Section 6
COMPARISON OF THE 2001 STUDY AND 2007 STUDY IMPACTS

6.1 Overview

This section compares the major findings of the 2001 Economic Impacts of Recycling in Iowa Study (2001 Study) with the current Study.

As in the previous study in which we compared two study results, there have been changes in the recycling industry, changes in how the nation characterizes recycling activities, changes in our computing technology and our approaches to measuring the Iowa recycling industry. These changes can make it difficult to compare the studies. The current Study and the 2001 Study used survey data of materials collectors, processors, end-users, remanufacturers, reuse industries, and recycling equipment manufacturers as the basis for the analyses. However, in some instances, the Project Team and IDNR representatives were required to use their expert judgments to fill some of the data gaps to effectively complete the analysis.

6.2 Methodology

Comparisons of the two periods were influenced in part by two factors. First, the U.S. changed its industrial accounting system from the Standard Industrial Classification (SIC) system to the North American Industrial Classification System (NAICS) format. This means that the scope of all inter-industrial transactions in our modeling system has changed. There is more precision in some parts, especially in industries that have emerged in the past 20 years, and less precision in other parts, like agriculture for example.

A second change concerns the compilation of the relevant "total" multiplier. A multiplier is a measure that represents the value of a change in the industry being analyzed. For example, a jobs multiplier of 1.25 means that for every 100 jobs directly created in the recycling industry, 25 additional jobs are created in supporting industries. Likewise, an income multiplier of $1.50 means that for every $1.00 of income created directly though the recycling industry, an additional $.50 of income is created in supporting industries.

For the 2001 Study data, we used a multiplier from our modeling system called a Type II multiplier. In the newer, updated modeling system, the multiplier is referred to as a social account matrix, or SAM multiplier. The SAM multiplier is preferred within the economic modeling industry because it includes the contributions of households as industries and exchangers of production goods and services when calculating

economic impacts. Both multipliers, though relevant for their time period, are labeled as total multipliers.

For our comparison, only the multipliers for jobs are compared. The output multiplier varies strongly from year to year, depending on the overall prices of inputs or the prices received for the commodity under study. This may have little effect on overall labor incomes and jobs. The 2001 Study isolated total income, which was the combination of labor earnings and return on investment. In this Study, we isolated only labor income because it provides a better reflection of the kind of incomes that are made by workers and by sole proprietors which is likely to remain in and be re-spent in the local economy. Consequently, the value added multipliers are not comparable.

Overall, comparing multipliers over time can be problematic. Industries may continuously introduce technology that reduces their direct demand for labor. Depending on the kind of inputs the industry will require and the overall expected pay received by employees, over a reasonable period of time job multipliers might increase or decrease markedly. Still, for the study purposes we have compared the jobs multipliers as they tend to have relevance for policy makers.

6.3 Study Comparison

At the outset, there are two economic factors that are different in the current Study than in the 2001 Study. They include the following:

- Prices paid for most commodities have changed; and
- The modeling system and its underlying foundation data have been modified and improved.

Table 6-1 shows the summaries of processed commodities and receipts and displays the major changes as related to the two factors listed above. There are some substantial differences in the amounts of commodities collected by material category, the amounts received per ton, and the overall gross output of Iowa's recycling processing industry. The data in this table are not adjusted for inflationary changes, but during the 1999 to 2005 period, consumer prices rose by 17 percent.

Table 6-1
Comparison of the 2001 Study and 2007 Study Estimated Recyclable Materials Processed and Receipts[1,2]

Material Types	2001 Study (1999 data)		2007 Study (2005 data)[3]				
	All Suppliers (Tons)	Expected Gross Receipts	All Suppliers (Tons)	Expected Gross Receipts	Pct. Change in Tons	Pct. Change in Receipts	Pct. Change $ Per Ton
All Paper	341,691	27,694,753	581,628	36,987,435	70%	34%	-22%
OCC	163,865	9,720,018	156,891	11,296,117	-4%	16%	21%
All Other Paper	177,826	17,974,735	424,737	25,691,318	139%	43%	-40%
Plastics	29,724	3,665,062	48,916	17,928,088	65%	389%	197%
Glass	47,409	1,386,288	63,499	1,125,407	34%	-19%	-39%
All Metals	608,627	71,565,587	239,353	119,531,111	-61%	67%	325%
Alum Cans	7,058	6,838,794	22,010	25,531,670	212%	273%	20%
All Other Metal	601,569	64,726,793	217,343	93,999,441	-64%	45%	302%
Wood Wastes	103,194	8,977,906	193,183	5,022,769	87%	-44%	-70%
Total Quantity	1,130,646	$113,289,596	1,126,579	$180,594,810	0%	59%	60%

[1] All data is for calendar years 1999 and 2005.
[2] Totals may not sum due to rounding.
[3] Source: Table 4-2 of this report.

One noticeable difference is in the estimate of the amount of processed commodities. The amount processed in 2005 is just slightly less than estimated in 1999. Only one material category had a noticeable decrease in tons since the last study and that was the metals, excluding aluminum cans. This could be attributed to the difference in surveys returned for this Study compared to the 2001 Study. (The survey totals, by commodity, were assumed representative of the distribution of processing activities in Iowa and used as a basis to calculate statewide totals.) Not all of the metals recycling businesses that responded to the 2001 Study survey, responded to the current Study survey.

Receipts, however, are much higher. On a gross, before inflation basis, they were 59 percent higher, and on a weighted-average basis per commodity ton they were 60 percent higher. Paper processing grew by 70 percent, plastics by 65 percent, but all metals were 61 percent lower. Aluminum processing gained more than twice as much tonnage, and wood wastes an estimated 87 percent more. Overall receipts to paper processors increased even though lower prices per ton were received, while plastics receipts appreciated sharply on both total receipts and on a price per ton basis. The prices received for metals processing were high, gaining 67 percent in total, led strongly by gains in the prices received for all other non-ferrous metals.

Next we compared the estimated total economic values of the processors. The direct commodity values in Table 6-2 align with the expected gross receipts that were just presented in Table 6-1. Table 6-2 below provides the direct values, the total values considering all multiplied-through considerations, and the total multiplier value for jobs.

Table 6-2
Comparison of the 2001 Study and 2007 Study Estimated Processor Economic Values

	2001 Study (1999 Processors)			2007 Study (2005 Processors)		
	Direct	Total	Multiplier	Direct	Total	Multiplier
OCC						
Industrial Output($)	9,720,018	16,246,095		11,296,117	13,956,398	
Value Added($)	4,211,020	7,949,224		7,746,271	11,490,011	
Jobs	163	254	1.55	181	315	1.74
All Other Paper						
Industrial Output($)	17,974,735	29,694,089		25,691,318	30,912,567	
Value Added($)	6,637,412	13,330,311		18,651,373	26,691,999	
Jobs	206	367	1.78	478	784	1.64
Plastics						
Industrial Output($)	3,665,062	5,514,626		17,928,088	26,495,953	
Value Added($)	866,208	1,912,058		5,092,339	8,045,388	
Jobs	34	59	1.73	41	105	2.53
Glass						
Industrial Output($)[1]	1,386,288	2,566,399		2,305,071	3,654,094	
Value Added($)	1,088,855	1,778,998		1,905,071	3,033,548	
Jobs	40	57	1.42	77	129	1.69
Aluminum						
Industrial Output($)	6,838,794	9,781,220		25,531,670	36,804,220	
Value Added($)	1,030,635	2,673,364		6,702,254	9,699,070	
Jobs	42	81	1.91	27	63	2.39
All Other Metal						
Industrial Output($)	64,726,793	102,115,423		93,999,441	138,265,365	
Value Added($)	18,875,302	40,113,389		28,802,350	46,662,235	
Jobs	665	1,175	1.77	228	565	2.48
Wood						
Industrial Output($)	8,977,906	14,359,019		5,022,769	6,068,184	
Value Added($)	2,658,061	5,702,088		6,074,846	9,221,088	
Jobs	119	192	1.61	202	334	1.65
All Commodity Processors[2]						
Industrial Output($)[1]	113,289,596	180,276,872		181,774,474	256,156,781	
Value Added($)	35,367,494	73,459,432		74,974,504	114,843,339	
Jobs	1,271	2,185	1.72	1,234	2,295	1.86

[1] The 2005 industrial output for glass does not match the gross receipts in Table 6-1 as all of the other values do. This sector, owing to low prices, appears to not cover its costs without some subsidies. This value represents the total estimated costs of production (or processing), not its receipts. This effects the 2005 All Commodity Processors' direct output total as well.
[2] Totals may not sum due to rounding.

This comparison to the 2001 Study, considers paper, plastics, glass, metals and wood processing only. The estimated total industrial output economic values increased to $256.2 million from $180.3 million in 1999. Value added total economic effects also appreciated from $73.5 million to an estimated $114.8 million. The estimated direct jobs declined slightly to 1,234 from 1,271, and the total jobs estimated to be supported by recyclable materials processing increased from 2,185 to 2,295.

The total job impact is greater because of induced economic activity. The generally higher prices paid for recyclable materials commodities in 2005 translates into higher earnings for workers and for owner/operators of processing operations. They in turn re-spend at greater levels in the state economy.

Old corrugated containers and wood processing reflected strong declines in total output effects, although the overall total job impact changes were up slightly for OCC processing. Wood processing was estimated to require more labor owing to a sharp increase in tonnage processed. Plastics reflected strong increases in value added, output, and in the total number of jobs.

The all other metals processing component saw total output impacts increase from $102.1 million in 1999 to $138.3 million in 2005, but the estimated job requirements declined sharply. Aluminum reflected gains in total output and value added, but owing to the allocation of all processing jobs relative to tonnage processed, declined in the total job effects.

6.4 Fiscal Impact Comparisons

The fiscal impact comparisons are presented below. Fiscal impact comparisons over time are influenced by overall governmental behavior, tax policies, and other broader economic and social factors. Much of the 1990s represented an era of expanded state and federal government activities. Towards the end of that period, state governments (Iowa among them), reduced their personal and corporate income tax rates and shifted more of government revenue generation into sales and use taxes. Local governments in Iowa also shifted their revenue emphases away from property taxes to local option sales taxes and to user charges and other service fees. Accordingly, the governmental revenue of Iowa state and local governments have changed.

This assessment uses a different modeling approach that is geared towards isolating own-source revenues (taxes, charges, and other miscellaneous sources) and does not estimate inter-governmental transfers. In order to align the comparisons over the two time periods on a standards basis, the accompanying tables compare tax collection changes for local and state governments over the respective relevant periods.

In Tables 6-3 and 6-4, we compare local and state government tax collections for the recycling commodity processors and the end-users, as these two groupings can be standardized over the two study periods. Again, the data are not adjusted for inflation, but consumer prices increased by 17 percent over the measurement period.

Table 6-3 compares the fiscal impacts for recyclable materials processing and excludes organic waste, construction and demolition debris, used tires, and electronics

to keep the two studies' commodity groupings the same[1]. Estimated local government tax collections declined by 7 percent although other taxes, primarily local option sales tax receipts, are estimated to have increased by 54 percent. Total state government tax receipts are estimated to have increased 26 percent. Personal income taxes declined, but sales and gross receipts taxes increased by 69 percent and all other taxes by 68 percent. Combined, we estimated that the local and state taxes generated by the recycling commodity economic activity increased by 10 percent.

Table 6-3
Recyclable Materials Processors Estimated Fiscal Impact Comparisons, 1999 and 2005

Selected Local Government Receipts	1999	2005	Percentage Change
Total Local Taxes	$2,578,642	$2,403,190	-7%
Property Taxes	2,320,575	2,006,956	-14%
Other Taxes	258,067	396,234	54%
Total State Taxes	2,772,005	3,494,953	26%
Personal Income Tax	1,388,343	1,369,937	-1%
Sales and Gross Receipts Taxes	945,014	1,596,838	69%
Corporation Taxes	191,187	113,327	-41%
Other Taxes	247,461	414,851	68%
Combined State and Local Taxes	$5,350,647	$5,898,143	10%

Table 6-4 summarizes the fiscal impacts of end-users. These values are quite large as Iowa's end-users represent a sizeable amount of the state's manufacturing capacity. The total incomes that are estimated from all end-use economic impacts are expected to support $48.85 million in local government taxes. This represents a 51 percent increase from the estimate made in 1999. Expected tax receipts to state government would be $71.04 million, up by 18 percent over the earlier period. Again this growth is driven by strong shifts into sales and gross receipts taxes and all other taxes. Overall, we estimated the amount of combined total state and local tax receipts generated increased by 29 percent between 1999 and 2005.

[1] The 2005 numbers in Tables 5-1 and 5-2 of the Fiscal Impacts Analysis of this Study are different than those shown in Tables 6-3 and 6-4 of the Comparison section because in Section 5, the fiscal impacts included organics, C&D, used tires and electronics.

Table 6-4
End-Users Estimated Fiscal Impact Comparisons, 1999 and 2005

Selected Local Government Receipts	1999	2005	Percentage Change
Total Local Taxes	$32,334,815	$48,847,006	51%
Property Taxes	28,805,493	40,793,196	42%
Other Taxes	3,529,322	8,053,810	128%
Selected State Receipts			
Total State Taxes	60,428,213	71,038,070	18%
Personal Income Tax	30,265,124	27,845,199	-8%
Sales and Gross Receipts Taxes	20,600,796	32,457,166	58%
Corporation Taxes	4,167,777	2,303,469	-45%
Other Taxes	5,394,516	8,432,236	56%
Combined State and Local Taxes	$92,763,028	$119,885,076	29%

6.5 Findings

This is the third study of this kind in the last decade. The approach to this analysis is unique because it assigns industrial production values to the different commodities that are processed even though many of those commodities are collected, sorted, and processed by some firms that specialize in one material (such as metals) and others that process all types of recyclable materials. The impact analyses focus on the commodity that is processed, not the individual industries.

Economic impact assessments are affected strongly by several factors over time. First, most industries have very predictable supply and demand relationships with very stable prices. In contrast, the recycling industry has relatively fluid supply and demand relationships and highly volatile prices. When we inject these industries into an accounting system using just one year's worth of data, we are not measuring the historical characteristics of the industry; rather, we are measuring what is discerned during a "snapshot" in time. We recommend consideration of on-going annual surveys to compile and develop a normalized set of data to account for strong variations in price, supply, demand, and other factors that influence this industry. The above analysis could then be undertaken to reflect the historical economic impacts of the Iowa recycling industry.

Second, the measurements in this report represent simulations. It must be noted that in all three of these studies, we have created sets of recycling commodity industries and inserted them into the Iowa industrial structure. Those industries all have very similar characteristics, but their input and labor needs are influenced by the volume of the commodity processed and the value of that commodity in the current market. Accordingly, our model allocates labor and labor income in relation to both the

quantity of the commodity processed and the value of that commodity. As those values change over time, so too will the allocation of labor and the expected returns to labor for the commodities that are processed. If a commodity appreciates in total weight and in value, then the modeling process puts more labor and labor income in that commodity. As the overall pool of workers and labor income is fixed at any point in time, that results in a reduction in the amount of expected labor to be allocated to other commodities. Changes in the overall estimated economic impacts are therefore a function of both the modeling system and the manner in which labor and labor income are allocated to the commodities.

Overall, it is most appropriate to look at the estimates of total tons processed, the total value of the commodity sales, and the total jobs as the best indicator of this sector's performance over the years. Using those benchmarks, the industry has increased its output strongly, value added has grown, and the total number of jobs associated with the recycling industry has remained relatively stable in Iowa.

In reviewing the comparison results in Table 6-2, the largest overall changes in total industrial output occurred in plastics, aluminum, and wood, as described below:

- Plastics processing suggests a total output impacts increase from $5.5 million to $26.5 million. This is attributed to a 65% increase in tons processed, and large increases in price per ton.
- The total industrial output for aluminum also increased dramatically from $9.8 million to $36.8 million. This can be attributed to increases in tonnage and price per pound from 1999 to 2005.
- The total industrial output for wood declined dramatically from $14.4 million to $6.1 million, most likely due to a 70 percent decrease in price per ton, although tonnage increased 87 percent.

The largest changes relative to jobs occurred in the following sectors: all other paper, plastics, all other metal, and wood. The number of jobs in the all other paper processing sector increased from 367 to 784. The number of total jobs created for plastics processing increased from 59 to 105. The all other metals sector saw the largest decrease in number of jobs, from 1,175 to 565. As for wood, the total jobs created increased from 192 to 334. Overall, the total number of jobs in the recyclable materials processing sector increased slightly from 1999 to 2005.

In reviewing the fiscal impacts comparisons, the recyclable materials processing industry had an estimated 10 percent increase in revenues from 1999 to 2005 and end-use manufacturing increased an estimated 29 percent, based on combined state and local tax revenues.

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