Metro Charter Committee
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71

1990 Recycling Levels

Survey of Recycling Markets

July 1991

METRO

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Recycled paper

THE 1990 SURVEY OF RECYCLING MARKETS

Solid Waste Department
Metropolitan Service District

July 1991

Printed on Recycled Paper

ACKNOWLEDGMENT

Metro thanks all of the industry representatives who spent a considerable amount of time helping with this survey.

Ordering Information

Title: The 1990 Survey of Recycling Markets

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SUMMARY

The overall recycling level for the Metro region during 1990 is estimated to be 32% of the waste generated. This is a significant increase from the 1989 level of 28%. Increased recovery of paper (primarily office and other paper besides OCC and newsprint) was the main reason for the higher recycling level. The 1990 per-capita disposal rate, 5.1 lbs/person/day, was the same as in 1989. In contrast, the per-capita recycling rate increased from 2.0 lbs/person/day in 1989 to 2.5 lbs/person/day in 1990. Per-capita generation increased from 7.2 to 7.6 lbs/person/day.

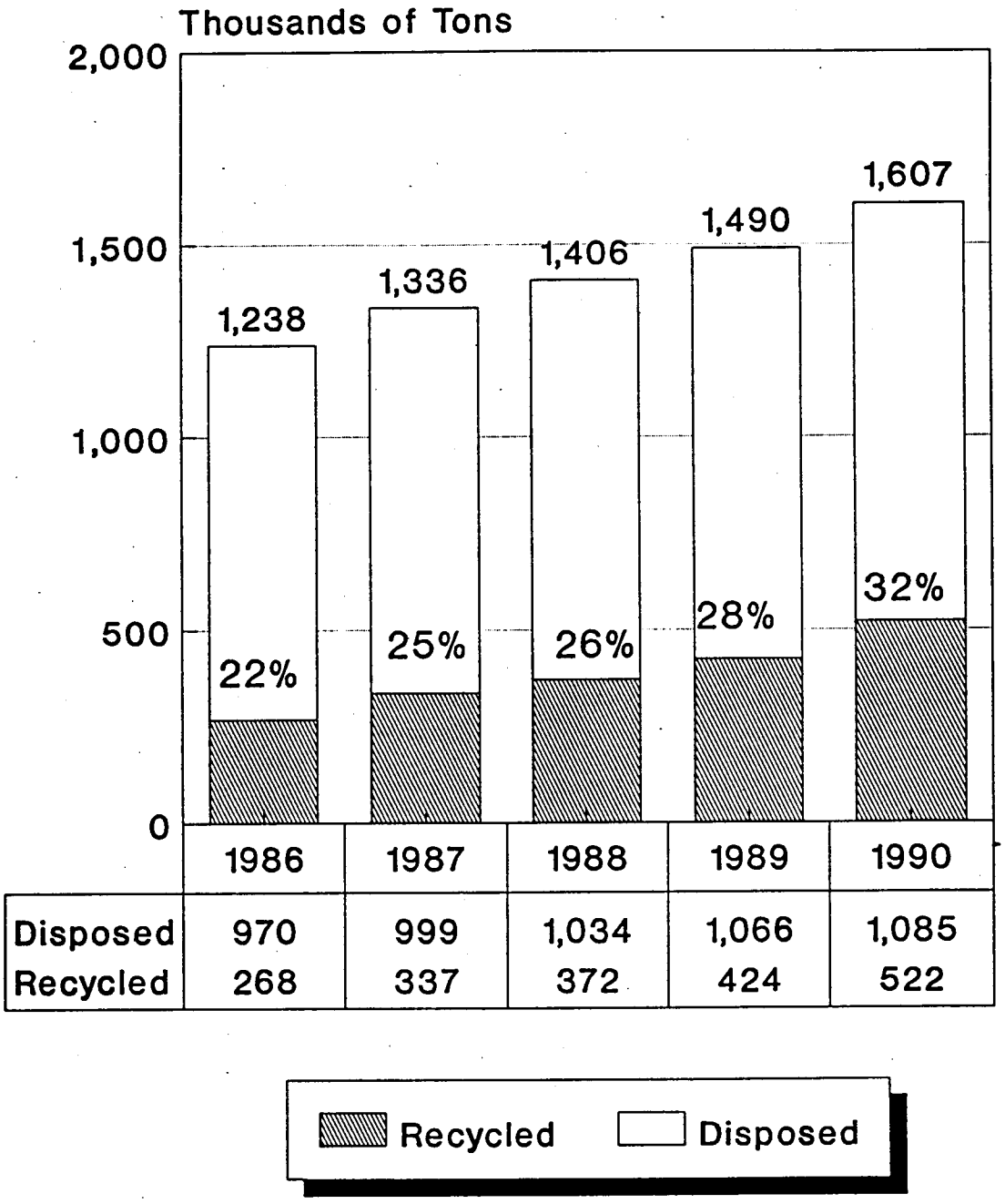
I. INTRODUCTION

Every year Metro conducts a markets survey to determine the regional recycling level. Data for 1990 are presented in this report.

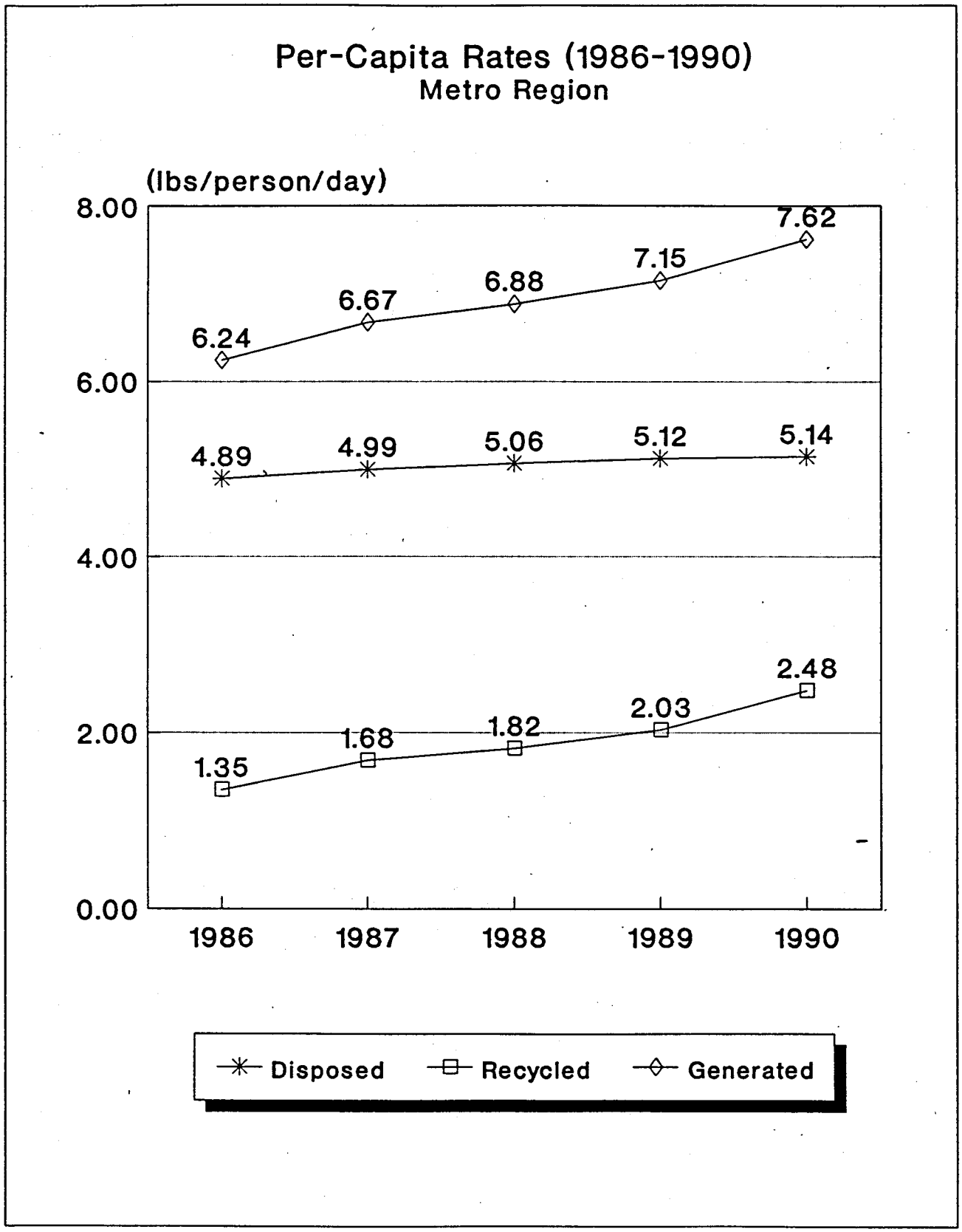
The main purpose of the survey is to evaluate how the effectiveness of recycling programs in aggregate changes from year to year in the Metro region. The intent is to use a survey methodology that is as consistent as possible each year so that comparisons over time are valid. Comparison with other jurisdictions is not a primary objective of this survey, although the methodology used is generally consistent with methods used in other jurisdictions.

The recent passage of new legislation (SB66) in Oregon places a new emphasis on the measurement of recycling levels. The Metro region is required to achieve at least a 45% recovery level by 1995. The following new programs that will increase the 32% recycling level by the estimated percentage in parentheses are: the Metro/Riedel Compost Facility (5%), expansion of the curbside collection program (2%), increased recovery at transfer stations (5%), additional yard debris recycling (2%), recycling of construction/demolition debris (2%), and further expansion of non-residential recycling programs (3%). With the implementation of these new recycling programs, the Metro region is expected to exceed the standards established in the state legislation.

Recycling Levels (1986-1990)
Metro Region



	1986	1987	1988	1989	1990
Disposed	970	999	1,034	1,066	1,085
Recycled	268	337	372	424	522


Per-Capita Rates (1986-1990)
Metro Region
(lbs/person/day)
8.00
6.00
4.00
2.00
0.00
6.24
6.67
6.88
7.15
7.62
4.89
4.99
5.06
5.12
5.14
1.35
1.68
1.82
2.03
2.48
1986
1987
1988
1989
1990
Disposed
Recycled
Generated

1990 Recycling Data

	Recycled Tons	% of Total Disposal Tonnage	Disposed Tonnage	Generated Tonnage	% Recycling Level
Paper					
OCC	119,982	12.0%	130,427	250,409	48%
Newspaper	89,717	4.1%	44,286	134,003	67%
Printing & Writing	55,627	N/A	N/A	N/A	N/A
Magazines	8,095	0.6%	6,645	14,740	55%
Other Paper	41,844	N/A	N/A	N/A	N/A
Total Paper	315,265	26.0%	282,008	597,273	53%
Plastics					
HDPE Clear	319	N/A	N/A	N/A	N/A
HDPE Colored	1,041	N/A	N/A	N/A	N/A
Polystyrene	300	N/A	N/A	N/A	N/A
Polystyrene Foam	12	N/A	N/A	N/A	N/A
LDPE	2,259	N/A	N/A	N/A	N/A
PET	1,645	N/A	N/A	N/A	N/A
Other Plastic	678	N/A	N/A	N/A	N/A
Total Plastic	6,254	9.9%	107,280	113,534	6%
Glass Containers					
Green	4,886	N/A	N/A	N/A	N/A
Brown	9,936	N/A	N/A	N/A	N/A
Clear	13,046	N/A	N/A	N/A	N/A
Other Glass	5,000	N/A	N/A	N/A	N/A
Total Glass	32,868	1.7%	18,532	51,400	64%
Yard Debris	32,223	12.8%	139,298	171,521	19%
Wood	17,679	11.6%	126,128	143,807	12%
Metals					
Ferrous	88,000	4.0%	42,915	130,915	67%
Tin	3,000	1.6%	17,433	20,433	15%
Aluminum	13,000	0.8%	8,856	21,856	59%
Other Metal	5,000	0.7%	7,398	12,398	40%
Total Metal	109,000	7.1%	76,601	185,601	59%
Other Material (From "Thrifts")	8,347			8,347	
Other Waste		30.9%	335,072	335,072	
TOTAL	521,636	100.0%	1,084,919	1,606,555	32%

1990 Total Recovery Level

	Tons	Cumulative Recovered Tonnage	Cumulative Generated Tonnage	Cumulative % Recovery Level
Recyclables	521,636	521,636	1,606,555	32.5%
Marion County Energy Recovery	13,500	535,136	1,620,055	33.0%
Oil	19,492	554,628	1,639,547	33.8%
Tires	16,652	571,281	1,656,200	34.5%
Total	571,281	571,281	1,656,200	34%

II. HIGHLIGHTS

- The recycling level increased from 28% in 1989 to 32% in 1990.

- Recycling of printing, writing, magazines, and "other" paper significantly increased during 1990. The recycling level of these types of paper increased from 23% in 1989 to 49% in 1990. The increase in volume may in part be attributed to the emphasis on office paper recycling by Metro (Metro's 1990 "Paper Train Your Staff" campaign and Commercial Waste Audits program) and programs by the paper recycling industry.

- There was no significant change in newspaper recycling.

- Recycling of plastic remained at about the same level as in 1989. The lack of improvement in plastics recycling may have been due to several collection programs being discontinued in 1990 because of fluctuating markets and non-payment by some re-processors, two re-processors ceasing operation, and some materials (non-HDPE) being stockpiled in anticipation of improved market conditions. There are many new plastic recycling programs currently being developed that are expected to be reflected in the 1991 recycling level.

- There was a significant increase in the recovery of wood as a result of new processing capacity. Hog fuel prices also rose in 1990 due to a supply shortage from the lumber mills. As a result, processors diverted some woody materials previously used in compost processing to their hog fuel line. Processors also sourced additional woody materials (e.g. building demolition and pallets) to add to their hog fuel.

- Recycling of yard debris remained at about the same level as in 1989. The 1990 yard debris tonnage does not include over 1,000 tons that were delivered to St. Johns Landfill but were not processed until 1991. In contrast, the 1989 yard debris figures included 6,000 tons of yard debris that was processed from the stockpiled inventory of one of the major processors.

- Glass recovery increased from 48% to 63% in 1990. There was a slight decline in the price paid for clear and brown glass, and a 50% decline in the price paid for green glass. Contributing factors that helped increase the recycling rate include a greater awareness of recycling because of education and promotion programs and the first phase distribution of curbside recycling containers in the region.

III. COMPARISONS WITH NATIONAL AVERAGES

Comparisons of the numbers reported for the Metro region with national averages could potentially help check the accuracy of the data. The table on the next page compares Metro tonnages from this survey with projections of national averages to the Metro region population. Based on these data, the national average for total recycling is 15%.

The national OCC and newspaper tonnages are from the American Paper Institute. The total 1990 production of OCC and newspaper (24,468,000 and 11,038,000 tons respectively) and the total 1990 recovery (13,451,000 and 4,817,000 tons respectively) were used to calculate national per capita rates for generation and recovery. The difference between generation and recovery was assumed to be the national disposal rate.

National per-capita rates for other materials were taken from the Franklin study as reported by the EPA (Characterization of Municipal Solid Waste in the United States: 1990 Update). The 1988 data reported by the EPA were linearly projected to 1990.

Most of the Metro tonnages are considerably different from the national averages. For example, the API data would predict 113,101 tons of OCC generated in the Metro region. This is less than the 119,982 tons reported as recycled by the local paper industry. The API also estimates that present recycling technology and the network of users of OCC limit the potential recycling level to 66% of the total generation of OCC (Solid Waste Management Newsletter, University of Illinois, Vol. 5, No. 7, July 1991). Therefore, it is likely that the national data considerably underestimate the amount of material generated, recycled, and disposed in the Metro region.

There may be many reasons why tonnages for the Metro region are different from the national averages. For example, use of kraft paper for shopping bags is higher than in metropolitan areas of the east coast. Local data as reported by area recyclers and gathered through waste stream analysis are likely to be more accurate than national data.

Comparison of Tonnage Estimates for the Metro Region
EXCLUDING CONSTRUCTION AND DEMOLITION WASTE

"Metro Data" estimates are based on this survey and the 1989/90 Metro Waste Characterization Study.

"National Data" estimates are projections of national averages of per-capita tonnages to the Metro region population.

Generation (tons)

	Metro Data	National Data	Difference (tons)	Difference (%)
OCC	241,633	113,101	137,308	121.4%
Newspaper	132,343	51,022	82,981	162.6%
Other Paper	210,136	199,506	13,356	6.7%
Total Paper	584,046	363,629	233,644	64.3%
Glass	50,729	55,623	(4,223)	-7.6%
Plastics	107,653	75,191	38,343	51.0%
Wood	101,316	33,435	110,372	330.1%
Yard Debris	162,447	150,998	20,523	13.6%
Other	253,111	145,760	189,312	129.9%
TOTAL	1,267,650	885,652	535,302	60.4%

Recovery (tons)

	Metro Data	National Data	Difference (tons)	Difference (%)
OCC	119,982	62,176	57,806	93.0%
Newspaper	89,717	22,266	67,451	302.9%
Other Paper	105,566	101,385	4,181	4.1%
Total Paper	315,265	185,827	129,438	69.7%
Glass	32,868	8,474	24,394	287.9%
Plastics	6,254	1,233	5,021	407.4%
Wood	17,679	0	17,679	NA
Yard Debris	32,223	3,852	28,371	736.5%
Other	0	15,562	(15,562)	NA
TOTAL	412,636	130,506	282,131	216.2%

Disposal (tons)

	Metro Data	National Data	Difference (tons)	Difference (%)
OCC	121,651	50,925	70,726	156.1%
Newspaper	42,626	28,756	13,870	54.0%
Other Paper	104,570	182,563	(77,994)	-41.2%
Total Paper	268,781	262,244	6,537	7.5%
Glass	17,861	47,148	(29,288)	-60.7%
Plastics	101,399	73,958	27,441	45.1%
Wood	83,637	33,435	50,202	277.2%
Yard Debris	130,224	147,146	(16,922)	-5.3%
Other	253,111	130,198	122,913	216.2%
TOTAL	855,014	755,146	99,867	43.7%

National Data Sources:
American Paper Institute, New York City
Characterization of Municipal Solid Waste in the United States: 1990 Update.
(EPA/530-SW-90-42)

IV. LIMITATIONS ON THE USE OF RECYCLING LEVELS

The following limitations of the recycling level reported in this study should be recognized.

1. The recycling level is a regional average for all types of waste produced by all types of generators. The recycling level may not accurately reflect recycling activity within individual waste streams. For example, an increase in residential recycling would be underestimated by the regional average if non-residential recycling did not also increase during the same time period.

2. The recycling level is an estimated value. Many brokers and processors receive material from throughout Oregon and, in some cases, the U.S. Many do not record the geographic origin of material they receive, and therefore have a difficult time estimating how much of their annual tonnage was generated within the Metro region. In addition, they often are unable to identify how the material was generated (e.g. post-consumer or industrial manufacturing scrap). As a result, the actual recycling level is within some range of the estimated value of 32% for 1990.

3. Recycling levels underestimate the value of waste reduction relative to recycling. The recycling level expresses recycled tonnage as a percent of generated tonnage. Reducing the amount of waste generated causes less of an increase in the recycling level than will additional recycling by the same amount. The recycling level could actually decrease if waste reduction causes both generated and recycled tonnages to decrease. Other data, such as per capita disposal rates (lbs/person/day), may be more meaningful measures of waste reduction programs.

4. Energy recovery from oil, tires, and the Marion County energy facility are not included in the recycling level. The 13,500 tons delivered to the Marion County Energy Recovery Facility from the Metro region during 1990 are counted as resource recovery. The majority of tires and oil recovered are also burned for energy. A large light fill project by the Oregon State Highway Division, however accounted for most of the increase in tire recovery compared to 1989. These items increase the recovery rate to 34%.

5. Recycling levels for other regions may not be directly comparable to the Metro region because of differences in what is counted as recycled or generated waste. Even within the Metro region, some local jurisdictions have reported recycling levels that are not comparable to the level in this report. For example, construction and demolition debris delivered to limited-purpose landfills is

included in Metro's recycling level as disposal tonnage. However, this waste is excluded by some local jurisdictions in their calculation of recycling levels.

6. Yard debris is only counted as recycled if it is actually marketed or processed into new products. Material that is collected and stockpiled is not counted. Delivery of yard debris to processors (not marketing) is reported in Metro's quarterly SWIS report.

7. Disposal tonnage used to calculate recycling levels for individual materials includes some material that is not currently recycled. For example, the OCC disposal and generation tonnage includes waxed corrugated paper even though this material is not currently being recycled.

V. DEFINITIONS

Not all waste that is diverted from the landfill through recycling or recovery is counted as recycled tonnage for calculating the recycling level. The following definitions give examples of the types of included and excluded waste. See the definitions in the appendix for a more detailed description of each material type.

1. Recovered manufacturing waste. This material includes by-products of manufacturing that are recovered without entering the wastestream. Newspaper over-runs during printing and aluminum scrap when car parts are cut from sheet metal are examples. This material is not counted as recycled or disposed tonnage in this report.

2. Major demolition debris (metal and other pure loads of inorganics). Major demolition projects produce significant quantities of metals and other inorganic materials. Examples include ferrous metal from decommissioned power plants and concrete from street reconstruction. Arrangements are made to sell or give this material to processors prior to demolition and it does not enter the waste stream. This type of material is not counted as recycled tonnage in this report. Other material from construction work, such as wood and land clearing debris, is counted.

3. Obsolete material. This includes consumer goods with a limited life span. Examples include appliances, bicycles, pots and pans, and other recyclable household items. Most of this material is included as both waste generated and recycled. Obsolete material that is not counted as recycled includes the ferrous and non-ferrous metals from discarded vehicles or parts of vehicles.

4. Post-consumer items. This category includes disposable consumer items (both residential and commercial consumers) with associated packaging, and is a finished material which would normally be disposed of as solid waste having completed its life cycle as a consumer item. This material is included in the recycling level. These items are included regardless of the method of collection and delivery to processing facilities. The recycling of post-consumer items by non-profit charitable recycling organizations (i.e. thrifts) is included in this year's recycling level.

5. Yard debris. Yard debris is a unique material that does not fit into any of the above categories. As in past years, yard debris is counted as recycled tonnage and waste generated if it is delivered to one of the regional processors of yard debris. Yard debris that is home composted or chipped by landscaping and tree services is not counted. See the 1990 Yard Debris Plan for recent estimates of these alternative methods of recovering yard debris.

VI. METHODOLOGY

Recycled Tonnage and Market Conditions

The survey was conducted during May and June of 1991. Industry representatives were contacted through mail and telephone interviews. Plastics, paper, yard debris, wood, tin, oil, tires, and glass markets were surveyed.

Disposal Tonnage

Disposal tonnage used in this report is from two sources: (1) Metro's Solid Waste Information System quarterly report (May 15, 1991), and (2) Metro's 1989 waste characterization study. Both reports are available upon request.

The waste composition percentages were adjusted to 1990 using the following methodology. The generated amount of each material was estimated by assuming that the growth rate for each material was equal to the growth rate for the total amount of waste generated. The quantity of material disposed was then calculated as the difference between the amount generated and the amount recycled. In the absence of annual waste characterization studies, such a method of estimating the amount of each material disposed is required.

Petroleum-contaminated soils and sewage sludge are not counted as part of the generated tonnage in the region. During 1990 an estimated 50,000 tons of these wastes were landfilled in the region (Note: disposal tonnage reported in Metro's SWIS Reports includes contaminated soils).

Changes In Methodology

In order to evaluate annual changes in the region's recycling level, this study attempts to use the same methodology from year to year. Changes are made, however, when necessary to accurately portray the region's recycling activities.

Several members of the metals industry have reported that they are unable to provide reliable estimates of tonnages that meet the above definitions. **In order to maintain the reliability of this report, metal tonnage (except for tin) from 1989 is used in the calculation of the 1990 recycling level. Only documented increases in metals recycling will be added in future years. Curbside collection and recovery at transfer stations are two activities for which Metro will be able to obtain reliable data. This method of reporting metals is likely to result in a conservative estimate of future increases in the region's recycling level.**

Revisions of 1989 Data

Several errors in the 1989 recycled tonnage were discovered during the preparation of this report. Revisions made in the previously published 1989 data are as follows:

1. The 1989 OCC tonnage was increased from 95,000 to 101,000. Tonnage from one of the major processors was incorrectly assumed to be included as part of another processor's tonnage.

2. The 1989 yard debris tonnage was reduced from 48,000 to 38,000. This was a typographical error in the 1989 report.

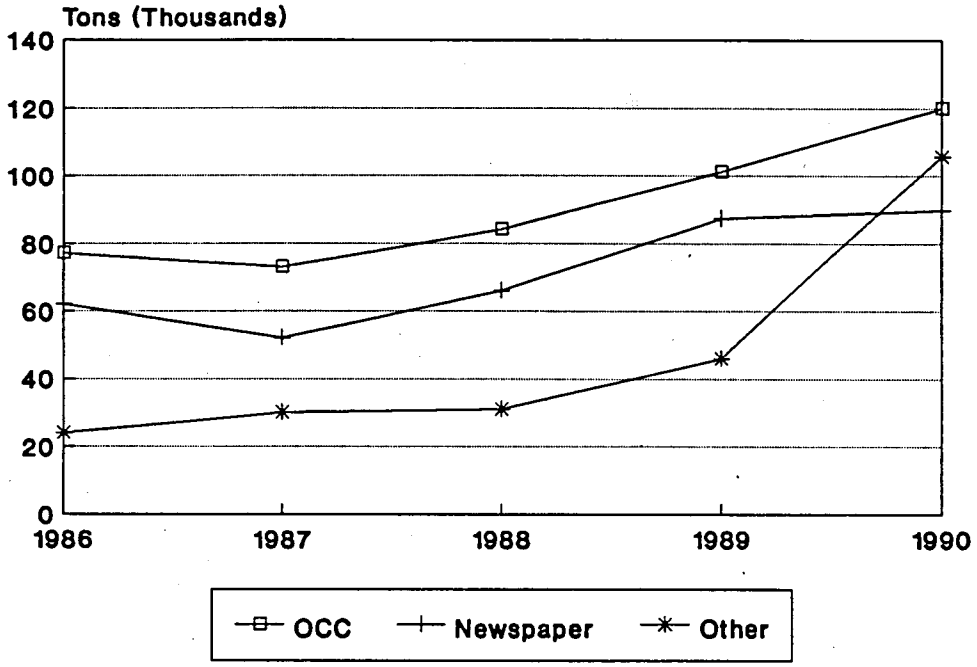
3. The 1989 glass tonnage was reduced from 30,000 to 23,000. Out-of-region tonnage from one of the processors was incorrectly included as part of the Metro tonnage.

4. The 1989 plastic tonnage was reduced from 15,000 to 6,000. Out-of-region tonnage from one of the major processors was incorrectly included as part of the Metro tonnage.

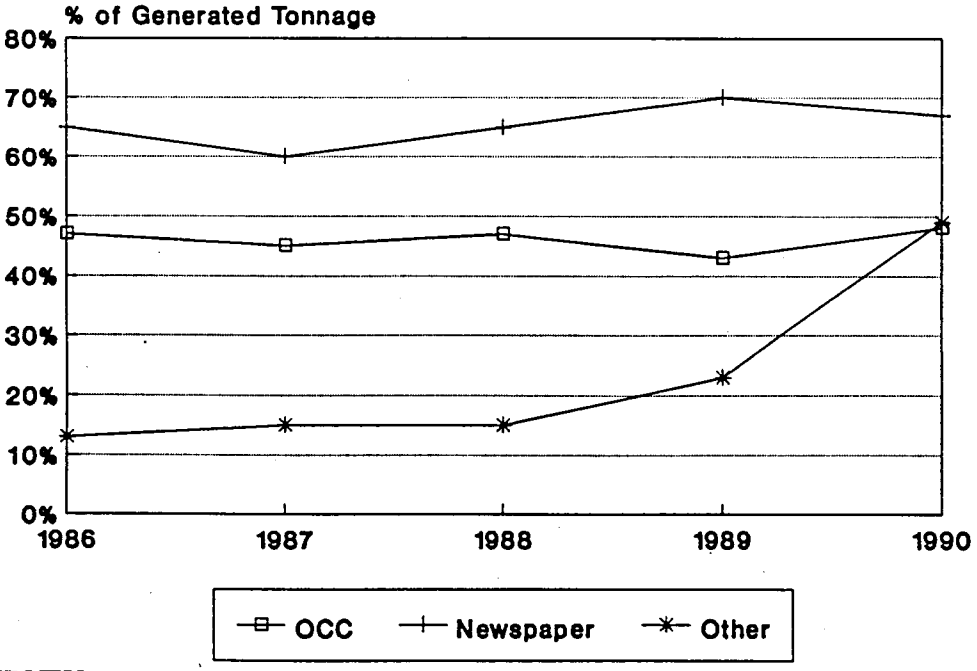
5. The 1989 newspaper tonnage was increased from 57,000 to 87,230. Tonnage from one of the major processors was incorrectly assumed to be included as part of another processor's tonnages.

After making these revisions, the overall recycling level for 1989 remains at 28% as previously reported.

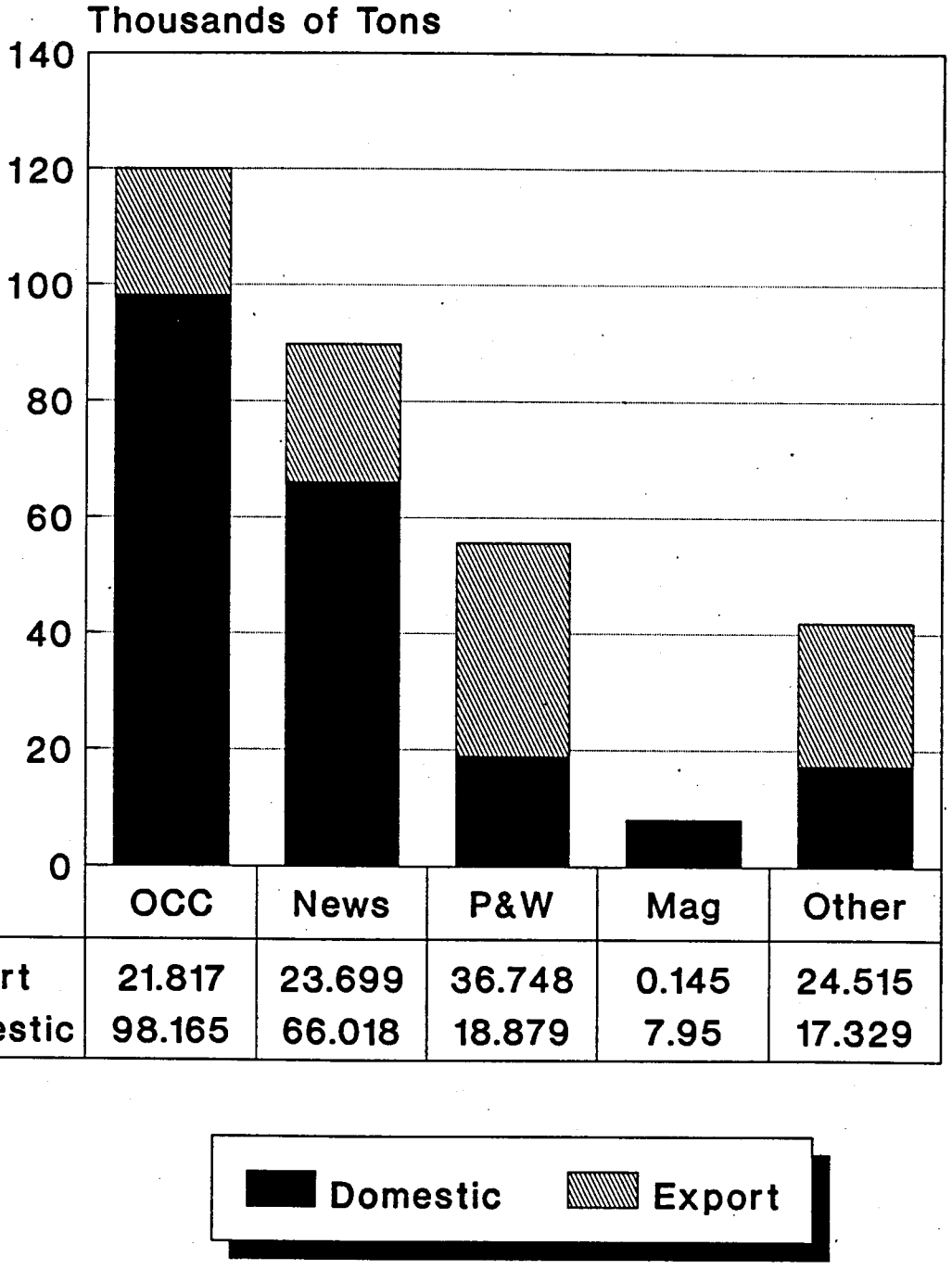
Recycled Paper Tonnage (1986-1990)



Paper Recycling Level (1986-1990)

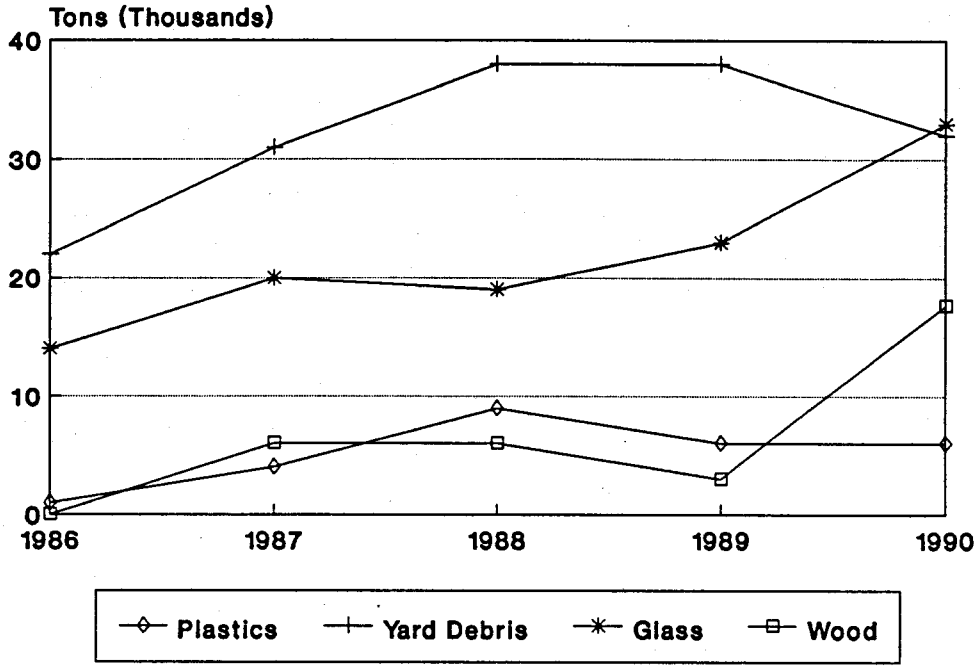


1990 Markets for Recovered Paper
Metro Region

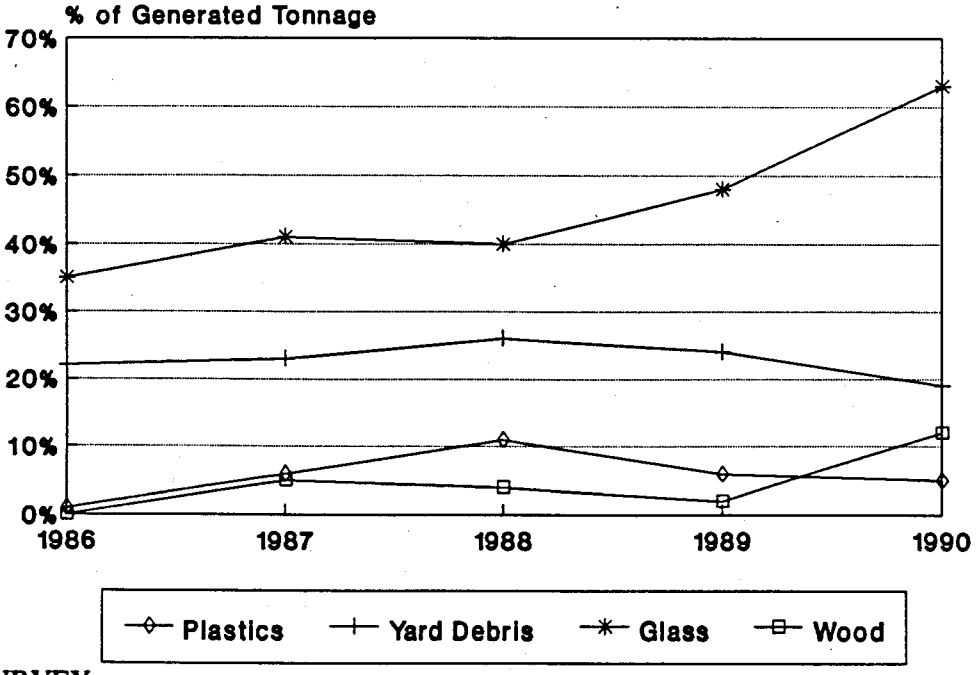


	OCC	News	P&W	Mag	Other
Export	21.817	23.699	36.748	0.145	24.515
Domestic	98.165	66.018	18.879	7.95	17.329

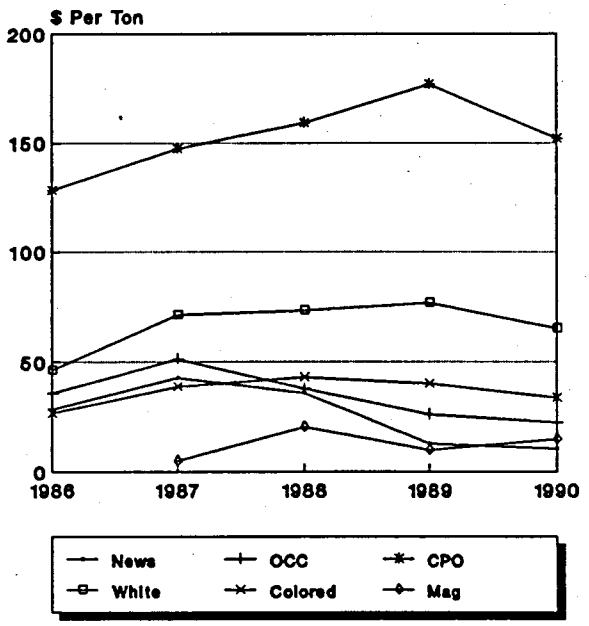
Other Recycled Tonnage (1986-1990)



Other Recycling Levels (1986-1990)

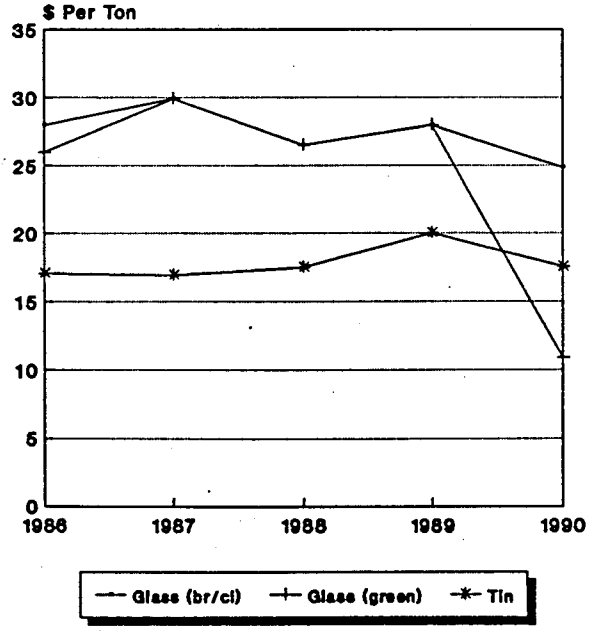


Paper Average Annual Market Prices
(Metro Region)



Prices shown are monthly averages of end-use and buy-back prices.

Other Average Annual Market Prices
(Metro Region)



Prices shown are monthly averages of end-use and buy-back prices.

APPENDIX A

MATERIAL CATEGORIES AND DEFINITIONS

The following are definitions of the categories of the waste stream.

1. **Corrugated Cardboard (OCC)/Kraft Paper.** Kraft linerboard and containerboard cartons of corrugated paper (waxed or unwaxed) and kraft paper bags. Excludes converting plant waste paper (i.e. DLK clippings and kraft grocery bag waste).

2. **Newspaper.** Printed ground-wood newsprint (minimally bleached fiber) and newspaper inserts; referred to as #1 news. Includes over-runs, trim and printer waste.

3. **Printing and Writing Paper.** White ledger, colored ledger, coated book stock, envelope grades, non-groundwood print shop waste, computer printouts (CPO), tab cards, bond paper, copy machine paper, and converting plant waste paper (i.e. business forms and manifolds waste paper). Includes printing and writing paper sold as mixed paper.

4. **Magazines.** Glossy, clay-coated, bleached paper; no newspaper inserts; no groundwood, tabloids or paperback books; may include magazine-type catalogs.

5. **"Other" Paper.** Books, manuals, phone books, non-corrugated paperboard and packaging, carbon paper, recycled boxboard and chipboard, and any other paper not included in the first four categories.

6. **Plastics.** HDPE clear, HDPE colored, polystyrene, polystyrene foam, LDPE (films and bags), PET (beverage containers), and "other" plastics.

7. **Yard Debris.** Pruning, bulky woody yard waste, and leaves and grass clippings.

8. **Wood.** Construction lumber (i.e., dimensional lumber construction materials resulting from remodeling, repair, demolition, or construction of residences, buildings and other structures); Packaging lumber used in pallets and crates; and wood from land clearing.

9. **Glass.** Beverage glass, container glass and other recyclable glass. Bottles that are washed and refilled are <u>not</u> included.

10. **Tin Cans**

11. **Ferrous Metals.** Ferrous metal scrap (other than tin cans).

12. **Aluminum.** All aluminum waste including food containers (i.e., food and beverage containers, which are generally not alloyed).

13. **Non-ferrous Metals.** Metals that are not materials derived from iron, including copper, brass, bronze, aluminum bronze, lead, pewter, zinc, and other metals to which a magnet will not adhere.

14. **Motor Oil.**

15. **Tires.** The majority of tires were chipped and recovered for energy, or were used in a tire-fill project with the Oregon State Highway Department. Only small amounts were recycled as crumb rubber because of limited markets. Estimated conversion factor was 106.4 tires per ton.

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July 29, 1991