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### M.Cubed

With offices in Davis, Oakland, and San Francisco, California, M.Cubed is a consulting firm specializing in resource economics and public policy analysis. M.Cubed professionals have substantial experience evaluating and recommending local, state, and federal policies. M.Cubed staff have worked for the U.S. Congress and the Executive Office of the President, and have testified before state legislatures, public utility commissions, and other regulatory bodies. Recent notable projects include an examination of electric industry restructuring in the State of California for the Agricultural Energy Consumers Association and the California Public Utility Commission; an evaluation of the costs of urban sprawl for the Bank of America and the American Farmland Trust; and an analysis of the aerospace industry for the Antelope Valley Aerospace Coalition.

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**The Economic Impact  
to Nevada  
if Triple Trailers are Banned**

**Steve Moss  
M.Cubed  
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### **Small Businesses Adversely Affected**

- **Small and low-profit firms located throughout the state would be adversely affected by a triples ban.** These firms take advantage of triples' lower shipping costs to transport their goods to new markets. For example, the lower shipping prices made possible by triples may enable a small wholesaler in Las Vegas to ship its product to customers in Salt Lake City, or elsewhere. The economic impacts of a triples ban would be felt throughout the state.

Allowing triple trailer trucks to operate in Nevada is a cost-effective method of encouraging statewide economic growth. In addition, by reducing overall tractor traffic triples use *may serve* to reduce mobile-source polluting air emissions, and by balancing loads over a greater number of axles triples, reduce pavement wear on the state's highways.

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## Economic Impacts of Prohibiting the Use of Triple Trailer Trucks in Nevada

### 1.0 Introduction

Nevada is the eastern gateway to California's *almost trillion dollar* economy. Because of its location, an enormous flow of people and goods from points east and west pass through the state. Transportation -- trucks and rail -- are a key part of the state's economy, and policies which decrease transportation access or increase costs can have a substantial negative impact on the state's prosperity.

Some policy makers propose to reduce Nevada's existing role as a transportation hub by prohibiting the use of productive trucks -- triple trailers -- within the state. Triple trailer trucks typically consist of a two-axle tractor pulling a 28-foot semi-trailer and two 28-foot trailers. As indicated in Table One, the result is a seven-axle combination truck with a total length of between 100 and 105 feet. Nevada allows a gross vehicle weight (GVW) for triples of up to 117,000 pounds.<sup>1</sup>

Table One  
Truck Characteristics<sup>2</sup>

Truck Type	Typical Length (meters)	Payload (cubic meters)	Fuel (@11PCF density)
Semi-trailer	20	100	100
Twin-trailer	22	120	91
Triples-trailer	31	175	77

Triples are generally used by trucking firms that specialize in less-than-truckload (LTL) and package shipments, in which multiple shippers transport several different kinds of merchandise. Triples are also used in resource-intensive industries, such as mining, frequently in a truck-trailer-trailer configuration. In general, however, triples are not used by "truckload" firms, which provide point to point service for individual shippers, and which represent the great majority of truck traffic. LTL firms typically convey goods from their source to a centralized sorting facility, where the cargo slated for other regions is broken down and continues its overland journey by truck or rail. LTL carriers are responsible for just 2 percent of

<sup>1</sup>Eric D. Moody, "Fuel Consumption and System Costs Related to Longer Combination Vehicle Operation on the Interstate Network," *Journal of the Transportation Research Forum*, Volume 17, Number 1, 1991; Telephone interview with John Collins, ATA, September 29, 1997.

<sup>2</sup>Byron Geuy, "An Industry Perspective on Longer Combination Vehicle Operations in the Western USA," *Transportation Planning and Technology*, Volume 14, 1989.

Nevada's total manufactured freight transported by truck.<sup>3</sup>

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) froze the roads on which triples, as well as other long combination vehicles (LCV), can operate to those routes on which triples were already serving on June 1, 1991.<sup>4</sup> As a result, sixteen states, including six turnpike authorities, currently permit triples operation. For example, triples operate on designated routes in many of Nevada's neighboring states, including Arizona, Colorado, Idaho, Oregon, and Utah.

This report examines the potential economic implications of prohibiting the use of triple trailer trucks in Nevada. In addition to this introduction, this report consists of the following sections:

- A description of Nevada's economy.
- A discussion of the cost-effectiveness of triple trailer trucks.
- An evaluation of the economic implications of prohibiting triples operation in Nevada.

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<sup>3</sup>ATA Foundation, draft, op. cit.

<sup>4</sup>Other LCVs include turnpike doubles and Rocky Mountain doubles.

## 2.0 Nevada's Economy is Linked to Transportation

Nevada is a crossroads for economic activity throughout the Western United States. The state is situated on California's eastern border -- within a days drive of Los Angeles, and a few hours east of San Francisco -- and has important economic relationships with Arizona and Utah. Nevada's \$44 billion dollar-plus economy supports almost 900,000 jobs. The state currently has a 4.4 percent unemployment rate, somewhat lower than the national jobless rate of 4.9 percent.<sup>5</sup> So far this year Nevada has been the fastest growing state in the Union, with an almost 5 percent increase in statewide employment.<sup>6</sup>

## 2.1 Transportation Plays a Key Role in the State Economy, Now and in the Future

Transportation plays a key role in the state's economy. Nevada is home to almost 1,500 for hire and private interstate trucking firms. Over 50,000 Nevadans were employed in the trucking sector in 1995, one out of every thirteen citizens. Likewise, trucking-related wages exceeded \$1.7 billion in that year.<sup>7</sup> What's more, a survey of businesses by the Nevada Commission on Economic Development indicated that the three top considerations in determining new business locations are taxes, *transportation*, and labor.<sup>8</sup>

Of particular importance to the state's economy is its warehousing and distribution sector. These facilities are strategically sited to provide customer service in the form of stock availability at the lowest cost, especially transportation cost. The factors that influence the location of warehouse facilities are well known: proximity to major markets, operating costs (including capital costs), transportation costs (in- and out-bound) and availability, inventory taxes, transit times from warehouse to customer, and executive preference. Nevada scores well on all of these factors, and use of triples adds an important advantage to the state's list of attributes.

As a result of these attributes, *significant employment in the state is linked to its growing prominence as a center for goods handling for the Western United States*, and to the use of triple trailer trucks. Over the past decade hundreds of new distribution firms have located in Nevada, many from previous sites in California, a state which currently does not allow triples use. These new employers include Freightliner and General Motors parts distribution centers, the K Mart,

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<sup>5</sup>Bureau of Labor Statistics.

<sup>6</sup>Arizona State University, *Blue Chip Job Growth Update*, Volume VIII, Number 9, September, 1997.

<sup>7</sup>American Trucking Association (ATA) Foundation, *Trucking in Nevada*, draft, September 29, 1997.

<sup>8</sup>ATA Foundation, op. cit.



Levi Strauss and T.J. Maxx distribution centers, and J.C. Penney's 1.7 million square foot, 160 acre processing and distribution facility.<sup>9</sup> Table Two indicates some of the firms currently serviced by triples.

Table Two  
Nevada Companies Served by Triple Trailer Trucks<sup>10</sup>

Firm	Firm
Aervoe Pacific	J.V. Corporation
CorporationAmway	Levi Strauss
Anexter Wire	Moen
Bender Warehouse Company	Owen Distribution
Boehringer Ingelheim	Snap-on Tools
Equotaox	Spalding
Freeman Decorating	State Farm
Greyhound Exhibition Services	United Engine and Machine Company
Henry Schien	WalMart
J.C. Penny	Wells Manufacturing Firm

<sup>9</sup>ATA Foundation, op. cit.

<sup>10</sup>Ted Scott, *Nevada Triple Trailer Truck Operations*, September 23, 1997.

### 3.0 Triple Trailer Trucks are Cost-Effective

As discussed in Section 1.0, triple trailer trucks are primarily used by LTL and package carriers, as well as for some resource-related industries, and it is for these carriers and their shippers that triples provide the greatest cost-savings. For example, triple trailer trucks offer the largest single productivity improvement that is currently available for the less-than-truck-load trucking sector.<sup>11</sup>

Although cost estimates differ somewhat depending on the shipping route, truck weight, and other characteristics, for LTL carriers the cost per-ton mile for triples is from 20 to 30 percent lower than for twin 28's.<sup>12</sup> As indicated in Table Three, this can represent almost a 3 cent per ton-mile savings compared to doubles, and a 12 cents per ton-mile savings relative to single-trailers.<sup>13</sup>

Table Three  
Typical Differences in Cost per Ton-Mile  
Between Triples and Other Trailer Combinations<sup>14</sup>

	Difference (Cents/Ton-Mile)
28' Double-Trailer	+2.7 cents
28' Single-Trailer	+12 cents
48' Semi-Trailer	+12.1 cents

<sup>11</sup>USGAO, 1994, op. cit.

<sup>12</sup>Sydec, Inc, *Productivity and Consumer Benefits of Longer Combination Vehicles*, submitted to the Trucking Research Institute of the ATA Foundation, May 14, 1990.

<sup>13</sup>The frequency of accidents related to triple trailer trucks also influences transportation productivity and costs. In general, longer combination vehicles are safer than non-LCVs, and as a result a prohibition on triples use could induce higher accident-related costs in the state. These potential additional expenses have not been factored into this analysis. See U.S. Department of Transportation, *Accident Rates for Longer Combination Vehicles*, Publication Number FHWA-MC-97-003.

<sup>14</sup>Economic Applications International, Inc., *Initiative to Ban Triple-Trailer Combination Trucks from Oregon Highways*, July 20, 1992.

A substantial portion of triples' cost-effectiveness is related to the fact that the vehicles use 27 percent less fuel than doubles for a given volume of freight.<sup>15</sup> This cost reduction is partially offset by the fact that, since triples are frequently operated by union drivers, they tend to have a higher wage cost per mile. However, after the increased trailer capacity is factored in, triples are cost-effective from a fuel, labor, and equipment perspective. For example, a company that switched from 28-foot doubles to 28-foot triples would need one-third fewer trips to transfer the same freight.<sup>16</sup>

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<sup>15</sup>USGAO, 1994, op. cit.

<sup>16</sup>It is important to note that while use of triples has important implications to trucking firms *within* the LTL and some resource-intensive sectors, a prohibition on their use is unlikely to have significant effects on other transportation modes (i.e., ships, planes, or rails), other than any potential reduction in overall shipping volumes. In particular, various studies have demonstrated that the rail sector is minimally impacted by use of triple trailer trucks. For example, nationwide implementation of *all* types of LCVs would divert less than 2.2 percent from rail freight. See U.S. Department of Transportation, *An Investigation of Truck Size and Weight Limits, Final Report*, August 1981. Research sponsored by the railroad industry likewise suggests that a small portion of rail tonnage competes with triples:

A major implication of the cost comparison is that except for LTL freight, twin and triple trailers do not pose a major competitive threat to the railroads...Although the railroad industry does carry LTL freight, it has traditionally represented only a small portion of the total railroad tonnage."

Association of American Railroads, "An Assessment of the Rail Competitive Motor Carrier Industry," presented to the Transportation Research Forum, 1987.

And finally:

It is unlikely that selective expansion of LCV routes would have a significant impact on rail traffic. On the other hand, LTL and package companies could expand their use of triples even with selective additions to the LCV network. These companies do not compete directly with railroads, but they do use intermodal rail service for some longer trips as well as for seasonal surges in traffic and for managing unbalanced markets. If triples could be used on a wider basis, some of these intermodal shipments might return to the highway. However, the LTL companies account for a very small percentage of intermodal rail business, so they would have little impact on rail ton-miles.

USGAO, 1994, op. cit.; see also CE-CERT, op. cit; and Scott M. Dennis, "Acquisition of Truckload Motor Carriers by Railroads: An Antitrust Analysis," *Transportation Journal*, 30(3), Spring 1991.

Yellow Freight System's use of triples has saved them 13 million miles of travel and 1.6 million gallons of fuel annually. As a result, Yellow's customers save approximately \$21 million a year in transportation costs.<sup>17</sup> United Parcel Service reports similar benefits. The Transportation Research Board (TRB) estimates that the use of longer combination vehicles nationwide could reduce vehicle miles traveled by 3.3 percent, for an \$4 billion annual savings in transportation costs.<sup>18,19</sup>

### 3.1 Estimated Cost Increases Resulting from a Prohibition of Triples Use in Nevada

Triple trailer trucks are currently allowed to operate on 2,404 highway miles in Nevada, or on less than 6 percent of the state's total highway miles.<sup>20</sup> Based on available data,<sup>21</sup> and the costs shown in Table Two, the total estimated cost increases induced by a prohibition on triples use in Nevada can be calculated.<sup>22</sup>

Prohibiting triples use in Nevada would act to increase trucking operating costs by between \$15 and \$60 million annually, including increased equipment costs related to replacing triples and facility modification to better accommodate doubles.<sup>23</sup> These findings are supported -- and appear to be conservative -- by an informal survey of only *four* of the *four hundred* Nevada carriers that currently rely on triples. These four firms reported that a triples ban

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<sup>17</sup>Letter to Congressman Jerry Lewis from Warren Hoemann, Vice President, Yellow Corporation, May 13, 1996.

<sup>18</sup>Larry Marshall, "A Look at Long Combination Vehicles," *Go-West Magazine*, Motor Transport Management Group, Sacramento, California, 1990. This study included triples and doubles variations. It is important to note that ATA's formal position is *not* to seek an expansion in the number of state's allowing triples use. Rather, the expansion-related quotes used herein are simply to provide information related to the cost-effectiveness of triples in current use.

<sup>19</sup>Scott, op. cit.

<sup>20</sup>"Code of Federal Regulations 23, Highways," April 1997, Part 658, Appendix C; "Highway Statistics 1996," FHWA-PL-96-017, November 1996.

<sup>21</sup>1997 U.S. DOT Comprehensive TS&W Study, Draft, June 5, 1997; ATA.

<sup>22</sup>Other important assumptions are as follows: the average triple carries 85,000 pounds, or 38 tons; triples would solely be replaced by doubles, rather than a combination of doubles and semis. This weight assumption is less than the Nevada's legal limit of 129,000 pounds. Some of these assumptions are based on Sydec; Economic Applications International, Inc. op. cit.

<sup>23</sup>These costs are assumed to be approximately 20 percent of increased operating costs, based on the survey discussed in the body of the report.

would induce additional fuel, labor, equipment, and maintenance costs of almost \$15 million a year for their operations alone.

Based on these estimated cost-savings, in the section that follows employment and fiscal impacts are estimated.

#### 4.0 Economic Implications of a Prohibition on Triples Use

In the longer term, a prohibition on triples use in Nevada would induce two adverse outcomes:<sup>24</sup>

- (1) The productivity savings currently engendered by triples use may act to increase investment in other parts of the state economy, such as greater production of the goods being shipped, reduced prices for these goods, and greater demand for commodities to be shipped to and from Nevada. **This additional investment would be lost if triples use were prohibited.**
- (3) The availability of triples, combined with the state's other advantages, has accelerated growth in the warehousing and distribution sector. Warehousing is attracted by triple's lower transportation costs, and by lower facilities expenses, including order processing and other business logistics costs which result from the less frequent but larger shipments associated with triple use. Although studies on triples are unavailable, up to a 60 percent reductions in annual total logistics costs for other types of LCVs have been observed.<sup>25</sup> Growth in warehousing and distribution likewise increases activity in the ancillary services -- telecommunications, GIS, and interactive computer capabilities -- necessary for transportation logistics. **This triples-related economic growth would be lost under a prohibition policy.**

#### 4.1 Estimated Economic Impacts

M.Cubed estimated economic impacts to Nevada based on two scenarios. The first scenario relies on the low cost estimate, and assumes that triples engender only modest increases in shipping volume and warehousing and distribution investment in the state. In this scenario the state loses between 10 and 50 percent of the estimated triples-related cost increases that would otherwise be invested back into the state over five years. The second scenario is based on the high cost estimate, in which the prohibition of triples acts to substantially reduce growth in Nevada's trucking sector. In this scenario the state loses between 20 and 100 percent of the estimated prohibition-related cost increases between 1998 and 2002.<sup>26</sup>

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<sup>24</sup>It should be noted that these estimates are based on *existing* truck traffic. National truck volume is expected to grow by almost 20 percent between 1994 and 2004. Increases in truck traffic will occur regardless of whether or not triples are allowed to operate in the state, but this growth will be based on less efficient transportation patterns, and Nevada will have no particular advantage in attracting transportation investment than its status quo characteristics. See DRI/McGraw Hill, *U.S. Freight Transportation Forecast...to 2004*, February 1996.

<sup>25</sup>Oak Ridge National Laboratory, *The Productivity Effects of Truck Size and Weight Policies*, ORNL-6840, November 1994.

<sup>26</sup>This estimate does not account for the likely cost-increases associated with warehousing

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Table Four displays the estimated increases in value-added production and employment between 1998 and 2002. As indicated in the table, between 130 to 1,190 jobs would be lost as a result of a triples policy over five years. Likewise, value-added production in the state would fall by between \$5 and \$49 million over the five year period.

Table Four  
Prohibition-Induced Employment and Personal Income Loss

Year	Cumulative Job Loss, Low	Cumulative Job Loss, High	Cumulative Reduction in Personal Income, Low	Cumulative Reduction in Personal Income, High
1998	-30	-265	-\$1.1 million	-\$10 million
1999	-55	-520	-\$2.1 million	-\$19.5 million
2000	-80	-755	-\$3.1 million	-\$28.4 million
2001	-105	-980	-\$4 million	-\$36.8 million
2002	-130	-1,190	-\$4.8 million	-\$44.7 million

The employment loss engendered by a prohibition would result in a reduction in "good" middle class wages. Warehouse jobs typically require relatively low skill levels and pay in the range of minimum wage to \$14.00 an hour.<sup>27</sup> However, annual wages for jobs in LTL firms range from \$30,000 to \$38,000, excluding benefits, compared to average Nevada trucking salaries of approximately \$33,000.<sup>28</sup> Unionized triples drivers receive higher pay -- \$50,000 or more -- as do warehouse equipment operators.<sup>29</sup>

#### 4.2 Tax Implications

Both truck taxes and local taxes -- chiefly sales and highway user -- would be affected by the triples policy. Table Five displays estimated local user and sales tax revenue reductions. As discussed above, in the short-term triples could result in reduced fuel tax revenues. However,

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and distribution, which would induce additional employment loss.

<sup>27</sup>Trucking Industry Self-Funded Research & Development Program, *Economic Development Potential* -- 1991, January 1992.

<sup>28</sup>ATA Foundation, *Trucking in Nevada*, Draft, September 29, 1997.

<sup>29</sup>M.Cubed, *Economic Impacts to San Bernardino County of Allowing the Use of Triple Trailer Trucks on Interstates 15 and 40*, December 1996.

revenue increases could result from greater registration fees for tractors, as triples are replaced by doubles or semis. These increases, in turn, would be offset by reductions in special permit fee revenues currently generated by triples.<sup>30</sup>

Table Five  
Estimated Tax Revenue Loss Related to Triples Prohibition<sup>31</sup>

	Estimated Tax Revenue Reduction, Low	Estimated Tax Revenue Reduction, High
1998	-\$0 million	-\$0.4 million
1999	-\$0.1 million	-\$0.8 million
2000	-\$0.1 million	-\$1.1 million
2001	-\$0.2 million	-\$1.4 million

<sup>30</sup>Use of triples may also serve to lower highway pavement expenses. This is because pavements are affected by *axle weights*, not gross weight. Average axle weights on triples are lower than the average axle weights on doubles, despite triple's higher gross weights. Even at 115,000 pounds, where the average axle weight from triples is the same as for doubles at 80,000 pounds, pavements would benefit by the less frequent repetitions of the steering axles (at 10,000 pounds) resulting from the fewer trips made possible by triples. Western Highway Institute, *LCV Guide to Operation and Regulation*, 1992.

For example:

Because LCVs spread their higher gross weight over more axles, they generally do not increase pavement wear relative to shorter combinations and may actually be less damaging... While LCVs may require some additional public investment in the highway infrastructure, these costs appear to be exceeded by the recurring annual benefits in the form of lower transportation costs.

United States General Accounting Office (USGAO), *Longer Combination Vehicles*, Statement of Kenneth M. Mead, Director, Transportation Issues, Resources, Community and Economic Development Division, September 14, 1994.

And in 1992 the Oregon Department of Transportation estimated that if triples were banned in a state referendum, the resulting increase in trucks on state highways would generate \$2.5 million annually in additional pavement costs. USGAO, *Longer Combination Trucks*, August 1994.

<sup>31</sup>Based on data from ATA Foundation, draft, op. cit.



2002	-\$ .2 million	-\$1.8 million
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## 5.0 Conclusion

Prohibiting triple trailer trucks in Nevada would serve to eliminate a cost-effective method of generating economic growth in the state. A triples ban would cost shippers and consumers between \$15 and \$60 million a year based on the best available data. As a result of triples-induced transportation cost increases, the state would attract less investment, particularly in the warehousing and distribution sector related to retail and wholesale trade. This lost investment, in turn, is estimated to reduce statewide employment by between 130 and 1,190 jobs. In addition, \$5 to \$49 million worth of goods and services which would otherwise be produced in Nevada would move outside the state.