and review the programs and services provided by jurisdictions to inquire why goals are not being met, DEQ will then work with local governments to address what steps can be taken to help achieve these goals.

Marion County's recovery rate for 2014 was reported to be 59.7%. But when removing the 6% waste reduction credits, the actual rate is 53.7%. The new goal will be to achieve a recovery rate of 64% by 2025 which would require an additional 40,000 tons to 50,000 tons of waste that is currently processed at the EFWF and disposed in landfills.

As shown in Table 3.1 Marion County's recycle rate minus the 6% credit has averaged 54.4% for the past four years. Whereas, the market for recycled materials has been volatile, over this period the stability of the programs and services provided throughout the county has demonstrated a consistent performance in the waste reduction and recycling efforts. It may be possible to expand some programs to recover some additional materials but it is not likely to increase the recycling rate by 10%. This suggests that new programs and/or services will be required in order to meet the new goals. This will be discussed in Section 5.

4.4 Status of Alternative Technology

This section will provide a brief overview of the recent developments in technologies as they apply to the Marion County solid waste system and the need to increase the recovery goal. There continues to be various emerging technologies that are not commercially viable but are in development stages. These will be mentioned but there is limited information available and further research on the status of these technologies is beyond the scope of the project.

4.4.1 Mixed Waste Processing (aka. Advanced Material Recovery)

Over the past 15 years the technology to process waste streams to recover recycled materials has significantly improved. This advancement can be attributed to the fact that many communities now collect co-mingled recyclable materials from residential customers. Whereas these programs have resulted in higher participation rates and therefore more materials, there is a corresponding impact of an increase in contamination in certain areas. The challenges facing equipment suppliers are not only to deliver a cleaner consistent marketable material but also to improve the productivity of processing materials; i.e., throughput.

Manufacturers of recycling equipment have responded with several improvements in processing technology to improve productivity and recover highly marketable materials. In recent years the significant improvements of processing equipment include the following:

1. In order to maintain system performance, screen technology has advanced to reduce the amount of plastic and other materials from wrapping around shafts and clogging openings. This minimizes the downtime needed to clean screens.
2. Screens are designed to do a better job of separating containers and fibrous materials. Some are adjustable to handle different waste streams under differing conditions.

3. The use of air, or what is called the air density separation, has been refined and improved. When used in conjunction with screening, systems achieve better separation of the 2-D and 3-D materials (i.e., separation of fiber from containers).
4. Optical sorters are capable of identifying different types of paper and plastic materials, which greatly reduces contamination, improves the quality of the recovered material resulting in improved market value.
5. Optical sorting can accurately sort materials at a rate of 1,000 items or picks per minute compared to manual sorters that operate at 40 to 50 picks per minute.

The impact of these advancements in sorting technologies improves the overall throughput of a plant to process recycled materials. In the past plants would process 20 to 25 tons per hour, but modern MRF's can process 35 to 50 tons per hour. Also, with the use of optical sorters, the number of manual sorters on the process line has been reduced significantly.

By reducing labor, increasing throughput and producing higher quality materials, modern MRF's, have become much more efficient and dependable.

These advances in sorting equipment have led to developing MRF's to process mixed waste streams. Mixed waste MRF's are designed to remove the food waste and mixed organics in the initial phase of the process line. After the wet organics or the small heavy fractions are separated, the remaining materials can be more easily processed on a typical sorting line. Mixed waste processing is widely used in Europe where high valued recycled materials are recovered and the remaining residue is processed to produce a fuel product. In many parts of Europe, food waste and other organics are often collected separately. The residue from the MRF is referred to as refuse derived fuel (RDF) and is used in advanced waste to energy plants to produce electricity.

In the United States, mixed waste processing has been a part of some solid waste systems but is not widely used. Recently, specifically in the past five years, several mixed waste MRF's, or sometimes referred to as advanced material recovery facilities, have been built and are successfully operating. In some cases mixed waste MRF's are being considered in communities where the residential recycling programs have not been successful because of excessive contamination. The IREP in Montgomery, Alabama is the most notable. The plant recovers about 60% of the materials and has successfully marketed these recovered materials. The plant is temporarily shut down because of the price the city was paying to process is not sufficient to meet operating costs under the current low market prices. Currently, both Indianapolis and Houston are evaluating the option going to a single can for residential collection and building mixed waste MRF's.

In California several mixed waste MRF's have been built and several are in the planning phase. These MRF's are targeting the recovery of materials from the commercial waste stream. This is a result of new legislation to recover primary recyclable materials from the commercial waste.

Waste composition studies indicate that anywhere between 20% and 35% of the commercial waste is comprised of marketable materials. Co-mingled recycled materials collected from residential customers will continue to be processed in “clean” MRF’s.

Mixed waste MRF’s that are operating include Newby Island in San Jose, Sun Valley in Los Angeles and Grand Central in the City of Industry in southern California. The Monterey Regional Waste Management District MRF is under construction and scheduled to start up in December 2016. Several communities in the northwest are evaluating advanced material recovery systems including Portland Metro. Both Seattle and Tacoma have recently prepared feasibility studies to evaluate building mixed waste MRF’s to help reach their new goals.



(Pictured above; The Athens mixed waste MRF in Sun Valley, CA Opened in 2014 and processes on average 1,600 tpd)

To summarize, the potential to implement a mixed waste MRF to recover more materials is a growing trend as more communities evaluate options to reduce waste disposed at landfills and meet new recycling goals.

4.4.2 Organics Processing Composting /Anaerobic Digestion

In the past few years recovery of food waste from the municipal solid waste stream has been a primary target for increasing recycling rates. Typically, food waste can represent between 20% and possibly more than 30% of the mixed waste stream from both commercial and residential generators. Recovering food waste is seen as the “lowest hanging fruit” or the next easiest material to recover and is bolstered by the trend to recover more materials. It is also a primary target because the material can be separated by generators and processed at compost facilities.

In the 2010 SWMP preliminary estimates suggest that 36% or about 40,000 tons per year of the mixed commercial waste stream is food waste. Marion County has already implemented food waste collection from select commercial customers. Currently, about 6,000 tons of food wastes are collected and delivered to PRC to be composted. Expanding the program to collect more

food scraps may be feasible since the program has successfully composted these materials. Similar programs have been implemented in many communities that have compost facilities permitted to accept food waste.

Marion County is fortunate to have two facilities in PRC and NW Greenlands that can accept, process, and market compost made from food waste and yard debris. As options to recover more organics from the mixed-waste line are considered, these facilities could play an important role in the system and in achieving higher recovery goals, assuming they have adequate capacity.

Another option for managing food waste is to create a slurry and process in an anaerobic digester unit (AD) similar to that used in a wastewater treatment plant. This approach that operates with waste streams containing a high concentration of food waste (more than 80%) and uses wet fermentation; AD technology is a practical and proven technology that generates methane gas for use. However, this option has limited application as it requires the local Waste Water Treatment Plant have sufficient capacity that is compatible with this digester technology to handle the food waste or a new digester facility will need to be constructed. The City of Tacoma currently uses equipment designed to grind up food waste into a slurry (referred to as the DODA System) which is feed to AD unit at the city's wastewater treatment plant. Metro is also transporting food waste an AD facility in Junction City.

One of the main by-products of operating a mixed waste MRF as discussed previously is separation of the mixed organics from the recyclable materials. Mixed organics include soiled paper and various other organic materials (referred to as mixed organics) that can then be placed and processed in an AD unit that uses dry fermentation technology. The mixed organic stream can be processed usually in less than 30 days producing methane gas. Afterwards, the wet solid material or digestate can be processed further to remove plastics and glass and then composted.

AD technology is widely used in Europe and is now becoming more popular in the United States. There are five AD plants operating in the U.S. that use similar technology but have features that are unique to each vendor/ supplier. Plants range from about 5,000 tpy year in Monterey, California to as much 80,000 tpy in the City of San Jose.



(Pictured above; ZWED Ad Facility in San Jose, CA and Monterey Regional Waste Management District)

In California the trend to build AD facilities has increased as collection companies are required to convert their fleets from diesel to compressed natural gas (CNG) or liquid natural gas (LNG). AD plants can convert food waste and/or mixed organics recovered at MRF's to CNG. The

Blueline MRF and Transfer Station in South San Francisco is converting 12,000 tpy of food waste and mixed organics, and is able to fuel as many as 18 collection trucks each day. This approach is consistent with the state's goal to encourage recovery of organics from the mixed waste stream.



(Pictured above; Blueline AD – CNG Fueling Station)

Anaerobic digesters (AD) offer a proven technology to process food waste and mixed organics from the municipal waste stream. However, whether such a facility should, or can, be a part of a community's solid waste system should be carefully evaluated to ensure it offers the best solution for meeting the goals of the system.

4.4.3 Waste to Energy (WTE)/Refuse Derived Fuel (RDF)

The technology review completed as part of the 2010 SWMP acknowledged that waste to energy is a proven method to reduce waste disposed at landfills. Whether mixed waste is delivered to a mass burn facility such as the Covanta's plant in Brooks, or whether refuse derived fuel (RDF) produced from MSW residue is processed in dedicated boilers, this technology is a reliable, environmentally safe technology to convert refuse to energy.

Since the 2010 report there have been no significant changes in the technology. In the interest to manage waste as a resource and reduce what is disposed in landfills, communities looked at Waste to Energy (WTE) technology as part of the solid waste system. Some existing plants are considering expansion. Recently, Portland Metro completed a request for qualifications aimed at identifying technologies to be considered for further evaluation. WTE was one technology that was recognized to be acceptable and met the criteria. Covanta did advance the possibility to expand the Brooks plant to handle waste from Metro. At this time there is no commitment to proceed with any specific alternative, but it only demonstrates that the technology continues to be a possible component of a solid waste system.

A drawback to building a new WTE capacity is the cost to build such a plant. When considering the recent decrease in the price of energy, the tpy fees would be higher. Although modern WTE facilities have demonstrated they can operate in an environmentally clean and efficient manner, there is still opposition to using this technology.

4.4.4 Gasification

Gasification is a technology to convert bio-fuels such as municipal solid waste into methane and ethanol. The majority of gasification plants are operating in Japan, Asia and Europe. Several of these are commercial scale operations but many are smaller plants (about 50-70 tons per day). Plants in Japan are larger scale in the range of 300 to 700 tons per day.

Energkem Alberta Biofuels opened a plant in Edmonton, Canada. The plant converts MSW to methane and ethanol. Covanta has introduced its CLEERGAS gasification system, a commercial scale demonstration project reported to operate at 300 tpd. Covanta is pursuing potential markets for application of this technology.

There has been steady progress made to building commercial gasification projects in the U.S. At this time there is more actual operational experience needed to demonstrate this technology is a reliable long-term method.

This represents a brief overview of the status of current technologies. Many companies are actively working to develop technologies to recover more materials and to convert waste into resources. However, several are in development stages and are not ready to be scaled up to commercial operation. Marion County is not under any immediate need to make a decision on future options and has time to monitor the progress of alternative technology in the future.

Section 5.0 Review Future Scenarios and Identify Options

Using the projections of the future waste stream presented in Section 2 and considering the status of existing facilities, this section identifies future system needs and presents some scenarios containing options that might be studied further. This section is intended to highlight the key policy considerations moving forward.

5.1 Review of Current Solid Waste System Needs

Marion County, along with the cities, towns and private service providers, have worked together to provide a first class recycling and solid waste system. In 2011 Marion County was recognized by the Solid Waste Association of North America with a Silver Award for one of the best integrated solid waste systems in the country. Also, Marion County has been a leader in the State of Oregon in recycling with comprehensive waste reduction/prevention and recycling services and a highly effective promotion and education program. In 2014 only 9% of the waste generated was landfilled excluding ash which is now being used for alternative daily cover (ADC) material at a landfill.

Financially, the county has just approved new disposal rates for all facilities. These rates were raised from \$67.45 per ton to \$87.45. This was the first rate increase since 1992. The waste generation rate has increased in recent years and given the fixed capacity of the EFWF, Marion County and its partners need to look towards the future to examine what changes are needed. Based on this assessment there are some challenges that lie ahead but fortunately there is time

to evaluate options and plan for the future. Some key issues to consider for planning for the future are as follows:

1. ***The Covanta EFWF is in good operating condition and appears to be capable of providing continued service but the facility has fixed capacity of 187,000 tpy*** – The EFWF has been a reliable component of the Marion County solid waste system. Assuming the contract to deliver waste that is not recycled to the plant is extended, it is reasonable to assume the plant may be expected to operate efficiently for another ten or more years. The County will need to verify the potential financial life span for the plant in order to evaluate alternatives beyond 2019.
2. ***Recovery goals increase to 64% by 2025*** – Since 2011 the County has consistently achieved a 54% recovery rate not including the 6% credits. What new programs and services can be implemented to increase the recovery rate and what is the cost to reach this goal?
3. ***The current infrastructure is adequate to maintain current programs and services but there may be limitations of facilities to possibly handle future needs.*** – Projections indicate that more waste will need to be transported to landfills outside the county. The primary facilities that currently handle the most waste are SKRTS and the MRRF. The amount of waste transported will depend on what new services are implemented to increase recovery and will the EFWF be expanded to process more waste.
4. ***There is available landfill capacity within 40 miles of Marion County*** – Riverbend Landfill has been expanded but may only have ten years whereas Coffin Butte has expected capacity of 30 years or more.

These represent a few key issues that have been identified in this assessment but certainly there could be others that may be more immediate. More discussion with the service providers could result in other items to be addressed.

5.2 Solid Waste System Scenarios

In this section a projection of the future waste quantities is made to identify the potential policy considerations and actions that might be further evaluated in planning for the future. The purpose of these projections is to shed light on the primary options that might be considered. To help illustrate the impacts to the system and decisions that may be considered in planning for the future three scenarios were created.

The scenarios were developed to be consistent with the policy statement adopted as part of the 2010 SWMP. The statement of “Guiding Principles” for managing Marion County waste is as follows:

“Guidance for continued development and implementation of an integrated solid waste management system that has been developed through a cooperative effort of local governments, citizens and industry. The SWMP should achieve development of a system which is environmentally sound, technologically feasible, cost-effective, locally controlled and publicly acceptable; and provides for an overall reduction in long-term per capita waste generation and toxicity.”

In addition to this overriding statement, the 2010 SWMP contains several objectives used to evaluate alternatives and formulate strategies that have guided the decisions for building a successful integrated solid waste system.

In preparing the projections for the scenarios, assumptions were developed to produce a range for future waste quantities. The scenarios will present both the low and high projection tables.

5.2.1 Scenario 1 – Maintain Current Programs w/o EFWF

In 1987, over 28 years ago, Marion County committed to process and produce energy from waste at the EFWF. This facility has been a mainstay in the solid waste system processing 187,000 tons per year of the County’s waste. This decision was consistent with the county’s goals to manage its waste in county and to maximize efforts to reduce waste and recycle. In 2013 the bonds used to finance the facility were retired eliminating the debt service requirements. Shortly after the revenue from electric sales were reduced when the federal PURPA regulations expired. The reduction of revenues from the EFWF impacted financial resources of the county to provide services.

The contract with Covanta to operate the facility also expired in 2014. The County and Covanta signed an extension for three years with an option to extend for an additional two years or until 2019. The facility has been well maintained and is reported in good operating condition. Covanta has demonstrated interest to expand the facility to handle not only waste from Marion County but also from Metro Portland and perhaps other jurisdictions.

Given these conditions, Scenario 1 assumes Marion County decides to discontinue the supply of waste to the EFWF. Under this scenario it is expected the County will continue to provide a full range of services to reduce waste, promote reuse and recycle materials. The following represent the assumptions for this scenario.

1. Marion County and service providers will continue the level of promotion and education necessary maintain the current recovery rate. This is important in order to keep the current recovery rate at 54%.
2. No new facilities will be constructed.
3. No new recycling services are added; therefore the recycling rate will stay at about 54%.
4. Expansion of current programs can be considered to increase the rate incrementally.

5. Marion County would need to transport waste to out of county landfills or invest in some other form of alternative technology.

Waste projections have made for two conditions. One, is the prospect that waste generator rates will continue to be stagnant similar to those in 2014. This produces a lower range of waste generation projections. Two, the projection uses the average waste generation rates over the past nine years but discounts the recession years of 2009- 2011. This produces a higher waste stream projection—one that simulates the waste generated during more normal economic conditions.

The following table shows the impacts to the amount of waste to be disposed at landfills if Marion County does not extend the contract with Covanta. This table assumes the lower projections.

Table 5.1 - Scenario 1 – Waste Quantities Low Projection for 15 years

Year	Waste Generated	Materials Recycled (tons)	Recovery Rate	Remaining Waste (tons)	Waste to WTEF (tons)	Ash Disposal	Total Waste Disposed	Brown's Island Landfill (Inert Waste)	MSW-Disposed (Out of County)
2015	450,869	242,265	54.0%	208,603	167,860	48,000	40,743	8,311	32,432
2016	457,592	245,878	54.0%	211,714	170,000	48,000	41,714	8,000	33,714
2017	464,416	249,544	54.0%	214,871	180,000	48,000	34,871	8,000	26,871
2018	471,341	253,266	54.0%	218,075	180,000	48,000	38,075	8,000	30,075
2019	478,370	257,042	54.0%	221,327	180,000	48,000	41,327	8,000	33,327
2020	482,879	259,466	54.0%	223,414	0	0	223,414	8,000	215,414
2021	490,080	263,335	54.0%	226,745	0	0	226,745	8,000	218,745
2022	497,388	267,262	54.0%	230,127	0	0	230,127	8,000	222,127
2023	504,805	271,247	54.0%	233,558	0	0	233,558	8,000	225,558
2024	512,333	275,292	54.0%	237,041	0	0	237,041	8,000	229,041
2025	518,103	278,392	54.0%	239,711	0	0	239,711	8,000	231,711
2026	525,040	282,120	54.0%	242,920	0	0	242,920	8,000	234,920
2027	532,070	285,897	54.0%	246,173	0	0	246,173	BI Closed	246,173
2028	539,194	289,725	54.0%	249,469	0	0	249,469	0	249,469
2029	546,414	293,605	54.0%	252,810	0	0	252,810	0	252,810
2030	552,789	297,030	54.0%	255,759	0	0	255,759	0	255,759

The result of this scenario is by 2020 when the county discontinues supply of waste to the EFWF there will be an estimated 215,000 tons of waste to be disposed. Because there is no Municipal Solid Waste (MSW) Landfill in Marion County all waste will need to be transported to

an out of county landfill. This assumes no new programs and new services are provided to recover more materials.

Marion County would need to work with the franchised collection companies to increase the capacity to transfer an estimated 825 tons per day. Currently, about 160 tons per day are transported to Coffin Butte.

Table 5.2 shows the amount of waste generated and the impacts to facilities based on the higher waste projections.

Table 5.2 - Scenario 1 – Waste Quantities High Projection for 15 years (Tons /Year)

Year	Waste Gen.	Waste Recycled	Recovery Rate	Remaining Waste (tons)	Waste to EFWF	Ash Disposal	Total Waste Disposed	Brown's Island Landfill (Inert Waste)	MSW-Disposed (Out of County)
2015	482,541	260,572	54.0%	221,969	167,860	48,000	54,109	8,311	45,798
2016	489,736	264,458	54.0%	225,279	170,000	48,000	55,279	8,000	47,279
2017	497,039	268,401	54.0%	228,638	180,000	48,000	48,638	8,000	40,638
2018	504,451	272,404	54.0%	232,048	180,000	48,000	52,048	8,000	44,048
2019	511,974	276,466	54.0%	235,508	180,000	48,000	55,508	8,000	47,508
2020	516,800	279,072	54.0%	237,728	0	0	237,728	8,000	229,728
2021	524,507	283,234	54.0%	241,273	0	0	241,273	8,000	233,273
2022	532,328	287,457	54.0%	244,871	0	0	244,871	8,000	236,871
2023	540,266	291,744	54.0%	248,522	0	0	248,522	8,000	240,522
2024	548,323	296,094	54.0%	252,228	0	0	252,228	8,000	244,228
2025	554,498	299,429	54.0%	255,069	0	0	255,069	8,000	247,069
2026	561,922	303,438	54.0%	258,484	0	0	258,484	8,000	250,484
2027	569,446	307,501	54.0%	261,945	0	0	261,945	BI Closed	261,945
2028	577,071	311,618	54.0%	265,453	0	0	265,453	0	265,453
2029	584,798	315,791	54.0%	269,007	0	0	269,007	0	269,007
2030	591,620	319,475	54.0%	272,145	0	0	272,145	0	272,145

Under the higher waste projections the amount of waste to be transported out of the county could be about 230,000 tons per year or almost 900 tons per day. Therefore, the results of discontinuing the contract with Covanta demonstrate that, at least in the interim, the County would transport between 800 and 900 tons each day to out of county landfills. The amount of waste transported would depend on how successful the county and its service providers are, in not only maintaining the recovery rate, but possibly making investments to grow the recovery rate where feasible.

Summary of Impacts of Scenario 1

For discussion purposes the following summary highlights what impacts might be expected from implementing the strategy. Further analysis of these impacts and options for addressing them are beyond the scope of this assessment.

1. The recovery rate is not expected to increase from current levels unless Marion County considers mandates, rate incentives, bans or other measures to cause changes in generator behavior that results in more materials being recycled.
2. Marion County and service providers will need to continue the level of promotion and education programs needed to support the waste reduction and recycling services.
3. Capital improvements will be necessary to increase the capacity at transfer stations to manage the additional traffic and waste quantities. This could include expansion of both SKRTS and/or MRRF. These improvements would be significant since the amount of new waste to be transported out of county landfill would increase from the current 160 tons per day in 2015 to more than 800 tons per day in 2020.
4. In 2020 the County might need to evaluate options for disposing of inert waste currently disposed at Brown's Island.
5. If waste quantities remain lower than expected there will be less revenue to pay for fixed operating expenses and therefore rates will need to be monitored to determine if there is sufficient revenue to meet expected expense requirements.

5.2.2 Scenario 2 - Maintain Current Programs and Facilities

As discussed in previously, the EFWF has been a key component in Marion County's solid waste system. In Scenario 2 it is assumed the County will continue to provide waste to the EFWF to produce electricity from renewable resources. A key element of the Marion County solid waste management system is the partnership established between the public agencies and private companies that provide services. Based on this assessment and assuming this partnership remains, the current infrastructure is in place to maintain the level of services for the near future.

Considering that no major changes are imminent, Scenario 2 was developed to illustrate how waste will be managed with no new facilities or changes to programs. The contract with Covanta would be extended for a minimum of ten years. The key assumptions for Scenario 2 are:

1. Marion County and service providers will continue the level of promotion and education necessary to maintain the current recovery rate. This is important in order to keep the current recovery rate at 54%.
2. No new facilities will be constructed.

3. No new recycling services are added; therefore the recycling rate will stay at about 54%.
4. Expansion of current services can be considered to increase the rate incrementally.
5. Certain facilities such as SKRTS, MRRF and Garten may need to make some investments to manage increased waste and customers.
6. The EFWF contract is extended ten years, to 2029 or longer.

Given these assumptions the following table shows the projected waste quantities and an estimate of how much waste is handled at each facility. This table uses the lower waste projection data.

Table 5.3 - Scenario 2 – Waste Quantities Low Projection for 15 years⁵ (Tons / Year)

Year	Waste Gen.	Waste Recycled	Recovery Rate	Remaining Waste	Waste to EFWF	Ash Disposal	Total Waste Disposed	Brown's Island	MSW (Out of County)
2015	450,869	242,265	54%	208,603	167,860	48,000	40,743	8,311	32,432
2016	457,592	245,878	54%	211,714	170,000	48,000	41,714	8,000	33,714
2017	464,416	249,544	54%	214,871	180,000	48,000	34,871	8,000	26,871
2018	471,341	253,266	54%	218,075	180,000	48,000	38,075	8,000	30,075
2019	478,370	257,042	54%	221,327	180,000	48,000	41,327	8,000	33,327
2020	482,879	259,466	54%	223,414	180,000	48,000	43,414	8,000	35,414
2021	490,080	263,335	54%	226,745	180,000	48,000	46,745	8,000	38,745
2022	497,388	267,262	54%	230,127	180,000	48,000	50,127	8,000	42,127
2023	504,805	271,247	54%	233,558	180,000	48,000	53,558	8,000	45,558
2024	512,333	275,292	54%	237,041	180,000	48,000	57,041	8,000	49,041
2025	518,103	278,392	54%	239,711	180,000	48,000	59,711	8,000	51,711
2026	525,040	282,120	54%	242,920	180,000	48,000	62,920	8,000	54,920
2027	532,070	285,897	54%	246,173	180,000	48,000	66,173	BI Closed	66,173
2028	539,194	289,725	54%	249,469	180,000	48,000	69,469	0	69,469
2029	546,414	293,605	54%	252,810	180,000	48,000	72,810	0	72,810
2030	552,789	297,030	54%	255,759	180,000	48,000	75,759	0	75,759

Under Scenario 2, if the waste generated on a per capita basis remains similar to 2014, the current facilities appear to be adequate based on capacity. Certainly each facility may make changes to operations for managing this waste in the most efficient way. However, the recycling rate would be expected to remain at about 54% without no new services or investments in processing waste to recover more materials. Marion County could consider material bans or mandates that result in commercial customers separating recyclable materials, similar to households or other programs similar to what some other communities are implementing. These

⁵ DEQ has not released official waste disposed and recovery rates for 2015. Estimates are based on projections.

may not require major investments in new infrastructure but such programs may not be popular or as effective. These options can be evaluated on an individual basis.

The other changes to the system during this time horizon will be the possible closure of Brown’s Island. If closed inert waste would either be disposed at a new in county inert landfill or transported to a landfill out of the county. There may need to be some investments in the transfer stations and at the MRRF. In 2014 only 32,000 tons were transported to Coffin Butte. By 2025 that amount could increase to over 50,000 tons per year. Investments in transfer stations to handle increased waste should not be significant, since, based the projections, daily waste will increase from 125 tons per day to about 200 tons per day by 2025. But looking at the longer term to 2030 the daily wastes to be transported is estimated to be almost 300 tons per day. This may trigger a need to expand certain facilities to transport waste to landfills. Table 5.4 Scenario 2, shows the high projection rate of waste quantities for the next 15 years.

Table 5.4 - Scenario 2 – Waste Quantities High Projection for 15 years⁶ (Tons per Year)

Year	Waste Gen.	Waste Recycled	Recovery Rate	Remaining Waste	Waste to EFWF	Ash Disposal	Total Waste Disposed	Brown Island	MSW (out of County)
2015	482,541	260,572	54%	221,969	167,860	48,000	54,109	8,311	45,798
2016	489,736	264,458	54%	225,279	170,000	48,000	55,279	8,000	47,279
2017	497,039	268,401	54%	228,638	180,000	48,000	48,638	8,000	40,638
2018	504,451	272,404	54%	232,048	180,000	48,000	52,048	8,000	44,048
2019	511,974	276,466	54%	235,508	180,000	48,000	55,508	8,000	47,508
2020	516,800	279,072	54%	237,728	180,000	48,000	57,728	8,000	49,728
2021	524,507	283,234	54%	241,273	180,000	48,000	61,273	8,000	53,273
2022	532,328	287,457	54%	244,871	180,000	48,000	64,871	8,000	56,871
2023	540,266	291,744	54%	248,522	180,000	48,000	68,522	8,000	60,522
2024	548,323	296,094	54%	252,228	180,000	48,000	72,228	8,000	64,228
2025	554,498	299,429	54%	255,069	180,000	48,000	75,069	8,000	67,069
2026	561,922	303,438	54%	258,484	180,000	48,000	78,484	8,000	70,484
2027	569,446	307,501	54%	261,945	180,000	48,000	81,945	BI Closed	81,945
2028	577,071	311,618	54%	265,453	180,000	48,000	85,453	0	85,453
2029	584,798	315,791	54%	269,007	180,000	48,000	89,007	0	89,007
2030	591,620	319,475	54%	272,145	180,000	48,000	92,145	0	92,145

⁶ DEQ has not released official waste disposed and recovery rates for 2015. Estimates are based on projections.

The assessment also looked at the impacts to the system if the waste generation would be similar to the past nine years if the recessionary years were disregarded. The biggest impact under this Scenario is the increase in waste to be transported out of the county. In this case, there would be almost 70,000 tpy to transport to Coffin Butte, or about 20% more waste than the lower projections. By 2030 this would increase to 92,000 tpy.

In planning for the possible changes to facilities, or for additional capital investments, it would be appropriate to use these higher projections. Assuming no new technologies or investments in recovering materials from the waste stream are made, the amount to be transported out of county is estimated to be between 250 tons to as much as 350 tons per day. This suggests there may be a need to make investments in the transfer station system sooner than shown in the lower waste projections. Marion County and service providers should evaluate the capacity of transfer stations and the MRRF to determine their capability to handle more vehicles and waste efficiently.

Summary of Impacts of Scenario 2

The following summary highlights what impacts might be expected from implementing the strategy for discussion purposes. Further analysis of these impacts and options for addressing them are beyond the scope of this assessment.

1. The recovery rate is not expected to increase from current levels unless Marion County considers mandates, rate incentives, bans or other measures to cause changes in generator behavior that results in more materials being recycled.
2. Marion County and service providers will need to continue a level of promotion and education programs needed to support the waste reduction and recycling services.
3. Some capital improvements may be necessary at SKRTS and/or MRRF to handle increased waste quantities. These should not represent major investments since the amount of new waste would be about 100 tons per day or about five new transfer trips to the landfill.
4. Marion County would need to secure a ten (10) to fifteen (15) year agreement with Covanta.
5. In 2020 the County might need to evaluate options for disposing of inert waste currently disposed at Brown's Island.
6. If waste quantities remain lower than expected there will be less revenue to pay for fixed operating expenses and therefore rates will need to be monitored to determine if there is sufficient revenue to meet expected expense requirements.

5.2.3 Scenario 3 – Expand Commercial Recycling Services

As discussed in the Section 4 of this report there are new recycling regulations approved by the legislature and new rules established by DEQ. The key change is the new goal for Marion County to achieve a recovery rate of 64% by 2025. Also, as mentioned in Section 4, there are recent developments in processing technologies that might be considered for pursuing measures to achieve this new goal.

Scenario 3 was prepared to illustrate a possible approach for achieving higher recovery rates. The County has been very successful with current services and programs to reach 54%. To increase the amount of materials recycled needed to meet the 64% goal additional investments in the system will be required.

The key assumptions for considering changes under this scenario are as follows:

1. Marion County and service providers will continue the level of promotion and education necessary maintain the current recovery rate. This is important in order to keep the current recovery rate at 54%
2. New processing capacity is added to the system to recover more recyclables from commercial waste stream. Actions may include:
 - a. Complete an evaluation and determine the feasibility of options to recover more recyclable materials from the commercial waste stream. These options may include:
 - Expand processing options to include a mixed waste MRF for commercial waste
 - Consider program options to create incentives or require separation of recyclable materials by commercial generators at the source.
 - Expand programs to collect more food waste to be composted.
3. Certain facilities such as SKRTS, MRRF and Garten will need to make some investments to manage an increase in waste and number of vehicles.
4. Add necessary equipment at Garten to enable all commingled materials generated in Marion County to be processed in county.
5. The EFWF contract is extended a minimum of ten (10) years to 2029 or longer.
6. Evaluate and begin planning for technologies to minimize transporting waste to out of county landfills.

As the waste quantities increase with population and improved economic factors and with the fixed capacity of the EFWF, Marion County will need to transport more waste out of county. Considering the new goals to increase the recovery rate the primary question is what strategies to recycle more materials should be pursued?

Answers to this question will take more study, but many communities faced with a similar dilemma are evaluating various approaches. Some local governments consider mandates, bans and rate incentives as viable approaches. These are possible options for Marion County to consider. They require less capital investments but, monitoring and enforcement must be part of the program. Local governments will need to fund administration and enforcement activities associated with these options if such programs are to have an impact. Although on paper these programs appear attractive, based on limited research from around the country results have been mixed. For instance, communities with bans on food waste and plastics have not reported results that can be relied upon. More evaluation of these options can be pursued.

The other approach is to introduce additional processing to recover materials from the mixed waste stream. Because of the comprehensive commingled collection program from households in the County, there are not large amounts of recoverable material contained in the residential waste stream. Where most communities are turning their attention to is the commercial waste stream. In fact, the new DEQ rules specifically call for jurisdictions to implement commercial recycling programs.

In the 2010 SWMP, a review of the waste stream was presented that depicted the potential for recovery of materials from the commercial waste stream. Table 5.5 shows a typical profile of the main composition of the waste stream. In this analysis Marion County was recycling 51% with 246,333 tons or 49% going to EFWF (170,000 tpy) and landfills.

Table 5.5 - Waste Stream Composition Estimates

Total Waste Disposed & Recovered (TPY)		Total Waste Recovered (TPY)		Total Waste Disposed (TPY)	
Paper	100,375	Paper	63,966	<i>Paper</i>	<i>36,408</i>
Plastics	30,428	Plastics	6,682	<i>Plastics</i>	<i>23,747</i>
Organics	236,070	Organics	119,506	<i>Organics</i>	<i>116,565</i>
Glass	12,062	Glass	8,022	<i>Glass</i>	<i>4,040</i>
Metals	72,593	Metals	55,793	<i>Metals</i>	<i>16,800</i>
Inorganics	33,969	Inorganics	1,822	<i>Inorganics</i>	<i>32,146</i>
Haz Mats	6,997	Haz Mats	5,469	<i>Haz Mats</i>	<i>1,527</i>
TOTAL	507,593	TOTAL	261,260	Total	246,333

It is assumed that about 55% of what is delivered to the EFWF and Coffin Butte is generated from commercial generators or about 130,000 tons. The composition of the commercial waste stream based on DEQ characteristic studies is presented in Table 5.6.

Table 5.6 - Composition Estimates for Commercial Waste

Material	% of Disposed	TPY	Assumed Recovery	TPY Recycled
All Paper	23%	29,900	75%	22,425
Plastics	13%	16,900	75%	12,675
Organics	50%	65,000		
<i>Yard Waste</i>	4%	5,200	50%	2,500
<i>Wood Waste</i>	2%	2,600	50%	1,300
<i>Food</i>	36%	46,800	50%	29,280
<i>Other</i>	8%	10,400	20%	2,080
Metal	5%	6,500	90%	5,850
Glass	1%	1,300		
Other Inorganic	8%	10,400	10%	1,000
Total	100%	130,000	55%	71,230 +

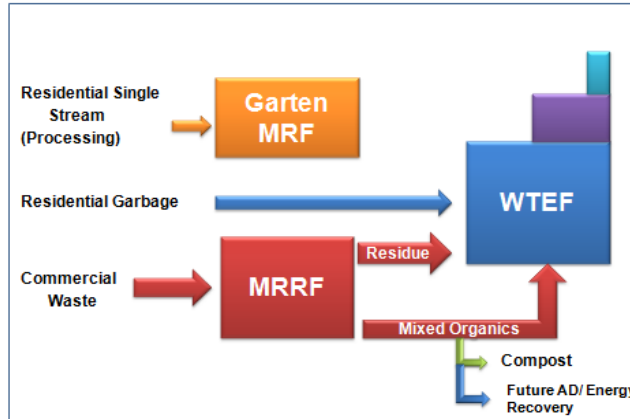
This analysis is conceptual as it reflects the typical composition of commercial waste based on limited waste characterization data. But it shows that potentially the waste stream contains more than 53,300 tons of marketable commodities (i.e. paper, plastics and metal) and about 65,000 tons of food waste and other organics. If a little over a half of the waste stream is processed, there is potential for 71,000 tons of material that could be recycled and/or diverted. To achieve the 64% recovery rate, the County would need to recycle or divert by about 50,000 tons per year by 2025.

As discussed in Section 4 Trends and Technology, the primary method for recovering materials from the mixed commercial waste stream is to process using an advanced material recovery plant. The most recent plants built are achieving 60% recovery for both organics and commodities. After the organics are recovered they must be processed at a compost facility or at an Anaerobic Digester (AD) plant.

In the case of Marion County, expanding the equipment line at the MRRF could be one option. If for instance 60% of all commodities in the commercial waste stream is recovered that would result in 32,000 tons of additional recycling for the county. To reach the 64% recovery rate another 20,000 tons of food waste and mixed organics could be recovered. This represents only 31% of all mixed organics in waste stream based on this conceptual model.

The diagram on page 40 depicts how the county solid waste system may operate under the Scenario 3 concept. All commingled materials collected at households can be delivered to Garten assuming some additional processing improvements are made. The MRRF could accept and process the mixed commercial waste to recover recyclable commodities. Some organics might be delivered for composting, but the residue and any materials not suitable for compost can be delivered to the EFWF.

Scenario 3 – System Diagram



To illustrate the impact to the solid waste system Table 5.7 presents the projected waste volumes managed under this scenario. Both the low and high projections are presented.

Table 5.7 – Scenario 3 - Waste Quantities Low Projection for 15 years (Tons per Year)

Year	Waste Gen.	Waste Recycled	New Processing Capacity	Recovery Rate	Remaining Waste	Waste to EFWF	Ash Disposal	Total Waste Disposed	Brown’s Island	MSW (Out of County)
2015	450,869	243,469	0	54%	207,400	167,860	48,000	39,540	8,311	31,229
2016	457,592	247,100	0	54%	210,492	170,000	48,000	40,492	8,000	32,492
2017	464,416	250,784	0	54%	213,631	180,000	48,000	33,631	8,000	25,631
2018	471,341	254,524	0	54%	216,817	180,000	48,000	36,817	8,000	28,817
2019	478,370	258,320	0	54%	220,050	180,000	48,000	40,050	8,000	32,050
2020	482,879	260,755	35,000	61%	187,125	180,000	48,000	7,125	8,000	-875
2021	490,080	264,643	35,700	61%	189,737	180,000	48,000	9,737	8,000	1,737
2022	497,388	268,590	36,414	61%	192,385	180,000	48,000	12,385	8,000	4,385
2023	504,805	272,595	37,142	61%	195,068	180,000	48,000	15,068	8,000	7,068
2024	512,333	276,660	37,885	61%	197,788	180,000	48,000	17,788	8,000	9,788
2025	518,103	279,775	48,000	63%	190,328	180,000	48,000	10,328	8,000	2,328
2026	525,040	283,522	48,960	63%	192,558	180,000	48,000	12,558	8,000	4,558
2027	532,070	287,318	49,939	63%	194,813	180,000	48,000	14,813	8,000	6,813
2028	539,194	291,165	50,938	63%	197,091	180,000	48,000	17,091	8,000	9,091
2029	546,414	295,064	51,957	64%	199,394	180,000	48,000	19,394	8,000	11,394
2030	552,789	298,506	52,996	64%	201,287	180,000	48,000	21,287	8,000	13,287

The low projection shows the County would achieve the 64% recovery rate by 2029. The County would continue to supply material to the EFWF. This would include the residue from the new MRF and the residential and commercial waste delivered directly by franchised collectors and material from NMCD and SKRTS. In this scenario the County would deliver 180,000 tons of MSW with 7,000 tons of special waste received from other sources. No outside waste would be delivered to the EFWF.

Assuming all other waste is not recycled or processed at the EFWF, the County would only transport an estimated 2,300 tpy. Considering the High Waste Projections as shown in Table 5.8, the County would transport about 16,000 tpy to out of county landfills.

Table 5.8 – Scenario 3 - Waste Quantities High Projection for 15 years (Tons per Year)

Year	Waste Gen.	Waste Recycled	New Processing Capacity	Recovery Rate	Remaining Waste	Waste to EFWF	Ash Disposal	Total Waste Disposed	Brown's Island	MSW (Out of County)
2015	482,541	260,572	0	54%	221,969	167,860	48,000	54,109	8,311	45,798
2016	489,736	264,458	0	54%	225,279	170,000	48,000	55,279	8,000	47,279
2017	497,039	268,401	0	54%	228,638	180,000	48,000	48,638	8,000	40,638
2018	504,451	272,404	0	54%	232,048	180,000	48,000	52,048	8,000	44,048
2019	511,974	276,466	0	54%	235,508	180,000	48,000	55,508	8,000	47,508
2020	516,800	279,072	35,000	61%	202,728	180,000	48,000	22,728	8,000	14,728
2021	524,507	283,234	35,700	61%	205,573	180,000	48,000	25,573	8,000	17,573
2022	532,328	287,457	40,000	62%	204,871	180,000	48,000	24,871	8,000	16,871
2023	540,266	291,744	40,800	62%	207,722	180,000	48,000	27,722	8,000	19,722
2024	548,323	296,094	41,616	62%	210,612	180,000	48,000	30,612	8,000	22,612
2025	554,498	299,429	51,000	63%	204,069	180,000	48,000	24,069	8,000	16,069
2026	561,922	303,438	52,020	63%	206,464	180,000	48,000	26,464	8,000	18,464
2027	569,446	307,501	53,060	63%	208,885	180,000	48,000	28,885	8,000	20,885
2028	577,071	311,618	54,122	63%	211,331	180,000	48,000	31,331	8,000	23,331
2029	584,798	315,791	55,204	63%	213,803	180,000	48,000	33,803	8,000	25,803
2030	591,620	319,475	56,308	64%	215,837	180,000	48,000	35,837	8,000	27,837

The amount materials recovered from the commercial waste are estimates based on similar waste composition data. However, it offers one approach to increase the county's recovery rate. Prior to any investments in such a program, it is recommended that a waste composition analysis be completed. This information can provide valuable data for planning a strategy for

recovering more materials from the commercial waste stream and possibly designing MRF facilities. A more detailed feasibility analysis can then be completed to determine what the cost to reach the new goals.

Summary of Impacts of Scenario 3

For discussion purposes the following summary highlights what impacts might be expected from implementing the strategy. Further analysis of these impacts and options for addressing them are beyond the scope of this assessment. Under the current system, with agreements to continue to deliver waste to the EFWF, the County has time to evaluate options and develop a plan of action for the best strategy to achieve higher recovery rates. It also only considers proven technologies and does not include new technologies that are still in the development stages.

1. Marion County will maintain the current level of waste reduction and recycling services and monitor performance of the system.
2. The County and its service providers would use a comprehensive waste composition study to develop a profile of what materials are being delivered to the EFWF and to Coffin Butte. A waste composition study is being performed by DEQ to be completed in 2017. This information can be used to verify the assumptions in this analysis and to evaluate the best options for increasing the recovery rate.
3. Based on the results of the waste composition a feasibility study to determine the cost and how best to proceed to recover materials can be determined.
4. The capital improvements to implement an advanced MRF are expected to include modifications to the MRRF facilities and new processing equipment. As illustrated in the Tables 5.6 the mixed waste processing system at MRRF would not become operational until 2020 or perhaps even later. Residue from the MRF operations can be transported to the EFWF.
5. To meet the 64% recovery goal established by the state, it most likely will require recovery and processing of organics. Here Marion County has several advantages over other solid waste systems that have limited options for processing organics. Organics recovered from an advanced MRF at MRRF are as follows:
 - a. Initially organics can be delivered to the EFWF. Possibly some percentage can be shipped to the Pacific Region Compost or Recology Oregon Compost (NW Greenlands) for composting to realize some added recovery benefits.
 - b. Once the processing system has been operating over a period of time, further evaluation of composting more organics and/or possibly building an Anaerobic Digester (AD) system can be evaluated.

- c. If the EFWF were to discontinue operations in the future, the County would be in a position to possibly implement an Anaerobic Digester (AD) system to recover renewable energy or some other proven technology.
6. Investments are needed at the Garten MRF to ensure it can process all materials generated in the county is needed. This would enable collection companies to deliver all commingled materials to an in county materials processor and discontinue receiving commingled materials at MRRF and avoid transportation commingled materials to Portland. This will also free up space at the MRRF building to consider processing other materials.
7. The county would need to secure a 10 to 15 year agreement with Covanta.
8. In 2020, the county may need to evaluate options for disposing of inert waste currently disposed at Brown's Island.

Section 6.0 – Summary of Findings

The previous SWMP was completed in 2010. The purpose of this 2016 assessment is to take a snap shot of the current solid waste management system and ascertain if there are impending actions necessary to meet the immediate needs of the services and improve system performance. It entailed updating the waste projections to determine actions or changes needed to address longer term strategies particularly, if such actions require significant capital improvements. Also, part of the assessment is to identify changes to regulations made since 2010, complete a brief overview of technologies and discuss trends in managing solid waste.

In reviewing the information presented in the assessment there are several conclusions.

1. The Marion County system is a leader in the state in waste reduction and recycling.
2. The County and its partners maintain a comprehensive promotion and education program to support the waste reduction and recycling services. This is a key element of maintaining a state leading recovery rate.
3. By committing to supply waste to the EFWF, almost 90% of the county's waste is diverted from landfill disposal.
4. There were no immediate needs or changes to the solid waste facilities required, thus no need for any significant capital investments in the next few years. This is contingent on extending the contract to supply waste to the EFWF.
5. Recent data appears to support the conclusion that an increase in waste quantities will return to pre-recessionary conditions, meaning waste quantities will grow.

6. Important to note that in the past few years, even though the generation rate has increased slightly, Marion County has shown an increase in the recovery rate that has somewhat offset this increase. The result is the disposal rate is not increasing at the same rate as the generation rate. To maintain the growth in the recovery rate, new programs will be needed.
7. Passage of Senate Bill 263 has increased the recovery goals for the county to 64% by 2025. This is not mandatory goal but is intended to be an expected target for the Marion County system whereby DEQ can review the system performance and programs being offered and can suggest changes if necessary to achieve these goals.
8. The County exercised the option to extend the contract with Covanta for an additional two years, until 2019.

These represent the key conclusions of the 2016 assessment report.

6.1 Key Policies and Future System Options

In addressing the long term solid waste management strategies Marion County might consider, three scenarios were presented. These scenarios were developed to take into account the updated waste projections and identify key policy decisions the county may consider for managing waste over the next ten to fifteen years. They also become a framework for future evaluation of system changes that might be needed. There are many variations or other alternatives that will emerge as the County and the service providers evaluate the future needs. However, the scope of this assessment was limited and more analysis and further evaluation of the options will need to be performed to identify the cost and other impacts to the system and its constituents.

The following represent key policy issues to be addressed for managing solid waste and the waste reduction and recycling services in the next ten years.

1. Should Marion County continue to deliver its waste to the EFWF?

Discussion: The EFWF has operated for over 28 years and is reported in good condition. The plant continues to operate and meet or exceed permit requirements. A key question to resolve is what is the remaining useful life of the existing facility? This assumes at some point additional investments may be necessary to operate for a longer term.

2. Should Marion County agree to participate in expanding the EFWF and accept waste from out of the County?

Discussion: Portland Metro is considering advancing the option to employ alternative technologies to reduce waste disposed at landfills. Covanta responded to a public solicitation process and proposed that Metro transport waste to the EFWF. To handle the additional waste Covanta is proposing to construct additional capacity at the plant. The plant was designed with the potential to add capacity. This option would now mean Marion County would be host to waste delivered from other jurisdictions.

3. What actions should Marion County take to meet the new recovery goals?

Discussion: Marion County is in a similar position as many jurisdictions particularly in the west coast. New legislation has challenged local jurisdictions to increase recovery and divert more materials from landfills. The challenge to meet these goals will either cause elected officials to place more requirements on households and businesses to reduce and recycle more or possibly build appropriate infrastructure to process waste to recovery more. Either option will add cost to the system.

4. What facilities are needed to manage waste cost effectively in the future?

Discussion: The options for what facilities are needed are largely dependent on what the future role the EFWF plays is serving the county's needs. If waste is no longer delivered to the plant then, based on waste projections, more waste would need to be transported to the out of county landfills. This condition will persist, at least in the near term, until an in-county alternative is available.

There are many subsets and other issues related to the greater policy considerations listed above that need to be fleshed out and analyzed. However, these represent the key policy or issues that need to be further evaluated in order for the county and its partners to develop a long term strategy.

In conclusion, over the next three to four years, the County will need to consider these policy alternatives, to establish how the system will develop for the next 10 to 20 years.