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DEVELOPMENT OF ALTERNATIVE TRANSPORTATION TECHNOLOGIES: A FOCUS ON RECENT TRANSPORTATION INITIATIVES

Dennin S. Brasch and Kenneth L. Casavant
Department of Agricultural Economics
Washington State University
Pullman, WA 99164-6210

INTRODUCTION

The liberalization of trade into the Mexican apple market in 1991 opened the door for Washington apple exporters to significantly expand sales in that country. Exporters wasted no time in capitalizing on this opportunity, but in the process have encountered problems which have shifted attention to transportation capacity and efficiency. Transport availability, reliability and cost are all becoming increasingly important as Mexican apple imports continue to rise and formidable competitors begin to enter the market. The critical nature of these issues is further accentuated by dramatic overall U.S.-Mexico trade expansion and associated problems of congestion at major border crossings.

In response to these constraints on transportation reliability and efficiency, several potential transport alternatives have recently emerged. The purpose of this paper is to evaluate the cost and performance characteristics of three transportation alternatives (thru-rail, rail-barge-rail, and steamship) which will soon be serving Washington apple exports into Mexico. The specific objectives are to:

1. Review the transportation system serving Washington apple exporters.
2. Discuss transportation system imbalances and efficiency constraints.
3. Detail the recent development of potential transportation alternatives.
4. Determine the relative costs and benefits associated with each alternative.
5. Draw conclusions regarding how the introduction of new alternatives can help improve transportation efficiency and export competitiveness.

WASHINGTON APPLE EXPORT DYNAMICS

During the 1990/91 season, Washington exported 574,229 boxes of apples. One year later (1991/92), following the opening of the Mexican apple market, Washington exports were a record 4,025,435 boxes, an increase of more than 700%. In one year, Mexico moved from being of moderate interest as an export target to becoming the number one foreign market for Washington apples (Washington Apple Commission).

The export volume in 1991/92 was indeed astonishing and yet in the following 1992/93 marketing season, more than 5.7 million boxes of apples were exported to Mexico, a 42% increase over the explosion of exports in 1991/92. Preliminary 1993/94 export figures indicates that this level may well continue to rise. The recent signing of the North American Free Trade Agreement (NAFTA) lends further support to such a trend. Mexico's 20% tariff on apple imports has already been lowered to 18% for the U.S. and Canada and is scheduled to be reduced 2% per year for the next nine years. Furthermore, NAFTA will serve to standardize and streamline import/export documentation which could help alleviate paperwork congestion at the border.

CURRENT MODES OF TRANSPORTATION

Currently, three transportation alternatives are utilized for moving fresh apples from Washington into Mexican markets. These alternatives are transshipment by truck, thru-shipment by truck and transshipment by rail.

Most Washington apples reach Mexico by way of truck transshipments. Apples are loaded on U.S. trucks in Washington and are delivered to one of several destinations along the U.S.-Mexico border. McAllen and Laredo, Texas, are the most common destinations (Chacra). A freight forwarder then transloads the apples onto Mexican trucks. At its most efficient, this procedure takes approximately 15-30 minutes if the load is on pallets or slipsheets and two-four hours if it must be transloaded by hand rather than by forklift.

The loaded Mexican truck then clears customs at the border and continues to its final destination. Truck shipments from Washington to McAllen or Laredo are typically "fourth morning delivery," meaning that a truck loaded in Washington on Monday morning will arrive at the border on Thursday morning. This is true for truck transshipments as well as well as thru-shipments.

The major difference between transshipments and thru-shipments is that with thru-shipments the apples are not transloaded onto a Mexican truck. While the

load stays on the same trailer the entire journey, the U.S. tractor is replaced by a Mexican tractor at the border. Transshipment by rail is essentially the same as transshipment by truck, except that the first leg of the journey (Washington to border) is by refrigerated boxcar. A boxcar holds approximately 2,100 boxes of apples, while a truck holds 930-1070 boxes (a box is typically 42 pounds). The per box cost of transloading a railcar is the same as for a truck.

Truck rates to the south Texas border are highly variable. Depending on backhaul availability and seasonally high demand for competing goods, rates can range from \$2.40-\$3.75 per box (Welch). Thru-truck rates are much steadier, but availability can be even more troublesome. Representative rates and transit times for delivery from Washington to Monterrey and Mexico City (two major destinations for Washington apples exports) are given in Tables 1 and 2.

Table 1. Apple Transportation: Washington to Monterrey, Mexico, by Rate and Delivery Time, April 1993.

Rate/Time	Thru-Truck	Transtruck	Transrail
Wash.-Laredo	\$2.92/box	\$2.75/box	\$2.46/box
Transload	--- 0 ---	\$0.20/box	\$0.20/box
to Monterrey	\$0.55/box	\$0.45/box	\$0.45/box
Total Cost	\$3.46/box	\$3.40/box	\$3.11/box
Delivery Time	6 days	6 days	13 days

Table 2. Apple Transportation: Washington to Mexico City, Mexico, by Rate and Delivery Time, April 1993.

Rate/Time	Thru-Truck	Transtruck	Transrail
Wash.-Laredo	\$2.92/box	\$2.75/box	\$2.46/box
Transload	--- 0 ---	\$0.20/box	\$0.20/box
to Mexico City	\$1.40/box	\$1.27/box	\$1.27/box
Total Cost	\$4.32/box	\$4.22/box	\$3.93/box
Delivery Time	7 1/2 days	7 1/2 days	15 1/2 days

As indicated in Tables 1 and 2, the transrail rate is the lowest of the three alternatives. Although transrail can at times be as much as \$1.00 per box cheaper than either truck alternative, it is the least utilized system for moving Washington apples to Mexico. This can be partly explained by the fact that transrail delivery times are substantially higher than for truck deliveries. Furthermore, transrail delivery time has been very inconsistent due to a lack of daily service on certain segments of the route from central Washington to the border.

Transtruck and thru-truck have very similar rates and transit times. As mentioned earlier, the primary differences are that thru-trucking service avoids transloading at the border and has steadier (but generally higher) rates. Transtruck service, on the other hand, has greater capacity and many more firms to choose from. Both systems have problems of availability at certain times of the year.

TRANSPORTATION SYSTEM IMBALANCES

The tremendous increase in Washington apple exports to Mexico has created, or at least accentuated, problems of availability and associated high truck rates at certain times of the year. Nearly all current apple movement to Mexico is by truck and during the summer months, truck rates to Laredo and McAllen, Texas (where most apple shipments to Mexico cross) tend to be very high. While apple exports to Mexico are relatively steady throughout the year, backhaul opportunities out of south Texas are not. During the summer there are very few return loads from this region and it is not uncommon for a truck to deadhead (travel empty) as far as California to get a load. Truck rates also tend to be high from mid-November through December due to greater alternative demand for refrigerated transport during this period (i.e., Christmas trees, frozen turkeys). In fact, during this time period truck rates can increase by 30%-40% and availability is still problematic (Welch).

Rapid market expansion in Mexico has not been limited to apples. As a prelude to the recently signed North American Free Trade Agreement, many trade restrictions were or are currently being phased out. The result has been a large increase in border traffic in the past few years and associated problems of congestion at the major crossing points. Significant growth in U.S.-Mexico trade began in 1986 when Mexico joined GATT; however, the increase in trade has been even more dramatic in recent years. During the period from 1989-92, total trade grew 45%. The volume of trade quickly outgrew the infrastructural capacity of Mexico's transportation system and the result has been excessive delays (U.S. Department of Transportation).

Delays have been due to both logistical capacity and administrative capacity. In an attempt to alleviate extreme congestion at the border, several infrastructural investment projects have been initiated and many more are in the planning stages. These projects include investment in several of the major bridges as well as the roads near the primary crossing points. However, it is not just increased truck and rail volume that has led to bottlenecks. The flow of paperwork has also grown dramatically. While Mexico has taken steps to streamline customs procedures at the Laredo crossing, there is still a large and growing need for further improvement in this area. This need arises because U.S. exports to Mexico are projected to increase by 65%-70% by the year 2000 and Mexican exports crossing at south Texas ports of entry are projected to increase by 120%. These projections are even more alarming considering that more than half of all overland exports to Mexico already cross in south Texas (U.S. Department of Transportation).

When dealing with perishable products like apples, reliable transportation is essential to preserving fruit quality. Furthermore, the timing of shipment arrivals is of particular importance in Mexico as cold storage is often limited or unavailable at the retail level. Clearly the efficiency of the transportation system is critical in exporting Washington apples to Mexico. In the following section, three potential transportation alternatives for shipping apples are examined:

Thru-rail. Direct rail service whereby apple shipments bypass border controls and clear customs and agricultural inspection upon arrival in Monterrey, Mexico. Railcars are transloaded into refrigerated trucks for delivery to final delivery to local buyers or interior destinations such as Mexico City or Guadalajara.

Rail-barge-rail. Rail service to Galveston, Texas, where boxcars are loaded onto barges and towed to a subport of Veracruz, Mexico. Railcars are then unloaded and continue to central Mexico.

Steamship. Refrigerated containers are transported by ship from Vancouver, B.C., to Los Angeles, California, where they are transloaded onto another steamship line for final delivery to Manzanillo, Mexico. Alternatively, containers are trucked from central Washington to Los Angeles and then are loaded onto a steamship bound for Manzanillo.

The rates and physical attributes of each system were developed through two research trips to the Texas-Mexico area and through interviews of exporters, brokers, carriers, freight forwarders and importers. It should be noted and

emphasized that all three of the alternatives examined in this paper are scheduled to begin serving Washington apple exports to Mexico in 1994.

POTENTIAL TRANSPORTATION ALTERNATIVES

Thru-Rail

Thru-shipment by rail has the potential to eliminate the additional cost and extra handling of transloading while at the same time providing quicker, more reliable service than transrail (Hurson). With this system, apples will be loaded on refrigerated boxcars in Washington. These cars travel on the Burlington Northern to Fort Worth, Texas, taking approximately five and one-half days. They are then switched to the Southern Pacific which takes the cars to the border at Eagle Pass in two days. At the border, they are picked up by the F.N.M. (Mexican National Railway) and approximately 16 hours later are in Monterrey. The total time expected from Washington to Monterrey is eight to nine days.

Unlike current transport alternatives, thru-rail shipments will not be inspected at the border. The shipments clear customs and agricultural inspection upon arrival in Monterrey. There are customs agents and Mexican agricultural inspectors at the offload site and, thus, congestion delays at the border are avoided. The projected cost of thru-rail to Monterrey is \$5900 per railcar. This rate is equivalent to \$2.95 per box (a railcar holds approximately 2000 boxes of apples). For interior destinations, such as Mexico City and Guadalajara, the additional truck freight would be approximately \$1.00 per box. The transload into trucks in Monterrey is included in the rate paid to Monterrey.

This transportation alternative has been under development for more than two years and is very close to being implemented. A number of administrative barriers have delayed start-up of the thru-rail system. Most of the obstacles have been related to the inland customs clearance. Mexican law previously required all goods to be inspected and clear customs at the border. This is the first and only transportation system in which the Mexican government has permitted inland customs clearance. While authority has been granted for thru-rail's streamlined customs process in Monterrey, the laws must be officially changed before operations can begin. The physical system has been firmly established and it appears that the only obstacles are in the paperwork.

The warehouse facility in Monterrey has been completely remodeled and is ready for operation. It is capable of docking up to ten railcars at a time and the anticipated transload time is 20-30 minutes per truck. The F.N.M. is in the

process of building Monterrey's first intermodal yard beside the thru-rail warehouse and it is expected that intermodal movement of Washington apples through Monterrey will soon be possible. Additionally, several companies have expressed interest in developing cold storage facilities in Monterrey. Currently, there is no commercial chill facility in Monterrey; however, railcars at the thru-rail warehouse will have seven days free demurrage and can serve as temporary cold storage as needed (Hurson).

Rail-Barge-Rail

This potential transportation alternative began service in April 1993. Initially, the system served primarily grain transport, but is now handling perishable commodities as well. With this system, apples would be loaded onto refrigerated boxcars in central Washington and travel on the Burlington Northern to Galveston, Texas. There they would be moved onto barges equipped with track. The barges would then be towed in tandem to Coatzacoalcos, Mexico, a subport of Veracruz. Upon arrival, the cars would be taken by the F.N.M. to the customer's facility in Mexico, D.F. The delivery time from Washington to Mexico City is an estimated 16 days. The current capacity is 108 cars every three and one-half days (each barge can carry 54 cars). This transportation system does not currently serve Monterrey or any northern Mexico destinations. It targets destinations between Veracruz and Mexico, D.F., and--until a port farther north can be served--only the south-central destinations will be available (Asplund).

The rail-barge-rail rate effective until April 1, 1994, is \$10,000 per railcar (approximately \$5.00 per box). The rate from central Washington to the port of Coatzacoalcos is \$8500 (\$4.25 per box) and includes inland rail freight from origin to Galveston, handling and port charges in Galveston, ocean freight to Coatzacoalcos and full cargo insurance up to \$30,000. The Mexico portion costs \$1500 (\$0.75 per box) and includes all port operations in Coatzacoalcos, wharfage and dockage, services and charges of Mexican customs broker to preclear cargo, overland rail transportation to customer facility (in Mexico, D.F.), shipment tracing and full cargo insurance up to \$30,000 per car. Also, railcars will have 48 hours free demurrage at the customer's facility.

While rail-barge-rail has only been in operation a short time, grain shipments have thus far met and in many cases exceeded stated timelines. Refrigerated cargo began moving by rail-barge-rail in November 1993 with frozen foods southbound and fresh fruit northbound. To date there have been no serious logistical or administrative problems. One potential problem related to perishable movement is the availability of refrigerated boxcars. Current reefer capacity on rail-barge-rail is 5-10 cars per week. Industry-wide availability of

reefer boxcars is expected to decrease as equipment continues to be removed from service and no new cars are being built (Asplund).

Steamship from Vancouver, B.C., or Los Angeles, California, to Manzanillo, Mexico

With a steamship-based transportation system, apples would be loaded in refrigerated containers in central Washington. They would then be trucked to Vancouver, B.C., where they would be loaded onto a steamship. The steamship line would deliver the containers to the port of Manzanillo (via Los Angeles, California) where they would be transloaded into Mexican trucks and carried to their final destination.

The total time estimated for delivery from Vancouver, B.C., to Manzanillo is 12 days (Edwards). Inland transport from origin to the port of Vancouver and from Manzanillo to final destination would be an additional two to four days.

Alternatively, containers would be trucked to Los Angeles, California, where they would be loaded onto a steamship bound for Manzanillo. The containers would have a single bill of lading for the overland and water freight. The truck portion to Los Angeles would take approximately two days. Transloading would take one day and the water transit time to Manzanillo would take approximately three days. Offloading and inland transit to Mexico City or Guadalajara would take an additional one to two days. The estimated cost for each of these alternatives is \$3500 per 40-foot container, approximately \$3.50 per box (Edwards).

This alternative is physically ready to begin moving Washington fruit and current capacity on both steamship lines is over 400 containers with eight-day cycle times. The only obstacle remaining is the declaration of Manzanillo as an official port of entry for U.S. fruit. Customs officials and agricultural inspectors are already located in Manzanillo to inspect Chilean and New Zealand fruit; however, it is not clear if or when U.S. fruit will be allowed to enter Mexico through the port of Manzanillo (Dunbar).

COMPARISON OF ALTERNATIVES BY RATE, TRANSIT TIME AND MARKET AREA

Monterrey

The three potential transportation alternatives are best compared with existing transport options by market area. Both steamship and rail-barge-rail are currently targeting the heavily populated area in central Mexico which encompasses Mexico City and Guadalajara, Mexico's two largest urban

centers. Both systems will enter Mexico far south of the border and the much greater geographical distance to northern Mexico and the industrial center of Monterrey (Mexico's third largest city) will preclude any attempts to serve this market area. Currently, neither of the steamship alternatives nor rail-barge-rail is offering deliveries to northern Mexico. Thru-rail, on the other hand, will serve both the northern markets with a competitive direct rail service as well as markets farther south via trucks transloaded in Monterrey. Estimated rates and transit times for apple transport from central Washington to Monterrey, Mexico, are detailed in Table 3.

Table 3. Representative Rates and Delivery Times for Apple Transport From Central Washington to Monterrey, Mexico.

Transport Options to Monterrey	Rate per Box	Total Transit Time
Transtruck	\$3.40	6 days
Thru-truck	\$3.46	6 days
Transrail	\$3.11	13 days
Thru-rail ^a	\$2.95	8 1/2 days

^aPotential alternative.

Thru-rail appears to be the best choice with minimizing cost as an objective and delivery by truck is the most attractive if speed of delivery is to be minimized. However, the figures do not capture the dynamics of the various alternatives. The modal selection process is far more complex than merely selecting the lowest rate that satisfies the desired delivery time. Rate variability, system capacity, service reliability and seasonal availability must also be considered.

As mentioned earlier, transtruck rates are highly variable relative to the other alternatives. Transtruck rates have ranged from \$2.40/box to as high as \$3.75/box. Thus, transtruck rates to Monterrey can be significantly higher than for the other alternatives at certain times during the year. Availability can be a problem during these periods, even for those willing to pay higher rates (Welch).

One apparent solution to this problem would be switching to thru-truck service. However, unless one is a regular customer of a thru-truck company, availability can be as troublesome at any time of year. The four thru-truck companies serving Washington are all large carriers with a well-established clientele. Their business strategy is to maintain regular service at steadier, more dependable rates (Aaron, Dolloff, Forston, Ward). Between the four

companies there is capacity for 80-100 truckloads of apples per week. Each has the equipment to meet increased demand for apple shipments to Mexico, although this would require decreasing service to regular, steady customers. Taking higher bids for sporadic shipments at the expense of losing regular customers is simply not done under the managerial approach of these firms.

The transrail rate is clearly lower than either truck alternative (Table 3). In fact, the per carton cost of transrail has been more than \$1.00/box cheaper than truck service. However, the lower price has not attracted any significant level of use. This suggests that the true cost of transrail is higher than that indicated by the nominal rate. When comparing transrail with the other alternatives, it appears that the lower price per carton is significantly offset by the relatively long 10-13 days travel time to the border and some concern about reliability and damage (Buak, Steensma).

The thru-rail system offers a unique combination of attributes. If the proposed time and rate schedules are achieved, thru-rail will provide speedier delivery than transrail (approximately five days quicker) and less rate variability than transtruck (apple freight rates will remain at \$2.95/box for 1994). Furthermore, potential logistic and administrative congestion at the border is also avoided. Thru-rail capacity is conservatively estimated at 500 cars (1000 trucks) for the first year of service and is expected to expand as the system becomes well established (Hurson).

It should be noted, however, that not all of the attributes of the thru-rail service are necessarily appropriate for all users. For example, thru-rail delivery time, while less than transrail, will still be about three days longer than truck service. Additionally, thru-rail service is currently planned only to Monterrey. Thus, shipments to any other Mexican destination (such as Mexico City or Guadalajara) must be transloaded onto trucks. Thru-rail may also be less attractive to those importers who wish to inspect the load prior to its crossing the border and those interested in only a single truckload quantity.

Mexico City/Guadalajara

Considering the size and importance of the Mexico City and Guadalajara markets, it is understandable that all three potential transportation alternatives are targeting this area. The combined population of these two urban areas is more than 20 million people, roughly one-fourth of the entire country's population. Accordingly, this area has been the primary destination for Washington apples. The rates and transit times for the various transportation options to Mexico City are given in Table 4. Corresponding figures for the

Guadalajara market are not given, but are very similar to those given for Mexico City.

Table 4. Rates and Delivery Times for Apple Transport From Central Washington to Mexico City, Mexico.

Transport Options to Mexico City	Rate per Box	Total Transit Time
Transtruck	\$4.22	7 1/2 days
Thru-Truck	\$4.32	7 1/2 days
Transrail	\$3.93	15 1/2 days
Thru-Rail ^a	\$4.24	10 1/2 days
Steamship ^a (Vancouver, B.C.)	\$5.95	16 days
Steamship ^a (Los Angeles, CA)	\$5.25	8 days
Rail-Barge-Rail ^a	\$4.76	16 days

^aPotential alternatives.

The two rate extremes, transrail (cheapest) and steamship via Vancouver, B.C. (most expensive), are the least likely to be used for moving Washington apples to Mexico. It was pointed out earlier that transrail takes a very long time and is considered to be very inconsistent. Despite its relatively low rate, it is very seldom used. A comparison of the figures listed in Table 4, indicates that the proposed steamship service from Vancouver, B.C., to Manzanillo has little chance of being used for Washington apples. For approximately \$0.70 per box less, containers can be trucked to Los Angeles for steamship service to Manzanillo and will also save eight days transit time. Since capacity should not be a limiting factor and the port and inland Mexico costs are identical for each system, there is no apparent reason to use steamship service from Vancouver, B.C.

With these two options excluded, the rates to Mexico City/Guadalajara appear to be very similar for the remaining options. As mentioned earlier, however, truck rates for the U.S. portion are highly variable. Mexican truck rates are also variable, but much less than those from central Washington to Laredo and McAllen, Texas (Trevino, Chacra). The thru-rail, steamship (Los Angeles) and rail-barge-rail rates, on the other hand, are expected to be very steady. These alternatives are all offering dependable rates, but dependable transit times have yet to be proven. Rail-barge-rail has been consistently meeting or

beating scheduled delivery times since beginning operations in April 1993. The only remaining obstacle is that Coatzacoalcos has yet to be cleared for apple shipments. The port is already handling fresh fruit and other perishable items requiring agricultural inspection, but apples have yet to be formally approved.

This type of constraint would seem easily resolved as it only requires a simple clearance from Mexican authorities. The physical system and paper flow have already been established and the addition of apples on these rail barges should not require much time or effort. This same type of obstacle, however, has kept thru-rail to Monterrey waiting for more than a year. Bureaucratic constraints such as the declaration of Coatzacoalcos and Manzanillo as official ports of entry for U.S. apples are not easily overcome. While the North American Free Trade Agreement may eventually reduce these administrative barriers to U.S.-Mexico trade, it will take some time before these obstacles no longer affect the flow of goods between the two countries.

As for utilizing steamship service from Los Angeles, the primary advantages are availability and capacity. The 400 container capacity per ship is much greater than necessary. The current average for total movement of Washington apples to Mexico by all modes is approximately 110 FEUs (40-foot container equivalent units) per week. While other goods will certainly use some of this capacity, availability is not expected to be a problem (Edwards). The relatively frequent eight day sailing schedule combined with dedicated reefer service should help assure that availability is consistent.

Rail-barge-rail has a relatively long transit time (16 days) and there does not appear to be significant cost savings even during those times when truck rates are \$1.00 per box higher. It appears that the main advantage to using rail-barge-rail is availability. When trucks to south Texas are simply not available, the longer transit time would become less of an issue for those users who prioritize speed of delivery. Furthermore, at these times the more dependable rail-barge-rail rate would be very competitive. With a current sailing schedule from Galveston of every 3.5 days and a projected increase to 2.25 times per week, the longer transit time could be efficiently managed if the system is able to hold close to its 16 day estimate. By getting in the habit of booking freight on 16 day notice rather than eight, shippers could maintain a steady flow of product to their markets.

One attribute unique to rail-barge-rail is that transloading is completely avoided. While thru-rail has direct service to Monterrey, shipments bound for other destinations must be transloaded onto trucks. Steamship service would avoid some risk of product damage from additional handling by using containers, but these containers will be not be allowed to travel to inland

Mexico destinations. They will be transloaded at the port of Manzanillo onto Mexican trucks for final delivery.

All three potential transportation alternatives have a number of apparent advantages and disadvantages depending on the specific needs of the user. Therefore, it is difficult to make a definitive statement favoring one system over another. Below is a summary of the attributes of each potential alternative.

Table 5. Key Attributes of Potential Transportation Alternatives for Moving Washington Apples onto Mexican Markets.

Thru-Rail	Rail-Barge-Rail	Steamship (L.A.)
* lowest rate, very steady	* less competitive but steady rates	* relatively high rate
* improved rail transit time, but longer than truck	* longest transit time	* competitive transit time
* direct rail service to Monterrey	* no transload	* very high capacity
* transloaded trucks to other destinations	* serves only south-central destinations (Mexico, D.F.)	* 8 day sailing schedule
* capacity 500 cars first year	* consistent, efficient service proven for other products	* cold storage available at port of Manzanillo
* inland customs clearance	* reefer car availability 5-10 cars per week	* transload into reefer trucks at Manzanillo
* inland agricultural inspection	* 48 hour free demurrage	* serves southern and central destinations
* 7 day free demurrage in Monterrey		

IMPLICATIONS

The benefits of an efficient and balanced transportation system are certainly not unique to Washington apple exporters. However, current and potential competition for the Mexican market has caused the costs of inefficient transport and the benefits of increased efficiency to rise dramatically. Taking advantage of the opportunity for improvement is quickly becoming a necessity.

The efficiency of current transportation alternatives is constrained by congestion, availability, reliability and cost. While the addition of thru-rail, rail-barge-rail and steamship systems has the potential to alleviate some of these imbalances, their performance and capacity have yet to be proven.

Furthermore, these new alternatives should be viewed as a step in the right direction, rather than a solution. No single mode of transportation can provide all of the attributes desired by various users. It is, therefore, critical that resolving constraints in the existing transportation system be balanced with the exploration of new avenues and alternatives.

It is obvious that increased competition for the Mexican apple market will create pressure for reducing transportation rates. However, the rate level is only one of many important attributes and, as illustrated by transrail, it is not necessarily the most critical. With perishable goods, such as apples, the quality of the product is directly related to the quality of transportation service. Reliable, high quality transport is essential to developing strong trade ties; strong trade ties are Washington apple exporters best defense against competition.

REFERENCES

- Aaron, Todd. Stevens Transport, Dallas, TX. Personal interview, Jan. 1994.
- Asplund, Nate. Protexa Burlington International, Fort Worth, TX. Personal interview, April 1993, Jan. 1994.
- Bryant, Bill. Consultant to Northwest Horticultural Council, Seattle, WA. Personal interview, March 1993, Feb. 1994.
- Buak, Christina. Columbia Marketing (C.M.I.), Wenatchee, WA. Personal interview, Feb. 1993.
- Chacra, Rafael. Lotto International, McAllen, TX. Personal interview, Feb. 1993.
- Dolloff, Terry. Frey Miller Trucking, Laredo, TX. Personal interview, March 1993.
- Dunbar, Patrick. Cofrumex, Manzanillo, Mexico. Personal interview, April 1993.
- Edwards, James. Southern Steamship, Long Beach, CA. Personal interview, Jan. 1994.
- Forston, Marion. Middleton Transportation, Ft. Worth, TX. Personal interview, Feb. 1993.
- Hurson, Patrick. Sun Country Transportation, Inc., Yakima, WA. Personal interview, Feb., March and April 1993.
- Steensma, Randy. NuChief Sales, Wenatchee, WA. Personal interview, Feb. 1993.
- Trevino, Jose. Transportes Aguila de Oro, Monterrey, Mexico. Personal interview, July 1993.
- U.S. Department of Transportation, Federal Highway Administration. *Assessment of Border Crossings and Transportation Corridors for North*

- American Trade*. Publication #FHWA-PL-94-009, Washington, DC, 1993.
- Ward, Houston. K.L.L.M., Fort Worth, TX. Personal interview, July 1993.
- Washington Apple Commission. Wenatchee, WA. Personal communication and data, Feb. and March 1993.
- Washington Growers Clearing House Bulletin, 35th Annual Report, 1990-91 and 36th Annual Report, 1991-92.
- Welch, Lonnie. H. and S. Freight Brokers, Yakima, WA. Personal interview, March 1993.