

3. COMPOSITION OF WASTE STREAM

3.1 INTRODUCTION

Identifying the quantity and composition of solid waste in Clallam County is necessary to provide the basis for determining solid waste programs and handling needs for the next twenty years. The total solid waste stream for Clallam County consists of various types of wastes including paper, metals, glass, wood waste, organics such as yard debris, and consumer products such as computers, carpet, furniture, etc. Commercial and industrial generators also produce a number of special waste streams that are not handled as part of the municipal solid waste stream. These special wastes include wood waste, construction and demolition debris, ash, and a variety of sludges and other wastes. Special wastes are discussed in Chapter 7. This CSWMP is primarily concerned with the wastes that are generally referred to as MSW, which is produced by residential, commercial, and industrial generators.

3.1.1 Solid Waste Quantities

This section compares the current MSW disposal and recycling (i.e., generation) quantities with those quantities from nine years ago, with future forecasts of MSW to 2025. Past MSW quantities were derived from the 1996 version of the County Solid Waste Management Plan. Current municipal solid waste quantities were developed from information provided by the disposal site operators (such as the Port Angeles Landfill), waste collection operators, industries, and tribes and is shown in Table 3-1. These figures do not include the special wastes that are handled separately from the municipal solid waste stream. Future projections of solid waste quantities assessed two scenarios. The first scenario assessed the yearly rate of disposal and recycling and was based on the existing per capita generation and disposal rates assuming no change in these rates over time. The second scenario assessed the yearly rate of disposal and recycling that would occur if 40 percent of the waste stream were diverted by 2025.

3.1.1.1 Past (1996) MSW Disposal and Recycling Quantities

As shown in Table 3-1, the County generated approximately 55,762 tons of MSW in 1996. Port Angeles accounted for approximately 33 percent and Sequim accounted for approximately 7 percent of this total. Of this total quantity generated, the County recycled approximately 11,358 tons of material. The per capita generation rate in the County was 5.04 lbs per day, the per capita recycling rate was 1.04 lbs per day, and the disposal rate was 4.00 lbs per day in 1996.

3.1.1.2 Existing (2005) MSW Disposal and Recycling Quantities

In 2005, the County generated approximately 71,115 tons of MSW, which represents an estimated 17 percent increase from 1996. The quantity of MSW generated in Port Angeles in 2005 increased by 8 percent from 1996 (see Table 3-1). The quantity of MSW generated by Sequim increased 45 percent, which was the largest change in the mass of MSW generation over the last nine years. This corresponds to the rapid growth in population in the Sequim area in the last decade. The eastern County areas outside Sequim and Port Angeles increased their MSW generation by 14 percent between 1996 and 2005. The amount of waste generated by percentage in the urban areas of Sequim and Port Angeles as compared to the County decreased slightly from 1996 to 2005 to approximately 39 percent, indicating a slight overall increase in the percentage of waste generated outside the more urbanized areas. Over the last

nine years, the per capita waste generation rate increased slightly from 5.04 lbs per person per day to 5.33 lbs per person per day (excluding West Waste and Tribal Lands for which 1996 data are not available). The per capita recycling rate also increased slightly from 1.04 to 1.15 lbs per person per day. Similarly, the per capita disposal rate increased from 4.0 lbs per day to 4.16 lbs per day between 1996 and 2005.

Table 3-1. Municipal Solid Waste (MSW) Quantities

Waste Origin/Type	Tons of Solid Waste ^a		Percent Change
	1996	2005	1996-2005
Port Angeles MSW ^b	18,366	19,834	8%
Sequim MSW ^c	4,177	6,037	45%
Eastern County MSW	21,861	24,827	14%
Western County MSW (West Waste)	n/a	5,000	n/a
Tribal Lands	n/a	1,100	n/a
Total MSW Disposed (Tons)	44,404^f	56,798	14%^f
County Recycled Material	11,358	14,317	26%
Total Waste Generated (Tons)	55,762	71,115	17%^f
Per Capita Waste Generation Rate/day (lbs)	5.04 ^{d,f}	5.83 ^e	6% ^f
Per Capita Recycling Rate/day (lbs)	1.04	1.15	11%
Per Capita Disposal Rate/day (lbs)	4.00^f	4.66	4%^f

^a Does not include compost, special wastes, or waste collected on tribal lands.

^b Includes municipal collections (residential and commercial accounts) and residential self-haul from Port Angeles residents.

^c Municipal collections from residential and commercial accounts.

^d Used population of 60,494 and 365-day year.

^e Used population of 66,800 and 365-day year. Per capita generation rate is 5.33 and disposal rate is 4.16, if West Waste and Tribal Lands are excluded.

^f Excluding West Waste and Tribal Lands, for which 1996 data are not available.

3.1.1.3 Future (2025) MSW Disposal and Recycling Quantities

As stated above, two scenarios were prepared to assess future waste generation and recycling in the county. Scenario 1 assumes that the per capita waste disposal and recycling rates increase at the same rate as they have over the past nine years. Thus, there would be a 4 percent increase in the per capita disposal rate and an 11 percent increase in the per capita recycling rate by the year 2015. Similarly, there would be another increase of 4 percent and 11 percent for the per capita disposal and recycling rates, respectively, between the years 2015 and 2025 (thus the per capita disposal and recycling rates would be 4.50 lbs per day and 1.42 lbs per day, respectively). These rates were converted to tons, multiplied by 365 days, and multiplied by the projected population to obtain estimates of the total yearly volume of disposal and recycling waste in tons.

Scenario 2 took the estimated total volume of waste (91,622 tons) from Scenario 1 and assumed that the plan goal of a 40 percent diversion of waste was met in the year 2025. The results of Scenarios 1 and 2 are shown in Table 3-2.

Under Scenario 1, the County is projected to dispose of approximately 71,517 tons of material and recycle 20,105 tons (the total waste generation would be approximately 91,622 tons) in 2025. This is an increase of approximately 26 percent for the total weight of MSW disposed and a 41 percent increase in the total weight of recycled material.

Table 3-2. Projected Solid Waste Quantities

Year	Population	Projected Tons of Solid Waste ^a			
		Scenario 1: Current Rate ^b		Scenario 2: Based on Goals ^c	
		Disposed	Recycled	Disposed	Recycled
2005	66,800	56,798	14,317	56,798	14,317
2015	71,051	62,842	16,552	---	---
2025	77,749	71,517	20,105	54,973	36,649

^a Based on per capita disposal and per capita recycling rates shown in Table 3-1 for 2005.

^b Assumes same percentage breakdown for disposal and recycling (80% and 20%, respectively) as shown in Table 3-1 for the year 2005.

^c Assumes goals shown in Chapter 6 are met (i.e., assumes waste diversion of 40% by 2025 based on total volume estimate of 91,622 tons).

Under Scenario 2, it is estimated that the County would dispose approximately 54,973 tons of material and recycle 36,649 tons of material. The amount of MSW disposed would be slightly less than what is currently landfilled. As compared to Scenario 1, there would be a reduction in the amount of MSW disposed by approximately 16,544 tons. This represents a potential decrease in the amount of material that would have to be disposed if the County was able to meet this goal.

3.1.1.4 Solid Waste Composition

The composition of MSW is extremely varied and encompasses all nonhazardous residential and commercial refuse generated in the County. Table 3-3 shows the estimated composition of disposed MSW for Clallam County. The waste composition data shown in Table 3-3 was derived from a recent study conducted by the County (Green Solutions 2003). This information was augmented by data from the City of Port Angeles that included a 2004-2010 Solid Waste Load Forecast (2004), the Port Angeles Landfill Permit Renewal Application (2004), and data from Ecology (2003).

The specific sources examined in the County’s waste characterization study include single-family homes, apartments, residential self-haul, commercial self-haul, and several types of businesses. The solid waste composition figures shown in Table 3-3 are typical of the waste streams in many areas, but it should be noted that the figures are only an approximation of Clallam County’s waste stream. Since the data for the specific waste streams (residential, commercial and industrial) are derived from a study of broad regional areas, these figures may or may not accurately reflect the composition of the waste stream as generated in Clallam County. Statistical accuracy of the figures shown in Table 3-3 is presented in Appendix A of the Clallam County Waste Composition Study.

Organic material makes up the largest component of MSW in the County. Based on the 2003 Waste Composition Study, approximately 10,798 tons or 21 percent of the MSW waste stream in 2003 was organic material. This is followed closely by paper waste, which comprised 9,674 tons or 19 percent of the waste stream. Other components in order of magnitude included wood waste (14 percent), plastics (12 percent), residual material (such as ash, dust, sludges at 10 percent), consumer products (8 percent), metals (7 percent), and glass and special waste (3 and 0.9 percent, respectively).

The composition of waste in the County can be expected to change in the future due to changes in consumption patterns, packaging methods, disposal habits, and other factors. These changes are difficult to predict in the long term. Furthermore, implementation of this CSWMP will affect waste composition in Clallam County by affecting purchasing and disposal habits (waste reduction) and by affecting the quantity and types of materials recycled and composted.

Table 3-3. Estimated 2003 Solid Waste Composition in Clallam County

Material	Residential Waste		Commercial Waste		Industrial Waste		Tribal Waste		Total Waste Stream	
	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr
PAPER										
Cardboard	3.28	741	5.37	911	2.40	229	4.58	80	3.86	1,882
Newspaper	2.57	582	2.03	345	0.10	9	2.44	42	1.92	936
Other Groundwood	0.40	90	0.58	99	0.05	5	0.14	2	0.38	193
High-Grade Paper	1.04	235	1.21	205	0.06	5	4.55	79	1.03	445
Magazines	2.62	592	1.44	244	0.07	7	1.60	28	1.71	843
Low-Grade Paper	5.58	1,262	6.42	1,089	2.53	242	5.72	99	5.29	2,593
Compostable	4.52	1,023	6.18	1,048	0.41	39	5.75	100	4.35	2,111
Other Paper	1.12	252	0.97	165	2.65	253	1.09	19	1.36	671
Paper Subtotal	21.12	4,777	24.21	4,107	8.27	790	25.87	450	19.90	9,674
PLASTIC										
PET Bottles	0.86	193	1.23	209	0.94	89	5.51	96	1.15	492
HDPE Bottles, Clear	0.59	132	0.32	54	0.88	84	0.97	17	0.57	271
HDPE Bottles, Colored	0.67	152	0.50	85	0.25	24	0.52	9	0.53	261
Film and Bags	4.12	931	6.32	1,072	3.30	315	6.27	109	4.77	2,318
Bottles 3-7	0.08	18	0.08	14	0.06	6	0.00	0	0.07	38
Expanded Polystyrene	0.51	115	1.09	186	0.13	13	1.82	32	0.68	314
Other Plastic Packaging	1.63	370	1.61	274	1.19	114	1.01	17	1.52	757
Other Plastic Products	2.65	598	3.80	645	1.85	177	1.04	18	2.83	1,420
Other Plastic	0.75	169	0.42	71	1.67	159	0.00	0	0.78	399
Plastic Subtotal	11.85	2679	15.38	2,609	10.27	982	17.14	298	12.91	6,270

Table 3-3. Estimated 2003 Solid Waste Composition in Clallam County (continued)

Material	Residential Waste		Commercial Waste		Industrial Waste		Tribal Waste		Total Waste Stream	
	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr
METAL										
Aluminum Cans	0.85	192	0.81	138	0.94	90	2.51	44	0.91	420
Aluminum Foil	0.16	36	0.17	28	0.08	8	0.10	2	0.15	73
Other Aluminum	0.07	15	0.06	11	0.02	2	0.00	0	0.06	28
Copper	0.00	0	0.01	2	0.06	6	0.00	0	0.01	7
Other Non-Ferrous	0.06	14	0.02	3	0.01	1	0.00	0	0.04	18
Tin Cans	1.92	435	1.00	170	2.07	198	1.40	24	1.63	803
White Goods	0.00	0	1.37	232	1.92	183	0.00	0	0.82	415
Ferrous	1.40	316	2.41	408	1.69	162	1.54	27	1.79	886
Mixed	2.36	534	1.45	247	0.93	88	2.27	39	1.79	869
Metal Subtotal	6.82	1,542	7.30	1,238	7.73	739	7.81	136	7.18	3,519
GLASS										
Clear Beverage	1.52	344	1.60	272	0.07	7	1.93	33	1.29	623
Clear Other	0.94	212	0.36	62	0.04	4	0.29	5	0.55	277
Brown Beverage	1.14	257	0.95	162	0.05	5	2.40	42	0.91	424
Brown Other	0.01	1	0.01	2	0.00	0	0.00	0	0.01	3
Green Beverage	0.68	154	0.62	105	0.00	0	0.61	0	0.53	259
Green Other	0.02	5	0.00	0	0.00	0	0.00	0	0.01	5
Plate Glass	0.03	8	0.02	3	0.00	0	0.00	0	0.02	11
Non-Glass Ceramics	0.22	50	0.11	18	0.00	0	0.00	0	0.13	68
Other Glass	0.16	36	0.07	12	0.00	0	0.11	2	0.10	48
Glass Subtotal	4.71	1,066	3.74	635	0.17	16	5.35	93	3.56	1,717

Table 3-3. Estimated 2003 Solid Waste Composition in Clallam County (continued)

Material	Residential Waste		Commercial Waste		Industrial Waste		Tribal Waste		Total Waste Stream	
	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr
ORGANICS										
Yard Debris	5.54	1,252	1.90	323	0.01	1	0.26	5	3.11	1,576
Food Waste	18.98	4,293	17.81	3,022	0.90	86	23.92	416	15.37	7,401
Manure	2.84	643	0.20	34	0.06	5	1.46	25	1.39	682
Diapers	3.06	693	2.05	347	0.14	13	4.52	79	2.23	1,053
Carcasses	0.04	9	0.00	0	0.00	0	0.00	0	0.02	9
Other Organics	0.18	41	0.20	34	0.02	2	0.00	0	0.15	77
Organics Subtotal	30.64	6,931	22.16	3,760	1.13	108	30.17	524	22.26	10,798
CONSUMER PRODUCTS										
Computers	0.54	122	0.23	38	0.00	0	0.00	0	0.32	160
Other Electronics	0.89	201	0.74	125	0.01	1	0.00	0	0.64	327
Synthetic Textiles	0.41	93	0.42	71	0.06	6	0.00	0	0.33	169
Organic Textiles	0.73	165	0.35	60	0.11	11	0.00	0	0.46	236
Mixed/Unknown Textiles	3.09	699	1.75	297	0.49	47	3.76	65	2.18	1,043
Shoes	0.43	97	0.15	25	0.00	0	0.00	0	0.24	122
Tires/Other Rubber	0.66	149	0.55	94	0.38	36	0.13	2	0.55	279
Furniture	0.72	163	1.39	235	0.14	13	0.00	0	0.81	412
Carpet	0.08	18	3.26	553	1.30	124	0.00	0	1.37	695
Carpet Padding	0.00	0	2.006	349	0.89	85	0.00	0	0.85	434
Rejected Products	0.00	0	0.00	0	3.56	340	0.00	0	0.67	340
Other Composite	0.39	88	0.03	5	0.00	0	0.00	0	0.18	93
Consumer Product Subtotal	7.94	1,795	10.92	1,853	6.94	663	3.89	68	8.61	4,311
WOOD and C&D										
Wood	4.30	973	5.85	992	18.92	1,808	1.93	33	7.48	3,772
C&D	2.53	573	1.59	269	26.04	2,488	0.00	0	6.55	3,330
WOOD and C&D Subtotal	6.84	1,546	7.43	1,261	44.96	4,296	1.93	33	14.03	7,103

Table 3-3. Estimated 2003 Solid Waste Composition in Clallam County (continued)

Material	Residential Waste		Commercial Waste		Industrial Waste		Tribal Waste		Total Waste Stream	
	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr	Percent	Tons/Yr
SPECIAL WASTES										
Special Waste Subtotal	0.95	215	0.90	152	1.38	132	0.18	3	0.99	499
RESIDUALS										
Ash	0.02	4	0.10	17	0.33	32	0.00	0	0.10	52
Dust	0.23	52	0.13	22	0.00	0	0.00	0	0.15	74
Fines/Residue	8.89	2,011	7.73	1311	1.37	131	7.67	133	7.05	3,452
Sludges/Other	0.00	0	0.00	0	17.44	1,666	0.00	0	3.28	1,666
Residual Subtotal	9.14	2,066	7.96	1350	19.14	1,829	7.67	133	10.57	5,245
TOTALS	100	22,616	100	16,965	100.0	9,555	100.0	1,738	100.0	50,874

Source. From "2003 Clallam County Waste Composition Study", by Green Solutions, June 2003 (Table 20).

C&D = construction and demolition debris.

3.1.2 Recycled Material Composition

Table 3-4 shows the estimated composition of recycled material in the County in 2004. This information was derived from survey data developed by Ecology. It does not include some diverted materials such as antifreeze and CDL waste. Corrugated paper, yard debris and mixed paper made up the largest components of the recycling stream. Approximately 4,459 tons of corrugated paper was recycled, which comprised approximately 31 percent of recyclables. There was 3,413 tons of yard debris recycled (for composting), which was approximately 24 percent of the recycled material. Mixed paper made up 8 percent of the recycled material (1,139 tons). Other major components of the recycling stream included white goods, newspaper, used oil, food waste, and rendering.

Table 3-4. Recycled Quantities by Material (2004)

Material	Tons
Aluminum Cans	131.22
Container Glass	404.08
Corrugated Paper	4,459.17
Electronics	8.21
Ferrous Metals	121.83
Fluorescent Light Bulbs	4.32
Food Waste	295.10
Food Waste: Fat & Bone	461.34
Food Waste: Used Cooking Oil	150.18
Gypsum	3.01
HDPE Plastics	89.67
LDPE Plastics	20.18
Mixed Paper	1,139.21
Newspaper	619.73
Nonferrous Metals	150.26
Other Recyclable Plastics	0.24
PET Bottles	51.34
Photographic Films	0.13
Rendering	425.65
Textiles (Rags, Clothing)	5.0
Tin Cans	126.43
Tires-recycled	95.85
Toner Cartridges	0.44
Used Oil	547.88
Vehicle Batteries	186.53
White Goods	949.68
Wood	457.0
Yard Debris	3,412.97
Total Tons	14,317
Recycling Rate (as a percentage of generation)	20%

SOURCE: The "2004 Washington State Recycling Survey" by the Washington Department of Ecology (Ecology 2006a). The results shown may be affected by the lower reporting rate that occurred for the 2004 recycling survey.