Long Haul Transportation of Oregon Nursery Products: Economic Conditions and Actions for Improved Performance

For

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Executive Summary

Oregon's nursery industry relies on out-of-state markets in the U.S. for about 75 percent of sales. This industry has expanded very rapidly over the last ten years. During the last two years, truck freight rates have increased significantly and the nurseries have experienced more problems securing needed trucks. This capacity squeeze is especially severe in the spring months when about 75 percent of the state's annual production is sold.

This study was funded by the Oregon Association of Nurseries. The objective was to evaluate the conditions and options for improving freight movement by interviewing nurseries, trucking companies and freight brokers.

The transportation difficulties for Oregon nurseries are caused by many factors. Chiefly they are:

- Insufficient truck capacity in the Pacific Northwest and Oregon to meet the peak spring seasonal demand by nurseries. This is particularly true for temperature controlled truck freight. The traditional base of firms that move nursery products are the independent and small trucking companies. The number of these firms have been declining and their capacity has not been replaced by the larger trucking firms.
- Nursery products are less favorable freight for refrigerated truck carriers compared to products such as fresh produce and frozen foods. Carriers want year-round transportation and "clean" loads—nursery products generally do not have the desired characteristics.
- Nursery loads are shipped almost exclusively by truck; presently there is no significant competition in service or price from the railroads.
- Nurseries rely heavily on truck brokers to arrange loads. Brokers perform vital functions and are important to the nurseries. However brokers work in the "spot market for trucks" on a load-by-load, nursery-by-nursery basis. This does not impact the changing needs of nurseries or their customers. Brokers also work principally with the smaller trucking companies, who are handling a declining percentage of the truck freight capacity.

Load pooling is advantageous to all nurseries, and it offers particular benefits to medium and smaller size companies. The primary reasons are: 1) Nurseries can save transaction costs (principally brokerage fees) if they pool loads and implement cost-savings alternative methods such as direct negotiation with trucking companies to secure trucks. 2) Pooling can result in more efficient loads by having centralized management of routing and scheduling, as well as instituting appropriate shipper practices for participating nurseries. 3) Greater discipline can result from individual nurseries working together to locate loads rather than bidding against each other for trucks.

Options for the nurseries to pool loads to respond to the changing freight environment are investigated in this analysis. There are several alternatives. Nurseries can work directly to put their loads together in order to negotiate and contract for the services of trucking companies. They can also work as a block of companies directly with brokers or with third party logistics (3PL) companies to build their volumes to the point of being preferred customers, as large nurseries have done.

The most conventional way to achieve load pooling is to form a transportation cooperative that would negotiate with trucking companies and brokers for loads. Cooperatives are formed under the corporation laws of Oregon. A transportation cooperative could undertake many different functions for its members. Principally it would be the means to pool loads to establish a favorable negotiating position with truck and rail carriers, as well as work with 3PL firms and brokers.

A cooperative could also develop transportation business practices for its members to follow that will improve the willingness of trucking companies or multimodal firms to handle the nursery loads. The practices may include: reduced "picks" at load origination and fewer drops per truck at destinations, development of a system to unitize loads for rail and /or truck shipment, and expand the use of vented dry vans during acceptable time periods.

There are risks of operating a cooperative that should be taken into consideration. Some of the major issues are:

- A cooperative could easily take one to three years to deliver significant value to nurseries in Oregon. It will be hard to hold cooperative members if they will be dissatisfied with this time frame.
- Participating in a transportation cooperative means adapting to some practices common in other business sectors that are not currently used by some potential members. The loss of autonomy and individual decision-making by individual nurseries might be difficult for some business owners to accept.
- Some nurseries may have concerns that as a member of the cooperative their proprietary business information about customers and products will be divulged to their competitors.
- Equitable treatment of all members is critical with respect to receiving their share of loads especially during the spring peak shipping period. If members cannot ascertain that they are being fairly treated, they will have little incentive to remain in the cooperative.
- Cooperative directors and executive management must share a common vision for the programs and the future direction of the cooperative. It will take enthusiasm and energy to establish a cooperative that is properly financed, cost-effectively managed and that benefits many nursery members.

Given the state of transportation in the nursery industry, the concept of a transportation cooperative is timely and it offers the prospect for long term benefits to nurseries in Oregon. To move forward, the nurseries who are the leading proponents will need to invest their time and financial resources to form it and formulate programs that benefit a wide range of members. Under these conditions, a cooperative has great potential to positively respond to the freight related challenges that now face Oregon nurseries.

Introduction

Efficient transportation of Oregon's nursery production to out-of-state markets is vital to the continued growth and prosperity of this industry. The report presents the analysis of how transportation services for nurseries can be improved, with particular analysis of a transportation cooperative.

The study was authorized and funded by the Oregon Association of Nurseries (OAN) and guidance was provided by the OAN's Executive Director and the Chairperson of the OAN Transportation Taskforce. Eight Oregon nurseries and plant wholesalers participated by providing in-depth responses to questions about their long-distance shipping. These eight companies were chosen to represent a cross-section of the nurseries in the state. Seven interviews were conducted with trucking companies and six interviews were held with truck brokers. To maintain confidentiality for each business, no specific information from any company that was interviewed is disclosed in this report.

Appendix A lists all of the individuals and their company affiliations who were contacted for this analysis. Everyone that was contacted agreed to be interviewed and their cooperation and willingness to share information is greatly appreciated.

Globalwise Inc. designed the analytical approach, conducted the survey research and took the lead in evaluating the results of the interviews and writing the final report. Dr. Ken Casavant, Washington State University transportation economist, provided insight and review of the truck transportation analysis. Dr. Casavant also estimated the current costs of long haul trucking operations.

Oregon's mild climate, productive soils and grower know-how have resulted in the strong competitive position of Oregon nurseries in the markets throughout much of the U.S. Out-of-state customers purchase about 75 percent of Oregon's total plant nursery production, or approximately $585 million of Oregon nursery production. These products are supplied to a very wide range of wholesale and retail sales outlets, such as wholesale plant re-sellers, professional landscape nurseries/contractors, independent retail garden centers, hardware/general merchandise retailers and the large box store chains such as Home Depot, Lowe's and Wal-Mart. Managing the cost and reliability of transportation to reach these markets is one key factor in keeping these customers from switching to new suppliers that are much closer to the markets and can deliver products at lower cost or with greater reliability.

Current Transportation Conditions

In the interviews with nurseries, each company stated that efficiently transporting their products to customers is a current problem and is expected to become a greater problem in the future. Nurseries spend an increasing amount of effort and expense to satisfy the delivery and freight cost requirements of customers in out-of-state markets. In the peak shipping periods of March through May, and again during a smaller secondary peak period from late August through October, nurseries experience great uncertainty over whether they can meet the desired order schedules of their customer's and ship at acceptable freight rates.

Some of the larger nurseries have sufficient transportation demand to negotiate annual freight rates with truck lines. However, the vast majority of Oregon nurseries rely principally on truck brokers to supply the truck and trailer service for out-of-state shipments. Many nurseries own and operate trucks to deliver their products locally—which generally includes Washington, Idaho and occasionally parts of other western states.

Brokers perform vital out-sourced services that to-date most nurseries have not wanted to manage internally. Brokers use their networks and relationships with trucking companies to locate operators of properly licensed and insured trucks which meet safety and performance standards. Brokers coordinate/negotiate between the nurseries and truck carriers to supply the needed equipment at an acceptable rate. They will often invoice and collect payment from the ultimate customers (i.e. retail buyers and professional landscape nurseries) and pay the trucking company, taking the difference as payment for their services. Issues about truck routing, arrival times, claims and other details are often the responsibility of the broker to resolve. This middleman service appears to be beneficial and has been well accepted, at least until recent years when supply constraints have hit the trucking industry.

The current brokered load method is a "spot market" system. Brokers supply trucks on demand, given the available supply of truck equipment. By the very nature of this system, brokers play a pivotal role in allocating loads in times of truck shortages. However, nurseries have no idea how the load allocation decisions are being made, or what profit is realized by the brokers. There is suspicion that brokers may realize more than the customary 8-10 percent commission in the peak season. Medium and small sized nurseries are most vulnerable to the brokerage system, as they have no direct marketing power to negotiate with truck lines and they also often have the weakest relationship with the brokers.

Larger nurseries and those that have hired professional traffic managers appear to have fared better than other nurseries. The rate data collected for this analysis shows that average line mile rates paid in 2004 are slightly lower for nurseries with the most experienced staff. However, their greatest advantage is "first and regular" access to the trucks in the spring shipping period. The professional managers interviewed in this study report that they have better access due mainly to strong direct relationships they maintain with both the carriers and the selected brokers they work with on an on-going basis. An additional advantage is they have more volume to offer the carriers and brokers.

One nursery interviewed views transportation as a function they simply will not contend with themselves. They sell only to plant wholesalers or they require customers to arrange the transportation of their plant stock. This approach is undoubtedly shared by other nurseries and could limit their overall competitiveness in out-of-state markets.

Refrigerated Load Capacity

The responses from the sample of nurseries clearly indicate that they are having difficulties securing enough loads in peak periods, or at least face great uncertainty about obtaining trucks for their refrigerated transportation service. A consistent response from people interviewed was that Oregon does not attract enough in-bound refrigerated truck loads. While rates are very important, having access to trucks and multimodal rail now and in the future is a concern of every nursery person interviewed.

The most acute shortages are in March, April and early May. At times in 2004, most nurseries reported that they occasionally had to delay or cancel delivery times due to lack of trucks during this season. Some nurseries reported that they only filled orders for customers who arranged their own loads in the peak time periods. In other cases, trucks were found but the rates paid were so high that customers said this will cause them in the future to investigate closer sources for nursery products or nurseries will have to absorb part of the rising cost of truck transportation in the future. Nurseries report that they know cases where nurseries have subsidized part of the freight cost to certain customers.

Trucking companies confirm that refrigerated freight hauling capacity from Oregon is very tight, particularly in the spring peak demand period. Many carriers can "pick and choose" their freight and customers. The seasonal nursery business is not attractive to some major carriers who have contracts to haul year-round steady, profitable business. However, nurseries pay premium rates to attract the trucks. In the past, this seasonal business has mainly been handled by independent owner-operators and the smaller regional trucking companies. However, many of these smaller trucking businesses have left the industry. Total refrigerated truck freight hauling capacity has not kept pace with the growth in demand for freight service, especially the growth in east-bound movements. Trucking companies have gained market power, after many years of great competition within the industry and relatively flat rates.

Several factors are preventing carriers from rapidly expanding their service to meet the current demand, and these include: 1) attracting new long haul drivers into this occupation is very difficult, 2) the new federal regulations that restrict hours of service for drivers are decreasing the speed of delivering freight in a given time period, 3) higher fuel costs and higher insurance costs are limiting factors on overall profitability and 4) big box stores demand just-in-time delivery which requires "extra" truck time as carriers plan early arrivals to avoid the financial penalties and other disincentives imposed if they miss slotted delivery times.

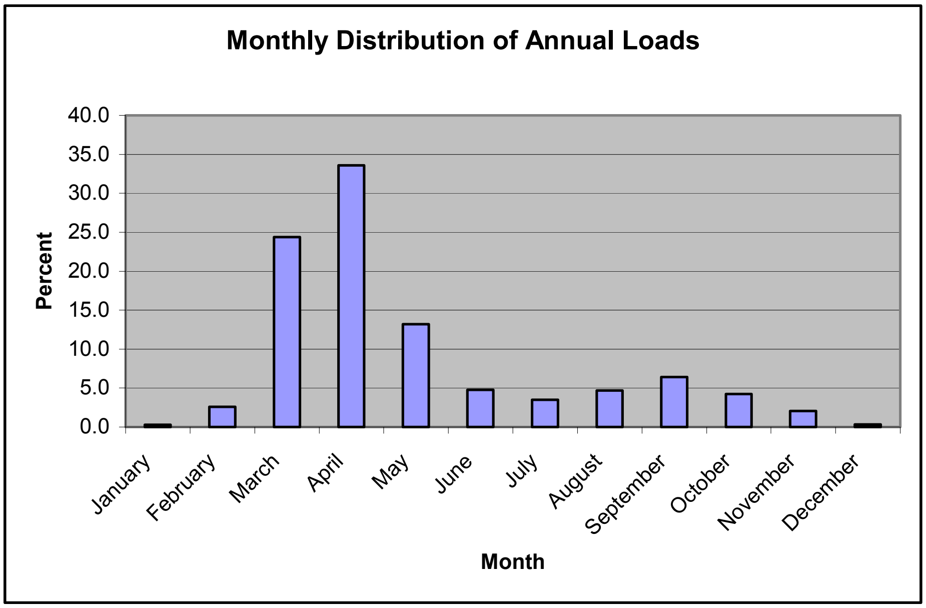
There is very little multimodal rail/truck shipment of nursery products from Oregon: so the dominant source of carrying capacity needed by the industry rests with refrigerated truck carriers.

Seasonality of Shipments

Nurseries have a huge rise in demand for transportation from March 1 to June 1 and a smaller late season up-turn in demand during August and September. About 75 percent of the Oregon nursery loads are shipped in the spring peak. This seasonal freight demand pattern is generally unfavorable to trucking companies, who like to plan for the year- round maximum profitable use of their equipment.

Since the seasonality spike of nurseries cannot be avoided, nurseries should otherwise present their freight loads to carriers as attractively as possible (e.g. more one pick/one drop loads, scheduling drops with minimum downtime for the driver, unitizing freight, etc) and by more coordination and direct negotiations with carriers so regional and national carriers can review their total annual business base to maximize service to nurseries while also effectively serving their other customers.

Figure 1



Source: Data from six Oregon nurseries/wholesale plant distributors interviewed in December, 2004 by Globalwise Inc.

Current and Future Truck Freight Rates

Since nursery loads are not considered preferred cargo, the freight rates paid are generally higher than rates charged for “clean” loads. For any given load, the rates nurseries are willing to pay are variable. Nurseries are known to “bid-up” the rates when they have highly profitable loads needing shipment in the peak periods when truck availability is short. On the supply side, truckers want higher rates when their equipment is in high demand, when the particular load is unattractive due to the drop locations, or the scheduling of the drops means excessive down time to the driver and the carrier.

The nurseries interviewed in this study were asked to give the per mile rates they paid during 2004. Their rates are “line mile” rates with fuel surcharges included, but they do not include accessorial charges for extra pick-ups or freight drops, detention charges, lumper fees and other supplementary charges.

The lowest long-haul line mile rate paid in 2004 from the nurseries interviewed was $1.25. Average rates paid were in the range of $1.30 to $1.68. The highest rates paid were for shipments to the Mountain states ($1.97) and to the Midwest ($2.01). As there rates were reported for a small sample of nurseries, it could be that lower and higher rates were paid by other nurseries during 2004.

Table 1

2004 Freight Rates Paid by Selected Nurseries
Dollars per Mile

Region/Range	Rates Paid	Region/Range	Rates Paid
Mountain States		***New England***	
Low	$1.33 - $1.45	Low	$1.25 - $1.35
Average	$1.40 - $1.68	Average	$1.30 - $1.55
High	$1.55 - $1.97	High	$1.30 - $1.74
Midwest		***Mid-Atlantic***	
Low	$1.30 - $1.35	Low	$1.30 - $1.45
Average	$1.30 - $1.50	Average	$1.30 - $1.55
High	$1.35 - $2.01	High	$1.35 - $1.86
Summary			
Low	$1.25 - $1.45		
Average	$1.30 - $1.68		
High	$1.30 - $2.01		

Source: Nurseries interviewed by Globalwise Inc. December, 2004.

Primarily because refrigerated freight carrying capacity is limited, truck carriers have increased market power. Freight rates in 2005 are expected to be significantly higher than in 2004. Prices for 2005 were in the early stage of negotiation between nurseries and trucking companies in early January. It remains unclear whether a cooperative could move this negotiation backward by several months (to the fall for example), to give more freight rate certainty to nurseries and their customers.

Multimodal (Rail-Truck) Shipment [1]

Currently virtually all nursery stock shipped out of Oregon moves by refrigerated truck trailers. About 50 years ago, before the advent of cost effective mass trucking, Oregon nursery stock did move by standard boxcars on the rail network. The results were not satisfactory at the time and there are still nurserymen who remember that experience. However, the rail network and railroad operations have improved during the intervening years. Given the challenges facing the nursery industry with regards to adequate trucking equipment at competitive rates, the industry is once again considering rail as a transportation alternative and some of the larger nurseries have sent trial shipments on a limited basis this past year.

[1] The Port of Portland assisted in assessing multimodal shipment as presented in this section.

In order for rail to become a viable and sustainable option for the nursery industry, four critical areas must be addressed: schedule reliability, equipment availability, unitization of nursery product and rates.

Schedule Reliability: The Burlington Northern Santa Fe Railway (BNSF) and the Union Pacific Railroad (UP) are the two Class 1 railroads currently serving Oregon. There is also a network of shortline railroads[2]. The BNSF east/west mainline runs on the north side of the Columbia River Gorge and they have operating rights into the Willamette Valley. Both of the Class 1 carriers have sufficient capacity along the mainlines to Chicago to accommodate additional incremental growth. Also several improvements are planned to add capacity both in the region and along the mainlines. Both BNSF and UP have expedited schedules for high priority trains and can reach Chicago in five days. All traffic which moves to the East Coast is interchanged in Chicago either by re-ramping from the rail and converting to truck or simply interchanged intact with other eastern Class 1 railroads. Interchange to East Coast destinations tends to make the schedule less consistent.

Rail Equipment Availability: Until now the only rail equipment which has been available in the Pacific Northwest is standard dry trailers and containers. Two nurseries have done trial shipments in dry vans this past year during the early season and the tests were reasonably successful. Both BNSF and UP potentially will begin to cycle refrigerated rail equipment into the PNW in the next couple of years. First, UP has been experimenting with refrigerated boxcars for the onion shippers. This involved inventing a bin system to unitize the onions so the product could be loaded by forklift. The onion shippers were thus able to get the volume of approximately three truckloads into one boxcar. The volumes were large enough that an entire train could be built with perishable commodities which then made it feasible to provide premium train service. Those boxcars are currently out of the UP system as they are providing refrigeration capabilities in Florida in wake of last season's hurricanes. They will soon cycle back into the PNW and since the onions move in the late summer through the fall, it is seasonally complimentary to the movement of nursery stock. BNSF Logistics – a wholly owned subsidiary of the BNSF - is beginning to purchase refrigerated trailers for the apple shippers in Washington and Oregon. This is a brand new program and needs to be explored as there are apparent transportation synergies possible with the nursery industry.

Unitization: The current mode for handling and loading of nursery stock for transportation is extremely labor intensive and will not work for boxcar loading. It also means long lead times for loading of truck trailers or rail containers. In order to fully utilize the entire menu of transportation options in the future, it would be prudent to explore racking systems to unitize nursery stock. Some investigation was done in conjunction with UP and their packaging vendor Tri-Enda. The conclusion was that plastic was not a suitable material for a racking system. Contact has now been made with Oregon State University to see if the engineering department can facilitate funding and execution of a project to further investigate a design for a racking system.

Rates: In order for any of the rail alternatives to be viable, there must at a minimum be a parity of rates with the trucks. Preliminary test shipments and conversations with service providers indicate that there is the potential for cost savings for the nursery

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[2] See Oregon rail map at http://www.oregon.gov/ODOT/RAIL/docs/rr.pdf).

industry if rail can meet the rest of the requirements for timely delivery of minimally damaged product and equipment availability. In addition, all indications are that the market for truck capacity will be tighter for the foreseeable future and trucking costs will be rising. Rail rates will also be rising due to demand and higher fuel costs, but on a less steep curve than spot trucking prices.

Rail will not completely resolve the transportation challenges faced by Oregon's nursery industry. It can however be an incremental part of a solution. There is growing interest by the BNSF and the UP to explore this market and both are purchasing equipment which may be compatible with nursery stock requirements. Dry vans, refrigerated boxcars and refrigerated trailers may all become part of the menu of transportation options available. Also, rail schedules with workable transit times do exist, particularly to the upper Midwest. There are many third party logistics providers who would be interested in consolidating and tracking shipments from multiple nurseries. Volumes are sizeable enough that long term contract rates could be established with the rail carriers. The Port of Portland is also interested in any potential development of consolidation facilities.

Improving Nursery Products as Attractive Freight

The majority of the nurseries interviewed foresee costs of transportation continuing to escalate in the near future. They also expect continued difficulty securing refrigerated loads during their peak spring demand period.

Given these conditions, nurseries need to seriously consider how they will make their freight more attractive to the carriers. Better load characteristics will greatly enhance any effort to expand the pool of loads offered to carriers. Trucking companies point out that nurseries generally do not offer "clean" loads in comparison to the alternative products in refrigerated loads such as Washington apples, California produce, or frozen food.

The interviews with nurseries have shown that there is tremendous diversity in the transportation practices followed by individual Oregon nurseries. Many nurseries have not developed direct experience in managing their transportation needs beyond calling brokers to secure trucks and then loading the trucks on arrival. Some nurseries—generally small firms—only ship out of state if their customers arrange the loads. On the other hand, some of the medium and larger nurseries have significant in-house expertise. These firms negotiate with carriers for rates and the supply of trucks and they have well established relationships with selected brokers.

For many of Oregon's nurseries, new business practices will have to be adopted to improve their freight-related performance. These changes may be significant. The industry should immediately start to test and demonstrate best practices to allow nurseries time to assess and modify procedures, if warranted for them.

The nursery industry should consider all of the following to improve the characteristics of their freight:

- <u>Amass large volumes and then negotiate with truck carriers or brokers to bid on shared loads among several nurseries</u>. (If a cooperative is formed, it would perform this function for its members.) Other procedures or practices discussed in this section could be implemented along with load pooling.

- Develop procedures to reduce the loading time. The fastest time to floor load a full trailer load appears to be about two hours. This is achieved by such practices as pre-staging the plants, worker team loading and by use of fork lifts in some cases. Best loading practices need to be implemented by Oregon nurseries and when this is improved it can be a performance metric when negotiating with truck carriers and freight brokers. To help smaller nurseries and cut travel/total load time when many small orders are on one trailer, consider establishing a central consolidation point where nurseries bring palletized products for single point loading.

- Encourage nurseries to adopt the practice of having carriers drop trailers. Reduction in driver and equipment down time at load origination is of critical importance to carriers. This could be an advantage in conjunction with consolidation point loading.

- Develop educational materials for nurseries to assist with establishing best practices for arrival/delivery. For example, nurseries (or a cooperative) should ensure that drivers are always sent with information required by customers (purchase order numbers, complete product lists, etc.). Also the appointment times for arrival should be pre-scheduled and drivers/dispatchers should be kept informed of any modifications or information received while the truck is en route.

- Give customers more options for use of commercial unitized/palletized loads. This is most feasible for customers who buy smaller size (e.g. one gallon) plants. One way pallets with frame-rack systems that can be left with customers should be tested. A shipper's cooperative or perhaps a company with industry support could be contracted to pick-up and return frame racks to Oregon nurseries. It would be very useful to test and demonstrate the results of this approach for independent retail customers with a small group of nurseries during the spring of 2005. A system should be developed that uses standard pallet and frame-rack equipment compatible with fork lifts to increase the speed of loading and unloading nursery freight while also minimizing plant damage.

- Work to completely eliminate the practice of driver's collecting payment for freight (COD) and drivers "touching" freight during loading or unloading. This practice is one of the most limited factors for the carriers, and this also lowers the speed of operation of trucking companies which in turn reduces their profitable operation. Nursery customers should be informed of the additional cost of these practices.

- Locate and invite vendors who have freight billing software present their system to nurseries (or the cooperative). Use of billing and tracking programs could be a key function of the cooperative or other alliance entity that directly negotiates with carriers for trucks and rates. As part of the decision-making about how best to establish pooling alliances, evaluate the cost effectiveness of freight billing as either an in-house task versus outsourced function managed by a third party logistics (3PL) firm.

- Investigate the full range of services of a 3PL and invite several of these firms to meet nursery shippers and view the freight business on-the-ground during the spring peak months. A cooperative could easily interact with logistics firms who can show they would add significant value.

- Emphasize least-cost methods to track the movement and real-time location of loads. Carriers that can tract their trucks would be favored, however smaller trucking companies who do not use real time tracking must remain a major part of the carrier group in order to maximize truck freight capacity.

- Establish separate rate structures within the pool that are based on the true cost of service. For example, higher rates are needed for loads that are the most costly to handle, ship and deliver. This includes products going to stores with narrow delivery windows compared to deliveries to other more favorable destinations; loads to destinations which have unfavorable backhauls; loads with high number of drops; loads with poorly spaced drops, etc. It is important that rates within a load pool reflect the underlying costs of transporting each load so “good” loads do not subsidize “bad” loads. Peak season premium rates (versus full year, flat rate pricing) may be justified as well. The goal is to gain the best possible rates, but still signal to nursery shippers and end-receivers the actual costs of providing the transportation services for the characteristics of each load that is placed in the pool.

- Consider conversion from the practice of buyer payment of freight to shipper payment of freight charges for all loads arranged in the transportation pool. (Consignees should still be provided data on the total cost for their deliveries, so they realize if they need to improve their receiving practices to achieve freight cost minimization.) This should be seen as a favorable change by buyers who commonly make two separate payments; one for the products and one for freight. With a pooled shipper system, it should be advantageous for nurseries to receive payment for their products, net of freight, on a consolidated statement delivered on a weekly basis. If a cooperative is formed, it can secure outside credit to finance the freight cost or set up a reserve fund to finance the expenses until freight payment is received. Borrowing or factoring may be used to finance the freight charges, with the goal of leaving the nurseries in the same cash flow position as presently. The goal is also to gain customer satisfaction while simplifying the invoicing and collection procedures.

- Evaluate load data to identify the specific, major freight lanes for Oregon nursery products. For the most freight-dense destinations, determine if a) multimodal routing can be implemented with reasonable backhauls and b) consider establishing cross-docking to facilitate end-point distribution by local freight haulers. Feasibility of these initiatives may increase if palletizing is further developed.

- Evaluate the total cost of purchasing dedicated freight service using a 3PL and/or direct carrier agreements (i.e. contract for guaranteed availability of transportation equipment where the shipper pool “owns the exclusive use of the equipment” during agreed upon time periods). The purpose is to minimize turn around time especially where backhauls can then be secured and integrated into freight lane management. These backhauls could be dry freight where the temperature control unit is turned off. This is one example of how pooling could in fact improve the availability of trucks in Oregon due to faster turn around time.

- Test and evaluate greater use of vented dry vans to supplement the supply of refrigerated trailers during March and possibly other peak time periods. Vented vans as trailer of flat car (TOFC) rail shipment also need further investigation. Part of the evaluation is to learn more about the conditions in which this is feasible without doing harm to the nursery stock, and which nursery stock holds up satisfactorily under these conditions.

Expected Transportation Benefits with Load Pooling

More effective methods of load pooling will benefit Oregon nurseries. Pooling allows nurseries to ship to distant market customers more efficiently and gives the industry greater control over the total delivered freight cost. Most importantly, nurseries can realize more reliable delivery during the peak shipping season.

There are several ways that Oregon nurseries can gain from pooling loads as compared to the current methods in which each nursery secures their own long-haul truck services. Typically truck brokers charge 8 to10 percent (or more) for their services to locate and negotiate for truck loads. Only the brokers know their actual net charges since they pay the carriers and then separately bill either the shipper or the consignee. In times of acute transportation shortages when nurseries have little leverage, truck brokers undoubtedly charge more than 10 percent. Some nurseries and truck lines believe the brokerage fees exceeded 15 percent at times in 2004.

To the extent that nurseries can secure these services for less cost through a cooperative or other means rather than through brokers, nurseries will realize savings in freight costs. In essence, the nurseries would cut “freight service costs” by bringing these services into their organization. The economies of large volume pooling of services might lead to lower costs, even if the nurseries were to appoint one or more “major” brokers to deliver trucks to cooperative members. This is due to the broker’s ability to spread the fixed cost portion of their operation over more business volume. Brokers can also offer more loads to the larger carriers, which in turn should result in lower average cost rate quotes to the shippers.

The second reason for pooling loads is to achieve better transportation service or lower-cost of the actual carrier service. Better route planning when combining partial loads is one major reason for this gain. Under current conditions, many brokers work with many nurseries to ship to many customers and the resulting loads are not optimally routed. With centralized management and scheduling of a large volume of loads, each partial load can be combined for better delivery sequencing with quicker drops and less delay. This will also decrease accessorial charges such as multi-stop drop fees and detention fees.

Having a large number of loads gives the pool the ability to contract directly with carriers. More stable rates, if not improved rates, should result for the pool of nurseries. There are many ways carriers can utilize their load planning and operating skills to better manage their costs. With skillful negotiation on the part of nurseries or cooperative, part of this savings will be passed on to the nursery shippers. An example is pre-positioning trailers for loading which in many cases reduces driver wait time. Contracting with trucking companies to freight-dense markets such as Chicago will also allow carriers to improve their operating efficiency through better equipment usage.

A pool of nurseries has a larger universe of local and national carriers to which to negotiate compared to individual nurseries. For the efforts of nurseries in the pool and the guarantee of more loads, the trucking companies can be induced to pass some savings on to the participating nurseries.

Pooling also allows the cooperative members to seek multimodal service for part of the freight, especially in the peak shipping season. Rail rates are significantly lower and any movement by this mode should reduce freight costs.

Pooling offers a third source of benefit to the industry: it would add discipline and more orderliness to the load market in the peak season. One nurseryman remarked that "nurseries are hurting themselves by the way they operate in the market". He referred to cases where nurseries, in desperation to attract trucks, have gone to truck stops and out-bid others for trucks. When nurseries act with forward planning and devise better ways to meet their needs, there is less panic bidding. Panic bidding signals upward rate movement for everyone in the nursery industry.

Alternative Forms of Load Pooling Alliances

There are many ways that the nursery industry can form load pooling alliances, where two or more nurseries work together. For example, more nurseries can do what some have already done: develop exclusive working agreements with one or more truck brokers, or directly negotiate contracts with one or more trucking companies to establish rates and work to secure a quantity of loads during the year, including the critical peak shipping periods. Furthermore, two or more nurseries could be allied if each nursery independently signed a freight contract with one or more trucking companies. This contract could be negotiated on behalf of the nurseries by a 3PL or other intermediary.

More complex, formal alliances also allow two or more nurseries to pool their transportation business for better load management, increased reliability of service and improved pricing. Following are three options for the alliances:

1. ***Transportation Cooperative***. One (or more) cooperatives can be formed under federal and state corporation laws to bring the desired transportation services to nurseries. A transportation cooperative could elect to operate in several ways, including: act as in-house transportation broker for its members, or directly negotiate contracts with truck lines and/or multimodal shippers for any and all transportation services it requires.
2. ***Operate with Third Party Logistics (3PL) Contract***. In this option, nurseries would associate for the purpose of contracting with trucking carriers using the services of a 3PL. A formal agreement would exist between each nursery and the 3PL for a term of one or more years. The 3PL would in turn contract with truck carriers (or potentially multimodal carrier service) for a guaranteed number of loads during an identified time period (seasonal or year round) with an established rate structure. Performance standards would be established which stipulate liability should the 3PL and/or trucking companies not provide the required level of service.
3. ***Direct Negotiation with Trucking Companies for Transportation Equipment.*** A group of nurseries could jointly agree to pool their loads and then select one or more trucking companies to provide truck load services. Many trucking companies also offer brokerage services, so one variation of this option is for the group of nurseries to also have a contractual agreement with a trucking company for their brokerage services. To be comparable in performance to the previous two alternatives, the brokerage would need to make a contractual commitment to arrange trucks at agreed terms.

Estimated 2004 Cost Structure for Long Haul Trucking in the Pacific Northwest

The relationship between cost of providing service by long haul trucking companies and the rates charged by those companies are directly related. Estimates of costs provide the base against which profits are determined (and added to costs) for rate-setting. Cost estimates also provide the minimum level that trucking companies are likely to set rates in the short run when competitive pressures are faced. In this section a scenario of costs in long haul trucking of nursery products are developed, using existing local data on costs, interviews of selected trucking sources and collaboration with national trucking estimates obtained from the Federal Highway Administration (FHWA). See Appendix B for a further description of the methodology for this calculation.

Table 2

2004 Estimated Cost of Operation for Pacific Northwest Refrigerated Long Haul Trucking Companies

Cost Component	Cost in Cents per Mile	Percent of Total (Rounded)
Driver (Wages, Benefits & Per Diem)	46	35
Fuel & Oil	24	18
Equipment Ownership (Depreciation & Interest)	19	14
Administration	8	6
Interest & Charges on Operating Capital	11	8
Repair & Maintenance	11	8
Tires	7	5
Insurance	4	3
Licenses, Cleaning & Miscellaneous	4	3
Total	$1.34	100

Source: Estimates by Dr. Ken Casavant, based on estimates from local trucking companies and national estimates from the Federal Highway Administration, 2004.

These costs are generally applicable to Pacific Northwest operators, and are probably close to the national average for refrigerated motor carriers. See Appendix B for further discussion on factors such as fuel price increases which have impacted trucking rates since 1990. Appendix B also explains why this estimate of costs averaging $1.34 might be higher than the actual rates experienced in 2004.

Recommendations for Pooling Loads

To improve the freight situation under current conditions, it appears essential that the nursery industry find one or more ways to pool loads and take advantage of economies of scale to move their products to distant markets. The formation of a transportation cooperative is the most straight forward method to accomplish this for a large number of nurseries. In this analysis a cooperative is assumed to be formed to manage the transportation business. The new cooperative would have the potential and capability to develop a range of shipping programs depending on the specific needs of its members.

One goal could be to increase the loads with "one pick and/or one drop" wherever possible and to adopt more uniform handling and loading practices that are more efficient for nurseries, trucking companies and the customers. Invoicing and freight payment advantages could also be integrated into the system.

An Oregon nursery shipping cooperative could operate with any of these main functions to improve freight conditions:

1) Arrange for truck loads by either negotiating freight contracts through a 3PL or directly with truck lines or operate like a broker to find "spot loads". How the cooperative arranges for loads will depend on the number of loads to be shipped, the destinations served and other factors. <u>To achieve 5,000 loads or more, as this analysis assumes, a cooperative would find it advantageous to negotiate directly with truck lines</u>. Even if the cooperative started out with fewer than 5,000 loads, it could negotiate with trucking companies.
2) Establish approved freight practices that participating nurseries must meet to receive preferred rates.
3) Establish a freight invoicing system to bill either nurseries or the consignee as directed by the nursery. The cooperative might be financed as discussed below.
4) If a palletizing program proves feasible that uses racks, implement a rack recovery program to return racks to the cooperative members. The goal is to establish a rack recovery program that should be acceptable to nursery customers and cost-effective for recovery. At least one commercial company is now providing rack systems to the Oregon nursery industry: there is opportunity to work with this company or to independently establish a program.
5) Establish a centralized loading facility for participating nurseries to bring their products for load consolidation. This location would need space for dropped trailer units, space for delivered pallets of plant materials and trailer loading docks with fork lifts. Such facilities would be sited to allow central access by nurseries and easy out-haul by truck carriers. Berry packing facilities or other agricultural packing/receiving operations which are in their off-season during the spring months could be invited to submit bids to provide the facilities and perhaps also operate the loading services. The consolidation facilities could move as usage demand changes throughout the seasons.
6) While immediately developing this system for better truck freight movement, the cooperative could also work with OAN to establish rail-truck multimodal shipments as part of the long-run freight solution for nurseries.

Background on Cooperatives [3]

A transportation cooperative has been discussed within the industry and it is a conventional way for nurseries to work in close association for a common purpose. This organizational structure is most commonly used to purchase suppliers (e.g. Wilco Farmers) or to market products (e.g. Ocean Spray and Sunkist Growers). Cooperatives have rarely been formed only for transportation of agricultural products.

Cooperatives are a corporate form of business. Cooperatives exist to serve only their member-users. The other form of corporations, investor-owned firms, exist to generate a return to their investors.

A cooperative operates under the authority granted by state charter for corporations. The cooperative must prepare Articles of Incorporation and establish bylaws. Membership is voluntary—no nursery would be forced to join. Nurseries could form partnerships, or align in other ways if they think the cooperative would not adequately serve their transportation needs.

Structuring a Cooperative

A cooperative must operate as an independent entity with its own board of directors elected from the cooperative's membership. Membership can be open or closed. A cooperative does not have to accept any business that wishes to apply for membership.

Members influence the direction of the cooperative by electing directors. Most cooperatives operate with "one member, one vote".

Professional management is essential to the success of the cooperative. The chief executive officer and board of directors will need to articulate and build programs quickly that attract enough members who commit sufficient equity funding to launch the cooperative.

It is unrealistic to expect a single entity-- cooperative or otherwise--to equally serve the diverse conditions and transportation needs of all Oregon nurseries. Large nurseries might find the cooperative less appealing because these firms already have the volume of business necessary to negotiate with carriers and develop close relationships with brokers and others. Even within the medium to small size category, the cooperative will probably serve certain types of nurseries more effectively than others. For example, if the cooperative develops a palletized load program, this might best serve shippers of small container products. Therefore one challenge would be for the cooperative to decide if it will offer several transportation programs to serve a wide range of needs, or if it would more narrowly focus its mission.

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[3] Information for this section comes from several sources: An Introduction to Cooperatives by Larry Burt, Oregon State University, Extension publication EM 8665, revised March 2004 and Cooperatives in Agribusiness, Rural Business-Cooperative Service, U.S. Department of Agriculture, Cooperative Information Report 5, March 2002. Additional information was provided in personal communications with Dr. Ken Duft, Professor, Washington State University, Department of Economic Sciences.

Capitalizing and Funding a Cooperative

Members must initially capitalize the cooperative. Internally generated capital to operate the cooperative can come in three ways: 1) through membership fees or sale of stock to members, 2) by agreement with members to withhold a portion of net income based on patronage, or 3) by assessments such as per unit of nursery products transported.

It is assumed that a transportation cooperative would also undertake short-term financing of freight costs. In this case, external sources of funds to operate the cooperative are likely to be needed. A common source of operating loans for agricultural cooperatives is CoBank.

Operating a Transportation Cooperative [4]

Several assumptions must be made to evaluate the feasibility of a nursery transportation cooperative. These assumptions are made:

1. The cooperative will secure 5,000 loads per year for Oregon nurseries, with 75 percent of the loads in the peak spring months of March, April and May. Due to the extreme seasonality of nursery loads, in order to operate efficiently, and retain highly qualified staff, the coop should operate year round at full staff. It is therefore also assumed that the cooperative would also arrange at least 3,500 additional brokered loads of non-nursery products during the off-peak period.
2. The cooperative will hire staff to perform all administrative and management functions that are typically handled by a full-service freight broker. This means the cooperative will evaluate and pre-qualify all carriers used, find and negotiate to secure loads for its membership and allocate those trucks in the most efficient and equitable ways possible.
3. The cooperative will perform the transportation services of paying the carrier, invoicing the shipper or receiver (as dictated by the sales arrangement of the nursery shipper) and receiving payment. The coop will need to establish a line of credit since carriers are generally paid in 14 days or less and payment is received from receivers (or shippers) in 30 days or more.
4. At the initial stage of operation, it is assumed that the cooperative will <u>not</u> establish a centralized consolidation point for nurseries to bring their products for "single-point" loading. Also, the analysis makes <u>no specific provision for establishing multimodal</u> (rail-truck) shipment, which would require some type of local haul/rail yard loading program and may require additional capital expenditures.
5. The cooperative will operate as a non-asset corporation to the maximum extent possible. For example, office space, office equipment and other assets will be leased.
6. **This analysis (including the cost estimations below) assumes a transportation cooperative is operating at full-scale**. It will likely to take some time to grow to this level. The cooperative structure is scalable, meaning

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[4] The Information on the administrative and management costs presented in this section of the report is estimated by Globalwise based on discussions with two local truck brokers.

that staff and other resources can be added as business volume dictates. If the cooperative starts at a lower level of operation, it could cost considerably less than what is presented in this report.

Annual Management and Administrative Costs

Through contacts with brokers, the expected cost of operating the brokerage functions of a transportation cooperative was estimated. A cooperative that arranges 8,500 loads per year would require approximately 11 staff. This includes a CEO, three brokers to arrange trucks, an accounting staff of six and one receptionist/office worker.

The costs of administration and management are presented in Table 3 on the next page. The estimate total annual cost is $1.24 million and includes the interest on a revolving line of credit to cover cash flow expenditures for carrier freight. The capital required to finance freight services is presented separately.

It should be noted that if the cooperative can negotiate annual freight rates with trucking companies, which is anticipated, the cooperative will need fewer brokers on staff. In this case, costs will be lower than what is presented here.

The costs in Table 3 do not include sophisticated software and traffic management systems which some 3PL firm's offer. This would be one program element that a cooperative could investigate as a service improvement for its members.

Bear in mind that if the cooperative were to start out at a lower volume of loads, the costs will be lower.

Capital Requirements and Funding Sources

Generally, cooperative members put up approximately half of the operating costs to fund the enterprise and the remainder is borrowed. This means the cooperative members would contribute approximately $650,000 to initially fund the first year operating cost of the cooperative and an equal amount would be borrowed from various sources.

The cooperative would pay freight charges to the trucking companies in advance of reimbursement by receiving payment from shippers or product buyers. Therefore the cooperative will need a revolving line of credit. The major credit needs in the spring months could reach approximately $8.0 million over a 60 day period. The cooperative and its members would collateralize the revolving loan.

The Rural Business–Cooperative Service, an agency of the U.S. Department of Agriculture, has grant programs to help new cooperatives establish themselves. It is likely that a nursery transportation cooperative as envisioned here would be able to access this funding source.

CoBank is the Agricultural Credit Bank within the Farm Credit System and it is a major lender to cooperatives. Compared to commercial lending institutions, CoBank's rate of interest is generally lower for cooperatives.

Table 3

Estimated Annual Administration and Management Costs
Of Transportation Cooperative Handling 8,500 Loads Per Year

Item	Number of Staff	Annual Cost
Salaries		
Chief Executive *	1	$200,000
Brokers/Account Mgrs *	3	$300,000
Accounting Dept Staff *	6	$330,000
Office Assistant *	1	$50,000
Other Office Expenses		
Office Rent & Utilities		$72,000
Telephones/Computers/ Other Office Equipment		$20,000
Insurance/Licenses/ Other Fees		$40,000
General Office Expense**		$30,000
Travel		$20,000
Board of Directors Expense		$15,000
Allowance for Bad Debt & Uninsured Claims		$125,000
Interest Expense		
Interest on Line of Credit***		$38,000
Total		$1,240,000

* Salaries include all payroll taxes and fringe benefits (total payroll costs).
** Includes all supplies, long distance telephone, etc.
*** Assumes a peak monthly borrowing for freight at $2.8 million at 8 percent interest for 60 days.
Source: Prepared by Globalwise principally based on discussions with freight brokers

Operating Risk for the Cooperative

The net direct financial impact of the cooperative on its members will depend on a number of factors. It is very important that the cooperative gauge its operations and costs to the volume of loads it manages. Table 4 shows the breakeven for the cooperative at various loads volumes managed by the cooperative using the pro forma costs in Table 3. If the cooperative can only generate 2,500 loads, it would be the equivalent of a 12.4 percent brokerage cost (actually at these lower volumes of business the cooperative would have fewer employees so costs would be lower than shown here). If the cooperative manages the full 8,500 loads, the costs of operating the cooperative comprise 3.6 percent of the freight charges.

Table 4

Breakeven Matrix for Transportation Cooperative

Operating Cost of Coop	Ave. Freight Charge per Load	No. of Nursery Loads	No. of Non-nursery Loads	Total Freight Charge	Breakeven As A Percent of Freight Charge
$1,240,000	$4,000	2,000	500	$10 Million	12.4%
$1,240,000	$4,000	3,000	1,000	$16 Million	7.7%
$1,240,000	$4,000	4,000	2,000	$24 Million	5.2%
$1,240,000	$4,000	5,000	3,500	$34 Million	3.6%

Source: Estimated by Globalwise

Expected Positive Impacts of a Cooperative

A number of potential advantages from operating a transportation cooperative have been indicated in this analysis. To summarize, these include:

Use the pooled load volume to negotiate with truck lines By offering a definite block of loads, the cooperative can negotiate line mile rates and accessorial charges with small, medium and large trucking companies. This can include firm contracts for service for cooperative members.

Use the pooled volume to negotiate with multimodal carriers The large volume represented in the cooperative will speed up the interest of railroads and related multimodal logistics companies in finding multimodal solutions for nurseries.

Develop and implement efficient freight practices As the cooperative works with its members and carriers, it can institute freight handling practices that will decrease loading time, improve scheduling of delivery and otherwise reduce costs of freight hauling. A prime example is the judicious use of vented dry vans in the spring peak period. As improvements are realized, the cooperative can negotiate for more favorable truck and rail service in subsequent years.

Increase discipline on the demand side of the market As more nurseries join the cooperative, there is less chance for "up-bidding" of rates by nurseries during the peak transportation demand season.

Challenges for a Cooperative

Forming a cooperative has obstacles that should be recognized. These are the most significant:

Influencing capacity Several nurseries, brokers and trucking companies made this point: there are only so many trucks available to shippers, including nurseries, in the Pacific Northwest market. This is largely true. In the first few years of operation a cooperative can only marginally influence the capacity of the truck freight hauling nursery products out of Oregon. This small influence occurs by working closely with trucking companies to turn the trucks faster and by finding multimodal solutions. A second way to influence capacity (but clearly less desirable) is to bid up the rates paid. The cooperative must work to satisfy nursery members in the short run when rates are likely to rise in any case, and work on solutions that when implemented will pay long term benefits.

Changes in business practices for individual nurseries and their customers A successful cooperative will probably establish more exacting freight management business practices for the nurseries to follow. These could include loading time limits, precise adherence to the space allocated in the trailer, unitizing loads and defining acceptable loading methods. Any new efficiency standards are also likely to require discussions between nurseries and their customers to ensure this will be acceptable.

Potential loss of proprietary information about customers and products Oregon nurseries compete vigorously among themselves and tightly guard their sales information and other business practices. As cooperative members, there is more likelihood that customer names and product sales by customer will be disclosed to other cooperative members.

Fair treatment of nurseries during truck shortage conditions The cooperative must allocate loads in a fair and transparent manner to its members. Strict rules must be established and followed to ensure that no nursery receives more loads or a greater amount of space in the trailer than is due to them. Cooperative participation would likely quickly evaporate if this is not well understood and properly managed.

Initial volume commitments If nurseries adopt a “wait and see” approach, it could result in fewer benefits to the existing members. However, since the cooperative is scalable, it probably can still start even if the volume commitment is not as large as assumed here (5,000 loads). Costs per load will be higher if the cooperative starts at a small scale.

Avoid being the outlet for bad loads The cooperative must exist to move the maximum volume in the peak shipping period under the most favorable conditions. It cannot be viewed as the depository for bad loads. This can be handled by setting rates to shippers that reward clean loads and penalize shippers for submitting unfavorable loads. Tiered pricing can discourage bad loads.

Board vision and CEO competency The board must operate with a shared vision for maximum benefits for all members. The cooperative needs staff that are thoroughly knowledgeable in transportation, preferably truck and rail. Both the CEO and board must articulate and sell the mission to nursery members/potential members and employees. The CEO should also be an effective business negotiator and thoroughly understand the brokerage system as well as truck and (preferably) rail transportation.

Conclusions

Oregon nurseries face some significant transportation challenges. Nurseries have several options to pool loads. A well structured transportation cooperative offers clear advantages. It also entails significant risks. Its success is predicated on the same fundamentals as any major business enterprise: strong vision by its leaders, sustained commitment by stakeholder/participants and progressive, experienced management. A cooperative succeeds only when the members truly share the same goals and work for the common good of all. As evaluated here, the cooperative would need to assemble a minimum of approximately 4,000 loads to cover the operating costs as a reasonable percentage of the freight volume generated.

The general outlook is for difficult freight conditions for nurseries for several more years. These conditions will add to the challenge if a cooperative is formed because members may initially see relatively small positive results from their participation. The start-up phase will be more difficult if expectations are not realistic.

Individual nurseries must provide a substantial portion of the initial equity capital to a tax-exempt cooperative. Nurseries will expect to realize the tangible advantages a cooperative offers or they will pursue other means to secure their transportation needs.

Appendix A

Persons Interviewed In Person or By Telephone

Organization	Name	Location
Nurseries & Plant Wholesalers		
A & R Spada Farms	Angelo Spada & Vinny Grasso	St. Paul, OR
Dieringer Nursery Co.	Greg Dieringer	Hubbard, OR
Fisher Farms LLC	Bob Terry, John Coulter & Doug Muench	Dayton, Gaston & Sherwood OR
Iseli Nursery Inc.	Greg Pilcher	Boring, OR
J. Frank Schmidt & Son Co.	Al Herzog	Boring, OR
McHutchinson LLC	Terry Van Arsdale	Wayne, NJ
Peters Meridian Nursery	Bill Peters	Aurora, OR
R & H Nursery Inc.	Pat Holt	Gresham, OR
Sester Farms Inc.	Melissa Malchow	Gresham, OR
Truck Brokers		
Continental Truck Freight Brokers	Brennon Newell	Wilsonville, OR
Landstar Logistics	Janelle Boyd	Eugene, OR
Northland Express Transport	Don Edward	Troutdale, OR
PAC West Transportation Services	Carl Johnson	Portland, OR
Truck Transportation Services	Dale Parra & Howard Rackham	Wilsonville, OR
Shippers Choice	Dave Mayo	Wenatchee, WA
Trucking Companies		
Apollo Transfer Co.	Chris Carriere	Scottsdale, AZ
Central Refrigerated Services	Darrell Koplan	Salt Lake City, UT
CR England	Mike James	Salt Lake City, UT
Gordon Trucking Inc.	Regan Myers	Pacific, WA
Grandview Enterprises Inc.	Stuart Thompson	Vancouver, WA
Gulick Freight Logistics	Bill Gulick	Vancouver, WA
Marten Transport Ltd	Jeff Hilliker	Wilsonville, OR

Appendix A (Continued)

Persons Interviewed In-Person or By Telephone

Organization	Name	Location
Others		
Cambium Strategy	Josh Hinerfeld	Lake Oswego, OR
Cash Flow Management Inc.	Thomas Cordry	Portland, OR
Nobis Logistics	Jane Redman & Bonnie Mac Eslin	Richardson, TX
Ocean Spray	Wayne Tessen	Lakeview, MA
Oregon Department of Transportation	Case McGinley	Salem, OR
Port of Portland	Ann-Marie Lundberg & Craig Levie	Portland, OR
E-Z Shipper Racks, Inc.	Jeff Salmanson	Westlake Village, CA
Washington State University	Ken Duft	Pullman, WA

Appendix B

Economic-Engineering Cost Estimates For Long Haul Trucking

Economic-engineering cost estimates for long haul trucking companies are usually based on three cost categories:

- Direct operating (over the road) costs which are chargeable to individual vehicles. These costs vary directly with vehicle mileage and the tonnage hauled, and includes fuel, oil, driver wages, etc.
- Fixed costs chargeable to individual vehicles but not varying directly with vehicle mileage or tonnage hauled, and include licensing, insurance, etc.
- Indirect or overhead costs not directly chargeable to any specific vehicle. These costs are general expenses which are common to the firm, such as office and administrative expenses.

The differences among these cost categories are very relevant when considering the ability of trucking firms to set rates with marginal cost pricing in times of either excess demand (as is currently the case) or excess capacity. Further, these costs can vary or be affected by the size of the trucking firm and the differing investment needs of each trucking firm.

The level of investment needed is based on whether the firm operates new or used equipment, other equipment variables and whether they receive volume discounts from their suppliers. Fixed costs, not related to the level of investment by owners include telephone, taxes, insurance, license, utilities and return to management (profit margin). Variable costs include tires (cost and taxes), telephone, driver's wages, and mechanic or repair-related wages. Fixed costs that are affected by type of investment include interest and depreciation. Variable costs affected by investment type include fuel, and maintenance. Table 2 on page 16 is a scenario of estimated truck operating costs for an average trucking operation or fleet offering service to the nursery industry. Individual firms and trucking experiences will, of course, vary from these estimates of overall averages.

It is assumed that that these trucking companies operate as specialized carriers in a truckload market, and they achieve a 10 percent lower cost than the general truckload carriers and operate at about 50 percent of the costs of less-then-truckload (LTL) carriers. The LTL carriers are faced with small loads, given origin and destinations, and more multiple pickup and deliveries.

Data from the FHWA indicate this refrigerated cost of operation in 1990 was $1.26 and was unchanged in 2000. Since that time the escalating costs of fuel, driver's wages and insurance have caused the estimated operational cost increase of 6.5 percent per mile. Diesel fuel was an average of $1.20 in 1990, $1.50 in 2000 and is estimated to have averaged $1.80 in 2004. The 30 cent increase from 1990 to 2000 caused an eight percent increase in overall costs; the fuel price increases in 2004 brought another eight percent estimated increase in overall costs.

The FHWA data also indicates that the average length of haul for refrigerated carriers in the United States increased from 811 miles in 1990 to 876 miles in 2000. For carriers operating in the Pacific Northwest the relative increase in mileage is probably approximately the same and is fairly constant in recent years. Obviously, nursery movements out of Oregon would have longer average hauls since the Midwest and the East Coast are common destinations. The longer hauls per trip should mean that the average estimated cost per mile as reported here may be slightly higher than the average costs actually experienced by trucking companies in 2004.