

construction & aggregates

in Tulare County

**An Economic Analysis of the Construction
and Aggregate Industries in Tulare County**

August, 2002



Prepared for Construction Materials Association of California,
Tulare/Kings County Chapter
*By Sharon Prager, e concepts and
Jim King and Randy Evans, Applied Development Economics*

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TABLE OF CONTENTS

1. EXECUTIVE SUMMARY.....	1
2. OVERVIEW	3
3. THE CONSTRUCTION AND AGGREGATE INDUSTRIES: CRITICAL COMPONENTS OF TULARE COUNTY'S ECONOMY.....	10
4. CONTRIBUTIONS OF THE CONSTRUCTION AND AGGREGATE INDUSTRIES TO THE TULARE COUNTY ECONOMY.....	15
5. CONCLUSION.....	23
GLOSSARY.....	25
APPENDIX A: THE IMPLAN ECONOMIC MODEL	26

1. EXECUTIVE SUMMARY

Recently, the State of California's *Commission on Building for the 21st Century* issued a major report indicating that there is an \$80-90 billion backlog of statewide infrastructure needs, including building, repairing, and maintaining roads, highways, bridges, housing, schools, hospitals, power plants, and public buildings. In addition, the report states that "over the next 20 years, California will add 6 million jobs, and 12 million people who will need at least 4 million new homes."

The San Joaquin Valley is growing at a faster rate than the State, and while the Valley's population increased 22% during the 1990s, 1 million more people are expected in the next 8 years. According to projections by Tulare County's Economic Development Corporation, the county is poised to share in this growth.

All construction depends upon the aggregates industry for producing and supplying sand and gravel and crushed stone – the basic raw materials required for building, and for making asphaltic and ready-mix concrete. Accessing local sources for large quantities of high-quality construction aggregates is the first step in the construction process.

This report examines and assesses the contributions of the construction and aggregate industries on the Tulare County economy measured by total output, including revenues, employment, wages, value added impacts, and taxes.

1.1 SIGNIFICANT FINDINGS

Based on 1999 data, without factoring in any projected growth, the study finds that:

- The total impact of the construction and aggregates industries in Tulare County is **\$1.01 billion**;
- This amount **exceeds the impacts** of food and feed crops (\$945 million) and wholesale trade (\$443 million) – two of the county's largest and most prominent industries;

- The construction and aggregate industries **contribute 8%** of Tulare County's \$12 billion output, exceeding both the 7% contributed by crops, and the 3% contributed by wholesale trade;
- The construction and aggregate industries employed 9,041 people, or 5%, of the county's workforce. The aggregates industry paid an average of **\$39,000** per employee, one of the highest salary levels in the County.
- The construction and aggregate industries paid **over \$108 million** in federal, state, and local taxes.

The successful growth of Tulare County will largely be determined by its ability to provide first-rate infrastructure. Infrastructure provides the foundation for an enhanced quality of life, attracts businesses with well paying jobs, is a key component of high-achievement schools, and is mandatory for efficient transportation corridors. However, providing a strong infrastructure is at risk in Tulare County because its development requires access to local, large, and low-cost supplies of high quality aggregates. Without a steady, dependable, and nearby supply, Tulare County's infrastructure cannot be built or maintained in a timely and cost effective manner. As reported by the State Division of Mines and Geology in 1997, critical supply areas for the County will be depleted shortly unless additional aggregate resources are permitted expeditiously.

This report specifically focuses on the economic contribution of the construction and aggregate industries in Tulare County. However, as discussed in Part I's *Overview*, the findings also have implications within the context of interrelated growth and infrastructure challenges for the Central Valley and statewide. California may have a variety of separate and distinct regional identities, but our futures are all interdependent.

2. OVERVIEW

2.1 CALIFORNIA'S CHALLENGES AND THE TRANSFORMATION OF TULARE COUNTY

During the early days of European settlement in California, Franciscan friars scattered mustard seeds along the roads so that travelers could then follow the mustard blossoms, or “yellow lines”, from one Mission to the next. Many years later asphalt roads were built with painted yellow lines, and travelers have been following them ever since.¹

Californians are expert road builders. They built the world's best freeway system, and married their state to movement. Roads and highways traverse from forests to deserts; from beaches to the Sierra. A state in perpetual motion, California's highways helped speed the state to becoming the world's 5th largest economy. Concurrently, Californians also built other kinds of roads: roads to possibilities and to the future, roads to transform and to transcend.

California's roads – whether of asphalt or of aspiration – continue to attract talented residents. Such growth shows no signs of abating, and gives the state a dynamism and diversity rarely experienced elsewhere. It is also causing complex challenges.

When renowned journalist Carey McWilliams wrote in the 1940s that California's water problems were “uniquely multidimensional with each dimension being most complexly interrelated with each other,” he could have been writing about the state in its entirety.² While California's diverse demographics and districts prioritize issues differently, a few dominate all regions consistently. Two of the most predominant, and inextricably intertwined, are population growth and an antiquated infrastructure.

2.2 POPULATION PRESSURES AND INSUFFICIENT INFRASTRUCTURE

Most [Californians] believe that the basic infrastructure in their regions today will be inadequate for the growth that lies ahead, including the transportation system and water supply. Californians emphatically say that they want their government to start planning for the future today. Nearly everyone said it was important to get ready for the future by building more schools and colleges, expanding water storage facilities, and building more roads.³

The California Department of Finance has conservatively estimated that the state's population will reach 40 million people by 2010 and 50 million by 2025. By 2022 California will have added 6 million jobs and 12 million people who will need at least 4 million new homes.

Even without any population growth, California's infrastructure is known for its crumbling condition. Currently there is an \$80-90 billion backlog of infrastructure needs not including what will be required to accommodate continued growth.⁴ California's failure to invest in infrastructure for nearly 4 decades ranks the state near the bottom in per capita spending.⁵ California is also 49th in home ownership, and has some of the most overcrowded schools and congested traffic in the nation.

16 years ago, Dan Walters presciently wrote that "The growth in and changing composition of California's population during the next 30 to 40 years will put an incredible strain on transportation systems, water supplies, sewage treatment plants, housing supply, educational facilities . . ." Stephen Levy, of the Center for Continuing Study of the California Economy predicted California's future in the 21st century as "absolutely dynamite", but also warned that "We simply have to avoid screwing it up by not doing any of the infrastructure things."⁶

Today, California is short 500,000 homes, and growth estimates indicate that another 50,000-70,000 will be needed each year.⁷ While additional infrastructure will be required for those homes, the state will also need both to provide new, and maintain or update current, roads, sewers, wastewater treatment plants, freeways, power plants, bridges, government buildings, hospitals, and all other

infrastructure necessary for maintaining a strong economy and a desirable quality of life.

2.3 NOT ALL CENTRAL VALLEY GROWTH IS PRODUCE

Future infrastructure investment must support where the population is living and is going to live.⁸

While California's population will continue expanding everywhere, the Central Valley is projected to become the second most populous region of the state. Projections indicate that the region will grow from 5.6 million to 14 million by 2040.⁹ Because of uneven regional growth it's predicted that the population of the Central Valley, Inland Empire, and Orange County will exceed the population of the San Francisco Bay Area and Los Angeles County during the 21st century.¹⁰

In an April, 2002 Public Policy Institute survey of the Central Valley, 42% of respondents, and 53% of Latinos, identified a lack of opportunities for well paying jobs as the main problem facing the Central Valley. In fact, nearly 25% of Central Valley residents worried that they or a family member might lose their job.¹¹ Of the 12 California counties with the highest unemployment rates, 10 are in the Central Valley.¹²

The San Joaquin Valley's population increased 22% between 1990-1999, and an additional 885,000 people are expected by 2010.¹³ Despite such growth, unemployment remains high in San Joaquin Valley counties, and historically is 6% higher than the state average.

Tulare County has one of the highest unemployment rates in the state, which, during 2001, was estimated at 15.8%¹⁴, compared to California's overall unemployment rate of 4.5%. Real per capita income was forecast to remain unchanged at \$20,426.¹⁵ Still, the county's population is projected to grow, especially because of coastal Californians relocating inland in search of affordable housing, and business promotion initiatives by the County's Economic Development Corporation.

There is a direct correlation between increased population and the demand for expanded infrastructure, including roads, schools, housing, public utilities, commercial centers, and industrial sites. Without the necessary infrastructure, communities will be unable to attract and retain new high performance businesses, nor sustain a healthy quality of life.

2.4 THE IMPORTANCE OF CONSTRUCTION AGGREGATES TO INFRASTRUCTURE

All construction depends upon having large quantities of locally available supplies of sand and gravel and crushed stone, called “aggregates”. These natural resources are the first step in the construction process and used in a wide variety of products. Aggregates are necessary for making Portland cement concrete and asphaltic concrete.

Huge quantities of aggregates are necessary for building, restoring, and maintaining every aspect of our physical infrastructure. Examples include:

- TRANSPORTATION, e.g., roads, highways, bridges, airports, railroad beds, and public transit
 - ♣ Aggregates make up more than 94% of asphalt and 80% of concrete pavements.
 - ♣ 38,000 tons of aggregates are required for one lane-mile of a four-lane highway.
- RESIDENTIAL, COMMERCIAL, AND INDUSTRIAL BUILDINGS
 - ♣ Construction of an average home requires 400 tons of aggregates.
 - ♣ A school or hospital requires at least 15,000 tons.
- OTHER PUBLIC WORKS
 - ♣ Thousands of tons of aggregates are required for water and sewage treatment plants, water storage, power plants, prisons, dams, tunnels, and erosion control.
 - ♣ Water and sewer facilities use aggregates for filtration in water purification and sewage treatment.

Aggregates are also used in agriculture and forestry, environmental protection, and in the manufacturing of glass, paint, cosmetics, pharmaceuticals, and many other consumer goods.¹⁶

However, not every aggregate deposit is physically or chemically suited for every use. Certain physical property characteristics and qualities must be present

depending on the ultimate application, and specifications have been set by various government agencies to ensure the suitability of aggregates depending upon the use. Concrete aggregate is construction aggregate that meets the quality standards for use in portland cement concrete and asphaltic concrete. For example, the California Division of Mines and Geology notes that “Most aggregate specifications have been established to ensure the manufacture of strong, durable structures capable of withstanding the physical and chemical effects of weathering and use. Specifications for portland cement concrete and concrete products prohibit or limit the use of rock materials containing mineral substances such as gypsum, pyrite, zeolite, opal, chalcedony, chert, siliceous shale, volcanic glass, and some high-silica volcanic rocks.”¹⁷ Specifications also mandate certain particle-size distributions, and customers such as CalTrans have their own requirements.

Just to make things more interesting, Mother Nature capriciously determines where high quality, or “concrete grade”, aggregate deposits occur. Access to these deposits has often been lost due to decisions favoring other land uses.

In addition, the expense of transporting aggregates is a major factor in the cost of construction projects. Aggregates are a low-value, high weight commodity, and “transportation cost is the principal constraint defining the market area for a specific production district.”¹⁸ The economic importance of maintaining local aggregate supplies cannot be overstated.

Aggregates are a Unique Resource

What is either not often acknowledged, or simply unknown, is that for most uses, there are no substitutes for aggregates – they can’t be duplicated, and their locations are determined by geological conditions. There are few other industries that can’t be moved or grown elsewhere, or that are so critical and unique to their applications. What might first appear like a common commodity, assumed as accessible everywhere, ubiquitous, and taken for granted, is actually quite the opposite. Just as Californians learned rather abruptly that obtaining electrical power isn’t determined by flipping a wall switch, greater education and

recognition will be required if residents are to make land use decisions that affect the availability of valuable, and irreplaceable, sand and gravel reserves.

Aggregates Sites are Restored to Valuable End Uses

Aggregate operations conform to a huge number of government regulations, many of which pertain to environmental and reclamation standards. Aggregate production is an interim land use, and afterwards, when end uses are developed, valuable land is created. A recent study found that after land has produced sand and gravel for constructing roads and buildings, California aggregate operators reclaim land to at least 44 different uses.¹⁹ Conservation is the primary land usage, including open space, wetlands, wildlife habitat, and native revegetation. While over 90% of wetlands have been lost during the past 100 years, “with negative impacts on water quality, flood protection, and habitat,”²⁰ California’s sand and gravel producers are a major resource for creating and restoring thousands of acres of wetlands and wildlife habitat. Recreation is the second most prevalent land use followed by agriculture and grazing. In addition, the California Office of Mine Reclamation has found that over 50 square miles of land from aggregate production statewide were reclaimed during the 1990s.

2.5 A FUTURE AT RISK

Tulare County will require millions of tons of high-grade construction aggregates in order to build, replace, and maintain current and future infrastructure. A 1997 Division of Mines and Geology mineral land classification report indicates that anticipated aggregate consumption through 2044 is estimated at 176.5 million tons, or over 5 tons per person. Of the 176.5 million tons required, 49% must be of portland cement concrete quality, and 31% of asphaltic concrete quality.²¹

In 1996, 219 million tons were identified as the total reserves available for Tulare County. However, at that time only 19 million tons existed in the Kaweah-St. Johns area that has historically supplied most of the portland cement concrete-grade aggregates for Tulare County. In the 6 years since the report, this total has

been further reduced, and will be completely depleted by 2010 unless additional aggregate resources are permitted.²²

As the report further states, “utilizing deposits from the southern end of the county would cause supply problems in the marketing areas already being served by those mines, not to mention the additional transportation surcharges.”²³ Tulare County’s infrastructure and economic future, including public health and safety, is at serious risk if supplies of local aggregates are not readily available.

This study concurs with the State’s *Commission on Building for the 21st Century*’s recommendation that both the California Environmental Quality Act (CEQA) and other permitting processes must be streamlined in order “to promote responsible land use planning while ensuring that the original intent of protecting the environment is maintained.”²⁴ If potential sources of sand and gravel experience long and expensive permitting delays, both Tulare County’s attractiveness to business, and quality of life, will deteriorate.

Part 2 of this Report assesses the specific economic contributions of the construction and aggregates industries to the Tulare County economy.

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1. Barbara Stauffacher Solomon, Good Mourning California (New York: Rizzoli, 1992), 74.
 2. Carey McWilliams, California: The Great Exception (Berkeley: University of California Press, 1949), 269.
 3. Mark Baldassare, California in the New Millennium (Berkeley: University of California Press, 2000), 182.
 4. California Commission on Building for the 21st Century, 20.
 5. Baldassare, 9.
 6. Dan Walters, The New California (Sacramento: California Journal Press, 1986), 17.
 7. California Commission on Building, 45.
 8. *Ibid.*, 13.
 9. Tapan Munroe, John Anguiano, and Mark Schniepp, Economic Forecast for California’s Central Valley 2001 (Modesto, CA: Great Valley Center), 8.
 10. Baldassare, 6.
 11. Mark Baldassare, PPIC Statewide Survey: Special Survey of the Central Valley, April 2002, Public Policy Institute of California, 19.
 12. Munroe, 8.
 13. The Economic Future of the San Joaquin Valley, January 2000 prepared by Collaborative Economics for New Valley Connexions, a partnership of the Great Valley Center and the Office of Strategic Technology, California Trade and Commerce Agency, 4.
 14. Munroe, 5.
 15. *Ibid.*, 62.
 16. 50 Fascinating Facts about Stone, Sand and Gravel (Arlington, VA: National Stone, Sand and Gravel Association).

17. Gary C. Taylor, Mineral Land Classification of Concrete Aggregate Resources in the Tulare County Production-Consumption Region, California (Sacramento: California Department of Conservation, Division of Mines and Geology, 1997), 13.
18. Ibid., 14.
19. Sharon Prager, Reclamation Survey (Sacramento: Construction Materials Association of California, 2001), 6.
20. California Commission on Building, 53.
21. Mineral Land Classification of Concrete Aggregate Resources, 55.
22. Ibid.
23. Ibid., x.
24. California Commission on Building, 59.

3. THE CONSTRUCTION AND AGGREGATE INDUSTRIES: CRITICAL COMPONENTS OF TULARE COUNTY'S ECONOMY

3.1 INTRODUCTION

As discussed in Part I, population pressures and a lack of investment for nearly 4 decades have exacerbated the critical need for building, repairing, and maintaining infrastructure throughout California. This circumstance affects the Central Valley – one of the fastest growing regions in California – and in turn, Tulare County.

Since sand and gravel and crushed stone are the basic raw materials used in construction, road building, and asphaltic and ready-mix concrete, the aggregates industry is an indispensable component of the construction industry. All of California's public and private infrastructure – its roads, highways, homes, schools, and buildings depend upon aggregates for construction. Having access to local, large, and high-quality supplies of aggregates is a prerequisite for efficient, cost-effective building.

3.2 CONSTRUCTION AND AGGREGATES IN TULARE COUNTY

This report focuses on the contribution of the construction and aggregates industries to the Tulare County economy in 1999. Construction is not only a major growth industry in itself, but by providing necessary commercial, residential, and public infrastructure, is an important driver of all development in Tulare County.

Alongside the construction and aggregate industries, this report also simultaneously compares food and feed crops and wholesale trade. Both of the latter industries are recognized as major employers and contributors to Tulare County's economy. Comparing the three industries is helpful for ascertaining the importance of the construction and aggregate industries to the county's economy, and for overall perspective.

The results of this report find that the total 1999 combined impact of construction and aggregates was \$1.01 billion. This total includes both direct and indirect contributions, and is larger than the \$945 million crops industry, and the \$443 million wholesale trade industry.

In 1999, the construction and aggregates industries employed 9,041 people in Tulare County, or over 5% of all employment in the county for that year. Even more impressive is that these two industries contributed over 8% of Tulare County's total \$12 billion output. This percentage exceeded the 7% contributed by crops, and was notably higher than wholesale trade's contribution of 3%.

TABLE 1
1999 TOTAL IMPACT OF THE CONSTRUCTION AND AGGREGATE
INDUSTRIES ON THE TULARE COUNTY ECONOMY

1999 Tulare Construction and Aggregates	Output	Employment
Direct	\$1,012,426,016	9,041
Indirect	\$3,135,112	28
Total	\$1,015,561,128	9,069

Source: MIG Implan Pro

The construction industry depends upon the aggregates industry. Without a readily available supply, construction costs skyrocket and work is delayed or postponed. In this sense, the construction industry can be seen as a value-added component of the aggregates industry. The connection between aggregates and construction is similar to the soil needed for crop production, or the silicon for semiconductors. Recognizing the importance of the construction industry to the Tulare County economy, therefore, is not possible without conferring equal weight to the aggregates industry.

In addition, aggregates are not only essential for construction, but for food and feed crops and wholesale trade as well. Wholesale trade needs the transportation systems and distribution facility infrastructure, and food and feed crops requires roads to access the fields and harvest the crops. Agriculture also uses aggregate products, such as crushed limestone, and remineralizes soils with byproduct fines from aggregates processing.

Construction

The construction industry builds structures for both the public and private sector, including roads, highways, bridges, dams, commercial buildings, hospitals, power plants, pipelines, sewage treatment facilities, homes, apartments, railroads, and airports. The term “construction” includes new work, additions, alterations, reconstruction, installations, and repairs. In other words, virtually every project that needs building, remodeling, or repairing involves some sector of the construction industry. The industry employs a wide range of trades and craftspeople, as well as architects, engineers, contractors, supervisors, truck drivers, equipment operators, and skilled and unskilled labor.

For this report, the construction industry includes:

TABLE 2
CONSTRUCTION INDUSTRY COMPONENTS

New Residential Structures
New Industrial And Commercial
New Utility Structures
New Highways And Streets
New Farm Structures
New Mineral Extraction Facilities
New Government Facilities
Maintenance And Repair, Residential
Maintenance And Repair Other Facilities

Source: MIG Implan Pro

In Tulare County, there are 924 businesses engaged in the construction industry.¹

Aggregates

Sand, gravel, and crushed stone are collectively referred to as “aggregates”. These basic raw materials are the first step in the construction process and used in a huge variety of products. Aggregates are required for making portland cement concrete and asphaltic concrete – essential substances for building and maintaining our public and private infrastructure. Without aggregates there would be no buildings, hospitals, roads, airports, shopping centers, homes, sewer systems, or any other structure used by Californians. Approximately 60% of all aggregates are used in public works projects, and nearly 90% of all materials required to build federal, state, and local roads consist of sand, gravel, and stone. The aggregates industry includes the following:

TABLE 3
AGGREGATE INDUSTRY COMPONENTS

Dimension Stone
Sand And Gravel
Nonmetallic Minerals
Misc. Nonmetallic Minerals, N.E.C.
Paving Mixtures And Blocks
Asphalt Felts And Coatings
Cement, Hydraulic
Concrete Block And Brick
Concrete Products, N.E.C
Ready-Mixed Concrete
Gypsum Products

Source: MIG Implan Pro

In Tulare County, there are 33 businesses engaged in the aggregates industry.²

¹ April – June 2002, iMarket by Dun & Bradstreet

3.3 FOOD & FEED CROPS AND WHOLESALE TRADE

Food & Feed Crops

Tulare County has been described, depending on the source, as either the first or second leading agricultural county in California. Food and feed crops are a substantial portion of the agricultural economy, and employ more people than the construction industry. Yet both food and feed crops and construction contribute about the same in output. This indicates higher productivity for workers in the construction industry.

The food & feed crops industry includes:

TABLE 4
FOOD & FEED CROPS INDUSTRY COMPONENTS

Cotton
Food Grains
Feed Grains
Hay And Pasture
Grass Seeds
Tobacco
Fruits
Tree Nuts
Vegetables
Sugar Crops
Miscellaneous Crops
Oil Bearing Crops

Source: MIG Implan Pro

In Tulare County, there are 749 businesses engaged in the food & feed crops industry.³

Wholesale Trade

Wholesale trade is another important contributor to the Tulare County economy. Wholesale trade includes establishments or places of business primarily engaged in selling merchandise to a) retailers; b) industrial, commercial, institutional, farm, construction contractors; and c) professional business users, or to other wholesalers, or those acting as agents or brokers in buying merchandise for, or selling merchandise to, such persons or companies.

² April – June 2002, iMarket by Dun & Bradstreet

³ April – June 2002, iMarket by Dun & Bradstreet

Sometimes termed “distribution and logistics” (but not including trucking or other transportation), wholesale trade is a large industry, both because of the sales of agricultural products, and because of Tulare County’s central location in California, and access to other parts of the West Coast. Even so, the construction industry’s total output dwarfs wholesale trade in Tulare County.

The wholesale trade industry includes:

TABLE 5
WHOLESALE TRADE INDUSTRY COMPONENTS

Wholesale Trade – Non-durable Goods
<hr/> Wholesale Trade – Durable Goods

Source: MIG Implan Pro

In Tulare County, there are 802 businesses engaged in the wholesale trade industry.⁴

⁴ April – June 2002, iMarket by Dun & Bradstreet

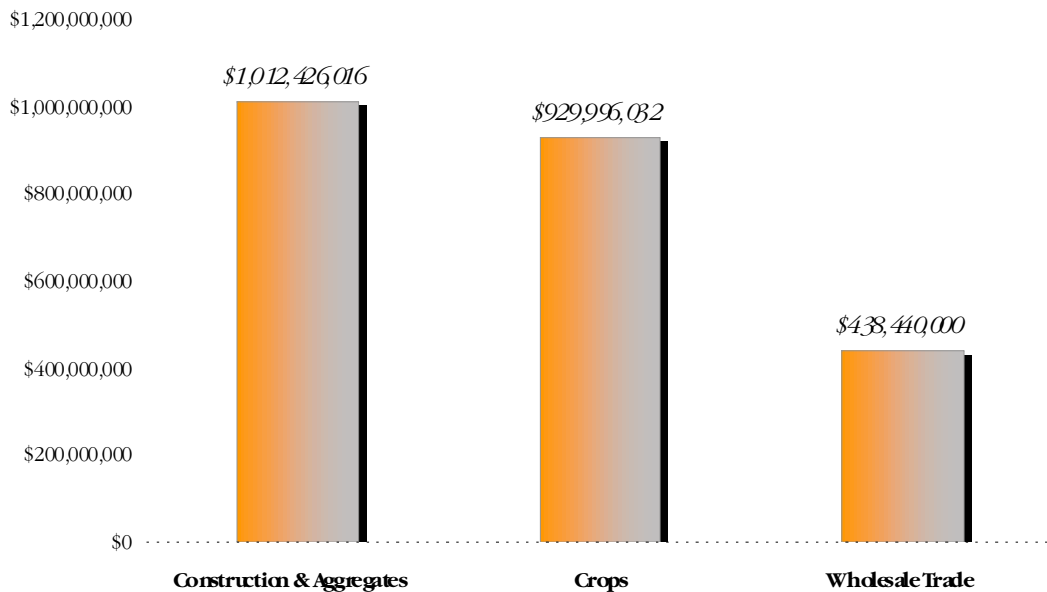
4. CONTRIBUTIONS OF THE CONSTRUCTION AND AGGREGATE INDUSTRIES TO THE TULARE COUNTY ECONOMY

The total output of all Tulare County industries in 1999⁵ was \$12.6 billion. The direct total output for the construction industry was \$956 million, or 7.6% of the Tulare County output. The aggregates industry, an integral supplier to the construction industry, contributed over \$55 million to total direct output.

Direct Output

The direct output of the construction and aggregate industries compares favorably to other important Tulare County industries. The total direct output for agricultural production crops in 1999 was \$930 million, while wholesale trade's output was significantly less at \$438 million⁶.

**FIGURE 1:
1999 DIRECT OUTPUT OF SELECTED TULARE COUNTY INDUSTRIES**



Source: ADE, MIGImplan Pro, 1999 Tulare County ES202 Data File

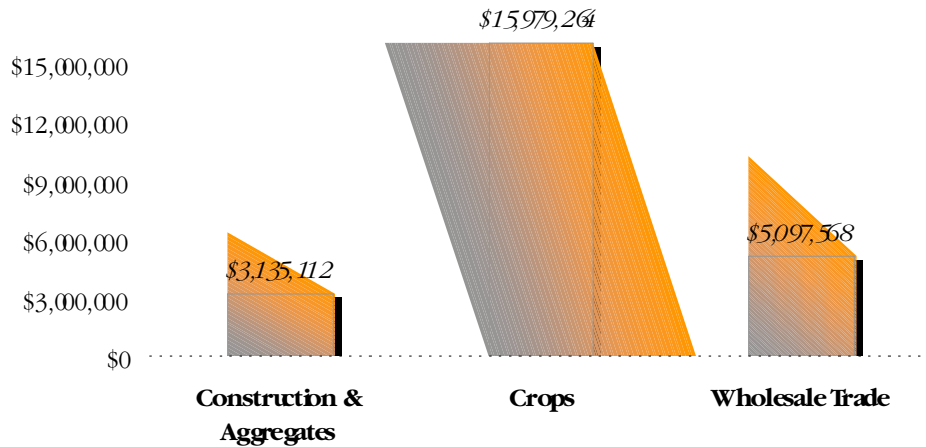
⁵ 1999 is the most currently available data for the input-output analysis.

⁶ It is estimated that the local construction industry contributed over \$27 million to the gross output of wholesale trade.

Indirect Output

In addition to the direct output of industries, their indirect contribution is an important component of the impacts on an economy. The indirect contributions of an industry are the revenues, salaries, and taxes generated by the industry's purchases. The construction and aggregate industries' indirect contribution of over \$3 million in output is significant to the Tulare County economy. This compares to the wholesale trade industry's indirect output of \$5 million. Having a greater percentage of total output attributed to direct output is an indicator that construction and aggregates impact the local economy through direct products rather than relying on ancillary purchases.

FIGURE 2
1999 INDIRECT OUTPUT OF SELECTED TULARE COUNTY INDUSTRIES



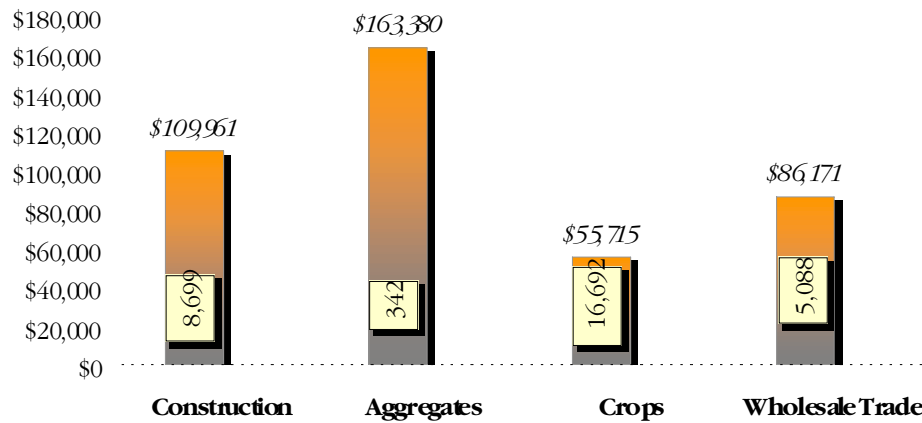
Source: ADE, MG Implan Pro, 1999 Tulare County ES202 Data File

Employment

The direct employment of the construction industry in 1999 was 8,699, or 4.9% of the county's total employment. During the same period, the wholesale trade industry employed 5,088, and 16,692 individuals worked for the crops industry. Aggregates, a low employment industry statewide, but distinguished by its high productivity, had 342 employees in Tulare County.

While crops had more employees than construction, each construction employee contributed \$109,960 towards direct output, much higher than the \$55,715 per crop employee, or the \$86,171 per wholesale trade employee. However, each aggregates employee contributed \$163,380 towards direct output – the highest of the industries.

FIGURE 3
1999 CONTRIBUTION PER EMPLOYEE TO DIRECT OUTPUT BY SELECTED
INDUSTRY



Source: ADE, MGImplanPro, 1999 Value County IS202 Data File

Employee Compensation

Wages paid to employees is another key indicator of an industry's contribution to the economy. The total direct and indirect compensation for the industries herein are as follows:

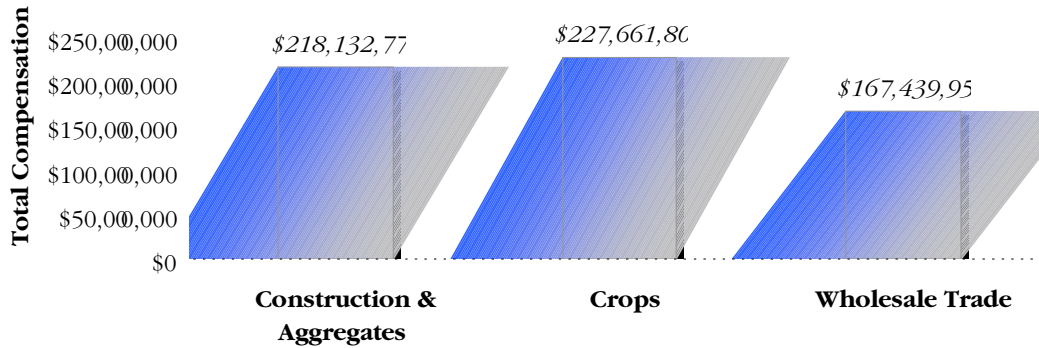
Note: Indirect compensation is compensation related to indirect output.

TOTAL DIRECT AND INDIRECT COMPENSATION IN 1999

	DIRECT	INDIRECT
CONSTRUCTION	\$ 203,000,000	\$ 659,000
CROPS	223,000,000	3,000,000
WHOLESALE TRADE	165,000,000	1,900,000
AGGREGATES	13,000,000	10,000

A larger proportion indicates greater spending power by those employed directly in the industry.

FIGURE 4: 1999 DIRECT & INDIRECT EMPLOYEE COMPENSATION BY SELECTED INDUSTRY FOR TULARE COUNTY

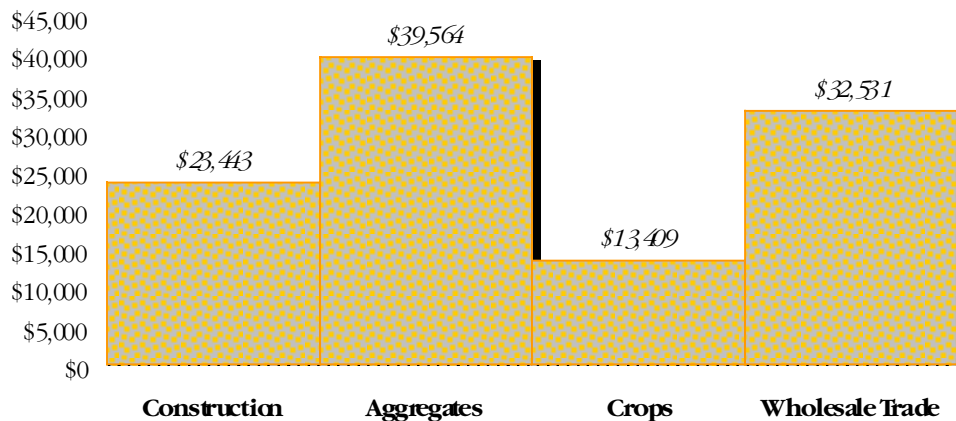


Source: ADE, MIG Implan Pro, 1999 Tulare County ES202 Data File

In terms of average pay per employee, aggregates were the highest paying industry at \$39,000. Wholesale trade paid \$32,000 followed by construction with over \$23,000. The crops industry paid the least at just over \$13,000.

Tulare County has one of the highest unemployment rates in the state and a per capita income of approximately \$20,000.

**FIGURE 5
AVERAGE WAGE PAID IN 1999 PER EMPLOYEE BY SELECTED TULARE COUNTY INDUSTRY**

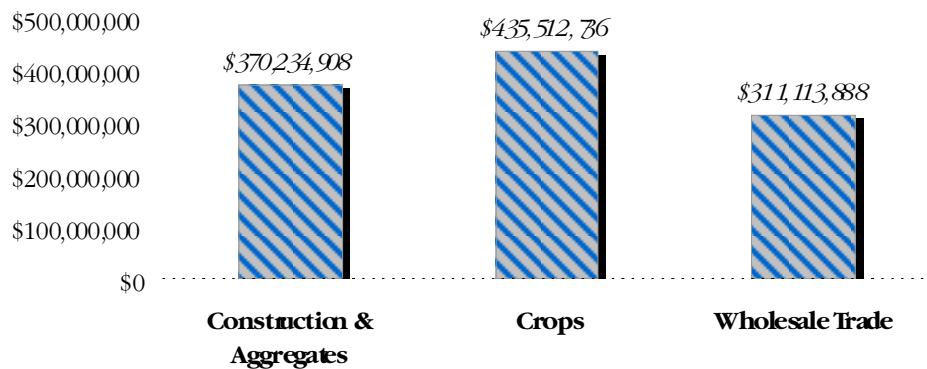


Source: ADE, MIG Implan Pro, 1999 Tulare County ES202 Data File

Value-added

Value-added contributions represent employee compensation⁷, proprietor income⁸, other property income⁹ and indirect business taxes¹⁰. The direct value-added contribution of the construction and aggregates industries to the Tulare County economy in 1999 was \$370 million. Crops had a direct value-added contribution of \$435 million and wholesale trade's value-added contribution was \$311 million.

FIGURE 6
1999 VALUE-ADDED CONTRIBUTIONS BY SELECTED INDUSTRY



Source: ADE, MG Inplan Pro, 1999 Tulare County IS202 Data File

Overall, at 71%, wholesale trade has a much larger percentage of its direct output in value-added dollars than the other industries. The value-added dollar in crops contributes 47% to direct output, and aggregates contribute 42%. The construction industry's value-added dollar contributes 36% to direct output. Since construction and aggregates contribute a lower percentage of value-added dollars, this means that their output is related to the goods and services they produce within Tulare County, resulting in a more important economic impact. In other words, more of the value attributed to output comes directly from construction or aggregates than an ancillary industry.

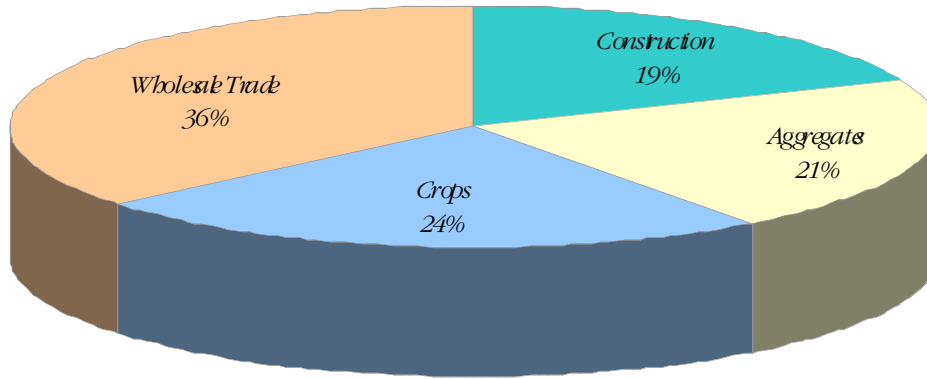
⁷ Includes wages, salary payments and non-cash compensation sources such as benefits.

⁸ Includes income derived from self-employment.

⁹ Includes payments from interest, rents, royalties, dividends and profits.

¹⁰ Includes household excise and sales taxes paid to business by households, excluding taxes on profit and income.

FIGURE 7
CONTRIBUTION OF VALUE-ADDED DOLLARS TO TOTAL OUTPUT IN 1999
FOR SELECT INDUSTRIES IN TULARE COUNTY

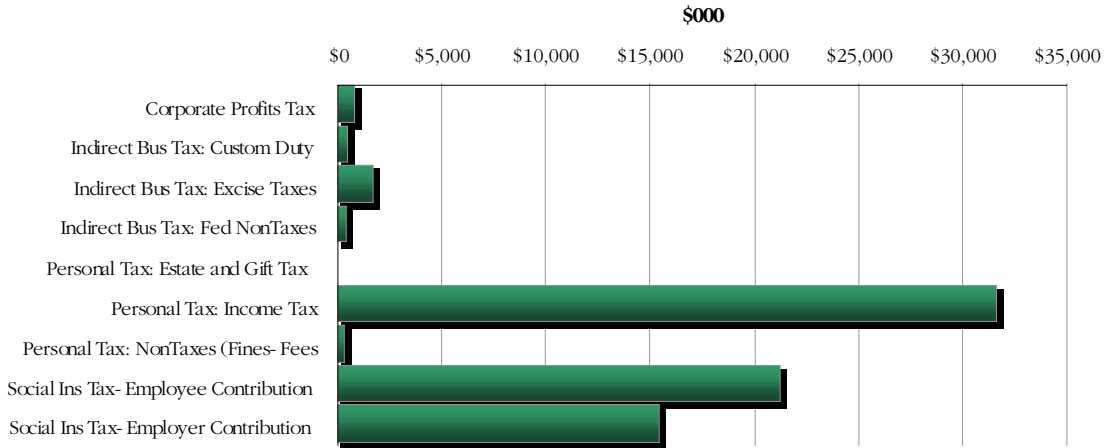


Source: ADE, MG Inplan Pro, 1999 Tulare County IS202 Data File

Tax Contribution

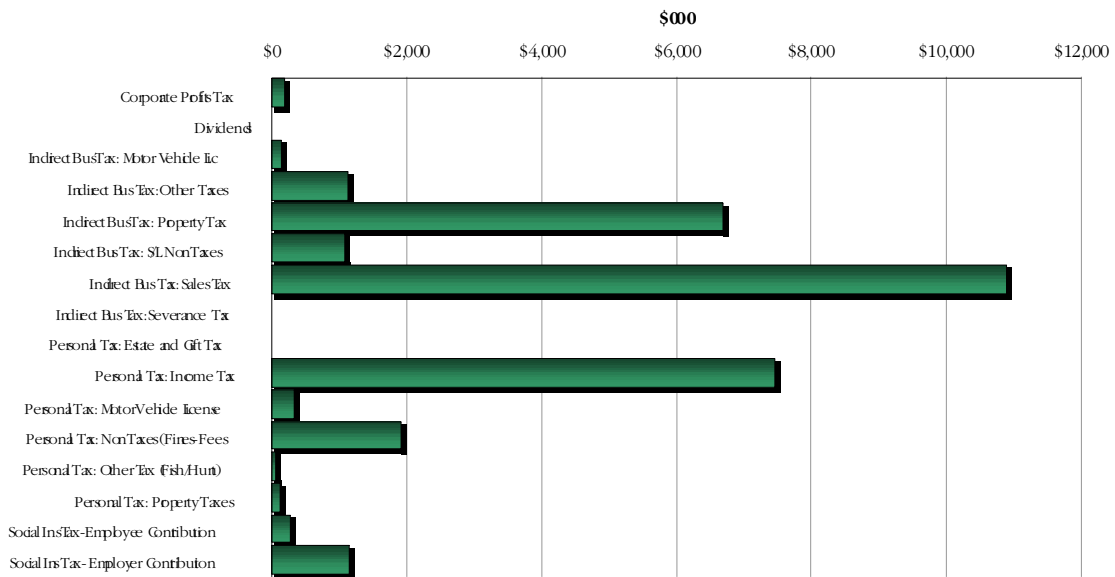
Federal, state and local governments receive significant additional tax revenue from the economic activity generated by the construction and aggregate industries. In Tulare County the construction industry contributed over \$72 million in federal taxes, and over \$31 million in state and local taxes. Aggregates contributed over \$5 million in combined federal, state, and local taxes. Together, the construction and aggregate industries paid over \$108 million in taxes in 1999. The following charts illustrate the estimated tax impact of the construction and aggregate industries in Tulare County.

FIGURE 8
1999 FEDERAL GOVERNMENT (NON-DEFENSE) TAX CONTRIBUTIONS OF
THE TULARE COUNTY CONSTRUCTION INDUSTRY



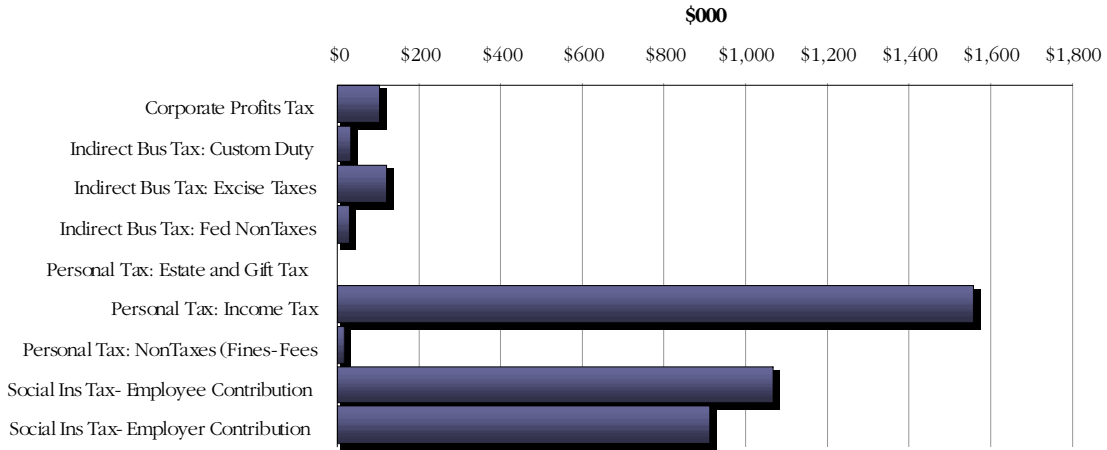
Source: MIG Implan Pro, 1999 Tulare County Data Files

FIGURE 9
1999 STATE/LOCAL GOVERNMENT (NON-EDUCATION) TAX
CONTRIBUTIONS OF THE TULARE COUNTY CONSTRUCTION INDUSTRY



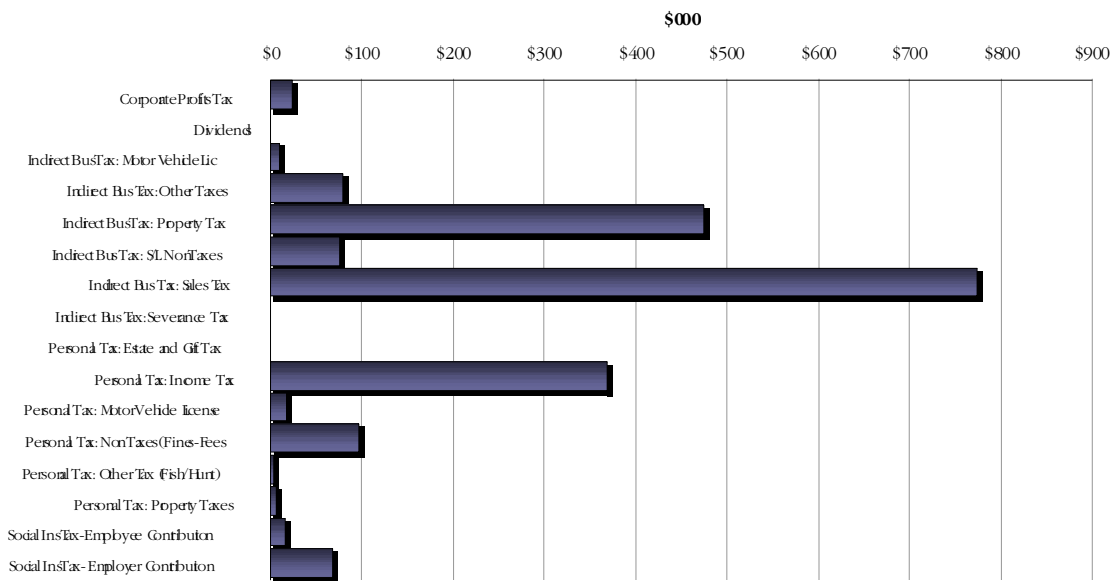
Source: MIG Implan Pro, 1999 Tulare County Data Files

FIGURE 10
1999 FEDERAL GOVERNMENT (NON-DEFENSE) TAX CONTRIBUTIONS OF
THE TULARE COUNTY AGGREGATES INDUSTRY



Source: MIG Implan Pro, 1999 Tulare County Data Files

FIGURE 11
1999 STATE/LOCAL GOVERNMENT (NON-EDUCATION) TAX
CONTRIBUTIONS OF THE TULARE COUNTY AGGREGATES INDUSTRY



Source: MIG Implan Pro, 1999 Tulare County Data Files

5. CONCLUSION

This study has found that the construction and aggregate industries is a major contributor to Tulare County's economy based on two very important indicators. First, their economic impact of over \$1 billion exceeds the outputs of either of two other powerhouse industries: food and feed crops, and wholesale trade. Second, they drive growth and development in Tulare County by providing the necessary commercial, residential, and public infrastructure for attracting businesses with high paying jobs, and for maintaining a healthy, safe, and sustainable quality of life.

In addition, the construction and aggregate industries contribute 8% of Tulare County's \$12 billion output, employ 5% of the county's workforce, and pay over \$108 million in federal, state, and local taxes. In a county where the per capita income is about \$20,000, the aggregates industry paid an average of \$39,000 per employee.

The study also finds that all construction depends upon having large quantities of locally available supplies of sand and gravel and crushed stone, or "aggregates". Without aggregates construction can't commence.

Tulare County is putting its future at risk if it fails to ensure the uninterrupted availability of local high-quality aggregates. As documented by the State Division of Mines and Geology, the Kaweah-St. Johns areas that have historically supplied most of the portland cement concrete-grade aggregates for Tulare County will soon be completely depleted unless additional aggregate reserves are permitted.

While this study specifically focuses on the economic impacts of the construction and aggregate industries in Tulare County, these findings are also part of the interrelated growth and infrastructure challenges facing the San Joaquin Valley, the greater Central Valley, and California.

Nearly 60 years ago at a state water conference, Harry Bashore, Commissioner of the Bureau of Reclamation from 1943-1945, warned that “the population of California will increase beyond your ability to support them and your own prosperity will decay, unless you give heed in time to developing your resources to their maximum long-term capacity. Piecemeal development, project by project, will not accomplish this.” What Mr. Bashore was really talking about was planning – something California needs to improve upon if it is to support its present and anticipated population. Failure to do so not only imperils Tulare County and the State of California, but the national economy as well.

GLOSSARY

Direct output: This is the direct impact directly attributed to an industry – their employees, revenues and wages.

Employee compensation: wage and salary payments as well as benefits, including health and life insurance, retirement payments and other non-cash compensation.

Indirect effect: the secondary impact caused by changing input needs of directly affected industries (e.g., additional input purchases to produce additional output).

Indirect business taxes: consist primarily of excise and sales taxes paid by individuals to businesses; these taxes occur during the normal operation of the businesses but do not include taxes on profit and income.

Indirect output: the revenues, salaries and taxes generated by the purchases made by an industry.

Output: industry output is a measure of the value of goods and services produced in a given area.

Proprietary income: consists of payments received by self-employed individuals as income. This includes income received by private business owners, doctors, lawyers and so forth.

Value-added: employee compensation, proprietary income, other property type income, and indirect business taxes. Generally, the value of goods and services less the cost of materials.

APPENDIX A

THE IMPLAN ECONOMIC MODEL

The IMPLAN United States Economic Model

The IMPLAN economic impact model was used to estimate the economic and tax contributions of the aggregate, construction, crops and wholesale trade industries to the Tulare County economy. The model, which is licensed by the Minnesota IMPLAN Group, Inc., was developed over a period of eight years at the University of Minnesota. IMPLAN is used by more than 500 universities and government agencies to estimate the economic and fiscal impacts of investments and/or changes in industry employment. IMPLAN is an economic impact assessment modeling system that estimates the national and local, private- sector impacts of economic changes.

IMPLAN Economic Impact Analysis

IMPLAN is an input-output model. Input-output accounting describes commodity flows from producers to intermediate and final consumers. The total industry purchases of commodities, services, employment compensation, value added, and imports is equal to the value of the commodities produced. Purchases for final use (final demand) drive the model. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services (indirect purchases) continues until leakages from the jurisdiction (imports and taxes) stop the cycle.

The model summarizes these complex interactions as economic multipliers, which can be used to estimate the total economic impact of the employment, sales and taxes generated by the industries in Tulare County.

Industry Definition

IMPLAN industrial sectors are made up of BEA (Bureau of Economic Analysis) Commodity and Standard Industry Classifications (SIC). The industries defined for the model constructed for Tulare County contain aggregated and partial industry sectors as defined by both BEA Commodity and Standard Industry Classifications. Below is a crosswalk for the industries from the IMPLAN model to BEA Commodity and the Standard Industry Classifications.

IMPLAN SECTOR TO BEA COMMODITY AND SIC CROSSWALK

IMPLAN Sector	BEA Commodity	SIC
New Residential Structures	11.0100	1500, 1600, 1700
New Industrial And Commercial	11.0200	1500, 1600, 1700
New Utility Structures	11.0300	1500, 1600, 1700
New Highways And Streets	11.0400	1500, 1600, 1700
New Farm Structures	11.0500	1500, 1600, 1700
New Mineral Extraction Facilities	11.0600	1500, 1600, 1700
New Government Facilities	11.0700	1500, 1600, 1700
Maintenance And Repair, Residential	12.0100	1500, 1600, 1700
Maintenance And Repair Other Facilities	12.0200	1500, 1600, 1700
Dimension Stone	Part 9.0001	1410, 1420
Sand And Gravel	Part 9.0003	1440
Nonmetallic Minerals	Part 9.0004	1480
Misc. Nonmetallic Minerals, N.E.C.	Part 9.0004	1490
Paving Mixtures And Blocks	31.0200	2951
Asphalt Felts And Coatings	31.0300	2992
Cement, Hydraulic	36.100	3251
Concrete Block And Brick	36.100	3271
Concrete Products, N.E.C	36.1100	3272
Ready-Mixed Concrete	36.1200	3273
Gypsum Products	36.1400	3275
Cotton	2.0100	0131, parts: 0191, 0219, 0259, 0291
Food Grains	2.0201	0111, 0112, parts: 0191, 0219, 0259, 0291
Feed Grains	Part 2.0202	0115, parts: 0139, 0191, 0219, 0259, 0291
Hay And Pasture	Part 2.0202	Parts: 0139, 0191, 0219, 0259, 0291
Grass Seeds	2.0203	Parts: 0139, 0191, 0219, 0259, 0291
Tobacco	2.0300	0132, parts: 0191, 0219, 0259, 0291
Fruits	2.0401	0171, 0172, 0174, 0175, parts: 0179, 0191, 0219, 0259, 0291
Tree Nuts	2.0402	Parts: 0173, 0179, 0191, 0219, 0259, 0291
Vegetables	2.0501	0134, 0161, parts: 0119, 0139, 0191, 0219, 0259, 0291
Sugar Crops	2.0502	0133, parts: 0191, 0219, 0259, 0291
Miscellaneous Crops	2.0503	Parts: 0119, 0139, 0191, 0219, 0259, 0291
Oil Bearing Crops	2.0600	0116, parts: 0119, 0139, 0173, 0219, 0259, 0291
Wholesale Trade – Non-durable Goods	69.0100	5000, 5100
Wholesale Trade – Durable Goods	69.0100	500, 5100

Source: IMPLAN Pro

