



Labovitz School OF BUSINESS AND ECONOMICS

Bureau of Business and Economic Research

Research Report

Economic Impacts of PolyMet's NorthMet Project and other Industrial Projects of Minnesota's East Range Communities

December 2005

for
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MINING CORP.

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Executive Summary

The objective of this study is to assess the cumulative employment and economic impacts of PolyMet Mining Inc's (PolyMet's) NorthMet Project along with the implementation of several other major industrial projects in Minnesota's St Louis County with a focus on East Range communities – both short term through construction and long term with employment growth for the region. The results of this study will be incorporated into the required Environmental Impact Statement (EIS) for PolyMet.

The University of Minnesota Duluth Labovitz School of Business and Economics' Bureau of Business and Economic Research (BBER) was asked to create tables reporting all available economic data from approximately 1980 to the present for the County of St. Louis, Minnesota and the following communities of the East Range in St. Louis County: Aurora, Babbitt, Biwabik, Hoyt Lakes, Soudan, and Tower. Data for population, employment by major industry, economic activity by major industry sector are reported. BBER was also asked to estimate economic impacts from the proposed projects on St. Louis County, including cumulative impacts for the following proposed projects: proposed NorthMet; proposed Erie Nugget Project (Mesabi Nugget, LLC); proposed NOvA Off-Axis Detector; proposed expansions of six taconite plants; and shutdown of LTV Steel Mining Company (LTVSMC).

Historical trends: The employment trend by industry sector (Figure 5) shows the decline of mining since 1980 and the ascent of the services sector. The recent data for industry sector employment show that

between 2000 and 2004, for instance, healthcare, retail trade, and tourism related sectors are consistently the top employers in the County.

The County's employment history can also be reviewed in terms of net gain or loss (Table 3). From 2000 to 2004 the data show employment gains for sectors representing health care, finance, services, government, and tourism-related services, but a net loss in employment of almost 2,500 jobs. The three sectors losing the most jobs include manufacturing, recreation, and mining.

As a measure of economic activity, total wages for the County from 1980 to 2004, adjusted for inflation, (Figure 7) show a low in the 1980s of \$2.041 billion to the current high of \$3.130 billion. However, the sectors of the economy driving that increase have changed dramatically from mining and services to an economy dominated by services (and to a lesser degree trade).

Economic impacts: This study applies an economic multiplier analysis and input/output model that was created in Minnesota by the Minnesota IMPLAN Group, Inc., and is used by other state governments and the USDA Forest Service, among others. Multiplier effects for operations on these projects range from 1.45 to 3.16.

For the proposed NorthMet facility, IMPLAN input-output models were constructed to estimate measures of Employment, Output, and Value Added impacts. Results from the NorthMet IMPLAN models for these measures are reported in terms of direct, indirect, induced, and total impacts.

Cumulative impacts are assessed by combining baseline economic activity, year by year projections of average annual employment, and estimated year by year construction cost for the proposed projects.

NorthMet: With the completion of the construction phase for NorthMet, it is estimated that the project will have generated \$65.5 million in spending in the County by directly expending approximately \$40.2 million on construction. During the year of construction, NorthMet will also have created over 752 full-time, part-time, and temporary jobs by directly employing nearly 451 people. (Table 10) When operations for the NorthMet project reach “typical year” capacity (2009), it is estimated to generate \$242 million in spending in the County by directly

expending approximately \$167 million on operations. During a typical year of operations, NorthMet will create 1,058 full-time, part-time, and temporary jobs by directly employing 472 people. (Table 14)

Yearly impacts, including other proposed projects: The impacts of NorthMet, three additional projects, and six expansions of mining operations were modeled. These impacts on total County economic output, including the NorthMet impacts, considered as year-by-year impacts (in 2004 dollars) are shown in Table 1.

The impact analysis includes tax impacts as well as shutdown impacts from LTVSMC (loss in County output of \$501,255,048) and NorthMet. Shutdown impacts from other projects are not included because their shutdown dates are not known.

**Table 1. St. Louis County Cumulative Impacts
Total Change for NorthMet and for All Projects in Output (2004 Dollars)**

<i>Total Change in County Output due to NorthMet</i>		<i>Total Change in County Output due to All Projects</i>	
2006	\$65,517,852	2006	\$106,704,616
2007	\$161,244,048	2007	\$218,866,893
2008	\$242,458,946	2008	\$429,606,055
2009	\$242,458,946	2009	\$488,978,298
2010	\$242,458,946	2010	\$488,978,298
2011	\$242,458,946	2011	\$479,943,542

1) Project Description and Purpose

The objective of this study is to assess the cumulative employment and economic impacts of PolyMet's NorthMet Project along with the implementation of several other major industrial projects on East Range communities – both short term through construction and long term with employment growth for the region. The results of this study will be incorporated into the required Environmental Impact Statement (EIS) for PolyMet.

Deliverables

Deliverables from the UMD Labovitz School Bureau of Business and Economic Research include the following:

1) *Background historical information:*

BBER will create tables reporting all data from approximately 1980 to the present for the County of St. Louis, Minnesota and the following communities of the East Range in St. Louis County: Aurora, Babbitt, Biwabik, Hoyt Lakes, Soudan, and Tower. Data for population, employment by major industry, and economic activity by major industry sector will be reported. Selected summary graphs and comparisons will be provided. Note: data is reported where available. Explanations of availability limitations where encountered are provided. Note also: It was assumed that it would be very difficult to find even the employment information at anything deeper than a county level. Other measures of economic activity were not likely to be available. Output would be the measure of interest where it could be found available.

2) *Impact analyses: The impact of NorthMet on St. Louis County*

For the proposed NorthMet facility, IMPLAN input-output models were constructed to estimate measures of Employment, Output, and Value Added impacts. Results from the NorthMet IMPLAN models for these measures are reported in terms of direct, indirect, induced, and total impacts. Models for the NorthMet project were constructed for a typical year in four discrete time periods including pre-installation economic base, construction period, operations period, and closure period. IMPLAN models were also constructed to assess impacts from the NorthMet facility to State, Local and Federal taxes. All prices correspond with the most recent data available (IMPLAN data for 2002). Input data about the proposed project for modeling were received by BBER before modeling could start, including average annual employment (year by year), average output (in dollars), and estimated construction cost (year by year). Some construction details to determine what is likely to be purchased locally were also requested. Impact results are reported in table format. A discussion of project methodology is provided. A brief explanatory narrative is provided for these tables.

3) *Cumulative impacts of NorthMet and other proposed projects:*

Cumulative impacts are estimated for the following proposed projects:

Proposed NorthMet; Proposed Erie Nugget Project (Mesabi Nugget, LLC; Proposed Cliffs Erie Railroad Pellet Transfer project (Cliffs Erie, LLC)[see note in report detail]; Proposed NOvA Off-Axis Detector (University of Minnesota); Proposed expansions of taconite plants; Shutdown of LTVSMC. BBER constructed a sequence of models that take into account each

of the projects. Cumulative impacts are assessed by combining baseline economic activity, year by year projections of average annual employment, and estimated year by year construction cost for the proposed projects. Impact results are reported in table format. A discussion of project methodology is provided. A brief explanatory narrative is provided for these tables.

4) *Presentation of results:*

A final report will be presented in bound copies, and also in PDF digital format.

The following event timeline from construction and operations start-up dates was created:

Event Timeline

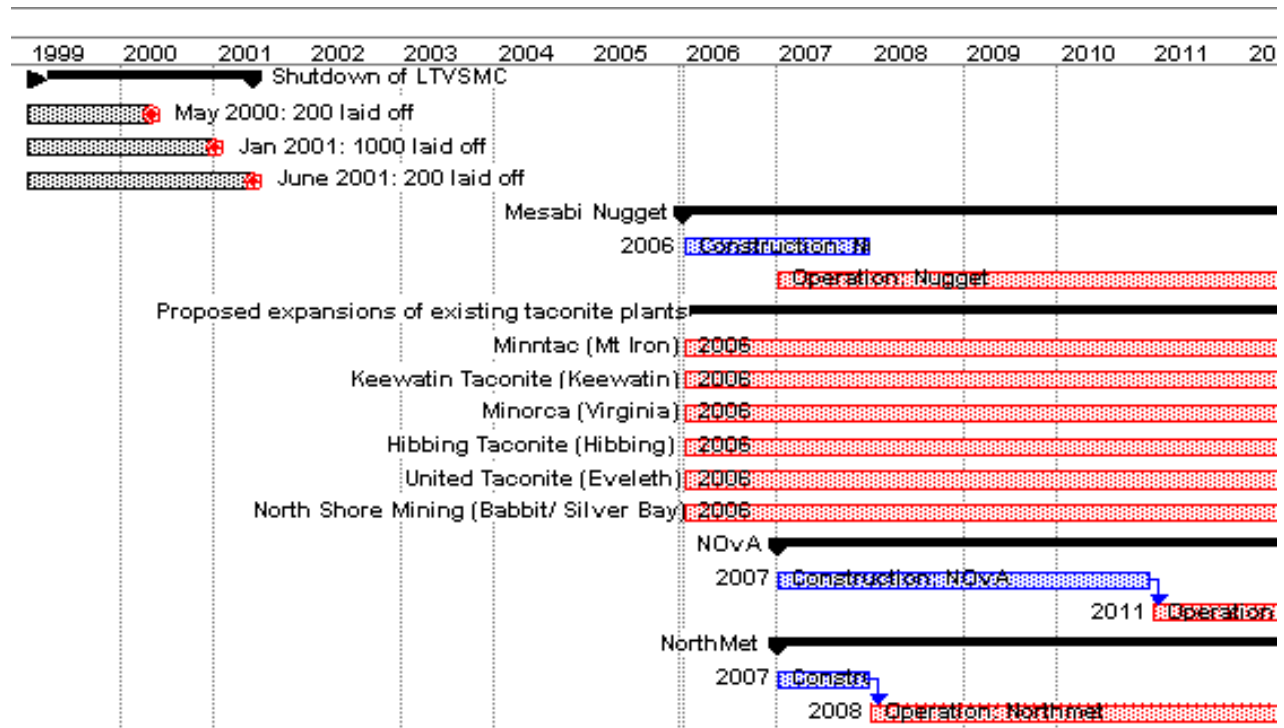


Figure 1. Timeline of construction and operations for proposed projects.
 Source: Project managers and developers associated with various projects, Short Eliot Hendrickson, PolyMet, BBER.

Study Area

The study area for historical data included St. Louis County and selected communities on the East Range, including: including Aurora, Babbitt, Biwabik, Hoyt Lakes, Soudan and Tower.

The study area for economic impact models was St. Louis County, Minnesota.

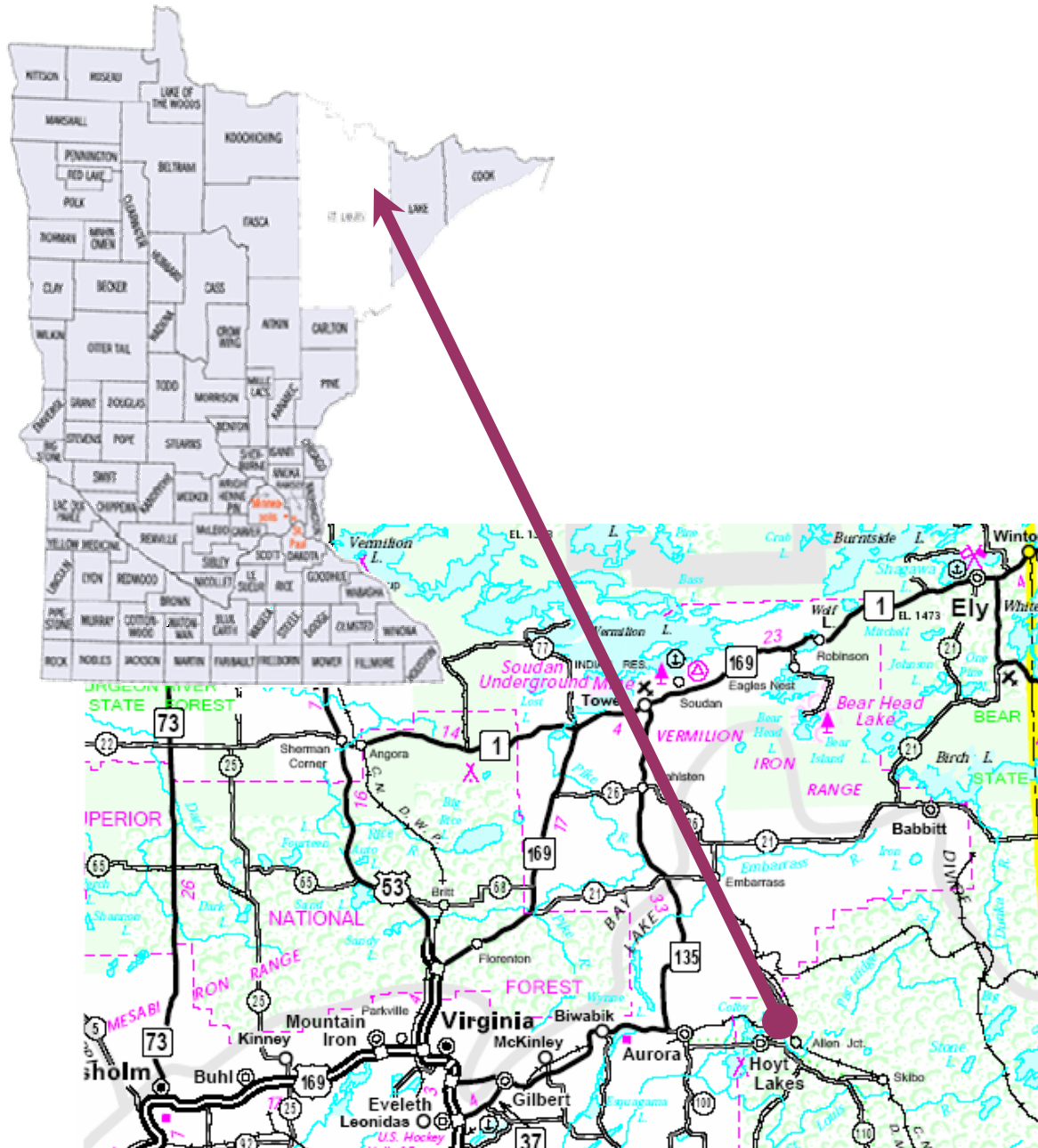


Figure 2. St. Louis County, Minnesota. *Source: census.gov.*

Figure 3. Detail of St. Louis County, MN, including Aurora, Babbitt, Biwabik, Hoyt Lakes, Soudan and Tower. *Source: www.dot.state.mn.us.*

2) Impact Procedures and Input Assumptions

IMPLAN Models

Data

Definitions

Inputs provided for modeling the impact

IMPLAN Models

There are two components to the IMPLAN system, the software and databases. The databases provide all information to create regional IMPLAN models. The software performs the calculations and provides an interface for the user to make final demand changes.

Comprehensive and detailed data coverage of the IMPLAN study areas by state, county or zip code, and the ability to incorporate user-supplied data at each stage of the model building process, provides a high degree of flexibility both in terms of geographic coverage and model formulation, in this case definition of the East Range study area, and the definition of specific models for baseline, construction, operations, and tax impact, with adjusted production functions to reflect the proposed development projects. Using the IMPLAN software and data, BBER identified various projects' expenditures in terms of the sectoring scheme for the model, in producer prices, in historical dollars based on the year of the model, and applied those dollars spent within the study area definition given for the impact analysis.

Data

IMPLAN data files use federal government data sources including:

- US Bureau of Economic Analysis Benchmark I/O Accounts of the US
- US Bureau of Economic Analysis Output Estimates
- US Bureau of Economic Analysis REIS Program
- US Bureau of Labor Statistics County Employment and Wages (CEW) Program
- US Bureau of Labor Statistics Consumer Expenditure Survey
- US Census Bureau County Business Patterns
- US Census Bureau Decennial Census and Population Surveys
- US Census Bureau Economic Censuses and Surveys
- US Department of Agriculture Crop and Livestock Statistics

IMPLAN data files consist of the following components: employment, industry output, value added, institutional demands, national structural matrices and inter-institutional transfers.

Impacts for models in these analyses use the most recent IMPLAN data available which is for the year 2002. The impact is reported in 2004 dollars (given the data year of inputs supplied to BBER) and calculated with the built-in deflators of the modeling software.

Economic impacts are made up of direct, indirect, and induced impacts. The following cautions are suggested assumptions for accepting the impact model:

- IMPLAN input-output is a production based model
- Local or export based purchases that represent transfers from other potential local purchases are not counted.
- The numbers (from U.S. Department of Commerce secondary data) treat both full and part time individuals as being employed.
- Assumptions need to be made concerning the nature of the local economy before impacts can be interpreted.
- The IMPLAN model was constructed for the year 2002 (most recent data available). 2004 dollars are estimated by the model.

Definitions used in this report:

Measures

- **Value Added** is a measure of the impacting industry's contribution to the local community; it includes wages, rents, interest and profits.
- **Employment** estimates are in terms of jobs, not in terms of full-time equivalent employees. These may be temporary, part time or short term jobs.
- **Gross Output** represents the value of local production required to sustain activities.

Effects

- **Direct** effects are initial new spending in the study area resulting from the project.
- **Indirect** effects are the additional inter-industry spending from the direct impact.
- **Induced** effects are the impact of additional household expenditure resulting from the direct and indirect impact.

Inputs provided for modeling the impacts

Personnel from each project provided the BBER with estimated expenditures concerning specific processes for the proposed plants, including estimated employment for the construction and operation phases, output estimations, as well as other miscellaneous inputs.

For the purposes of this analysis, the NorthMet project is well documented with background data and projections. Other projects in this study are less well supported, or at a more preliminary stage of development and could provide less information for driving the economic models used for these estimates.

Production functions were reviewed and in some cases new sectors were introduced which address changes in the gross absorption tables for the industrial sectors of the input-output modeling to reflect estimates for the projects' construction and operations demand changes.

Benchmark (economic base) and impact (additional plant) models were constructed for St. Louis County.

Note on Employment

IMPLAN measures of direct, indirect, and induced employment follow from assumptions in the model concerning the number of jobs created to deliver production to the economy. Individual plant's efficiencies and individual plant's allocation of permanent, temporary, and part-time employment can alter the model's job estimation.

Note on Inflation

The most recent IMPLAN data available for modeling these impacts are for industry sectors in the year 2002. To more accurately represent costs and impacts, input data was deflated from year 2004 to year 2002 dollars where necessary; these values were used to estimate impacts. These 2002 impacts were then re-inflated to show 2004 dollars in the tables of this report, using the industry specific deflators from the IMPLAN model.

3) Historical Data

The geographic scope for this cumulative employment and economic impact analysis is proposed to be St. Louis County, MN given the location of principal proposed projects and the anticipated geographical extent of their effects.

BBER has created tables reporting all available data for the County of St. Louis, Minnesota and the designated communities of the East Range in St. Louis County: Aurora, Babbitt, Biwabik, Hoyt Lakes, Soudan, and Tower. Secondary sources provided data from as early as 1970 for some variables, to the current year 2004. Data for population, employment by major industry, and economic activity by major industry sector is reported, with selected data in summary graphs and comparisons.

Notes:

1. Data are reported here where available. Explanations of availability limitations where encountered are provided.
2. : As indicated in BBER's project proposal, the historical data reporting is undertaken with the assumption that it would be very difficult to find employment and economic activity information below the county level. The data reported below includes an explanation of BBER's analysis of county and minor civil division wage/salary data, offered as a measure of economic activity for the county and communities of the research project.
3. State of Minnesota data sources are constrained by law to include disclosure protection for firms dominating their local markets and geography. Also important to note: Industry sector reporting at the minor civil division level can be inconsistent regarding SIC code structure. And finally: Changes from SIC to NAICS coding in these datasets restructures the reporting of industry data for many industries. In some cases, BBER has attempted to provide solutions for these problems in order to present trend analyses over the range of requested years of data.

ST. LOUIS COUNTY

Population, Employment by Major Industry, and Economic Activity by Major Industry Sector

Population: Population data is available from the U.S. Census for St. Louis County, Minnesota for the decennial years and is estimated by the Census for intervening years. Applying trend analysis to the data for population in St. Louis County, with the trend line extending to the typical year of operations for the NorthMet project and beyond to the operational start-up of the NOvA project, shows declining population from a high in 1980 of 222,229, as follows:

Population Trend, St. Louis County, MN, 1970 to 2004

Source: U.S. Bureau of the Census, Population Estimates and Population Distribution Branches, CO-EST2003-01

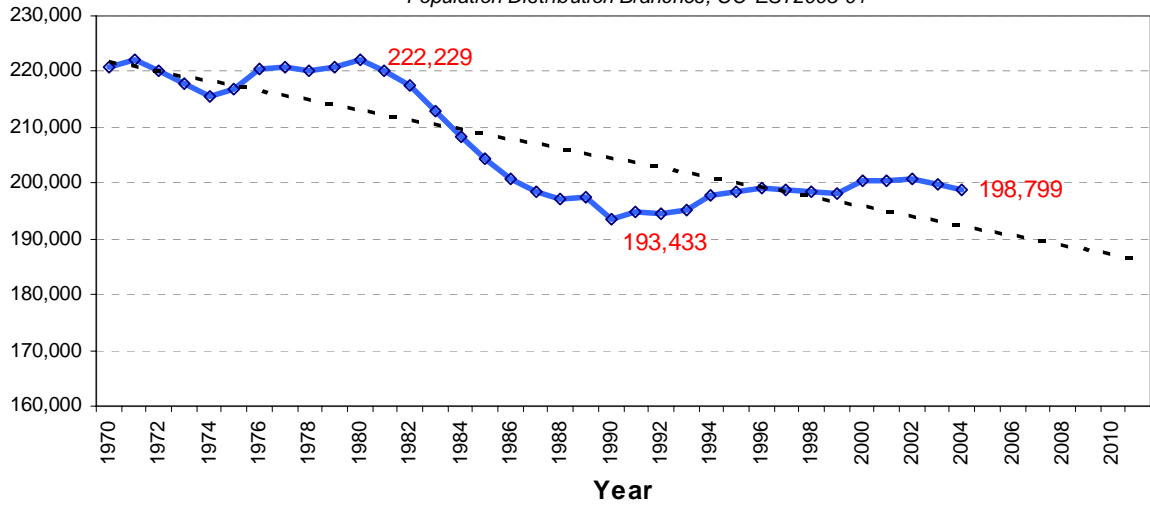


Figure 4. Population Trend, St. Louis County MN 1970 to 2004. Source: U.S. Census. See also data table for St. Louis County Population 1970 to 2004 in appendix(Table A-1).

Employment by Major Industry: Data for employment by major industry for St. Louis County, Minnesota is available from the Minnesota Department of Employment and Economic Development (MN DEED) for St. Louis County for all the years of the requested data (1980 to 2004). These data are reported here in the appendix to this report. Note that after 1999 the data ceases to be reported by Standard Industrial Classification codes (SIC) and that as of 2000 data appears reported by the new and different sectors of the North American Industrial Classification codes (NAICS).

Bridging schemes from the U.S. 1997 Economic Census and from MN DEED demonstrate the relationship between NAICS and SIC by showing data for the lowest common denominators between the two systems. BBER relied on a bridge scheme from the Minnesota Department of Employment and Economic Development to bridge and graph the following industrial trends:

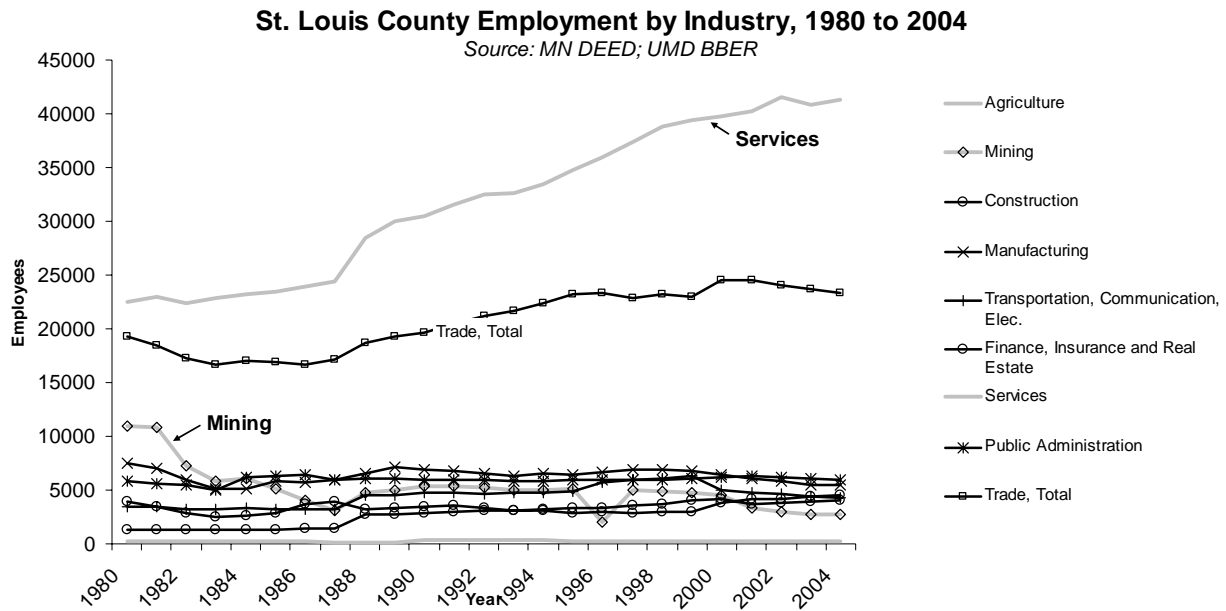


Figure 5. St. Louis County Employment by Industry, 1980 to 2004. Source: MN DEED, BBER. See also data tables for St. Louis County Employment by Industry, 1980 to 2004 in appendix.(Table A-2) Note Services sector increases and Mining sector decreases, as discussed in this study.

To report recent trends and changes in industry employment for the County, industrial sectors were ranked for employment for the NAICS data years, 2000 to 2004. Tables for these rankings are included in the appendix material. The most recent ranking shows the following major employers in descending order:

Table 2. St. Louis County, Employment by Major NAICS Industry 2004, Ranked

Source: MN DEED

Average Employment by Year

NAICS TITLE	2004
Total, All Industries	92,668
Health Care and Social Assistance	20,566
Retail Trade	12,183
Accommodation and Food Services	8,907
Educational Services	7,737
Public Administration	5,919
Manufacturing	5,504
Construction	3,926
Finance and Insurance	3,733
Transportation and Warehousing	3,313
Administrative and Waste Services	3,242
Other Services, Ex. Public Admin	3,191
Mining	2,752
Professional and Technical Services	2,585
Information	2,356
Wholesale Trade	2,072
Arts, Entertainment, and Recreation	983

Utilities	942
Real Estate and Rental and Leasing	912
Management of Companies and Entpr.	662
Agriculture, Forestry, Fishing & Hunting	249

Ranking employment by year (Table A-4) shows that for the period 2000 to 2004,

- **Health Care and Social Assistance** consistently ranks as the top employing sector, and the sector shows growth over 2000 to 2004
- **Retail Trade** consistently ranks as the second top employer, but falls slightly from 2000 to 2004
- **Accommodation and Food Services** consistently ranks as the third top employer
- **Educational Services** consistently ranks as the fourth top employer
- **Total all industries** falls by 2,489 from 2000 to 2004

However,

- The ranking of **Manufacturing** as an employer drops and is overtaken by **Public Administration** after 2001.
- **Transportation**, and then **Construction** overtakes **Mining**
- **Transportation** and then **Finance and Insurance** overtake **Construction**

The County's employment history can also be reviewed in terms of job net gain or loss over the recent NAICS data collection period, showing employment gains for activities such as health care, finance, services, government, and tourism-related services, and loses for activities such as mining, recreation, and manufacturing, as follows:

Table 3. St. Louis County Jobs Lost and Added by Industry Sector, 2000 to 2004

Source: MN DEED; UMD/LSBE BBER

NAICS TITLE	Jobs
Total, All Industries	-2,489
Health Care and Social Assistance	2,650
Finance and Insurance	693
Administrative and Waste Services	462
Public Administration	136
Accommodation and Food Services	126
Educational Services	2
Agriculture, Forestry, Fishing & Hunting	1
Real Estate and Rental and Leasing	-51
Utilities	-57
Other Services, Ex. Public Admin	-102
Professional and Technical Services	-191
Construction	-201
Management of Companies and Entpr.	-293
Information	-515
Transportation and Warehousing	-635
Wholesale Trade	-683
Retail Trade	-863
Manufacturing	-885
Arts, Entertainment, and Recreation	-1,268
Mining	-1,818

Economic Activity by Major Industry: Among the possible measures of economic activity for the County, BBER chose to use total wages reported by industrial sector as the most reliable and consistent data available. While use of total wages as a measure for economic activity may be the most reliable and consistent data available, it can be noted that for some sectors' (mining, construction, manufacturing) wages are only a fraction of the cost of goods produced and for others (public administration, finance/insurance/real estate) wages are most of the cost. This is reflected in the multiplier used to determine the number of spin off jobs. The wage and employment data shown below also has shortcomings for trend analysis. Over the years, the total industry wages are affected by changes in labor productivity and improving technologies. Capital intense industries, such as mining, have taken advantage of rising output per worker and innovative technologies. This has resulted in lower total labor cost or wages as a percent of total production costs. The services sector is labor intensive and will have high total wages.

Total wages is the only practical measure for this study, however, because of the factors discussed above, the impact on the overall economy of projects in the basic production industries (mining, logging, agriculture, manufacturing) are understated using this method. It is clear that basic industries provide the foundation of any economy.

The Minnesota Department of Employment and Economic Development reports the data, for the years 1980 to 2004, by SIC and after 1999 by NAICS codes for St. Louis County.

Note that as with employment data reported above, data for total wages converts to NAICS industrial sectors as of 1999. Also note the change from nine industrial SIC sectors as reported above for the County, compared to twenty sectors reported in the NAICS data.

For the purposes of trend analysis, it is desirable to adjust these data for inflation in order to suppress the growth from inflation and reveal the growth from economic activity. Therefore, BBER adjusted the above data for St. Louis County total wages by major industrial sector. The adjusted tables appear in the appendix material to this report. The following graphic represents industrial trends for the County, as follows:

**St. Louis County Economic Activity as Measured by Total Wages
for Major Industries 1980 to 2004 Adjusted for 2004 Dollars**

Source: Minnesota DEED, County Business Patterns, UMD/LSBE BBER

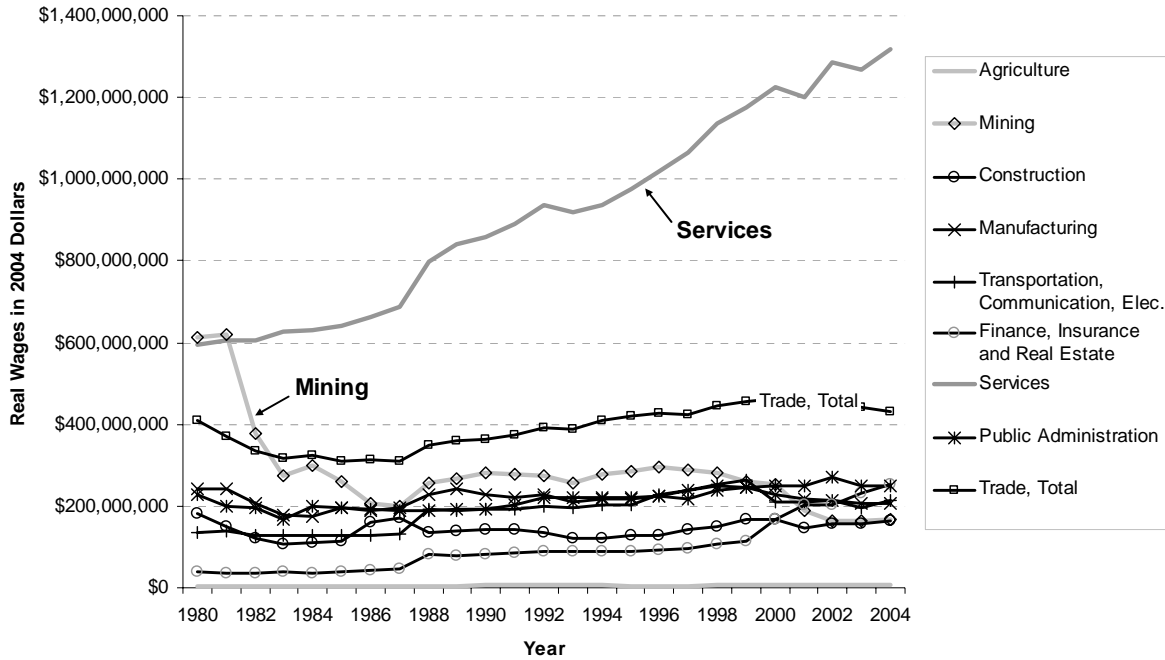


Figure 6. St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars. *Source: MN DEED, County Business Patterns, BBER. See also data tables for St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars in appendix (Table A-5).*

Note: To combine SIC and NAICS sectors the following sectors have been configured:

- Transportation, Communication, Elec. includes NAICS transportation and Utilities
- Finance, Insurance and Real Estate includes Finance and Real Estate
- Services includes Information, Professional and Technical, Administrative Services with Waste Services, Education, Human C and Social Assistance, Arts and Entertainment

Trade, Total includes Wholesale, retail, accommodation and food

Economic activity for specific sectors can be compared to a general trend line for economic activity overall in the County, including all sectors over time, as follows, showing that from the low point in the 1980s to the highest point to date in 2004, the total for all industries wages grew by more than a billion dollars:

St. Louis County Economic Activity as Measured by Total Wages 1980 to 2004, Adjusted for 2004 Dollars

Source: Minnesota DEED, County Business Patterns, UMD/LSBE BBER

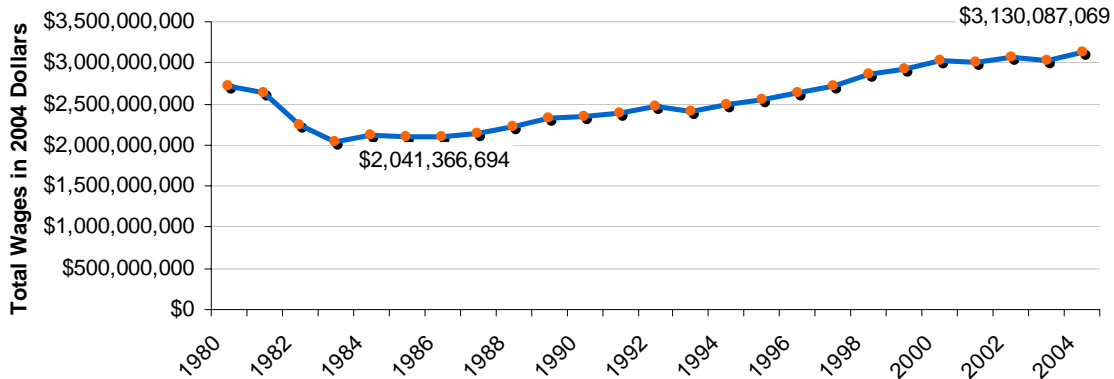


Figure 7. St. Louis County Economic Activity as Measured by Total Wages 1980 to 2004 Adjusted for 2004 Dollars.
Source: MN DEED, County Business patterns, BBER. See also data tables for St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars in appendix (Table A-5).

COMMUNITIES IN ST. LOUIS COUNTY

Population, Employment and Economic Activity by Major Industry Sector

Population: Population data is available from the U.S. Census for minor civil divisions in St. Louis County, Minnesota for the decennial years, and is estimated by the Census for intervening years for most minor civil divisions, including the towns of Aurora, Babbitt, Biwabik, Hoyt Lakes, and Tower, and is included in the appendix to this report (Table A-6). Note, however, that data for the smallest community, Soudan, was not found to be available except for the decennial census years of 1990 and 2000.

The trend of these data (Figure 8) shows consistent declining populations for these communities with the exception of Aurora, which increased against the general trend from 1970 to 1980, but then joins the decline in subsequent years. The largest community population, Hoyt Lakes, drops from a high of 3,634 in the first year of the dataset (1970) to a low of 1,961 in the most recent year (2004). As with the St. Louis County data, a trend line forecast of these data show further population decline for all the selected communities in this study.

**Population of Selected Cities in St. Louis County,
MN 1970 to 2004**

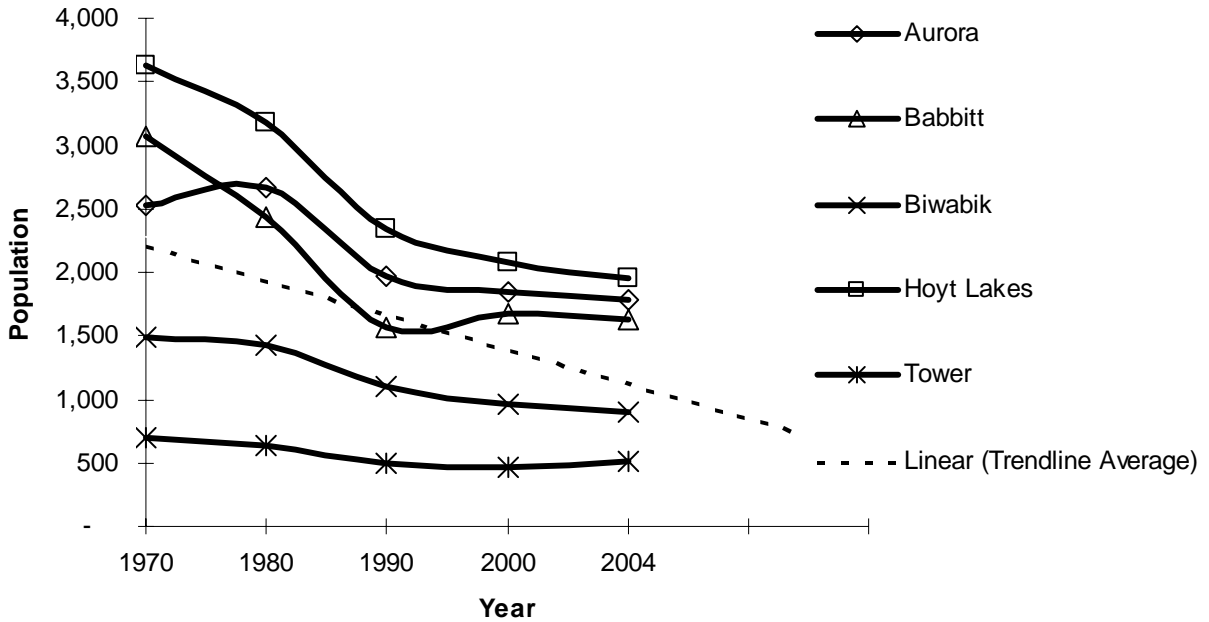


Figure 8. Population of Selected Cities in St. Louis County, MN 1970 to 2004. *Source: MN DEED, BBER*

Employment and Economic Activity by Major Industrial Sector: Data for the designated cities in the study area were unavailable to a significant degree until 1988. After 1988 and to 2004, data were subject to disclosure regulation and in some cases were therefore unavailable. Data is reported where available in the appendix to this report (Tables A-7, A-8 and A-9). In these tables of the appendix where data were unavailable table values report N/A. Note also that industry level employment and wage and detail data for Soudan was also found to be unavailable.

All projects under study in this report are mining projects except the NOvA underground laboratory. Mining data in particular are not disclosable from the State data at the city level aggregation. The UMD Bureau requested special data runs of MN DEED to aggregate these data for the cities' total. The State replied that even with a new aggregation scheme (such as selected cities) data could not be disclosed. MN DEED offered state-wide mining data as the only disclosable data for mining, as follows:

Table 4: Iron Ore Mining State-wide in Minnesota, SIC 1011, NAICS 212210

Source: MN DEED QCEW

Year	Average Estab	Avg Emp	Total Wages
1980	24	13746	\$337,775,877
1981	23	13487	\$381,217,136
1982	22	8710	\$238,418,558
1983	23	7007	\$177,000,127
1984	22	7403	\$205,372,591
1985	18	6181	\$180,260,406
1986	18	4596	\$136,595,789
1987	16	4178	\$132,663,563
1988	15	5268	\$170,132,308
1989	14	5700	\$196,392,968
1990	13	6139	\$223,903,662
1991	12	6238	\$237,979,653
1992	12	6086	\$238,290,436
1993	10	5779	\$228,141,692
1994	11	5657	\$243,138,075
1995	10	5891	\$268,492,797
1996	11	5930	\$290,913,004
1997	14	5960	\$293,038,957
1998	13	5832	\$291,679,786
1999	12	5639	\$276,927,344
2000	11	5494	\$280,247,404
2001	10	4162	\$218,270,356
2002	9	3733	\$193,232,723
2003	9	3450	\$201,318,983
2004	8	3497	\$213,404,693

Along with the disclosure problems for this data set, it should be noted that , for the purposes of trend line analysis these data findings demonstrated several structural problems:

- 1) Industrial coding for economic and employment activity present two sectoring schemes: the Standard Industrial Codes, used by the U.S. Department of Commerce and the State of Minnesota up to the point where the North American Industrial Codes become the industrial sectoring scheme of government data. Bridging this change in sectoring schemes requires using a bridge scheme whereby the time series data can be configured as continuous. BBER has used the MN DEED suggested bridge for these data.¹
- 2) Wage and employment data reported by the selected cities to the State of Minnesota appear to reveal several inconsistencies in format: SIC industry sectors are sometimes aggregated with other sectors, or not; and specific sectors may appear for some years and not others [As DEED says in a publication on wage and employment data “If you can’t find the employment and wage data that you want at this site, then we either don’t have it or can’t release it due to data disclosure laws!”²]

¹ See <http://www.deed.state.mn.us/lmi/publications/review/0901supp.htm>

² See <http://www.deed.state.mn.us/lmi/publications/trends/0104/back.htm>.

4) ECONOMIC IMPACTS

St. Louis County (Baseline)

Baseline conditions are based on the economic activity reported in the most recent tax year available in the County/East Range for IMPLAN data. Cumulative impacts will be assessed by combining the baseline economic activity and projections of average annual employment (year by year) and estimated construction cost (year by year) for the proposed NorthMet Project and each of the future projects (if they meet the criterion for “reasonably foreseeable”).

Benchmarks for determining the baseline of St. Louis County, MN to be used as baseline numbers for understanding the economic activity of the county include employment, value added and output measures for all sectors of the county economy (see appendix) as well as specific breakout data reporting activity in the sectors represented by the proposed projects, including:

- IMPLAN sector 41: Other new construction – BEA sector 230250, NAICS sector 23
- IMPLAN sector 21: Iron ore mining – BEA sector 212210, NAICS sector 21221
- IMPLAN sector 22: Copper, nickel, lead, and zinc mining
– BEA sector 212230, NAICS sector 21223
- IMPLAN sector 203: Iron and steel mills – BEA sector 331111, NAICS sector 331111
- IMPLAN sector 446: Scientific research and development services
– BEA sector 541700, NAICS sector 5417

St. Louis County Background

The notion of a multiplier rests upon the difference between the initial effect of a change in final demand and the total effects of that change. Total effects can be calculated either as direct and indirect effects, or as direct, indirect, and induced effects. Direct effects are production changes associated with the immediate effects or final demand changes. Indirect effects are production changes in backward-linked industries caused by the changing input needs of directly effected industries (for example, additional purchases to produce additional output). Induced effects are the changes in regional household spending patterns caused by changes in household income generated from the direct and indirect effects. Assumptions in the model for St. Louis County 2002 include:

Table 5. IMPLAN General Model Information: St. Louis County, MN 2002

Household	< 10K	10-15K	15-25K	25-35K	35-50K	50-75K	75-100K	100-150K	150K+	Total
Income	6,176	15,441	24,705	37,058	52,498	86,468	111,173	154,407	216,169	5,572,635,136
Households	10,367	7,860	14,307	13,260	16,788	19,199	8,371	4,327	1,787	96,265
TOTALS				Population	Area sq.mi.	Household Total			PI Total	
				199,887	6,226	96,265			5,572,635,136	

St. Louis County Benchmarks

Again, the IMPLAN model measures Gross Output (which represents the value of local production required to sustain activities), Value Added (which is a measure of the impacting industry's contribution to the local community; it includes wages, rents, interest and profits) and Employment (which is an estimate in terms of jobs, not in terms of full-time equivalent employees).

Table 6. Total Value Added, Employment and Output, 2002 St. Louis County Summary

St. Louis Benchmark *Source: IMPLAN 2002*

*in Millions

All Industries	Total Value Added*	Employment	Industry Output*
Totals	\$6,155.70	117815	\$11,063.88

Table 7. Output, Value Added, and Employment 2002 St. Louis County Detail

St. Louis Benchmark *Source: IMPLAN 2002*

*in Millions

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Totals	11063.88	117814.88	3867.49	329.60	1501.02	457.58	6155.70

St. Louis County NorthMet Project and Related Industrial Sectors

Iron and steel mills, as below, in the IMPLAN sectoring scheme represents NAICS sector 331111. This U.S. industry comprises establishments primarily engaged in one or more of the following: (1) direct reduction of iron ore; (2) manufacturing pig iron in molten or solid form; (3) converting pig iron into steel; (4) making steel; (5) making steel and manufacturing shapes (e.g., bar, plate, rod, sheet, strip, wire); and (6) making steel and forming tube and pipe.

Table 8. Total Value Added, Employment and Output, Selected Sectors, 2002 St. Louis County

St. Louis Benchmark *Source: IMPLAN 2002*

*in Millions

Industry	Total Value Added*	Employment	Industry Output*
Other new construction	\$19.91	472	\$40.75
Iron ore mining	\$252.56	3377	\$971.71
Copper, nickel, lead, and zinc mining	\$0.00	0	\$0.00
Iron and steel mills	\$5.49	66	\$29.26
Scientific research and development services	\$2.66	108	\$5.05

Comparisons

Economic base industries in St. Louis County, especially Mining, Utilities, Health Care and Social Assistance, Public Administration, Accommodation and Food Services, Retail Trade, Educational Services, Other Services, and Information are more concentrated in St. Louis County than in the State of Minnesota. An industry such as Mining, in 2004 is represented in the County more than fourteen times that of the State as a whole. This concentration is measured by a ratio known as a location quotient. The location quotient is defined as a calculated ratio between the local economy (St. Louis County) and the economy of some reference unit, for instance here the State of Minnesota.

Table 9. St. Louis County Industries Employment Compared to the State of Minnesota, 2004, Ranked

Source: MN DEED; UMD/LSBE BBER

	2004		Location Quotient
	MN	St. Louis Co.	
Total, All Industries	2,577,178	92,668	
Mining	5,182	2,780	14.9
Utilities	13,195	951	2.0
Health Care and Social Assistance	358,214	20,772	1.6
Public Administration	115,739	5,978	1.4
Accommodation and Food Services	203,091	8,996	1.2
Retail Trade	297,772	12,305	1.1
Educational Services	196,587	7,814	1.1
Other Services	85,026	3,223	1.1
Information	63,786	2,380	1.0
Transportation and Warehousing	98,921	3,346	0.9
Construction	132,521	3,965	0.8
Finance and Insurance	136,280	3,770	0.8
Administrative and Waste Services	120,537	3,274	0.8
Real Estate and Rental and Leasing	37,874	921	0.7
Professional and Technical Services	117,780	2,611	0.6
Arts, Entertainment, and Recreation	46,635	993	0.6
Wholesale Trade	127,476	2,093	0.5
Manufacturing	341,024	5,559	0.5
Agriculture, Forestry, Fishing & Hunting	16,380	251	0.4
Management of Companies and Enterprises	63,161	669	0.3

NorthMet Impact Findings

About the Project: The NorthMet Mine and Ore Processing Facilities Project (NorthMet) is proposed by PolyMet Mining Inc. (PolyMet) to extract copper, nickel, cobalt, and precious metals. Waste rock, lean ore, and deferred ore stockpiles from the mining operations are

proposed near the mine pit. Ore would be processed at a refurbished and modified taconite processing facility. The hydrometallurgical process of flotation and autoclave leach facilities would be used with refurbished crushing and grinding facilities to produce copper metal and precipitates of nickel, cobalt, palladium, platinum, and gold

IMPLAN sector 22: Copper, nickel, lead, and zinc mining
BEA sector 212230, NAICS sector 21223

The following analysis reports findings for a typical year in four discrete periods: baseline year, construction period, operating period and closure period. Findings will be reported as employment, output impact (dollars), value added impact (dollars) and tax impact (dollars).

NorthMet Construction

Table 10 shows the economic impact of the \$40 million spent in St Louis County during the construction phase of the project. The 451 direct jobs generates an additional 301 indirect and induced employment or a total of 752 jobs. The NorthMet construction has a total dollar output impact of over \$65 million. These impacts are temporary and end when the construction is completed.

Table 10. Economic Impact of NorthMet's Construction Expenditures on St. Louis County, MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$19,644,622	451	\$40,218,000
Indirect	6,706,341	124	10,950,002
Induced	8,949,800	177	14,349,849
Total*	\$35,300,763	752	\$65,517,852

*Note: totals are summed from IMPLAN and thus will not sum to total in rows.

An industry sector ranked breakdown of the employment impacts is highlighted below. As expected, the service sectors feel the greatest impacts from NorthMet construction. Retail and wholesale trade combined show a total employment impact of 77.3, while Professional – Scientific & Tech Services and Health & Social Services have a total job impact of 53.1 and 37.2 respectively.

Again, note the IMPLAN model reports these impacts in terms of Effects:

- **Direct** effects are initial new spending in the study area resulting from the project.
- **Indirect** effects are the additional inter-industry spending from the direct impact.
- **Induced** effects are the impact of additional household expenditure resulting from the direct and indirect impact.

Table 11. NorthMet Employment Impacts from Construction on St. Louis County, MN, Year 2007, by Industry Sector

<i>Source: IMPLAN</i>	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
Construction	451	1	1	453
Retail trade	0	22	43	65
Professional- Scientific & Tech Services	0	48	6	53
Health & Social Services	0	0	37	37
Accommodation & Food Services	0	3	26	29
Other Services	0	7	18	25
Administrative & Waste Services	0	12	5	17
Finance & Insurance	0	5	8	13
Wholesale Trade	0	7	5	12
Transportation & Warehousing	0	5	4	9
Real Estate & Rental	0	3	5	8
Manufacturing	0	6	2	8
Arts- Entertainment & Recreation	0	1	6	7
Information	0	2	3	5
Educational Services	0	0	5	5
Government	0	1	2	3
Management of Companies	0	1	1	2
Agriculture, Forestry, Fish & Hunting	0	0	1	1
Utilities	0	0	1	1
Mining	0	0	0	0
Totals	451	124	177	752

NorthMet Operations

The economic impacts of NorthMet operations for the start up Year 2008 are shown in 2004 dollars. The \$111 million direct output impact results in a total output impact of over \$161 million. This translates into a 1.45 output multiplier effect. The 2008 operations have a total employment impact of 529 jobs and a value added total impact of \$93 million for St. Louis County.

Note: BBER suggests that the selection of typical year of operations inputs to the IMPLAN model (2009) include values from PolyMet's range of projections for NorthMet Year 2009 to 2028: Best case labor at 472; Net revenue at \$167 million. Inputs from 2009 appear most closely drive the model in acceptable ways, reflecting production coefficients and output per worker expectations, as determined in the model.

Table 12. Economic Impact of NorthMet's Operational Expenditures on St. Louis County, MN, Year 2008 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$61,530,688	236	\$110,963,976
Indirect	15,407,140	116	23,727,197
Induced	16,560,659	177	26,552,877
Total*	\$93,498,483	529	\$161,244,048

*Note: totals are summed from IMPLAN and thus will not sum to total in rows.

The employment impact sector rankings reveal that after Mining, the second ranked sector was Professional- Scientific & Tech Services with 65.3 total employment impact. Accommodations & Food Services total employment of 31.8 ranked fourth.

Table 13. NorthMet Employment Impacts from Operation, on St. Louis County, MN, Year 2008, by Industry Sector

<i>Source: IMPLAN</i>	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
Mining	236	6	0	242
Professional- Scientific & Tech Services	0	60	6	65
Retail Trade	0	2	43	46
Health & social services	0	0	37	37
Accommodation & Food Services	0	6	26	32
Other Services	0	1	18	19
Wholesale Trade	0	6	5	12
Finance & Insurance	0	4	8	11
Transportation & Warehousing	0	7	4	11
Administrative & Waste Services	0	4	5	9
Manufacturing	0	5	2	8
Arts- Entertainment & Recreation	0	1	6	7
Real Estate & Rental	0	1	5	7
Management of Companies	0	6	1	6
Educational Services	0	0	5	5
Utilities	0	4	1	5
Information	0	1	3	4
Government	0	1	2	3
Construction	0	1	1	1
Agriculture, Forestry, Fish & Hunting	0	0	1	1
Totals	236	116	177	529

The Year 2009 was chosen as a “typical year” of operations. Adjusting for typical revenue and labor projections between 2006 and 2028, this typical year uses a value for average employment of 472, which generates a total of 1,058 jobs in St. Louis County. The NorthMet facility output

for the typical year, \$167 million, stimulates an additional \$75.6 in output and \$48 million in added value added for the County.

Table 14. Economic Impact of NorthMet's Operational Expenditures on St. Louis County, MN, Typical Year 2009 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$92,522,264	472	\$166,853,952
Indirect	23,167,360	233	35,678,037
Induced	24,901,879	353	39,926,946
Total*	\$140,591,500	1,058	\$242,458,946

*Note: totals are summed from IMPLAN and thus will not sum to total in rows.

Table 15. NorthMet Employment Impacts from Operation, on St. Louis County, MN, Typical Year, by Industry Sector

<i>Source: IMPLAN</i>	<i>Direct</i>	<i>Indirect</i>	<i>Induced</i>	<i>Total</i>
Mining	472	12	0	484
Professional- Scientific & Tech Services	0	119	11	131
Retail Trade	0	5	86	91
Health & Social Services	0	0	74	74
Accommodation & Food Services	0	11	53	64
Other Services	0	2	35	37
Wholesale Trade	0	12	11	23
Finance & Insurance	0	7	15	22
Transportation & Warehousing	0	14	8	22
Administrative & Waste Services	0	8	9	17
Manufacturing	0	10	5	15
Arts- Entertainment & Recreation	0	3	11	14
Real estate & Rental	0	3	10	13
Management of Companies	0	11	1	13
Educational Services	0	0	9	9
Utilities	0	8	1	9
Information	0	3	6	8
Government	0	2	3	5
Construction	0	1	2	3
Agriculture, Forestry, Fish & Hunting	0	0	2	2
Totals	472	232	353	1,058

NorthMet Shutdown:

Given the proposed duration of twenty years for operations at the proposed NorthMet plant, a shutdown of those operations might be imagined as what happens when those operations activities are absent from the economy. An important caution should be used however, when projecting this impact so far into the future. For instance, the nature of the industry suggests that

changes in technology will present production and employment changes in the future, which are unknowable at the present time. The life of NorthMet was estimated by the proposer based on estimated mineable material. It is very likely given what is known about area geology that additional mineable material will be found. The economic viability of NorthMet is a function of metal prices and operating costs. It is likely that operating experience and technology improvements will improve economic viability.

Hypothetically, a NorthMet shutdown in 2028 might mean (for the typical year of operations in 2004 dollars) the disappearance from the economy of St. Louis County of more than \$242 million in total output and the loss of more than a thousand jobs.

NorthMet Tax Impacts:

The NorthMet tax impacts are IMPLAN model estimates of the tax impacts. The impacts assume a typical business operation. Other tax structures such as net proceeds approach were not analyzed. Note the following two assumptions about the IMPLAN model and tax impacts: 1) impacts use the same distribution as a base year of social accounts, and 2) the distribution of expenditures holds, no matter what the mix of affected industries (once indirect business taxes are estimated from the various impacted industries those indirect business taxes are disbursed as a single entity).

The Federal tax includes \$17.3 million from the NorthMet facility for a typical year of operations. Tax impacts from the direct and induced impact includes Personal Income taxes, Indirect Business taxes and other taxes paid by the impacted sector.

NorthMet’s contribution of State and local taxes are estimated to be about \$14.5 million for a typical year’s operations. The tax impacts from the direct and induced impact of Personal Income taxes, Indirect Business taxes and other taxes would again be paid by the indirect and induced impacted industrial sectors.

Table 16. NorthMet Federal, State and Local Construction Tax Impacts, Year 2007

Source: IMPLAN

<i>Summary:</i>	2007
Federal Government	\$5,353,833
State/Local	<u>2,489,528</u>
Total	7,843,361

Table 17. NorthMet Federal, State and Local Operating Tax Impacts, Year 2008 and Typical Year

Source: IMPLAN

<i>Summary:</i>	2008	Typical
Federal Government	\$11,504,128	\$17,298,490
State/Local	<u>9,651,856</u>	<u>14,513,272</u>
Total	21,155,984	31,811,763

Other Projects' Impact Findings

- LTVSMC Shutdown
- Mesabi Nugget
- Taconite Plant Expansions
- NOvA

This list of projects derives from the EIS requirement for cumulative impact analysis which requires that “reasonably foreseeable” future projects be included in the analysis.

LTVSMC Shutdown

About the Shutdown: In the spring of 2000, Cleveland-based LTV Steel Corp., announced its intention to close permanently the operations of LTVSMC, a Hoyt Lakes-based producer of taconite pellets. LTV Steel Mining was the oldest continuously operating taconite mining operation on the Minnesota Iron Range. It employed approximately 1,400 people.

The shutdown, announced in the spring of 2000, was to be effective summer of 2001. Bankruptcy in December 2000 resulted in accelerated shutdown in January of 2001. The shutdown also affected several thousand of the company's Minnesota retirees. The LTV Corporation said it believed that the Pension Benefit Guaranty Corporation (PBGC) would become trustee of the Company's major defined benefit pension plans as of March 31, 2002. As reported by the Associated Press in 2005, more than 4,000 retirees and laid-off miners saw their pensions plunge 35 percent to 50 percent and lost their company-subsidized health insurance after LTV went bankrupt.

Poor conditions in the steel business and the need to conserve cash were major factors in the pre-emptive closing, said Mark Tomasch, senior director of corporate communications for the Cleveland-based company.

IMPLAN sector 21: Iron ore mining -- Bureau of Economic Analysis
(BEA) sector 212210, NAICS sector 21221

LTVSMC Operations Shut-down Impact

Table 18. Economic Impact of LTVSMC Shutdown on St. Louis County, MN, Year 2000 (2004 Dollars)

Source: IMPLAN

2000 model	Value Added	Employment	Output
Direct	-\$12,211,796	-200	-\$44,671,384
Indirect	-7,704,516	-114	-13,910,527
Induced	-5,916,441	-128	-9,323,455
Total	-\$25,832,752	-442	-\$67,905,368

Table 19. Economic Impact of LTVSMC Shutdown on St. Louis County, MN, Year 2001 (2004 Dollars)

Source: IMPLAN

2001 model	Value Added	Employment	Output
Direct	-\$79,953,664	-1,200	\$292,679,072
Indirect	-43,624,678	-481	-73,344,731
Induced	-39,185,173	-838	-67,326,900
Total	-\$162,763,512	-2,519	-\$433,350,680

LTVSMC Tax Impact

Table 20. LTVSMC Shutdown Federal, State and Local Tax Impacts, 2000, 2001

Source: IMPLAN

Summary:	2000	2001
Federal Government	-\$5,202,676	-\$28,497,212
State/Local Govt	<u>-3,661,071</u>	<u>-24,158,449</u>
Totals	-\$8,863,832	-\$52,655,749

Mesabi Nugget

About the Project: The Mesabi Nugget project is proposed to purchase concentrate from a taconite plant and ship high quality iron to steel makers. Mesabi Nugget is the leader in the development and commercialization of the ITmk3 iron nugget process, a proprietary process developed by Kobe Steel of Japan.

Mesabi Nugget plans to use the Kobe Steel ITmk3 Process to turn Mesabi iron ore concentrate into iron nuggets at the world's first commercial iron nugget plant at a site four miles north of Aurora, Minnesota. The Mesabi Nuggets will be 97% metallic iron compared to 65% iron in the form of oxide for a taconite pellet.

Modeling for this impact involved the impact of changes in the construction sector and in operations for the ore IMPLAN sector:

IMPLAN sector 41: Other new construction – BEA sector 230250, NAICS sector 23
 IMPLAN sector 203: Iron and steel mills – BEA sector 331111, NAICS sector 331111

Mesabi Nugget Construction

Table 21. Economic Impact of Mesabi Nugget Construction Expenditures on St. Louis County, MN, Year 2006 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$7,815,255	180	\$16,000,000
Indirect	2,668,025	49	4,356,300
Induced	3,560,592	70	5,708,949
Total	\$14,043,872	299	\$26,065,250

Table 22. Economic Impact of Mesabi Nugget Construction Expenditures on St. Louis County, MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$7,815,255	180	\$16,000,000
Indirect	2,668,025	49	4,356,300
Induced	3,560,592	70	5,708,949
Total	\$14,043,872	299	\$26,065,250

Mesabi Nugget Operation

Table 23. Economic Impact of Mesabi Nugget Operational Expenditures on St. Louis County, MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$2,345,637	26	\$12,500,002
Indirect	2,501,842	30	4,203,115
Induced	1,377,813	27	2,209,108
Total	\$6,225,292	83	\$18,912,225

Table 24. Economic Impact of Mesabi Nugget Operational Expenditures on St. Louis County, MN, Typical Year 2008 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$14,073,820	50	\$75,000,008
Indirect	15,011,053	56	25,218,688
Induced	8,266,876	52	13,254,650
Total	\$37,351,749	158	\$113,473,351

Table 25. Mesabi Nugget Federal, State and Local Construction Tax Impacts, Year 2006, 2007

Source: IMPLAN

<i>Summary:</i>	2006	2007
Federal Government	\$2,129,971	\$2,129,971
State/Local Govt	<u>990,433</u>	<u>990,433</u>
Total	\$3,120,404	\$3,120,404

Table 26. Mesabi Nugget Federal, State and Local Operation Tax Impacts, Year 2007, 2008

Source: IMPLAN

<i>Summary:</i>	2007	2008
Federal Government	\$842,820	\$5,056,920
State/Local Govt	<u>644,116</u>	<u>3,864,699</u>
Total	\$1,486,936	\$8,921,619

Taconite Plant Expansions

About these Projects: According to the Iron Range web-site taconite.org, “Minnesota’s six iron mining and processing operations produce two-thirds of the iron ore used to make steel in the United States. Combined, they represent a \$4 billion capital investment. They employ 4,000 men and women who earn an average wage and benefit package worth \$65,000 a year. These companies contribute nearly \$1.3 billion each year to the state’s economy in the form of purchases, wages and benefits, royalties and taxes.”

Included in this group of Minnesota iron mining operations proposed for expansion in this study are the following organizations:

United Taconite LLC

Operates a mining facility at Eveleth and a processing plant at Forbes
Capacity: 5.4 million tons
Owner: Cleveland-Cliffs Inc & Laiwu Steel Group

Keewatin Taconite

Located in Keewatin
Capacity: 5.3 million tons
Owner: US Steel

Hibbing Taconite Company

Operates mining and processing facilities near Hibbing.
Capacity: 8.1 million tons
Owner: Mittal Steel USA, Cleveland Cliffs, Stelco Inc

North shore Mining

Operates mining facilities at Babbitt; processing facilities, power plant and shipping dock at Silver Bay.
Capacity: 4.7 million tons
Owner: Cliffs MN Mineral Company

Minorca Mine

Located in Virginia, MN
Capacity: 2.8 million tons
Owner: Mittal Steel USA

Minntac

Located in Mt Iron (Central Mesabi Range)
Capacity: 15 million tons

Expansions to these mining operations are proposed for construction in 2006 and construction estimated to be completed and expanded operations to begin in 2007. These impacts are modeled as an aggregated event combining the effects of six mining operations within the industry sector.

IMPLAN sector 21: Iron ore mining -- Bureau of Economic Analysis
(BEA) sector 212210, NAICS sector 21221

Table 27. Economic Impact of Construction on Expansion of Taconite Plants on St. Louis County, MN, Year 2006 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$24,178,446	555	\$49,500,000
Indirect	8,254,203	153	13,477,304
Induced	11,015,582	218	17,662,061
Total	\$43,448,230	926	\$80,639,366

Table 28. Economic Impact of Construction of Expansion of Taconite Plants on St. Louis County, MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$11,722,883	269	\$24,000,000
Indirect	4,002,038	74	6,534,451
Induced	5,340,888	105	8,563,424
Total	\$21,065,809	449	\$39,097,875

Table 29. Economic Impact of Operation of Expansion of Taconite Plants on St. Louis County, MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$6,347,197	78	\$24,419,996
Indirect	4,543,131	38	7,339,993
Induced	3,076,107	61	4,932,140
Total	\$13,966,435	177	\$36,692,129

Table 30. Economic Impact of Operation of Expansion of Taconite Plants on St. Louis County, MN, Year 2008 (2004 Dollars)

	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$14,810,125	183	\$56,979,984
Indirect	10,600,637	89	17,126,651
Induced	7,177,583	142	11,508,327
Total	\$32,588,345	413	\$85,614,965

Expansion Plants Tax Impacts

Table 31. Expansion of Taconite Plants Construction Tax Impacts, 2006, 2007

Source: IMPLAN

<i>Summary:</i>	2006	2007
Federal Government	\$6,589,598	\$3,194,957
State/Local Govt	<u>3,064,151</u>	<u>1,485,649</u>
Total	\$9,653,749	\$4,680,606

Table 32. Expansion of Taconite Plants Operation Tax Impacts, 2007, 2008

Source: IMPLAN

<i>Summary:</i>	2007	2008
Federal Government	\$2,045,611	\$4,773,092
State/Local Govt	<u>2,037,735</u>	<u>4,754,714</u>
Total	\$4,083,346	\$9,527,807

NOvA

About the Project: The Soudan Underground Laboratory is a general-purpose science facility, which provides the deep underground environment required by a variety of sensitive experiments. Soudan's two large laboratory rooms, both located about 2,400 feet underground, currently house two world-leading experiments. A third is under construction. These experiments are located deep underground in order to protect highly sensitive instrumentation from cosmic rays, naturally incident from space.

NOvA Construction

Table 33. Economic Impact of NOvA Construction Expenditures on St. Louis County MN, Year 2007 (2004 Dollars)

<i>Source: IMPLAN and BBER calculations</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$9,769,070	224	\$20,000,000
Indirect	3,335,031	62	5,445,376
Induced	4,450,740	88	7,136,187
Total	\$17,554,842	374	\$32,581,562

Table 34. Economic Impact of NOvA Construction Expenditures on St. Louis County, MN, Year 2008 (2004 Dollars)

<i>Source: IMPLAN and BBER calculations</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$9,769,070	224	\$20,000,000
Indirect	3,335,031	62	5,445,376
Induced	4,450,740	88	7,136,187
Total	\$17,554,842	374	\$32,581,562

Table 35. Economic Impact of NOvA Installation Expenditures on St. Louis County, MN, Year 2009 (2004 Dollars)

<i>Source: IMPLAN and BBER calculations</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$3,430,371	80	\$6,700,000
Indirect	978,083	18	1,590,151
Induced	1,527,254	30	2,448,755
Total	\$5,935,709	128	\$10,738,907

Table 36. Economic Impact of NOvA Installation Expenditures on St. Louis County, MN, Year 2010 (2004 Dollars)

<i>Source: IMPLAN and BBER calculations</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$3,430,371	80	\$6,700,000
Indirect	978,083	18	1,590,151
Induced	1,527,254	30	2,448,755
Total	\$5,935,709	128	\$10,738,907

NOvA Operations

Table 37. Economic Impact of NOvA Operational Expenditures on St. Louis County, MN, Year 2011 (2004 Dollars)

<i>Source: IMPLAN and BBER calculations</i>	<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Direct	\$528,105	8	\$1,000,000
Indirect	126,519	2	213,795
Induced	305,828	2	490,356
Total	\$960,452	12	\$1,704,151

NOvA Tax Impact

Table 38. NOvA Federal, State and Local Construction Tax Impacts, Year 2007, 2008

<i>Source: IMPLAN</i>		<i>2007</i>	<i>2008</i>
<i>Summary:</i>			
Federal Government		\$2,662,464	\$2,662,464
State/Local Govt		1,238,041	1,238,041
	Total	\$3,900,505	\$3,900,505

Table 39. NOvA Federal, State and Local Installation Tax Impacts, Year 2009, 2010

<i>Source: IMPLAN</i>		<i>2009</i>	<i>2010</i>
<i>Summary:</i>			
Federal Government		\$910,989	\$910,989
State/Local Govt		435,803	435,803
	Total	\$1,346,792	\$1,346,792

**Table 40. NOvA Federal, State and Local Construction Tax Impacts,
Year 2011**

Source: IMPLAN

<i>Summary:</i>	<i>2011</i>
Federal Government	\$167,946
State/Local Govt	<u>69,105</u>
Total	\$237,051

Cliffs Erie Transfer Station

This Project is Not Analyzed: The economic impact of the Cliffs Erie Transfer Station is not analyzed or presented in the report. Detailed information and data is not available at this time. Key assumption or data for the IMPLAN model cannot be estimated with accuracy and reliability. Therefore, The Cliffs Erie Transfer Station project is not included in the cumulative economic impacts that are reported in this study.

However, because the project (as currently understood) transfers work (haulage of pellets from a mine to a port) from one entity (CN) to another (Cliffs Erie) and because most of that work is expected to remain in St. Louis County, the project may not have significant economic impact on the county.

Cumulative Impacts by Year

The EIS requirement for cumulative impact analysis requires that “reasonably foreseeable” future projects be included in the analysis. A proposed criterion for “reasonably foreseeable” is that any State agency has received a permit application from the project proposer or the project proposer has formally initiated the environmental review process. This criterion was applied to the projects listed in the following section at the time the EIS scope was defined. Note: The Cliffs Erie Transfer Station, although mentioned in the EIS scope, is not part of this study because data was not available.

Two schedules of economic impact are organized below and include the timeline for accomplishment of the phases of projects and year by year reporting of impacts from the activities of those projects on St. Louis County. The cumulative construction phase and operation phase for proposed projects are as follows.

Timeline for Cumulative Construction Impacts, 2006 to 2010

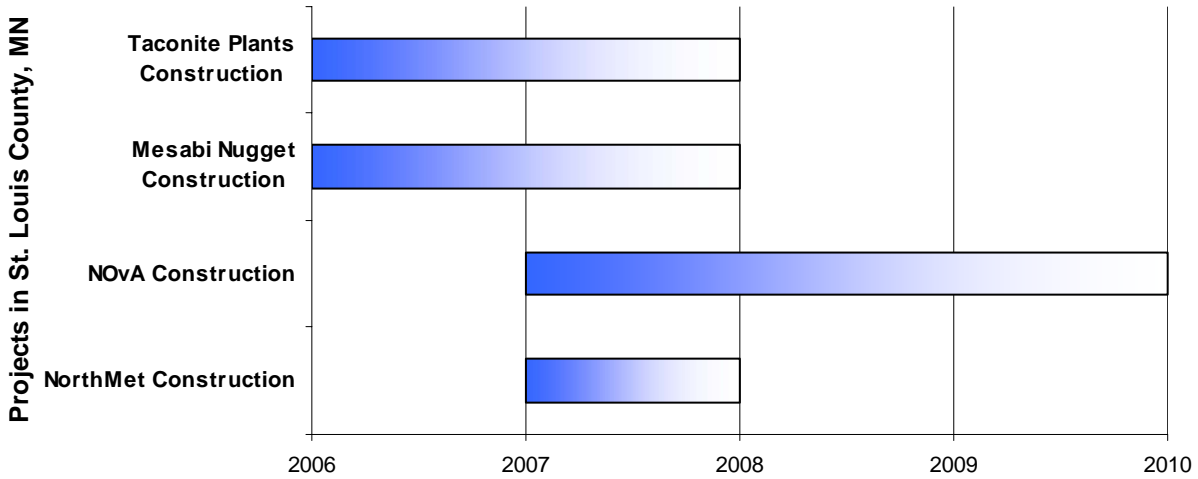


Figure 9. Timeline for Cumulative Construction Impacts, 2006 to 2010. *Source: Project personnel and BBER.*

Table 41. Total Impacts from Construction, by Project, by Measure, by Year (2004 Dollars)

Year	Project Phase	Project	Value Added	Employment	Output
2006	Construction	Mesabi Nugget	\$14,043,872	299	\$26,065,250
		Expansion Plants	43,448,230	926	80,639,366
		Total	\$57,492,102	1,225	\$106,704,616
2007	Construction	NorthMet	\$35,300,763	752	\$65,517,852
		Mesabi Nugget	14,043,872	299	26,065,250
		NOvA	17,554,842	374	32,581,562
		Expansion Plants	21,065,809	449	39,097,875
		Total	\$87,965,286	1,874	\$163,262,539
2008	Construction	NOvA	\$17,554,842	374	\$32,581,562
2009	Installation	NOvA	\$5,935,709	128	\$10,738,907
2010	Installation	NOvA	\$5,935,709	128	\$10,738,907

Timeline for Cumulative Operations Impacts, 2007 to 2011

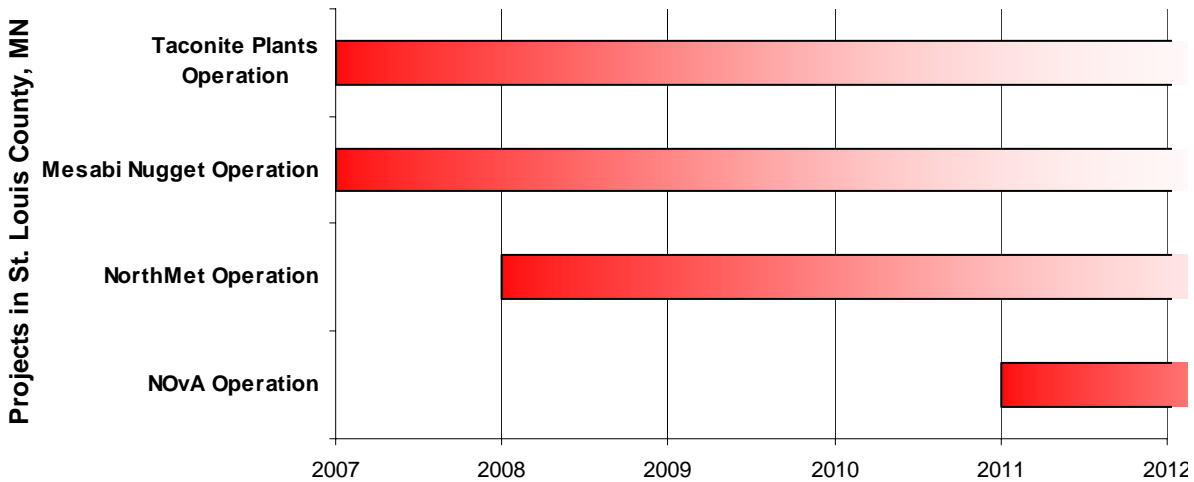


Figure 10. Timeline for Cumulative Operations Impacts, 2007 to 2011. Source: Project personnel and BBER

**Table 42. Total Impacts from Operations, by Project, by Measure, by Year
(2004 Dollars)**

Year	Project Phase	Project	Value Added	Employment	Output
2007	Operation	Mesabi Nugget	6,225,292	83	18,912,225
		Expansion Plants	13,966,435	177	36,692,129
		Total	20,191,727	260	55,604,354
2008	Operation	NorthMet	93,498,483	529	161,244,048
		Mesabi Nugget	37,351,749	158	113,473,351
		Expansion Plants (1)	13,966,435	177	36,692,129
		Expansion Plants (2)	32,588,345	236	85,614,965
		Total	177,405,012	1,100	397,024,493
2009	Operation	NorthMet	140,591,500	1,058	242,458,946
		Mesabi Nugget	37,351,749	158	113,473,351
		Expansion Plants (1)	13,966,435	177	36,692,129
		Expansion Plants (2)	32,588,345	236	85,614,965
		Total	224,498,029	1,629	478,239,391
2010	Operation	NorthMet	140,591,500	1,058	242,458,946
		Mesabi Nugget	37,351,749	158	113,473,351
		Expansion Plants (1)	13,966,435	177	36,692,129
		Expansion Plants (2)	32,588,345	236	85,614,965
		Total	224,498,029	1,629	478,239,391
2011	Operation	NorthMet	140,591,500	1,058	242,458,946
		Mesabi Nugget	37,351,749	158	113,473,351
		Expansion Plants (1)	13,966,435	177	36,692,129
		Expansion Plants (2)	32,588,345	236	85,614,965
		NOvA	960,452	12	1,704,151
		Total	225,458,481	1,641	479,943,542

Table 41 and 42 show a detailed breakdown of construction and operations by project by individual years. Mesabi Nugget and Taconite Plant Expansion construction is shown in 2006 with 1,225 jobs and a total output value of \$107 million.

In 2007, construction at NorthMet is underway. Mesabi Nugget construction is completed and operations are slated to start during the last quarter of the year. The NOvA project begins a two year construction phase. The Taconite Plant Expansion that was constructed in the previous year now becomes operational and is shown as Expansion Plant Operation (1). At the same time, different construction projects at other Taconite Plants are also underway. Analysis shows the cumulative average employment impact of 2,134 jobs is at its peak for the entire time period. The 2007 Value Added impact increases to \$108 million.

The following table shows year-by-year impacts of all projects on the County by industry sector. Note: Other New Construction, as listed below, excludes residential, farm, commercial and institutional, highway, street, bridge, and tunnel, water, sewer and pipeline construction.

Table 43. Year-by-Year Value Added, Employment, Output on St. Louis County, MN of Proposed Projects by Industry Sector 2002 to 2011 (2004 Dollars)

		<i>Value Added</i>	<i>Employment</i>	<i>Output</i>
Iron Ore Mining	2002	\$274,033,025	3,377	\$1,054,305,350
	2007	280,380,262	3,456	1,078,725,500
	2008	295,190,480	3,638	1,135,705,848
Iron and Steel Mills	2002	\$5,857,830	66	\$31,217,219
	2007	8,220,980	92	43,810,548
	2008	20,036,728	116	106,777,195
Copper, nickel, lead, and zinc mining	2002	\$0	0	\$0
	2008	62,881,876	241	113,400,704
	2009	94,554,016	482	170,518,016
Scientific Research and Development Services	2002	\$2,766,270	108	\$5,237,748
	2011	3,294,557	116	6,238,091
Other Maintenance and Repair Construction	2002	\$4,937,740	115	\$9,644,088
	2009	8,369,404	196	16,346,613
	2010	8,211,664	196	16,038,525
Other New Construction	2002	\$20,561,865	472	\$42,094,750
	2006	52,555,536	1,207	107,594,750
	2007	69,513,665	1,597	142,312,750
	2008	30,330,935	696	62,094,750

During 2008 NorthMet starts operations and the NOvA project construction phase is completed. Mesabi Nugget is now at full production. In addition, the second Taconite Plant Expansion becomes operational and is shown as Expansion Plant Operations (2). Total cumulative output climbs to \$429 million while Value Added reaches \$195 million, and the average number of jobs drops to 1,474. This is because construction employment multipliers are higher and therefore construction activity requires more jobs.

For the years 2009 and 2010 the three impacts stabilize for all the projects with the exception of the NOvA project. NOvA equipment installation and calibration is shown for both years. The Value Added and Output cumulative impacts for the study period both peak during these years, at \$230 million and \$489 million, respectively.

Finally, during the last year of cumulative impacts (2011), there is a slight cumulative total impact decline because the NOVA project operations begins with a corresponding drop in the total number of jobs, total Value Added and Output from peaks in 2010.

5) Conclusion

This presentation of data and economic analysis from the UMD Labovitz School's research bureau reports the historical trends of demographic and economic data. This report also presents the results of modeling several proposed projects' direct effects, plus the additional spending effects that are expected to have an impact on the greater economy of Saint Louis County, Minnesota.

Historical trends: The employment trend by industry sector shows the decline of mining since 1980 and the ascent of the services sector. The recent data for industry sector employment show that between 2000 and 2004, for instance, healthcare, retail trade, and tourism related sectors are consistently the top employers in the County.

The County's employment history can also be reviewed in terms of net gain or loss. From 2000 to 2004 the data show employment gains for sectors representing health care, finance, services, government, and tourism-related services, but a net loss in employment of almost 2,500 jobs. The three sectors losing the most jobs include manufacturing, recreation, and mining.

As a measure of economic activity, total wages for the County from 1980 to 2004, adjusted for inflation, show a low in the 1980s at more than \$2 billion to the current high at more than \$3 billion. However, the sectors of the economy driving that increase have changed dramatically from mining and services to an economy dominated by services (and to a lesser degree trade). However, it should be noted that for some sectors (mining, construction, and manufacturing) wages are only a fraction of the cost of goods produced, and for other sectors (public administration, finance/insurance/real estate) wages are most of the cost.

Economic impacts: This study applies an economic multiplier analysis and input/output model that was created in Minnesota by the Minnesota IMPLAN Group, Inc., and is used by other state governments and the USDA Forest Service, among others. Multiplier effects for these projects range from 3.16 to 1.45. Note: The output multiplier of 1.45 for NorthMet operations reflects the economic impact on the region of St. Louis County only. If a larger region such as the seven county Arrowhead Region or the State of Minnesota was studied, the multiplier would most likely be greater. Tax impacts from the models are also reported for each of these projects in the report details.

NorthMet: With the completion of the construction phase for NorthMet, it is estimated that the project will have generated \$65.5 million in spending in the County by directly expending approximately \$40.2 million on construction. During the year of construction, NorthMet will also have created over 752 full-time, part-time, and temporary jobs by directly employing nearly 451 people. When operations for the NorthMet project reach “typical year” capacity (2009), it is estimated to generate \$242 million in spending in the County by directly expending approximately \$167 million on operations. During a typical year of operations, NorthMet will create 1,058 full-time, part-time, and temporary jobs by directly employing nearly over 472 people. The average multiplier effect for NorthMet’s proposed operations is 1.7; IMPLAN estimates that for every dollar spent on operations at NorthMet’s plant, \$1.70 is circulated in the economy of the County.

Yearly impacts, including other proposed projects: The impact of the shutdown of LTVSMC, of three additional projects, and the impacts from six expansions of mining operations were modeled. These impacts, including the NorthMet impacts, considered as year-by-year impacts (in 2004 dollars) are estimated to be as follows:

2000 LTVSMC shutdown: lost output from LTVSMC operations \$68 million, lost employment from LTVSMC employment 442 jobs.

2001 LTVSMC shutdown: lost output from LTVSMC operations \$433 million, lost employment from LTVSMC employment 2,519 jobs.

2006 (a construction year only), it is estimated that projects will have generated \$106.7 million in spending in the County. This construction activity will have created 1,225 full-time, part-time, and temporary jobs.

2007 construction and operations activity results in \$219 million in spending, and results in the highest employment year, generating a total of 2,134 jobs.

2008 construction and operations activity results in the highest output year, including activity from all projects. In 2008, it is estimated that the projects will have generated \$429.6 million in spending in the County. This activity will also have created 1,474 full-time, part-time, and temporary jobs.

2009 is modeled as the typical year of operations for NorthMet.

2010 the only new activity comes from the beginning of the NOvA project installation, and will be relatively small.

2011 is the year NOvA starts operations; it is estimated that the combined projects will have generated \$480 million in spending in the County. Employment generated by these activities is estimated to be 1,641 jobs.

Other shutdown impacts: Hypothetically, a NorthMet shutdown in 2028 might mean (for the typical year of operations in 2004 dollars) the disappearance from the economy of St. Louis County of more than \$242 million in total output and the loss of more than a thousand jobs. It is not a strength of the IMPLAN model to reliably project twenty years into the future. Shutdown of the other projects included in this study could be suggested by the impacts from typical year operations included in the project summaries in the report detail.

Special considerations

Special considerations for interpreting these impact numbers include the following cautions:

- Regional indirect and induced effects are driven by assumptions in the model. One problem is that the assumptions can mask the true multiplier. This is especially true of the assumption of constant returns to scale: This assumption most affects induced effects and says that if I drink coffee, and my income increases, I will drink proportionally more than before. The amount of weight placed on the induced effects (the percentage of the total induced effect you would want to use) can be further analyzed with an in-depth impact study, involving much more specific data collection and more detailed analysis.
- Readers are also encouraged to remember the BBER was asked to supply an a review of historical demographics and etc. and to provide economic impact analysis only. Any subsequent policy recommendations should be based on the “big picture” of total impact. A cost-benefit analysis would be needed to assess the environmental, social, and governmental impacts.
- BBER suggests caution in regard to the interpretation of the tax impacts from these events: Tax law changes frequently and will be difficult to forecast through the years proposed as operations for these projects.
- The cumulative effects are based on the actual construction and operations sequencing suggested in the proposed timeline. For instance the interconnection of the North Shore Mining project and the Mesabi Nugget projects would dictate that changes to one project would directly affect the timing and therefore the impacts from the other. This is true for other relationships in the sequence of events.

Readers should also note that estimated changes in production technology and employee productivity for industry sectors can differ. For instance, note a difference in output per worker for differing industry sectors when Mesabi Nugget production modeling includes *Iron ore mining* and *Iron and steel mills*, where NorthMet production modeling includes only *Iron ore mining*.

Finally, and most importantly, the relationship of Output to Employment has been set for the model by data provided by the project managers to the BBER; the modeling in this study is driven by inputs provided to the models by the best estimates of engineers and managers involved in each project. It can be noted that, for purposes of research and with more resources, the modeling methodology can be driven by data collected from surveys and post-construction values. This survey data can provide greater accuracy in regional impact assessments for the linkage between core and peripheral labor market areas, and deliver better estimates of local vs. regional purchases.

References

Urban Regional Economics: Concepts, Tools, Applications, by Wilbur R. Maki and Richard W. Lichty. February 2000. Iowa State Press.

Minnesota IMPLAN Group, Inc., IMPLAN System (data and software), 1725 Tower Drive West, Suite 140, Stillwater, MN 55082, www.implan.com, 1997.

Input-output Analysis: Foundations and Extensions by Ronald E. Miller and Peter D Blair, Englewood Cliffs, N.J. Prentice-Hall, 1985 (out of print).

Elements of Input Output Analysis, William Miernyk, New York, Random House, 1966.

Appendix

1) General description of input/output analysis

See a general description of input/output analysis, "A Readymade Input-Output Model" in *Urban Regional Economics: Concepts, Tools, Applications*, by Wilbur R. Maki and Richard W. Lichty. February 2000. Publisher: Iowa State, Press, pp. 233-245, ISBN: 0813826799

2) The Mathematics of the Model

3) St. Louis County Historical Data

- a. Table A-1. Population, St. Louis County, MN 1970 to 2004
- b. Table A-2. St. Louis County Employment by Major SIC Industry 1980 to 1999, and by Major NAICS Industry 2000 to 2004
- c. Table A-3. St. Louis County, MN, Total Wages by Major SIC Industry 1980 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted
- d. Table A-4. St. Louis County, Employment by Major NAICS Industry 2000 to 2004, Ranked
- e. Table A-5. St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars

4) St. Louis County Selected Cities Historical Data

- a. Table A-6. Population of Selected East Iron Range Cities in St. Louis County, MN 1970 to 2004
- b. Table A-7. Selected Cities in St. Louis County, Employment by Major SIC Industry 1980 to 1999 and by Major NAICS Industry 2000 to 2004
- c. Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages for Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted
- d. Table A-9. Selected Cities in St. Louis County, Economic Activity as Measured by Wages for Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Adjusted for 2004 Dollars

5) IMPLAN Data

- a. Table A-10. St. Louis County, IMPLAN Model Information 2002, Output and Employment, Ranked by Employment

General description of input/output analysis

1) A Readymade Input-Output Model

The point of departure for this assessment is the suggestion that “. . . a truly flexible readymade model will enable the introduction of survey-based trade coefficients in some sectors while continuing to balance the rest of the sectors in a truly unbiased manner” (Brucker, Campbell, and Latham III, 1990, p.136). System effectiveness requires not only a truly flexible model but one that invites “coefficient fix-up” with superior information, coupled with “. . . software and/or handbooks that guide the user (professional or lay) through the intricacies of final demand determination” (p.137).

Forecasting Area Economic Impacts

Use of the IMPLAN regional modeling system as an impact prediction model starts with the existing database. The U.S. Department of Commerce Regional Economic Measurements Division Annual Regional Economic Information System (REIS) series covering industry employment, labor earnings, total population, and total personal income is a common starting place.³ The historical (REIS) series include every county in the United States. They cover total employment and total labor earnings in a two-digit industry breakdown based on the 1987 Standard Industrial Classification Manual.

The U.S. IMPLAN database calibrates to the REIS series. The IMPLAN series also use the individual state ES-202 covered (by the cooperative federal-state unemployment insurance program) employment and payroll files, especially for the three- and four-digit industry groups that are not available in the REIS database. IMPLAN has a 528-sector industry breakdown for each of 3,120 counties in the United States.

The 1988 U.S. Department of Commerce Office of Business Economics Regional Series (OBERS) on industry employment, labor earnings, total population, and total personal income extend the corresponding 57-industry REIS series to 2040. The 1988 OBERS series calibrate to the 1988 U.S. Bureau of Labor Statistics (BLS moderate projection series. High and low projection series, which are derived for individual states, MSAS, and the Bureau of Economics economic areas in the auxiliary IMPLAN database, correspond to the U.S. BLS high and low projection series (Kutcher, 1991).

The IMPLAN database extends the OBERS series to equivalent measures of industry output and commodity production in a long-term forecast mode. It further allocates the commodity production to intermediate and final demand sectors in the United States and in each of the 50 states. The intermediate demand sectors include the two-digit industry groups in the OBERS sectors. Individual industries in the 528 sectors of the IMPLAN database aggregate to the three-and four-digit BLS sectors, the two-digit OBERS sectors, and many other combinations of two- and three-digit industry groups.

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The final demand sectors in the IMPLAN database include (1) personal consumption expenditures, (2) gross private capital formation, (3) change in business inventory, (4) federal government purchases, (5) state and local government purchases, (6) exports, and (7) imports. Regional purchase coefficients (RPCs) that allocate imports to each local purchasing sector are calculated for each IMPLAN “model” (that is, a county or multi-county impact assessment). The uniquely estimated RPCs produce estimates of local exports and imports that are consistent with levels of industry output and commodity production in each IMPLAN impact assessment.

The IMPLAN-based regional forecast methodology presents a series of readily reproducible steps for converting BLS and OBERS projections to corresponding sets of county forecasts of industry employment, labor earnings, resident population, and personal income. The individual county series track their respective state projection series. Each state has a set of high, low, and moderate projections based on the 1988 OBERS projection series and the corresponding high, low, and moderate 1988 and 1990 BLS projections series for the United States. This method of approach to county-level forecasting thus extends the BLS and OBERS forecasting methods and results. It introduces the BLS county-level modeling capabilities and database for use in industry-specific assessments of local resource requirements and the effects of these requirements on local and state economies.

State, regional, and county projection series relate directly to corresponding data series from the IMPLAN models of one or more counties. Individual IMPLAN regional reports, for example, expand the number of variables that correlate with the two-digit employment and earnings projections, including commodity exports and commodity imports. They also provide a framework for assessing the differential rates of growth of individual counties and regions. Each IMPLAN model takes given changes in final demands and derives the effects of these changes on the local economy and its institutions. Included with each IMPLAN model is a social accounting matrix (SAM) for tracking changes in local income distributions in the local economy.

The IMPLAN input-output model has been constructed using 528 industry sectors, although the model can be run for any level of aggregation of these sectors. The underlying coefficients in the model are derived from the U.S. input-output accounts. Flows of goods and services in the Minnesota model are derived from commodities produced and consumed in Minnesota as well as those that are imported into the state and exported to areas outside of the state. The system is run for all regions together to ensure consistency with both U.S. and individual regional input-output accounts.

One very useful aspect of the IMPLAN model is the IMPACT module. It permits the user to evaluate the effects of changes or variations in economic activity. For example, the impact of the direct purchase of goods and services by the air transportation industry can be traced through the economy as a series of spending iterations among all sectors, including households. The long-term multiplier used in the model includes indirect effects (to which multipliers are normally limited) as well as induced effects related to employment and population change.

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The U.S. Departments of Commerce, Labor, and Agriculture maintain the *reference data systems* for Micro-IMPLAN. The Department of Commerce houses the periodic censuses of population and employment, agricultural, manufacturing, wholesale, and retail trade, and selected business services, as well as the annual statistical series on personal income and industry employment and earnings of the employed industry workforce. State- and county-level data sources most critical for early fix-up and updating of the current database are the individual state reports on county business patterns, ES-202 files on covered industry employment and payroll, and the agriculture censuses.

A common problem in using each of these data sources is the occurrence of nondisclosures. Use of supplementary information in the bi-proportional adjustment procedures for filling in the missing data, for example, allow for closer correspondence of the remaining calculated values with values reported by the U.S. Department of Commerce.

Delays in the reporting cycles for reference data systems result in two- to three-year lags in the availability of each new update of the county-level Micro-IMPLAN database. Reducing lags in data availability is probably a less feasible alternative, however, than forecasting new control totals for the bi-proportionally adjusted U.S., state, and county input-output tables.

A hybrid approach that combines local surveys of critically important industries with the forecast approach facilitates the likelihood of attaining both greater timeliness and greater accuracy in regional impact assessments. Such an approach incorporates various measures of linkage between core and peripheral labor market areas, like survey-based estimates of the physical volume and market value of commodity shipments between the core area and periphery.

Delineation of the LMAs within an economic region introduces a spatial structure into the organization of the Micro-IMPLAN database. This helps address the twofold problem focus—system bias and specification error. Each of the problem sources, whether industry production functions, RPCs, marketing margins, or industry output, varies between center and periphery. Investment per worker is lower in the periphery, and rate of return on investment also is lower when discounted for perceived investment risk. However, high levels of commodity trade occur between center and periphery. This emanates from the unique competitive advantage of each of the two types of export-producing systems, with the center specializing in high-order, high-profit services, and the periphery specializing in standardized commodity production.

The use of LMAs and the center-periphery structure of these areas apply especially well to the organization of transportation and local land use impact assessments. Commodity transportation originates from dispersed farms, mines, and factories. It concentrates in major shipping centers that also are the primary and secondary core LMAs of the U.S. trading regions. Air transportation concentrates even more than commodity transportation in the primary core areas.

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This concentration of high-order economic services near the globally connected air nodes of core metropolitan areas apparently accounts for the higher productivity of both labor and capital in the core areas.

Modeling System Formulation

The first step in model reformation is to calculate *total regional commodity demand*. We multiply the regional absorption matrix by the regional industry output to obtain the intermediate input purchases of each industry. We add our estimate of gross final commodity demand to the estimate of intermediate demand to obtain total commodity demand. The U.S. estimates of industry purchases include both domestic production and foreign imports. Thus, the input profile for each industry includes all commodity inputs of that industry. In addition, each industry may produce more than one commodity. The estimates of gross domestic exports relate to both the commodity production and the regional demand for this production.

The next step relates to the calculation of *total regional commodity supply*. Again, the estimate of total regional industry output enters into the calculation, but in multiplication with the industry byproduct ratios from the U.S. byproduct matrix. The result is the regional matrix that shows the commodity production (columns) by each industry (rows). These estimates, together with the estimates of institutional commodity output (commodity sales by government and from inventory depletion), yield the total commodity output for the regional economy.

Finally, to estimate trade flows, the *RPC* is the key parameter.⁵ The *RPC* value times the corresponding value in the regional gross use matrix yields the regional industry use of the locally supplied commodity. Similarly, the *import propensity* for a given commodity times the corresponding value in the regional gross use matrix yields the regional *industry domestic imports* of each commodity. This procedure applies also in estimating regional institutional use and regional institutional imports, that is, the commodity purchases for local final demand.

The calculation of *domestic commodity exports* results from subtracting regional commodity demand from regional gross commodity supply. The individual commodity imbalances in the U.S. estimates of foreign exports and imports carry through to the individual county or multi-county Micro-IMPLAN models. Domestic exports and imports theoretically balance for the domestic economy as a whole, but not for individual counties or multi-county areas. However, the criteria for allocating the two sets of exports and imports differ greatly. Micro-IMPLAN allocates U.S. *foreign commodity exports* to regions according to their share of U.S. commodity production. It also allocates U.S. *foreign commodity imports* to regions according to the same rule. Estimates of a region's total imports and total exports thus derive from a variety of data sources and allocation criteria.

While local commodity production provides the basis for allocating foreign exports and imports, uniquely generated local *RPCs* provide the basis for estimating domestic exports and imports for each

county or multi-county area. These estimates of gross domestic imports relate to both commercial production and the demand for this production in a given region. Model reformulation calls for similar criteria in allocating U.S. foreign imports to individual industries and regions.

Interregional trade is synonymous with commodity shipments. Most commodity shipments move from producing areas to export markets by truck, rail, and barge. However, an increasing volume of high-value manufactured products move by air transportation to and from the designated air transportation nodes. These shipments typically move by truck to the larger air transportation nodes, such as Chicago. Micro-IMPLAN currently fails to account for such multimodal shipments.

Technology transfer is an increasingly important form of interregional trade. It is also a singularly important factor in accounting for a region's competitive advantage in specialized production and its export to other regions. It is associated, in part, with the total value of technology-intensive manufactured products in a given region. Again, Micro-IMPLAN, when conjoined with an optimizing transportation network model, can simulate the local economic effects of technology transfer. This application may extend to the role of a state's research universities in the formation and strengthening of spatially separated, functionally integrated industry clusters. These clusters are viewed by at least one student of regional growth and change as the new industrial systems of the emerging information economy (Saxenian, 1994).

Refinements and Applications

Several types of refinements are available for the outcomes of the preceding steps (Alward et al., 1989). These include (1) changing regional supply, (2) modifying industry production function, (3) editing RPCs, and (4) controlling for induced effects once better information becomes available. Superior local knowledge warrants changing the readymade database values in each category. Superior local knowledge also warrants changing regional purchase coefficients, by institution, industry, or commodity. The RPC adjustments for an industry or institution result in the given change being applied to all commodities, by industry or institution. Overlooked, however, is the further regionalization of the final local sales accounts and the industry margins that convert industry output from producer prices to purchaser prices. This process requires detailed, regionally differentiated estimates of final product sales to households, governments, and businesses. Furthermore, input-output models generally are demand-driven with no supply constraints.

The lack of capacity limits for industry expansion and the assumption of full resource use or availability, including labor, result in overestimating industry production response to demand changes. Fixed-price multipliers add to this problem by overestimating multiplier effects and underestimating the substitution effects from exogenous changes (Koh, Schreiner, and Shin, 1993). Also, the current modeling system sidesteps the issue of commuting effects. These attributes of input-output models ultimately result in underestimating or overestimating factor income responses to market changes.

A Simple Input-Output Model

The model is triggered by changes in final demand; that is, demand for goods or services related to final uses. The components of final demand are exogenous to the model's structural characteristics in much the same way as final payments are, but the role of final demand as an initiator of impacts gives it a unique role in the input-output scheme.

The basic input-output model consists of a series of three separate tables. The first is called the transactions table. The transactions table lists all industrial sectors defined for the purposes of the analysis being conducted. It should be noted that these sectors have to be defined so as to account for every firm in the region. The individual sectors should be relatively homogeneous in terms of their input requirements and output distributions. They should generally be disaggregated enough to highlight the true structure of the region without being so disaggregated as to cause significant problems in data collection or in disclosure of the operations of any one firm in the region.

The transactions table also contains values for final demand, as discussed earlier, as well as the values for final payments. The grand totals of such a table contain the gross outputs for each industrial sector and the gross inputs required to produce those outputs.

Table 6-1A represents the structure of a hypothetical input-output table with three industrial sectors:

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extractive, manufacturing, and services. Remember, the sectors should be defined so as to account for every firm in the region. The sectors should also, ideally, be as disaggregated as possible. For these reasons, this represents a very unrealistic example of the size of an actual table. Keeping the size of the model to just three industries, however, makes required computations much simpler. The structure and use of larger tables remains much the same.

One of the most important things to remember when reading an input-output table is that the rows of the table represent sales and the columns of the table represent purchases. Thus, the 700 that appears in the Extractive row and the Manufacturing column indicates that firms in the extractive industry sold \$700 worth of goods and services to firms in the manufacturing sector.

TABLE 6-1A Commodity transactions of a regional economy

Commodity	Extractive (mil.\$)	Manufg (mil.\$)	Services (mil.\$)	Intermediate Demand		Gross Output (mil.\$)
				Total (mil.\$)	Final Demand (mil.\$)	
Extractive	100	700	0	800	4,625	5,425
Manufacturing	50	200	0	250	6,400	6,700
Services	75	300	75	450	4,905	5,355
Value added	5,000	5,500	230	10,730	1,800	28,730
Imports	200	0	5,000	5,200	0	5,200
Total inputs	5,425	6,700	5,355	17,480	17,730	33,930

Looked at the other way, we could say that the 700 also represents a \$700 purchase by the firms in the manufacturing sector from firms in the extractive sector. The 50 in the Manufacturing row and the Extractive column represents a \$50 transaction between manufacturing (the seller) and extractive (the buyer) and so on.

The same industrial sectors identified on the left-hand margin of the table appear along the top of the table. The sales and purchases between these sectors represent sales and purchases of “intermediate” goods and services. These are goods and services produced for the purpose of facilitating further production. Semi finished goods would be an obvious example of intermediate production but so would the services of lawyers, bankers, transportation agencies (in all cases not involving a final transportation use), and any other sector input or output oriented toward helping other industries with their own production.

The value added row of the table represents another form of sale—the sale of resources of production to each sector. In a theoretical sense, the resources of production include land, labor, capital, and enterprise. In a more practical sense, this row generally includes the income received by local households for whatever contribution they make to the production process.

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These resource inputs are not generally considered to be intermediate even though the sale takes place so further production can occur. Rather, they represent final inputs that add to the income of households as opposed to industrial sectors.

Imports represent sales to local industries by industries and resource holders outside of the locality's defined boundaries. Although not shown above, in reality final demand accounts for a large, often a major, share of an area's imports; the smaller and less diversified the area, the larger the share. Remember, imports—and exports too, for that matter—are defined in terms of payments.

Finally, final demand consists of sales for final uses. The usual categories making up final demand include household consumption (by households located in the region), government purchases of goods and services, gross private domestic investment (including inventory changes), and exports (again, defined in terms of the payment made).

The gross output and input values are equal. This is due to the fact that the transactions table really represents a type of cost-accounting sheet for a regional economy—debits equal credits. The elements in the table that force this balance (which is a balance by definition) are profits or losses. This is because the final value of output is made up of all the costs that go into production, with profits and losses making up the difference.

In summary, the transactions table has three identifiable parts: the intermediate transactions component, representing sales and purchases between firms; the final payments plus imports component, representing resource inputs into the firm's production plus inputs from outside the region; and final demand, representing the sale of goods and services for final use. The table balances between inputs and outputs, with profit as the balancing mechanism.

The transactions table contains a great deal of useful information in its own right. The regional balance of trade (exports—imports) can be discerned from this table, as can gross regional product (the dollar value of all final goods and services produced with the economy minus imports). The level of interaction between local industries and between industries in the region and households can be seen in this table. Finally, the relation between local household income and production is depicted in the transactions matrix.

The principal use for this table is found in the construction of the other two tables of the input-output system. As mentioned, the transactions table alone represents a cost-accounting sheet for the region, nothing more or less. It is descriptive rather than analytical, and it does not allow for general equilibrium analysis of the type previously described without further modification. The next step uses the transactions table to construct a table of direct requirements, often called the technical coefficients matrix.

The question answered by the technical coefficients table is: if each local industrial sector sells to other local industrial sectors some total value of intermediate goods and services so that the purchasing sectors can produce their own output, how much do the purchasing sectors require from the other local sectors per dollar of output? For example, Manufacturing purchased \$300 worth of intermediate output from Services in order to facilitate its own production of \$6,700 worth of intermediate and final outputs. How much did Manufacturing buy from Services per dollar of gross output? The answer is $300/6,700 = \$0.45$. The same computation can be made for each intermediate sale and purchase in the transactions table. The result of these divisions is shown in Table 6-2A.

TABLE 6-2A

Commodity	Extractive (mil.\$)	Manufg (mil.\$)	Services (mil.\$)
Extractive	0.018	0.104	0.000
Manufacturing	0.009	0.030	0.000
Services	0.014	0.045	0.014
Subtotal	0.041	0.179	0.014
Value added	0.922	0.821	0.043
Imports	0.037	0.000	0.934
Total inputs	1.000	1.000	1.000

The rows are still read as sales and the columns as purchases. Only now the sales are in terms of cents per dollar, and the purchases have the special interpretation of “input requirements” per dollar of output. We call these input requirements because they represent requirements during the period of analysis in order for each sector to produce its own outputs, scaled down to a “dollar of output” basis.

The technical coefficient matrix represents a recipe for production. To produce one dollar’s worth of output, the extractive industry needed a pinch of its own intermediate output, a dash of the intermediate output of the manufacturing sector, and a smidgen of the intermediate products of the services industry. For Manufacturing to produce a dollar’s worth of output, it required a pinch from Extractive, a dash from Manufacturing, and a smidgen from Services. And so it goes through all the identified industries for the region.

One of the key assumptions of input-output analysis, as mentioned earlier, is that this recipe does not change, regardless of the level of output. Thus, if the extractive industry were to experience an increase in final sales equal to \$10,000 it would require another \$180 worth of intermediate products from its own firms, \$90 from Manufacturing, and \$140 from Services. It should be emphasized that this process starts with a change in the final sales of an industry, or from “exogenous” forces. The coefficients in the inter-industry section of the table represent the “endogenous” component of the table

It can be seen that this first computed table gives the analyst limited ability for impact analysis. He or

she could go through the process of assuming any number of changes in the final sales of the identified industries, multiply these assumed changes by the direct requirements coefficients, and come up with estimates as to the direct effects from these changing final sales on each identified industry in the region. To make sure that this process is understood, one might ask: What is the direct effect on each regional industry from an increase in the exports from the manufacturing sector equal to \$10 million? The answer is that Manufacturing would increase by \$10 million plus a direct intermediate production effect of \$300,000, for a total of \$10.3 million, the extractive industry would find its intermediate production increasing by \$1.4 million, and the services industry would see its intermediate production increase by \$450,000.

But this is not the end of the story if each industry has to increase its output in order to service the increase in final sales of the manufacturing industry, then each must, in turn, increase its intermediate purchases and sales from and to one another to service this second round of expansion in activity. The second round must then be serviced by a third round of outputs.

TABLE 6-3A Round one of \$10 million change in final sales

	Intermediate (mil.\$)	Final (mil.\$)
Extractive	0.300	0.000
Manufacturing	1.040	10.000
Services	0.450	0.000
Total	1.179	10.000

TABLE 6-4A Round two of \$10 million change in final sales

Commodity	Extractive (thou.\$)	Manufg. (thou.\$)	Services (thou.\$)	Total (thou.\$)
Extractive	18.720	31.200	0.000	499.200
Manufacturing	9.360	9.000	4.050	106.650
Services	14.560	4.200	6.300	156.100
Total	42.640	325.200	10.350	761.950

Each round is smaller than the previous one due to leakages to imports and to local value added, until the process has completely played itself out. The first of three rounds of such a \$10,000 increase in final sales is shown in Table 6-3A.

Note that the only exogenous change is the initial change in final demand assumed for the manufacturing industry. The rest of the sales represent the direct first-round results from those sales on

the intermediate output of all industries in the region, including Manufacturing. These are recipe requirements for Manufacturing to produce the hypothesized increased final sales.

Table 6-4A presents second-round totals. Note that Manufacturing requires still more intermediate inputs from its own firms, this time to service the additional \$300,000 of output it had to produce to directly allow for the initial \$10 million increase in final sales. Similarly, the services industry needs to buy from each of the other industries to enable it to produce the additional \$450,000 directly required by Manufacturing. Finally, the extractive industry must have additional inputs to produce its additional \$1,040,000 for Manufacturing. The rounds of production in Table 6-4A are *indirect* impacts.

Manufacturing has now increased its sales three times: the \$10 million that was initially assumed, the \$300,000 needed to directly service that increase in final sales, and the \$22,410 to service the \$300,000 in the first round. The extractive industry has increased its sales by \$1,040,000 to service the final sales change for Manufacturing plus the \$49,900 to service that first-round increase, for a total of \$1,089,920 to this point and so it goes.

We will now run through a third round of increased production (Table 6-5A), this time to service the second round.

TABLE 6-5A Round three of \$10 million change in final sales

Commodity	Extractive (thou.\$)	Manufg. (thou.\$)	Services (thou.\$)	Total (thou.\$)
Extractive	0.899	2.331	0.000	3.230
Manufacturing	0.449	0.672	0.225	1.346
Services	0.699	0.351	0.351	1.401
Total	2.047	3.354	0.576	5.977

Each additional round is computed in the manner shown above, and the totals are added to determine the total direct and indirect effects from the initial assumed change in the final sales of one of the regional industries. This process is obviously cumbersome. It would be even more difficult—impossible, probably—to work such an iterative scheme for a larger number of industries or for higher direct coefficient values. Fortunately, the system of simultaneous equations represented by an input-output system can be solved using high-speed computers in a matter of seconds, even for the largest of tables. The solution for the system in this example is given in Table 6-6A.

TABLE 6-6A Direct and indirect input requirements

Commodity	Extractive (mil.\$)	Manufg. (mil.\$)	Services (mil.\$)
Extractive	1.019	0.109	0.001
Manufacturing	0.010	1.032	0.010
Services	0.015	0.049	1.015
Total	1.044	1.190	.026

The diagonal of Table 6-6A shows “ones” plus some other number (for example, 1.032 in row 2, column 2.) These ones represent the dollar increase to final sales of the industry for which such an exogenous change is assumed. The numbers appearing after the decimal represent the direct (shown in Table 6-2A) plus indirect effects from each assumed change in final sales. Thus, the \$10 million change for the example using Manufacturing turns into \$10,320,000 total - increase in Manufacturing sales: \$10 million to final sales, \$300,000 in direct sales, and \$20,000 in indirect sales. That \$10 million in Manufacturing sales turns into an increase of \$1,090,000 in sales by the extractive industry—\$1,040,000 of that direct and \$50,000 indirect. Finally, the \$10 million assumed increase in manufacturing leads to an increase of \$490,000 in the sales of services—\$450,000 of that direct and \$40,000 of that indirect.

The total impact on all of the industries in the region combined is \$11.9 million (1.190 X 10 million). The 1.190 is called the demand multiplier for Manufacturing, or the total direct and indirect purchases this sector must make from itself and from the other regional industries in order to produce one dollar’s final output. To conduct an impact study, simply multiply an assumed change in final demand for any of the industries by the demand multiplier for that same industry. This indicates the direct and indirect effects on the region resulting from the assumed change. The impacts stem from the fact that industries in a region interact with one another through their purchases from and sales to one another. The greater this level of interaction, the greater the industrial demand multiplier.

Thus, the input-output model represents a detailed accounting of the economic base of a region. It can be used to delineate the export structure of the regional economy and the multipliers that emerge from that structure. It also identifies, in final demand, the relationship between local activity, investment, and export activity in relation to the identified industrial structure. As in most models, its weakness is in its assumptions. But, at the least, the input output system can be used for simulations and sensitivity analyses for a regional economy.

Notes

1. According to *The American Heritage Dictionary*, 3d ed., version 3.6a, Houghton Mifflin Company, New York, 1993, *predict* means “to state or tell about, or make known in advance, especially on the basis of special knowledge.” Somewhat along the same line, *project* means “to calculate, estimate, or predict (something in the future), based on present data or trends.”
2. The Standard Industrial Classification (SIC) is the statistical classification underlying all establishment-based federal economic statistics classified by industry. This classification was established by the Office of Management and Budget and is used widely by states, industries, and analysts. The Major Group SIC 45 (Air Transportation) is a two digit classification (that is, the group number consists of two digits) and includes the following four-digit subcategories: Air Transportation, Scheduled (4512); Air Courier Services (4513); Air Transportation, Nonscheduled (4522); Airports, Flying Fields, and Airport Terminal Services (4581).
3. U.S. Department of Commerce, Regional Economic Measurements Division. *Regional Economic Information System*: Unpublished series, 1969—1990.

2) The Mathematics of the Model

The basic input-output model is production oriented and was developed by Wassily Leontief in the 1940's. It attempts to make operational the concept of general equilibrium, first discussed in detailed theoretical terms by Leon Walras.

The standard structural equation for an input-output model is as follows:

$$(1) \quad Y_j = x_{1j} + x_{2j} + \dots + F_j + M_j$$

where: Y_j is the gross dollar inputs of purchasing industry j ,

x_{ij} is the intermediate dollar sales from selling industry i to purchasing industry j ,
 F_j is the final payments of purchasing sector j , primarily payments to value added components in the economy, and
 M_j represents purchases from imports.

The same model from a sales, rather than purchases, point of view takes the following form:

$$(2) \quad Y_i = x_{i1} + x_{i2} + \dots + x_{ij} + D_i$$

where: Y_i is the gross dollar output of selling industry i ,

x_{ij} is as before, and

D_i is the sales of selling industry i to final uses (consumption, government, investment, and exports).

These equations make up the transactions table of an input-output system, dividing the economy into $i = j$ sectors and tracing through the stages of production as a good or service moves toward the final sale.

The transactions table is descriptive rather than analytical. To make the model analytical, a direct coefficient must be computed as follows:

$$(3) \quad a_{ij} = x_{ij}/Y_j.$$

This is the percentage of gross output required by the purchasing industry in the form of intermediate outputs from the selling industries. Then:

$$(4) \quad Y_i = a_{ij}Y_j + D_i.$$

Putting the model in vector/matrix form, there is a column vector of outputs, Y , a matrix, AY or X , of x_{ij} coefficients written in terms of the definition for technical coefficients,

($x_{ij} = a_{ij}Y_j$) and a column vector of final demands, or:

$$(5) \quad Y = AY + D.$$

If we assume the technical coefficients are constant, we can solve for this linear set of equations. The result will be industrial demand multipliers based on each industry's need to purchase intermediate outputs from the other industries in the region in order to produce a dollar's worth of output in the reference industry. The solution is as follows:

$$(6) \quad Y = AY + D$$

$$(7) \quad (I - A)Y = D$$

$$(8) \quad Y = (I - A)^{-1}D$$

Where: I is the identity matrix,
Y is a column vector of gross outputs,
D is a column vector of final demands,
A is a matrix of technical coefficients, and
 $(I - A)^{-1}$ is the Leontief inverse.

This inverse represents the direct and indirect input requirements of all industries in a region in order to produce a dollar's worth of output. It is out of this matrix that industrial demand multipliers are determined.

Thus, the most usual form of input-output analysis emphasizes the input structure of the economy. This is because most tables are constructed for relatively large areas where production relationships are deemed to be the most important. The emphasis on production would miss the point for small economies since little or no manufacturing activity takes place in such rural areas. For these economies, the emphasis should be on trade rather than production relationships.

**Table A-1: Population, St. Louis County, MN 1970
to 2004**

*Source: U.S. Bureau of the Census, Population Estimates and
Population Distribution Branches, CO-EST2003-01*

1970	220,693
1971	222,100
1972	220,300
1973	217,900
1974	215,700
1975	216,800
1976	220,500
1977	220,700
1978	220,300
1979	220,900
1980	222,229
1981	220,116
1982	217,595
1983	212,906
1984	208,391
1985	204,237
1986	200,877
1987	198,537
1988	197,045
1989	197,457
1990	193,433
1991	194,687
1992	194,556
1993	195,006
1994	197,692
1995	198,287
1996	199,122
1997	198,761
1998	198,452
1999	198,232
2000	200,528
2001	200,431
2002	200,854
2003	199,887
2004	198,799

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Table A-2. St. Louis County Employment by Major SIC Industry 1980 to 1999, and by Major NAICS Industry 2000 to 2004

Source: MN DEED

SIC TITLE	Average Employment by Year																			
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All Industries	82,696	81,176	72,812	68,830	71,359	71,513	71,675	72,611	75,342	78,671	79,650	81,649	82,846	82,594	84,519	86,712	89,179	90,846	92,864	93,642
Agriculture	223	234	214	200	235	204	186	N/A	N/A	N/A	318	316	322	327	328	266	251	253	289	297
Mining	10,973	10,813	7,246	5,801	6,040	5,113	4,034	N/A	N/A	N/A	5,326	5,306	5,181	4,964	5,033	5,073	5,051	5,051	4,927	4,723
Construction	3,939	3,400	2,820	2,557	2,642	2,825	3,681	3,959	3,225	3,356	3,465	3,515	3,331	3,097	3,158	3,312	3,361	3,589	3,635	4,063
Manufacturing	7,462	7,070	5,997	5,114	5,170	5,847	5,767	5,915	6,493	7,166	6,868	6,736	6,581	6,349	6,505	6,448	6,709	6,926	6,904	6,823
Transportation, Com., Elec.	3,448	3,435	3,244	3,194	3,310	3,206	3,218	3,244	4,485	4,545	4,733	4,749	4,698	4,708	4,779	4,888	5,659	5,963	6,076	6,318
Finance, Insur. and Real Est.	1,364	1,328	1,284	1,278	1,258	1,316	1,395	1,451	2,725	2,743	2,820	2,981	3,080	3,067	3,049	2,866	2,929	2,903	2,992	2,960
Services	22,525	23,022	22,387	22,903	23,235	23,473	23,973	24,374	28,441	30,035	30,472	31,577	32,455	32,571	33,403	34,752	35,912	37,335	38,768	39,402
Public Administration	5,838	5,568	5,447	4,971	6,204	6,344	6,373	5,986	6,058	6,050	5,968	5,934	5,982	5,819	5,888	5,895	5,995	5,915	6,001	6,020
Trade, Total	19,332	18,452	17,278	16,644	17,059	16,930	16,673	17,087	18,745	19,268	19,680	20,535	21,217	21,692	22,376	23,213	23,312	22,911	23,273	23,035

Note: N/A for Agriculture and Mining in 1989 and 1988 are reported from DEED as problems of disclosure.

NAICS TITLE	Average Employment by Year				
	2000	2001	2002	2003	2004
Total, All Industries	95,157	93,773	93,535	92,613	92,668
Agriculture, Forestry, Fishing & Hunting	248	245	243	259	249
Mining	4,570	3,353	3,009	2,732	2,752
Construction	4,127	3,659	3,821	3,901	3,926
Manufacturing	6,389	6,072	5,794	5,513	5,504
Utilities	999	992	1,014	988	942
Wholesale Trade	2,755	2,640	2,541	2,356	2,072
Retail Trade	13,046	12,910	12,448	12,311	12,183
Transportation and Warehousing	3,948	3,787	3,596	3,423	3,313
Information	2,871	2,325	2,352	2,372	2,356
Real Estate and Rental and Leasing	3,040	3,241	3,299	3,429	3,733

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Table A-3. St. Louis County, MN, Total Wages by Major SIC Industry 1980 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted

Source: MN DEED

<i>SIC</i>						<i>Transportation, Communication, Elec.</i>	<i>Finance, Insurance and Real Estate</i>		<i>Public Administration</i>	<i>Trade, Total</i>
<i>YEAR</i>	<i>Total Industry</i>	<i>Agriculture</i>	<i>Mining</i>	<i>Construction</i>	<i>Manufacturing</i>			<i>Services</i>		
1980	1,181,703,394	1,757,736	266,636,825	78,784,915	106,148,887	59,501,155	17,373,098	259,890,273	98,701,861	179,026,327
1981	1,272,016,627	1,912,545	298,406,071	72,410,598	116,721,871	66,466,405	17,862,159	290,948,648	96,115,964	178,560,636
1982	1,145,539,806	1,968,961	192,713,751	62,398,569	106,162,333	65,965,017	18,230,711	309,850,095	100,574,831	171,278,528
1983	1,076,337,336	2,024,072	144,279,237	56,580,083	93,375,962	67,460,763	19,987,547	330,211,935	87,417,911	167,533,476
1984	1,164,296,304	2,153,366	165,420,534	60,709,328	96,189,059	70,598,462	20,421,356	346,780,873	110,690,859	177,416,424
1985	1,195,221,023	2,042,795	149,049,297	65,253,533	110,967,215	74,017,204	21,771,112	364,647,215	112,333,726	176,954,041
1986	1,216,682,882	2,009,258	119,165,277	93,582,243	109,007,918	74,361,750	24,524,648	385,312,460	111,796,717	180,987,710
1987	1,289,855,326	2,029,000	118,933,000	103,349,369	117,481,048	79,624,327	28,006,411	414,246,332	114,534,055	185,428,389
1988	1,398,422,823	2,093,000	161,471,000	83,772,488	143,115,643	121,493,256	51,297,138	500,837,401	117,426,651	218,522,993
1989	1,524,610,698	2,073,000	174,536,000	91,092,853	158,367,973	124,885,831	51,721,912	552,542,969	126,284,692	235,785,774
1990	1,622,096,719	4,336,062	194,078,198	99,608,195	156,591,870	133,023,558	55,937,867	593,928,979	132,600,304	251,991,686
1991	1,728,250,578	4,494,908	201,309,543	103,794,892	159,546,048	138,460,219	61,231,723	642,948,752	146,605,376	269,859,117
1992	1,841,110,565	5,071,767	202,976,531	100,296,952	170,514,466	147,184,315	65,892,668	694,588,736	164,643,351	289,941,779
1993	1,843,308,905	5,141,454	197,338,787	92,516,063	160,613,871	149,364,379	68,072,918	704,139,929	167,761,816	298,359,688
1994	1,947,479,320	5,280,449	218,005,477	94,889,768	171,168,108	159,107,571	68,899,676	735,110,025	174,002,065	321,016,181
1995	2,054,428,819	4,199,370	231,166,087	103,492,488	175,038,407	164,782,061	70,723,423	786,950,912	178,260,101	339,815,970
1996	2,197,230,717	4,118,531	245,279,285	107,996,574	187,710,248	188,124,966	76,575,237	847,489,850	185,036,857	354,899,169
1997	2,303,726,473	4,259,540	246,098,749	121,529,221	201,357,981	201,963,078	81,606,820	904,991,701	183,172,480	358,746,903
1998	2,472,650,993	5,373,238	243,561,144	128,765,296	214,674,402	218,974,111	90,869,300	979,906,879	205,987,180	384,539,443
1999	2,585,423,174	5,724,674	228,866,218	146,806,745	216,207,231	232,801,174	98,983,631	1,036,625,055	217,024,304	402,384,142

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Table A-3. St. Louis County, MN, Total Wages by Major SIC Industry, 1980 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted (continued)

Source: MN DEED

NAICS TITLE	Total, All Industries	Agriculture, Forestry, Fishing & Hunting	Mining	Construction	Manufacturing	Utilities	Wholesale Trade	Retail Trade	Transportation and Warehousing	Information	
2000	\$2,755,359,123	\$6,216,688	\$231,881,457	\$153,264,448	\$207,541,558	\$63,819,224	\$107,622,255	\$227,171,886	\$128,024,671	\$134,458,775	
2001	2,810,787,365	6,341,756	176,987,547	137,175,611	203,101,178	68,289,637	106,103,847	233,466,990	129,932,982	75,912,264	
2002	2,915,403,297	6,379,966	157,343,017	149,291,460	203,085,947	74,129,132	102,298,491	234,741,183	128,517,659	76,476,700	
2003	2,956,935,752	7,100,758	159,937,854	153,326,144	201,820,191	68,961,279	98,961,529	239,095,785	122,870,569	75,483,921	
2004	\$3,130,087,069	\$7,175,770	\$167,298,106	\$165,372,514	\$207,126,939	\$84,533,301	\$89,040,103	\$249,351,548	\$127,755,246	\$78,315,723	
	Finance and Insurance	Real Estate and Rental and Leasing	Professional and Technical Services	Management of Companies and Entrpr.	Admin and Waste Services	Educational Services	Health Care and Social Assistance	Arts, Ent., and Recreation	Accommodation and Food Services	Other Services, Ex. Public Admin	Public Administration
2000	\$134,458,775	\$18,032,363	\$104,411,827	\$40,809,610	\$48,749,486	\$240,656,615	\$559,619,460	\$30,393,156	\$88,185,239	\$55,385,821	\$227,433,038
2001	173,962,809	17,335,088	107,514,474	34,037,390	50,214,782	259,617,242	600,742,563	32,866,860	89,840,106	56,912,716	234,792,679
2002	176,189,686	17,397,210	110,865,076	34,856,239	59,978,887	276,230,844	671,781,132	27,933,782	92,240,075	57,562,629	256,483,030
2003	207,135,769	18,866,096	110,338,665	32,447,576	62,479,050	274,370,031	699,690,475	11,678,088	91,625,085	57,263,172	244,122,204
2004	\$233,364,658	\$18,548,028	\$110,372,451	\$35,572,322	\$69,630,589	\$283,298,322	\$763,699,075	\$12,326,857	\$93,939,744	\$64,319,934	\$247,787,619

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Table A-4: St. Louis County, Employment by Major NAICS Industry 2000 to 2004 Ranked

Source: Minnesota Department of Employment and Economic Development

Average Employment by Year						
NAICS TITLE	2000	2001	2002	2003	2004	
Total, All Industries	95,157	Total, All Industries 93,773	Total, All Industries 93,535	Total, All Industries 92,613	Total, All Industries 92,668	
Health Care and Social Assistance	17,916	Health Care and Social Assistance 18,470	Health Care and Social Assistance 19,664	Health Care and Social Assistance 19,960	Health Care and Social Assistance 20,566	
Retail Trade	13,046	Retail Trade 12,910	Retail Trade 12,448	Retail Trade 12,311	Retail Trade 12,183	
Accommodation and Food Services	8,781	Accommodation and Food Services 9,022	Accommodation and Food Services 9,068	Accommodation and Food Services 8,964	Accommodation and Food Services 8,907	
Educational Services	7,735	Educational Services 7,940	Educational Services 7,898	Educational Services 7,838	Educational Services 7,737	
Manufacturing	6,389	Public Administration 6,256	Public Administration 6,181	Public Administration 6,050	Public Administration 5,919	
Public Administration	5,783	Manufacturing 6,072	Manufacturing 5,794	Manufacturing 5,513	Manufacturing 5,504	
Mining	4,570	Transportation and Warehousing 3,787	Construction 3,821	Construction 3,901	Construction 3,926	
Construction	4,127	Construction 3,659	Transportation and Warehousing 3,596	Finance and Insurance 3,429	Finance and Insurance 3,733	
Transportation and Warehousing	3,948	Mining 3,353	Finance and Insurance 3,299	Transportation and Warehousing 3,423	Transportation and Warehousing 3,313	
Other Services, Ex. Public Admin	3,293	Other Services, Ex. Public Admin 3,287	Other Services, Ex. Public Admin 3,235	Other Services, Ex. Public Admin 3,188	Administrative and Waste Services 3,242	
Finance and Insurance	3,040	Finance and Insurance 3,241	Administrative and Waste Services 3,021	Administrative and Waste Services 3,170	Other Services, Ex. Public Admin 3,191	
Information	2,871	Professional and Technical Services 2,757	Mining 3,009	Mining 2,732	Mining 2,752	
Administrative and Waste Services	2,780	Wholesale Trade 2,640	Professional and Technical Services 2,809	Professional and Technical Services 2,639	Professional and Technical Services 2,585	
Professional and Technical Services	2,776	Administrative and Waste Services 2,469	Wholesale Trade 2,541	Information 2,372	Information 2,356	
Wholesale Trade	2,755	Information 2,325	Information 2,352	Wholesale Trade 2,356	Wholesale Trade 2,072	
Arts, Entertainment, and Recreation	2,251	Arts, Entertainment, and Recreation 2,312	Arts, Entertainment, and Recreation 1,887	Utilities 988	Arts, Entertainment, and Recreation 983	
Utilities	999	Utilities 992	Utilities 1,014	Arts, Entertainment, and Recreation 944	Utilities 942	
Real Estate and Rental and Leasing	963	Real Estate and Rental and Leasing 954	Real Estate and Rental and Leasing 885	Real Estate and Rental and Leasing 943	Real Estate and Rental and Leasing 912	
Management of Companies and Entpr.	955	Management of Companies and Entpr. 705	Management of Companies and Entpr. 722	Management of Companies and Entpr. 705	Management of Companies and Entpr. 662	
Agriculture, Forestry, Fishing & Hunting	248	Agriculture, Forestry, Fishing & Hunting 245	Agriculture, Forestry, Fishing & Hunting 243	Agriculture, Forestry, Fishing & Hunting 259	Agriculture, Forestry, Fishing & Hunting 249	

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Table A-5: St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars

Source: MN DEED; UMD BBER, County Business Patterns

	<i>Real Wages by Year</i>										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	
Total, All Industries	2,709,026,349	2,643,387,688	2,242,409,009	2,041,366,694	2,116,800,499	2,098,301,591	2,097,001,792	2,144,838,654	2,232,984,542	2,322,572,265	
Agriculture	4,029,567	3,974,475	3,854,267	3,838,827	3,915,022	3,586,282	3,463,037	3,373,927**	3,342,077**	3,157,981**	
Mining	611,258,450	620,119,987	377,239,664	273,638,031	300,750,134	261,667,400	205,386,139	197,767,990**	257,834,927**	265,885,890**	
Construction	180,612,505	150,477,029	122,146,007	107,309,013	110,375,284	114,557,550	161,292,753	171,854,717	133,766,889	138,769,677	
Manufacturing	243,343,747	242,560,632	207,814,142	177,095,575	174,880,782	194,811,403	187,879,523	195,353,609	228,525,317	241,255,727	
Transportation, Communication, Elec.	136,404,954	138,124,355	129,127,375	127,945,162	128,354,663	129,942,842	128,165,461	132,403,480	193,998,952	190,249,464	
Finance, Insurance and Real Estate	39,827,405	37,119,492	35,686,853	37,908,109	37,127,951	38,220,846	42,269,215	46,570,520	81,910,646	78,792,493	
Services	595,792,143	604,622,658	606,535,575	626,275,447	630,480,336	640,165,975	664,101,494	688,830,388	799,731,066	841,736,829	
Public Administration	226,271,621	199,739,336	196,876,534	165,795,616	201,246,422	197,210,417	192,686,130	190,453,195	187,505,447	192,380,470	
Trade, Total	410,413,509	371,068,252	335,279,937	317,741,703	322,559,793	310,656,304	311,939,584	308,339,988	348,934,855	359,193,006	
	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	
Total, All Industries	2,352,040,243	2,396,964,274	2,478,872,315	2,409,695,863	2,482,313,384	2,546,467,217	2,645,359,353	2,711,364,055	2,865,544,617	2,931,491,222	
Agriculture	6,266,887	6,234,127	6,828,630	6,721,250	6,730,613	5,205,125	4,958,512	5,013,253	6,227,022	6,490,942	
Mining	280,500,165	279,202,443	273,287,717	257,974,373	277,876,077	286,530,668	295,304,378	289,645,194	282,261,964	259,500,772	
Construction	143,963,183	143,956,352	135,039,873	120,943,144	120,949,239	128,279,075	130,022,644	143,033,457	149,225,549	166,457,348	
Manufacturing	226,321,379	221,279,357	229,580,774	209,965,123	218,175,814	216,960,335	225,994,046	236,987,680	248,785,243	245,147,335	
Transportation, Communication, Elec.	192,258,226	192,034,768	198,169,046	195,259,039	202,803,105	204,247,581	226,493,347	237,699,847	253,768,157	263,962,436	
Finance, Insurance and Real Estate	80,846,695	84,924,174	88,717,926	88,989,441	87,821,517	87,661,776	92,192,876	96,046,905	105,308,042	112,232,941	
Services	858,402,327	891,725,545	935,194,670	920,498,495	936,992,468	975,426,688	1,020,336,728	1,065,127,304	1,135,609,874	1,175,380,990	
Public Administration	191,646,499	203,331,538	221,675,902	219,309,391	221,788,057	220,953,629	222,775,413	215,584,308	238,717,658	246,073,776	
Trade, Total	364,202,215	374,275,971	390,377,777	390,035,606	409,176,495	421,202,341	427,281,409	422,226,106	445,641,109	456,244,684	

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Table A-5: St. Louis County Economic Activity as Measured by Total Wages for Major Industries 1980 to 2004 Adjusted for 2004 Dollars (continued)

Source: MN DEED, UMD/LSBE BBER

	<i>SIC and NAICS 2000-2004 Bridged</i>				
	2000	2001	2002	2003	2004
Total, All Industries	3,022,574,555	2,998,067,381	3,061,254,490	3,035,680,237	3,130,087,069
Agriculture	6,819,584	6,764,301	6,699,142	7,289,854	7,175,770
Mining	254,369,380	188,780,054	165,214,541	164,197,069	167,298,106
Construction	168,128,073	146,315,488	156,760,182	157,409,286	165,372,514
Manufacturing	227,668,991	216,633,611	213,245,889	207,194,750	207,126,939
Transportation, Communication, Elec.	210,448,965	211,429,998	212,784,763	196,940,414	212,288,547
Finance, Insurance and Real Estate	167,279,768	204,043,889	203,271,621	232,020,393	251,912,686
Services	1,226,741,303	1,201,950,311	1,284,463,741	1,266,903,258	1,317,643,017
Public Administration	249,489,552	250,436,686	269,314,310	250,623,284	247,787,619
Trade, Total	464,000,028	458,022,175	450,755,668	441,125,028	432,331,395
*adjusted to 2004 Dollars					
** County Business Patterns					

Note: To combine SIC and NAICS sectors the following sectors have been configured:

- Transportation, Communication, Elec. includes NAICS transportation and Utilities
- Finance, Insurance and Real Estate includes Finance and Real Estate
- Services includes Information, Professional and Technical, Administrative Services with Waste Services, Education, Human C and Social Assistance, Arts and Entertainment

Trade, Total includes Wholesale, retail, accommodation and food

Table A-6. Population of Selected East Iron Range Cities in St. Louis County, MN 1970 to 2004

Source: U.S. Bureau of the Census, Population Estimates and Population Distribution Branches, CO-EST2003-01

	<i>Aurora</i>	<i>Babbitt</i>	<i>Biwabik</i>	<i>Hoyt Lakes</i>	<i>Soudan</i>	<i>Tower</i>
1970	2,531	3,076	1,483	3,634	N/A	699
1980	2,670	2,435	1,428	3,186	N/A	640
1990	1,965	1,562	1,097	2,348	502	502
1991	1,952	1,557	1,091	2,339	N/A	499
1992	1,952	1,547	1,091	2,324	N/A	493
1993	1,939	1,585	1,082	2,327	N/A	492
1994	1,923	1,585	1,078	2,329	N/A	493
1995	1,905	1,576	1,071	2,318	N/A	497
1996	1,895	1,580	1,070	2,317	N/A	498
1997	1,895	1,586	1,072	2,312	N/A	493
1998	1,879	1,577	1,071	2,287	N/A	494
1999	1,873	1,572	1,072	2,280	N/A	496
2000	1,850	1,670	954	2,082	372	469
2001	1,831	1,661	943	2,070	N/A	476
2002	1,815	1,651	934	2,055	N/A	473
2003	1,791	1,642	905	1,987	N/A	504
2004	1,777	1,630	904	1,961	N/A	504

Note: Data for Soudan, MN was not found for years other than the 1990 and 2000 decennial census.

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Table A-7. Selected Cities in St. Louis County, Employment by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004

Source: Minnesota Department of Employment and Economic Development, Quarterly Census of Employment and Wages (QCEW)

Aurora	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	706	729	744	742	714	689	678	663	702	685	650	680
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	25	N/A	N/A	N/A	N/A	16	24	19	N/A	16	N/A	N/A
Manufacturing	84	N/A	24	27	37	42	48	52	58	69	66	78
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A		144	135	135	132	144	139	124	127	124
Public Administration	61	80	70	69	68	54	75	70	83	77	48	54
Trans, Commun, and Public Utilities	11	55	78	79	66	62	60	56	54	N/A	N/A	60
Finance, Insurance and Real Estate	18	17	17	17	17	17		27	25	25	26	23
Services	350	343	393	384	370	360	316	291	300	318	318	320
Babbitt	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	127	425	416	409	438	329	358	366	366	368	356	366
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7	5	4	3	5
Manufacturing	19	25	34	34	36	34	58	57	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	89	89	110	109	110	124	120	111	107	119
Public Administration	38	31	31	31	36	35	39	35	35	34	29	30
Trans, Commun, and Public Utilities	5	5	5	5	5	5	5	5	18	19	21	21
Finance, Insurance and Real Estate	13	22	24	24	14	14	14	14	16	15	15	14
Services	130	131	133	136	131	95	102	103	102	100	97	94
Biwabik	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	280	291	271	289	257	263	289	314	345	346	330	336
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	5	5	5	6	4	4	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	109	131	N/A	N/A	82	N/A	N/A	66	75	92	73	64
Public Administration	38	35	35	34	46	56	62	73	81	88	90	85
Trans, Commun, and Public Utilities	5	4	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	16	12	N/A	N/A	N/A
Services	114	112	103	110	104	109	114	112	126	107	110	131

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Table A-7. Selected Cities in St. Louis County, Employment by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004 (continued)

Hoyt Lakes	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	155	160	147	143
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	47	56	58	60	66	62	76	85	80	87	86	82
Public Administration	85	82	87	77	79	108	106	105	103	106	102	92
Transportation*	6	6	5	6	5	5	5	5	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate	N/A	N/A	N/A	N/A	16	15	14	14	18	N/A	N/A	N/A
Services	67	68	72	76	88	85	118	118	144	165	157	158

*Data given for Transportation Vs Transp,Comm, Pub Ut

Tower	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	174	164	164	177	208	190	209	213	268	623	654	690
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	9	11	9	7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	22	18	19	19	26	28	36	36	44	50	45	40
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	71	72	69	69	65	68	78	75	86	84	90	90
Public Administration	22	18	26	32	41	34	36	29	25	36	36	39
Transportation*	2	2	2	2	N/A	N/A	N/A	N/A	N/A	N/A	8	7
Finance, Insurance and Real Estate	16	15	14	14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Services	26	25	21	31	37	34	37	52	85	424	452	487

*Transportation, Comm, Electricity- data given.

Table A-7. Selected Cities in St. Louis County, Employment by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004 (continued)

Source: MN DEED, Quarterly Census of Employment and Wages (QCEW)

Aurora	2000	2001	2002	2003	2004
Total, All industries	715	686	670	753	747
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	26	20
Manufacturing	N/A	N/A	N/A	79	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	94	N/A	N/A	N/A	N/A
Information	N/A	18	14	14	12
Accommodation & Food Services	N/A	N/A	N/A	N/A	30
Public Administration	89	93	80	76	69
Postal Service	5	5	5	5	5
Trade, Transportation and Utilities	161	117	111	112	110
Financial Activities	22	22	22	67	61
Educational & Health Services*	288	285	290	318	338
Leisure & Hospitality	32	33	34	42	44
Babbitt	2000	2001	2002	2003	2004
Total, All industries	400	380	372	353	338
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	6	6	7
Manufacturing	85	74	68	45	29
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	102	97	95	91	87
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	32	31	33	28	31
Postal Service	5	5	5	5	5
Trade, Transportation and Utilities	129	123	118	120	119
Financial Activities	13	14	15	15	15
Educational & Health Services*	67	66	64	60	51
Leisure & Hospitality	48	47	49	60	54

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Table A-7. Selected Cities in St. Louis County, Employment by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004 (continued)

Biwabik	2000	2001	2002	2003	2004
Total, All industries	407	415	365	373	410
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	33	23	20	24	33
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	95	96
Public Administration	93	91	76		
Postal Service	2	2	2	2	2
Trade, Transportation and Utilities	35	25	22	26	35
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational & Health Services*	76	103	108	N/A	N/A
Leisure & Hospitality	106	102	72	95	
Hoyt Lakes	2000	2001	2002	2003	2004
Total, All industries	148	622	304	273	247
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	49	49	43
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	94	94	86	95	93
Postal Service	5	6	6	5	4
Trade, Transportation and Utilities	61	59	54	54	48
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational & Health Services*	48	49	18	N/A	N/A
Leisure & Hospitality	37	44	57	43	28
*Educational & Health Serv only for Total Govt mentioned					
Tower	2000	2001	2002	2003	2004
Total, All industries	715	N/A	N/A	760	864
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	32	29	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	69	61	45
Information	20	19	19	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	29	N/A
Public Administration	38	N/A	N/A	46	51
Postal Service	2	2	2	2	2
Trade, Transportation and Utilities	76	79	75	67	52
Financial Activities	34	30	31	14	
Educational & Health Services	N/A	N/A	N/A	N/A	N/A
Leisure & Hospitality	N/A	N/A	N/A	486	540

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**Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages
by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted**

Source: Minnesota Department of Employment and Economic Development, Quarterly Census of Employment and Wages (QCEW)

Aurora	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	16,463,785	17,056,377	17,134,986	16,792,927	16,668,302	15,715,634	16,081,843	16,326,070	18,004,746	17,234,339	16,847,954	17,849,242
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	1,025,511	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	1,319,879		311,782	355,318	495,405	643,610	786,687	976,504	1,236,760	1,750,772	1,487,503	1,588,091
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	N/A	2,234,299	2,225,744	20,534,250	1,975,361	2,209,251	2,166,830	1,946,476	2,177,171	2,167,034
Public Administration	1,619,898	1,793,337	1,553,207	1,544,535		1,285,248	1,555,407	1,554,471	1,590,906	1,576,343	594,157	605,066
Trans, Commun, and Public Utilities	297,076	2,582,054	3,632,962	3,733,965	3,450,419	3,379,131	3,576,885	3,282,230	3,295,736	N/A	N/A	3,602,491
Finance, Insurance and Real Estate	525,908	493,280	504,695	493,566	485,166	495,743		597,095	615,000	655,033	679,865	640,924
Services	8,422,323	7,930,325	8,356,420	7,849,753	7,783,282	7,285,205	6,905,496	7,098,239	7,817,549	7,800,833	8,315,246	8,714,068
Babbitt	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	4,137,994	10,805,715	9,967,397	9,240,562	8,505,805	6,813,946	7,046,284	6,760,500	6,976,716	6,866,447	7,205,235	7,829,488
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	379,279	553,730	704,801	637,974	829,157	672,726	1,140,108	1,163,172	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	1,196,626	1,206,480	1,384,124	1,429,710	1,489,484	1,548,580	1,553,006	1,541,338	1,546,560	1,683,306
Public Administration	762,690	735,598	753,289	733,319	767,662	809,363	773,710	733,357	653,838	627,892	632,947	627,853
Trans, Commun, and Public Utilities	176,477	175,880	170,384	166,349	168,564	193,240	183,420	181,549	360,095	304,843	331,033	379,345
Finance, Insurance and Real Estate	238,967	264,999	265,901	261,575	233,063	223,881	221,103	221,464	304,703	198,392	221,808	246,244
Services	3,732,303	3,444,352	3,071,923	3,077,066	2,966,857	2,158,035	2,568,667	2,406,865	2,396,009	2,235,972	2,475,588	2,560,902

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**Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages
by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted (continued)**

Biwabik	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	5,887,529	5,816,009	5,200,194	5,604,886	6,214,017	6,136,762	7,797,832	7,673,942	8,038,063	8,352,413	8,131,686	8,208,613
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	118,275	109,470	116,357	173,168	94,631	98,628	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,047,459	N/A	N/A	N/A	794,464	N/A	N/A	753,695	777,980	875,882	701,352	666,289
Public Administration	1,220,153	1,166,645	1,171,494	1,191,787	1,224,263	1,455,763	1,355,577	1,574,319	1,849,090	1,831,450	1,926,602	1,972,394
Transp, Commun, and Public Utilities	91,170	92,607	86,147	86,463	86,844	88,346	62,680	N/A	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	362,957	256,064	N/A	N/A	N/A
Services	3,125,964	3,132,651	2,666,181	2,946,733	3,497,391	3,232,849	3,230,483	2,493,419	2,171,724	2,324,607	2,433,776	2,590,235
Hoyt Lakes	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	860,135	982,620	946,366	1,068,744	1,150,879	1,132,348	1,208,510	1,237,015	1,185,304	1,305,533	1,295,163	1,557,324
Public Administration	1,164,545	1,119,249	1,190,651	1,148,200	1,160,677	1,235,053	1,233,166	1,056,563	1,224,917	1,201,730	1,277,859	1,258,972
Transportation*	237,378	236,925	219,443	221,779	225,755	225,242	227,134	215,081	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate	N/A	N/A	N/A	N/A	350,693	386,523	345,228	316,332	357,445	N/A	N/A	N/A
Services	1,905,348	1,999,647	2,277,976	1,963,595	1,990,684	2,152,830	1,928,795	1,950,639	3,835,304	3,812,259	3,884,861	3,937,825

*Data given for Transportation Vs Transp,Comm, Pub Ut

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**Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages
by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted (continued)**

Tower	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	3,297,046	2,974,208	2,742,169	2,939,190	3,634,649	3,260,200	3,294,378	3,578,640	4,379,259	11,602,207	12,269,243	12,918,675
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	447,037	370,416	314,791	357,710	778,761	790,444	820,345	870,565	960,222	997,168	1,016,888	1,029,048
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	816,707	776,381	709,770	730,252	716,487	693,166	825,167	761,894	853,000	881,844	974,685	974,079
Public Administration	571,276	541,825	539,157	594,070	693,293	710,633	748,247	673,365	469,872	705,983	790,680	843,698
Transportation*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Services	621,784	552,566	410,706	573,870	633,729	505,466	389,153	704,668	1,394,562	8,247,628	8,578,694	9,218,153

*Transportation, Comm, Electricity- data given.

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Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted (continued)

Source: MN DEED, Quarterly Census of Employment and Wages (QCEW)

Aurora	2000	2001	2002	2003	2004
Total, All industries	18,703,120	17,615,695	19,375,104	19,955,498	21,418,610
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	582,922	N/A
Manufacturing	N/A	N/A	N/A	1722907	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,926,420	N/A	N/A	N/A	N/A
Information	389,374	325,842	306,817	268,186	286,877
Accommodation & Food Services	N/A	N/A	N/A	N/A	182728
Public Administration	1,853,204	1,793,097	1,857,450	1,884,199	1,881,331
Postal Service	226,483	206,388	215,810	214,025	211,400
Trade, Transportation and Utilities	5,474,567	4,151,290	4,136,254	4,056,815	4,462,731
Financial Activities	719,242	605,923	600,411	1,881,177	1,806,685
Educational & Health Services	8,126,847	8,156,585	9,684,786	9,066,363	10,317,405
Leisure & Hospitality	224,590	230,233	243,231	319,741	345,456

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**Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages
by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted
(continued)**

<i>Babbitt</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>
Total, All industries	8,285,222	7,317,547	7,626,242	6,622,502	6,455,008
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	117,852	146,240	173,548
Manufacturing	2,069,923	1,370,696	1,781,978	1,088,415	683,382
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,547,992	1,512,894	1,568,519	1,430,775	1,435,052
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	644,005	721,845	765,694	769,834	801,476
Postal Service	179,052	188,468	201,690	195,609	200,240
Trade, Transportation and Utilities	2,134,294	1,984,237	1,930,702	1,839,389	1,908,143
Financial Activities	265,842	279,894	317,927	310,944	304,605
Educational&Health Services	2,288,622	2,216,447	2,105,724	1,863,111	1,881,414
Leisure & Hospitality	421,191	407,855	396,667	385,903	362,050
<i>Biwabik</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>	<i>2003</i>	<i>2004</i>
Total, All industries	8,658,693	8,255,006	7,378,013	6,834,232	7,196,771
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	368,925	245,641	239,689	309,919	434,811
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	2,166,549	2,028,820	2,054,642	N/A	N/A
Postal Service	69,860	64,232	79,057	89,538	71,984
Trade, Transportation and Utilities	438,786	309,874	318,745	399,457	506,795
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational &Health Services	1,962,225	2,817,833	2,596,007	N/A	N/A
Leisure & Hospitality	1,316,813	1,139,153	649,383	1,068,702	N/A

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**Table A-8. Selected Cities in St. Louis County, Economic Activity as Measured by Wages
by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Unadjusted
(continued)**

Hoyt Lakes	2000	2001	2002	2003	2004
Total, All industries	2,698,806	31,655,387	6,795,483	6,057,219	3,954,036
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	634,576	704,747	626,727
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	1,259,280	1,220,769	1,212,096	1,205,329	1,203,861
Postal Service	224,919	231,781	248,496	236,828	194,691
Trade, Transportation and Utilities	1,288,940	1,019,358	883,072	941,575	821,418
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational & Health Services*	1,476,338	1,600,051	784,915	N/A	N/A
Leisure & Hospitality	321,291	346,029	403,907	304,031	186,791
*Educational & Health Serv only for Total Govt mentioned					
Tower	2000	2001	2002	2003	2004
Total, All industries	14,608,806	add fed+st+pvt	N/A	16,676,288	18,308,683
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	951,662	829,920	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	936,277	777,409	605,963
Information	360,713	401,484	410,372	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	207,703	N/A
Public Administration	969,733	N/A	N/A	1,434,127	1,532,051
Postal Service	88,363	75,694	84,318	76,844	80,684
Trade, Transportation and Utilities	1,066,174	1,112,681	1,147,878	984,826	813,337
Financial Activities	1,066,059	790,038	922,608	302,350	N/A
Educational & Health Services	N/A	N/A	N/A	N/A	N/A
Leisure & Hospitality	N/A	N/A	N/A	10,516,152	11,997,716

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Table A-9. Selected Cities in St. Louis County, Economic Activity as Measured by Wages by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Adjusted for 2004 Dollars

Source: Minnesota Department of Employment and Economic Development, Quarterly Census of Employment and Wages (QCEW)

Aurora	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	16,463,785	17,056,377	17,134,986	16,792,927	16,668,302	15,715,634	16,081,843	16,326,070	18,004,746	17,234,339	16,847,954	17,849,242
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	1,025,511	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	1,319,879	N/A	311,782	355,318	495,405	643,610	786,687	976,504	1,236,760	1,750,772	1,487,503	1,588,091
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	N/A	2,234,299	2,225,744	20,534,250	1,975,361	2,209,251	2,166,830	1,946,476	2,177,171	2,167,034
Public Administration	1,619,898	1,793,337	1,553,207	1,544,535	N/A	1,285,248	1,555,407	1,554,471	1,590,906	1,576,343	594,157	605,066
Trans, Commun, and Public Utilities	297,076	2,582,054	3,632,962	3,733,965	3,450,419	3,379,131	3,576,885	3,282,230	3,295,736	N/A	N/A	3,602,491
Finance, Insurance and Real Estate	525,908	493,280	504,695	493,566	485,166	495,743	N/A	597,095	615,000	655,033	679,865	640,924
Services	8,422,323	7,930,325	8,356,420	7,849,753	7,783,282	7,285,205	6,905,496	7,098,239	7,817,549	7,800,833	8,315,246	8,714,068
Babbitt	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	4,137,994	10,805,715	9,967,397	9,240,562	8,505,805	6,813,946	7,046,284	6,760,500	6,976,716	6,866,447	7,205,235	7,829,488
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	379,279	553,730	704,801	637,974	829,157	672,726	1,140,108	1,163,172	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	1,196,626	1,206,480	1,384,124	1,429,710	1,489,484	1,548,580	1,553,006	1,541,338	1,546,560	1,683,306
Public Administration	762,690	735,598	753,289	733,319	767,662	809,363	773,710	733,357	653,838	627,892	632,947	627,853
Trans, Commun, and Public Utilities	176,477	175,880	170,384	166,349	168,564	193,240	183,420	181,549	360,095	304,843	331,033	379,345
Finance, Insurance and Real Estate	238,967	264,999	265,901	261,575	233,063	223,881	221,103	221,464	304,703	198,392	221,808	246,244
Services	3,732,303	3,444,352	3,071,923	3,077,066	2,966,857	2,158,035	2,568,667	2,406,865	2,396,009	2,235,972	2,475,588	2,560,902
Biwabik	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	5,887,529	5,816,009	5,200,194	5,604,886	6,214,017	6,136,762	7,797,832	7,673,942	8,038,063	8,352,413	8,131,686	8,208,613
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	118,275	109,470	116,357	173,168	94,631	98,628	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,047,459	N/A	N/A	N/A	794,464	N/A	N/A	753,695	777,980	875,882	701,352	666,289
Public Administration	1,220,153	1,166,645	1,171,494	1,191,787	1,224,263	1,455,763	1,355,577	1,574,319	1,849,090	1,831,450	1,926,602	1,972,394
Transp, Commun, and Public Utilities	91,170	92,607	86,147	86,463	86,844	88,346	62,680	N/A	N/A	N/A	N/A	N/A

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Table A-9. Selected Cities in St. Louis County, Economic Activity as Measured by Wages by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Adjusted for 2004 Dollars (continued)

Finance, Insurance and Real Estate Services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	362,957	256,064	N/A	N/A	N/A
Hoyt Lakes	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries												
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	860,135	982,620	946,366	1,068,744	1,150,879	1,132,348	1,208,510	1,237,015	1,185,304	1,305,533	1,295,163	1,557,324
Public Administration	1,164,545	1,119,249	1,190,651	1,148,200	1,160,677	1,235,053	1,233,166	1,056,563	1,224,917	1,201,730	1,277,859	1,258,972
Transportation*	237,378	236,925	219,443	221,779	225,755	225,242	227,134	215,081	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate Services	N/A	N/A	N/A	N/A	350,693	386,523	345,228	316,332	357,445	N/A	N/A	N/A
	1,905,348	1,999,647	2,277,976	1,963,595	1,990,684	2,152,830	1,928,795	1,950,639	3,835,304	3,812,259	3,884,861	3,937,825
*Data given for Transportation Vs Transp,Comm, Pub Ut												
Tower	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
Total, All industries	3,297,046	2,974,208	2,742,169	2,939,190	3,634,649	3,260,200	3,294,378	3,578,640	4,379,259	11,602,207	12,269,243	12,918,675
Mining	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Manufacturing	447,037	370,416	314,791	357,710	778,761	790,444	820,345	870,565	960,222	997,168	1,016,888	1,029,048
Wholesale Trade	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Retail Trade	816,707	776,381	709,770	730,252	716,487	693,166	825,167	761,894	853,000	881,844	974,685	974,079
Public Administration	571,276	541,825	539,157	594,070	693,293	710,633	748,247	673,365	469,872	705,983	790,680	843,698
Transportation*	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Finance, Insurance and Real Estate Services	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	621,784	552,566	410,706	573,870	633,729	505,466	389,153	704,668	1,394,562	8,247,628	8,578,694	9,218,153

*Transportation, Comm, Electricity- data given.

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Table A-9. Selected Cities in St. Louis County, Economic Activity as Measured by Wages by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Adjusted for 2004 Dollars (continued)

Source: MN DEED, Quarterly Census of Employment and Wages (QCEW)

Aurora	2000	2001	2002	2003	2004
Total, All industries	18,703,120	17,615,695	19,375,104	19,955,498	21,418,610
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	582,922	N/A
Manufacturing	N/A	N/A	N/A	1722907	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,926,420	N/A	N/A	N/A	N/A
Information	389,374	325,842	306,817	268,186	286,877
Accommodation & Food Services	N/A	N/A	N/A	N/A	182728
Public Administration	1,853,204	1,793,097	1,857,450	1,884,199	1,881,331
Postal Service	226,483	206,388	215,810	214,025	211,400
Trade, Transportation and Utilities	5,474,567	4,151,290	4,136,254	4,056,815	4,462,731
Financial Activities	719,242	605,923	600,411	1,881,177	1,806,685
Educational & Health Services	8,126,847	8,156,585	9,684,786	9,066,363	10,317,405
Leisure & Hospitality	224,590	230,233	243,231	319,741	345,456
Babbitt	2000	2001	2002	2003	2004
Total, All industries	8,285,222	7,317,547	7,626,242	6,622,502	6,455,008
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	117,852	146,240	173,548
Manufacturing	2,069,923	1,370,696	1,781,978	1,088,415	683,382
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	1,547,992	1,512,894	1,568,519	1,430,775	1,435,052
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	644,005	721,845	765,694	769,834	801,476
Postal Service	179,052	188,468	201,690	195,609	200,240
Trade, Transportation and Utilities	2,134,294	1,984,237	1,930,702	1,839,389	1,908,143
Financial Activities	265,842	279,894	317,927	310,944	304,605
Educational & Health Services	2,288,622	2,216,447	2,105,724	1,863,111	1,881,414
Leisure & Hospitality	421,191	407,855	396,667	385,903	362,050
Biwabik	2000	2001	2002	2003	2004
Total, All industries	8,658,693	8,255,006	7,378,013	6,834,232	7,196,771
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A

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Table A-9. Selected Cities in St. Louis County, Economic Activity as Measured by Wages by Major SIC Industry 1988 to 1999, and by Major NAICS Industry 2000 to 2004, Adjusted for 2004 Dollars (continued)

Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	368,925	245,641	239,689	309,919	434,811
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	2,166,549	2,028,820	2,054,642	N/A	N/A
Postal Service	69,860	64,232	79,057	89,538	71,984
Trade, Transportation and Utilities	438,786	309,874	318,745	399,457	506,795
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational & Health Services	1,962,225	2,817,833	2,596,007	N/A	N/A
Leisure & Hospitality	1,316,813	1,139,153	649,383	1,068,702	N/A
Hoyt Lakes	2000	2001	2002	2003	2004
Total, All industries	2,698,806	31,655,387	6,795,483	6,057,219	3,954,036
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	N/A	N/A	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	634,576	704,747	626,727
Information	N/A	N/A	N/A	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	N/A	N/A
Public Administration	1,259,280	1,220,769	1,212,096	1,205,329	1,203,861
Postal Service	224,919	231,781	248,496	236,828	194,691
Trade, Transportation and Utilities	1,288,940	1,019,358	883,072	941,575	821,418
Financial Activities	N/A	N/A	N/A	N/A	N/A
Educational & Health Services*	1,476,338	1,600,051	784,915	N/A	N/A
Leisure & Hospitality	321,291	346,029	403,907	304,031	186,791
*Educational & Health Serv only for Total Govt mentioned					
Tower	2000	2001	2002	2003	2004
Total, All industries	14,608,806	add fed+st+pvt	N/A	16,676,288	18,308,683
Mining	N/A	N/A	N/A	N/A	N/A
Construction	N/A	N/A	N/A	N/A	N/A
Manufacturing	N/A	N/A	951,662	829,920	N/A
Wholesale Trade	N/A	N/A	N/A	N/A	N/A
Retail Trade	N/A	N/A	936,277	777,409	605,963
Information	360,713	401,484	410,372	N/A	N/A
Accommodation & Food Services	N/A	N/A	N/A	207,703	N/A
Public Administration	969,733	N/A	N/A	1,434,127	1,532,051
Postal Service	88,363	75,694	84,318	76,844	80,684
Trade, Transportation and Utilities	1,066,174	1,112,681	1,147,878	984,826	813,337
Financial Activities	1,066,059	790,038	922,608	302,350	N/A
Educational & Health Services	N/A	N/A	N/A	N/A	N/A
Leisure & Hospitality	N/A	N/A	N/A	10,516,152	11,997,716

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment

Source: IMPLAN

	Industry	Industry Output*	Employment
	Totals	11,063.881	117815
504	State & Local Non-Education	381.175	9060
481	Food services and drinking places	293.694	8209
503	State & Local Education	294.620	7131
467	Hospitals	570.531	6012
465	Offices of physicians- dentists- and other health	559.162	5542
468	Nursing and residential care facilities	207.308	4975
21	Iron ore mining	971.710	3377
390	Wholesale trade	341.221	2862
410	General merchandise stores	106.896	2696
470	Social assistance- except child day care services	70.372	2368
405	Food and beverage stores	85.321	1908
431	Real estate	103.514	1872
38	Commercial and institutional buildings	136.107	1744
412	Nonstore retailers	52.312	1567
483	Automotive repair and maintenance- except car wash	94.136	1547
401	Motor vehicle and parts dealers	130.969	1507
479	Hotels and motels- including casino hotels	59.443	1400
427	Insurance carriers	341.967	1378
407	Gasoline stations	54.720	1338
411	Miscellaneous store retailers	49.846	1326
430	Monetary authorities and depository credit interme	197.860	1253
505	Federal Military	26.982	1161
493	Civic- social- professional and similar organizati	66.831	1145
33	New residential 1-unit structures- nonfarm	150.081	1131
404	Building material and garden supply stores	64.722	1091
506	Federal Non-Military	77.400	1057
437	Legal services	66.099	1030
455	Business support services	34.772	996
439	Architectural and engineering services	64.153	984
499	Other State and local government enterprises	275.670	982
409	Sporting goods- hobby- book and music stores	21.767	938
408	Clothing and clothing accessories stores	32.700	935
438	Accounting and bookkeeping services	45.266	896
30	Power generation and supply	435.998	874
398	Postal service	54.686	873
458	Services to buildings and dwellings	24.353	864
394	Truck transportation	134.076	815
464	Home health care services	26.030	769
462	Colleges- universities- and junior colleges	41.217	765
406	Health and personal care stores	37.421	749

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
451	Management of companies and enterprises	88.701	748
494	Private households	2.439	718
125	Paper and paperboard mills	296.567	710
414	Periodical publishers	110.816	706
428	Insurance agencies- brokerages- and related	54.927	702
487	Personal care services	21.154	644
454	Employment services	15.820	619
491	Religious organizations	20.683	611
441	Custom computer programming services	33.403	603
35	New residential additions and alterations- nonfarm	87.367	589
422	Telecommunications	106.484	588
312	All other electronic component manufacturing	89.799	585
14	Logging	102.613	583
478	Other amusement- gambling- and recreation industri	26.144	566
469	Child day care services	15.472	563
461	Elementary and secondary schools	17.057	538
395	Transit and ground passenger transportation	31.264	511
114	Reconstituted wood product manufacturing	141.741	487
426	Securities- commodity contracts- investments	58.483	484
403	Electronics and appliance stores	15.178	481
399	Couriers and messengers	31.462	479
41	Other new construction	40.750	472
392	Rail transportation	100.531	458
471	Performing arts companies	5.609	450
402	Furniture and home furnishings stores	32.439	442
43	Maintenance and repair of nonresidential buildings	33.512	435
413	Newspaper publishers	41.101	427
420	Radio and television broadcasting	68.077	420
39	Highway- street- bridge- and tunnel construction	35.953	419
391	Air transportation	90.702	414
393	Water transportation	152.185	379
17	Hunting and trapping	21.402	378
460	Waste management and remediation services	53.643	375
447	Advertising and related services	22.331	353
11	Cattle ranching and farming	33.554	331
463	Other educational services	15.023	310
489	Drycleaning and laundry services	12.107	307
466	Other ambulatory health care services	30.499	304
485	Commercial machinery repair and maintenance	34.302	299
480	Other accommodations	13.809	297
107	Cut and sew apparel manufacturing	23.983	297
435	General and consumer goods rental except video tap	23.693	294

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
482	Car washes	5.200	284
492	Grantmaking and giving and social advocacy organiz	24.395	263
37	Manufacturing and industrial buildings	19.875	260
139	Commercial printing	28.170	258
442	Computer systems design services	13.760	252
34	New multifamily housing structures- nonfarm	23.666	239
60	Frozen food manufacturing	52.822	230
497	State and local government passenger transit	8.182	224
221	Ferrous metal foundaries	32.158	223
347	Truck trailer manufacturing	16.635	193
457	Investigation and security services	4.985	191
476	Fitness and recreational sports centers	4.627	189
73	Bread and bakery product- except frozen- manufactu	13.036	186
40	Water- sewer- and pipeline construction	17.558	184
474	Promoters of performing arts and sports and agents	4.912	175
488	Death care services	9.642	173
425	Nondepository credit intermediation and related a	26.391	151
283	Cutting tool and machine tool accessory manufactur	19.844	150
397	Scenic and sightseeing transportation and support	91.867	149
260	Mining machinery and equipment manufacturing	25.207	142
243	Machine shops	14.605	137
449	Veterinary services	8.048	135
473	Independent artists- writers- and performers	7.309	129
350	Motor vehicle parts manufacturing	23.579	127
252	Fabricated pipe and pipe fitting manufacturing	16.388	126
240	Metal can- box- and other container manufacturing	33.866	125
418	Motion picture and video industries	9.895	119
45	Other maintenance and repair construction	9.336	115
433	Video tape and disc rental	5.808	114
486	Household goods repair and maintenance	15.291	114
490	Other personal services	9.584	113
267	Food product machinery manufacturing	17.590	111
475	Museums- historical sites- zoos- and parks	7.122	111
446	Scientific research and development services	5.046	108
450	All other miscellaneous professional and technical	7.156	105
123	Miscellaneous wood product manufacturing	14.589	99
456	Travel arrangement and reservation services	6.410	99
423	Information services	12.613	98
444	Management consulting services	9.099	97
477	Bowling centers	3.761	97
192	Ready-mix concrete manufacturing	17.511	94
151	Other basic organic chemical manufacturing	108.125	89

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
452	Office administrative services	12.953	88
181	Other rubber product manufacturing	14.397	86
424	Data processing services	9.558	85
111	Other leather product manufacturing	4.802	85
25	Sand- gravel- clay- and refractory mining	17.409	85
13	Animal production- except cattle and poultry and e	2.671	83
44	Maintenance and repair of highways- streets- bridg	12.325	83
396	Pipeline transportation	42.390	82
42	Maintenance and repair of farm and nonfarm residen	11.531	80
321	Watch- clock- and other measuring and controlling	12.605	77
498	State and local government electric utilities	63.821	76
71	Seafood product preparation and packaging	14.997	75
448	Photographic services	3.429	74
168	Explosives manufacturing	13.454	73
421	Cable networks and program distribution	34.013	73
484	Electronic equipment repair and maintenance	6.189	72
472	Spectator sports	0.462	70
429	Funds- trusts- and other financial vehicles	17.323	67
203	Iron and steel mills	29.257	66
445	Environmental and other technical consulting servi	6.743	63
293	Overhead cranes- hoists- and monorail systems	11.398	63
18	Agriculture and forestry support activities	2.731	63
62	Fluid milk manufacturing	25.007	60
177	Plastics plumbing fixtures and all other plastics	11.185	59
10	All other crop farming	1.130	59
6	Greenhouse and nursery production	1.205	58
400	Warehousing and storage	4.029	58
194	Concrete pipe manufacturing	11.508	56
383	Office supplies- except paper- manufacturing	3.246	55
100	Curtain and linen mills	6.074	54
261	Oil and gas field machinery and equipment	11.302	52
334	Motor and generator manufacturing	7.296	50
235	Metal window and door manufacturing	6.961	47
103	Other miscellaneous textile product mills	6.110	46
459	Other support services	3.765	45
112	Sawmills	6.737	44
118	Cut stock- resawing lumber- and planing	11.385	44
273	Other commercial and service industry machinery ma	8.474	43
76	Dry pasta manufacturing	3.920	41
362	Wood kitchen cabinet and countertop manufacturing	3.621	40
32	Water- sewage and other systems	6.794	39
434	Machinery and equipment rental and leasing	28.445	39

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
15	Forest nurseries- forest products- and timber trac	10.252	38
179	Tire manufacturing	7.486	38
242	Spring and wire product manufacturing	4.334	36
233	Fabricated structural metal manufacturing	6.309	35
307	Broadcast and wireless communications equipment	11.285	34
384	Sign manufacturing	3.566	33
371	Showcases- partitions- shelving- and lockers	3.421	31
170	Photographic film and chemical manufacturing	12.412	31
322	Software reproducing	2.683	30
351	Aircraft manufacturing	8.279	30
440	Specialized design services	1.674	29
234	Plate work manufacturing	2.550	27
381	Sporting and athletic goods manufacturing	3.933	27
143	Asphalt paving mixture and block manufacturing	11.231	26
36	New farm housing units and additions and alteratio	4.484	26
443	Other computer related services- including facilit	1.829	24
26	Other nonmetallic mineral mining	3.115	23
316	Industrial process variable instruments	1.415	22
236	Sheet metal work manufacturing	2.637	21
301	Scales- balances- and miscellaneous general purpos	4.600	20
5	Fruit farming	0.495	18
119	Other millwork- including flooring	1.455	17
432	Automotive equipment rental and leasing	5.515	16
302	Electronic computer manufacturing	5.539	16
380	Jewelry and silverware manufacturing	2.093	16
496	Other Federal Government enterprises	3.305	16
195	Other concrete product manufacturing	1.762	14
122	Prefabricated wood building manufacturing	1.903	14
160	Pharmaceutical and medicine manufacturing	5.327	14
379	Dental laboratories	0.760	13
386	Musical instrument manufacturing	1.127	13
294	Industrial truck- trailer- and stacker manufacturi	2.438	13
226	Custom roll forming	8.267	13
285	Turbine and turbine generator set units manufactur	6.150	12
161	Paint and coating manufacturing	4.370	12
318	Electricity and signal testing instruments	1.686	12
453	Facilities support services	0.679	11
416	Database- directory- and other publishers	3.131	11
389	Buttons- pins- and all other miscellaneous manufac	1.499	11
110	Footwear manufacturing	0.671	10
12	Poultry and egg production	1.551	10
116	Engineered wood member and truss manufacturing	1.088	9

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
246	Metal coating and nonprecious engraving	1.208	9
277	Heating equipment- except warm air furnaces	1.746	8
108	Accessories and other apparel manufacturing	0.423	8
255	Miscellaneous fabricated metal product manufacturi	1.756	8
172	Plastics packaging materials- film and sheet	2.317	8
358	Boat building	1.027	8
415	Book publishers	2.325	8
2	Grain farming	0.012	8
85	Soft drink and ice manufacturing	2.033	7
419	Sound recording industries	1.544	7
220	Secondary processing of other nonferrous	1.921	7
165	Surface active agent manufacturing	4.044	6
230	Saw blade and handsaw manufacturing	0.672	5
237	Ornamental and architectural metal work manufactur	0.472	5
61	Fruit and vegetable canning and drying	1.868	5
232	Prefabricated metal buildings and components	0.743	5
86	Breweries	1.121	5
378	Ophthalmic goods manufacturing	0.362	5
376	Surgical appliance and supplies manufacturing	0.787	5
58	Confectionery manufacturing from purchased chocola	1.905	5
3	Vegetable and melon farming	0.055	5
248	Metal valve manufacturing	0.795	5
148	Industrial gas manufacturing	0.378	4
1	Oilseed farming	0.002	4
288	Pump and pumping equipment manufacturing	so.745	4
178	Foam product manufacturing	0.715	4
369	Custom architectural woodwork and millwork	0.907	4
280	Metal cutting machine tool manufacturing	0.413	4
223	Nonferrous foundries- except aluminum	0.496	4
101	Textile bag and canvas mills	0.223	3
364	Nonupholstered wood household furniture manufactur	0.327	3
29	Support activities for other mining	0.473	3
186	Ceramic wall and floor tile manufacturing	0.142	3
83	Spice and extract manufacturing	0.884	3
47	Other animal food manufacturing	1.435	3
329	Household cooking appliance manufacturing	0.506	3
141	Prepress services	0.082	3
247	Electroplating- anodizing- and coloring metal	0.092	2
169	Custom compounding of purchased resins	0.530	2
80	Coffee and tea manufacturing	0.795	1
281	Metal forming machine tool manufacturing	0.047	1
199	Cut stone and stone product manufacturing	0.057	1

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Table A-10: St. Louis County, IMPLAN Model information 2002- Output and Employment, Ranked by Employment (continued)

	Industry	Industry Output*	Employment
138	Blankbook and looseleaf binder manufacturing	0.080	1
164	Polish and other sanitation good manufacturing	0.088	1
508	Inventory valuation adjustment	(1.085)	0
	Totals	11,063.881	117815
	*in Millions		