OPERATIONS: ADAPTIVE MANAGEMENT STRATEGIES

WSF conducted a comprehensive review of options and best practices to improve operating efficiencies, in response to the question of how the ferry system can operate more efficiently, and taking into consideration legislative direction around operating strategies. It considered the experience of transportation industry professionals and included an extensive national and international best practices review.

There are two ways to address expected increases in peak demand. One way is to build larger boats and terminals, which is problematic both from a capital funding perspective and also due to landside constraints, permitting issues, and community concerns. The other way to deal with it is to try to spread peak vehicle ridership and make better use of existing vessel and terminal capacity.

Through these avenues, a wide range of strategies was identified, and over 90 discrete operational strategies were ultimately considered for inclusion in this Plan (see Appendix H for detailed discussion of all operating strategies). These strategies can be grouped into the following nine categories:

- Vehicle Reservation Systems. Strategies pertaining to the implementation of a system that allows customers to buy a vehicle fare for a specific sailing in advance.
- Transit Enhancements. Strategies encouraging the use of public transit systems and thereby increasing mode shift. They include things like improved connections, transit access at terminals, expanded park-and-ride capacity, improved schedule coordination, real time connections information, and sheltered transit facilities at terminals.
- Non-motorized Enhancements. Strategies to improve ease with which customers can walk-on or ride bicycles in lieu of driving on, including improved pedestrian and bike connections and facilities.
- Optimized Fare Collection Techniques. Strategies to reduce ticketing time and therefore queue lengths outside the tollbooth. They include options like optimizing the electronic fare system, fully automating the system, providing transponder only lanes, expanding

Legislative direction on operating strategies

WSF must develop, and the Commission must review, operational strategies that (section 5):

- Use data from a current user survey.
- Recognize each travel shed is unique.
- Are consistent with the vehicle level of service standards.
- Use a life cycle cost analysis to find the best balance between capital and operating investments.
- Use methods of collecting fares that maximize efficiency and achieve revenue control.
- Are re-evaluated periodically, at least before a new capital plan is developed.
- Consider the following:
  - Options for leveling vehicle peak demand and increasing off-peak ridership.
  - Feasibility of reservation systems.
  - Ways to shift vehicle traffic to other modes.
  - Dock operation and queuing efficiencies.
  - Costs/benefits of remote holding versus over-water.
  - Methods of reorganizing holding areas to maximize space available for customer vehicles.
  - Schedule modifications.
  - Efficiencies in exit queuing and metering.
  - Interoperability with other transportation services.

fare card coordination and marketing, limiting payment forms accepted, and round-trip ticketing.

- Enhanced User Information. Strategies to encourage mode and time shift through better information and trip planning tools. They include, for example: automated route planning; real-time queuing, departure transit, and wait information; improved wayfinding for bicycles, pedestrians, and parking; and real-time parking capacity information.
- Scheduling. Strategies to better accommodate vehicle demand through sailing schedule adjustments like extending schedules with the existing fleet type or more frequent sailings on smaller vessels. (Note: the ongoing JTC Vessel Study will explore the costs and benefits of these options in more detail).
- Traffic and Dock Space Management. Strategies to reduce queuing outside of the holding area and lessen negative community impacts, including traffic management, metered exit queuing, minimized employee parking at terminals, reorganized flow and lane usage, and relocation of non-essential functions from immediate holding area.
- Promotion and Marketing of Non-SOV Modes. Strategies to encourage mode shift by providing incentives for increased use of HOV options. They include options such as partnering with Transportation Management Associations, expanding carpool definition and HOV priority, creating incentives for car-sharing pods at terminals, subsidizing taxi or rental car services, ongoing marketing and promotion of non-SOV modes of ferry access.
- Parking and Holding. Strategies to increase parking supply and efficiency, thus encouraging mode shift. Options include a parking reservation system, shared parking, decentralized holding, and increased parking capacity at terminals.

The WSTC, in collaboration with WSF, submitted to the Legislature recommendations for all of the operating and pricing strategies the ferry system should be pursuing, as appropriate, in the future. The complete joint recommendations on operating and pricing strategies can be found in Appendix I. While all of these strategies are recognized as having benefits to the ferry system, this section focuses on those strategies with the greatest potential benefits, upon which the Final Plan has been built.

The Cost of Forgoing Adaptive Management Strategies

In addition to screening criteria that included maximizing demand management benefits, minimizing negative impacts to customers and

communities, and increasing operating efficiencies, the adaptive management strategies were also evaluated in terms of what it would cost the system to not implement these strategies. As many of the strategies have initial capital costs associated with them (and several have operating impacts as well), one might assume that a "do nothing" scenario is the least costly option.

This is not the case. Without strategies to encourage mode shift and manage growing vehicle volume at terminals, the ferry system would need to expand its terminals (and expand its capital program) or allow service degradation and vehicle queuing that translates into significant costs for local communities.

A package of well-coordinated operating strategies designed to address the specific situations faced by each ferry terminal is a key component to the Long-Range Plan. In many cases it eliminates the need for additional terminal investments or even reduces the existing terminal capital program. Furthermore, it reduces and postpones the demand pressure for additional investment in new vessels.

The strategies identified as having the greatest impact on demand management and operating efficiency objectives are cost effective relative to alternatives and described in further detail below.

11. TRANSIT ENHANCEMENTS

In addition to other local benefits transit enhancements might provide with respect to commute trip reduction and improved traffic flow, the options included in this Plan are chosen to maximize a customer's ability to shift mode of transportation. This will postpone the need to add additional vessels to the system and mitigate expected service degradation.

The costs to WSF of transit enhancement strategies must therefore be considered in this context. Given that some costs would likely be borne by local transit agencies, a targeted package of transit enhancements is expected to be less costly than the service degradation or earlier vessel acquisition need that would occur under a "do nothing" scenario. A full cost-benefit analysis will be conducted as part of the pre-design requirement around substantial investments in transit enhancements on the part of WSF.

Furthermore, the WSTC customer survey corroborates the notion that transit enhancements are likely to have a significant mode shift impact. Particularly on commuter routes, a large portion of ferry customers identified inadequate transit connections and other transit related issues as a significant driver of mode choices. This would indicate that strategies related to improving transit in and around terminals could be quite effective in achieving mode shift objectives

and would be valued by customers. Survey results showed that three factors clearly dominated the drive-on versus walk-on decision-making:

- The availability of transit or another alternative such as transit from a park-and-ride lot or parking at the ferry to get from their home to the ferry
- The amount of time the trip takes walking-on versus driving-on
- The availability of transit or a second car to get to their final destination

Options for increasing transit availability are included as part of the proposed transit enhancements.

Exhibit 17
Summary of Transit Enhancements

Transit Service	Facility Needs	Non-motorized Facilities
• Downtown Seattle shuttle • Better park & ride connectors • More frequent service during peak • More night and midday service • New routes and better connections • Better timing with vessel arrivals and departures • Hold buses until boat arrives	• Covered walkways • Sheltered bus stops • Improved pedestrian crossings • Preferential access for buses • More park & ride locations away from the terminal • Improved wayfinding through terminal	• Covered and secure bike storage at terminal • Car sharing locations at ferry terminals • Trails and dedicated pedestrian and bike paths to connect with terminals

Exhibit 17 above summarizes these options, some of which will require coordination with highways, other regions, and local transit agencies. Appendix J includes a complete list of proposed transit enhancements by terminal.

Coordination with Local Transit Agencies

To effectively implement a package of transit enhancements most likely to result in mode shift behaviors, WSF will need to coordinate closely with local transit agencies. It is expected that some of the costs for improvements would be borne by WSF, while local transit organizations would need to provide other improvements. This does not assume any contracting of local services by WSF, rather an

increased level of coordination and targeted investments by WSF and transit providers.

Without the support of local transit agencies, there are still mode shift benefits to the improvements WSF can provide on its own, and those will be pursued. However, mode shift outcomes are expected to be highest with full support from local transit partners.

WSF will continue to work closely with these agencies to improve transit services at terminals and coordinate scheduling where possible.

12. VEHICLE RESERVATIONS

A vehicle reservation system is the primary demand management strategy included in this Plan. Under the current system, automobiles queue within and around the terminals, waiting until there is adequate vehicle capacity on a vessel. This is an extremely inefficient system that has high costs in terms of lost time, unpredictability for riders, customer frustrations, and negative community impacts. Building larger holding areas would only partially improve the system, and would require significant capital investments and would increase operating costs.

At many terminals during periods of high demand, the capacity of the terminal vehicle holding is reached and traffic begins to overflow. When the holding areas overflow, the traffic and congestion impacts are frequently severe on streets and highways surrounding the terminals, and effects are felt by the neighborhoods and businesses in the terminal area. In most cities and towns served by WSF, local and county governments see this traffic impact as untenable. While most understand ferry traffic is an overall benefit to the community, when waiting ferry traffic clogs the streets, increases air pollution, and reduces commerce, it is no longer seen as beneficial and is largely deemed as detrimental.

There are a number of secondary impacts that also result from this situation, including customer inconvenience in terms of lost time, energy use, lack of predictability, and frustration. The system also experiences higher operating costs for traffic control and often the acquisition, construction, and maintenance of auxiliary holding areas to accommodate these peak conditions.

Historically, the solution to this problem has been to consider construction of larger vehicle holding facilities so that even on the highest peak days, vehicles do not back up onto local streets.

Reservations Allow for Much Smaller Terminals

A major benefit of a reservation system for vehicles is that WSF can operate a high quality service with the smallest possible terminal facilities, while providing predictability for customers and mitigating most of the queuing impacts around terminals.

The ability to operate with smaller terminals also has a significant benefit for WSF, as it would be much more expensive to address some of these issues through terminal investments alone.

For example, even a "low cost" approach that emphasized remote holding facilities would cost approximately $280 million, compared to an investment in a reservation system of $18 million.

There are three primary ways to address how peak traffic is accommodated:

- Facility Approach. Build larger terminals to hold all vehicles, including more extensive use of auxiliary and/or remote holding to accommodate vehicles during overload situation. This could require two or more boat loads of storage.
- Service Approach. Add more ferry service, so arriving demand seldom outstrips the capacity of the terminal. In other words, adding a third boat to a route will increase the frequency of service and throughput capacity, which in turn will reduce the likelihood that there will be significant overloads.
- Operational Approach. Use other methods, such as a vehicle reservation system, to move the overflow into a virtual queue and smooth out the arrival rate. Since there is a better balance of arrival vehicles and space on departing sailings, there will be minimal vehicle storage requirements.

The first two options require significant capital investments for terminal expansion and vessel acquisition, and increase maintenance and other operating costs. In the facility options, there are significant investments in large facilities, which if located over water can be very difficult to permit. In the case of the service approach, the costs could include the acquisition of a new vessel to add to the route, plus the annual cost to maintain and operate the service, or additional docking slips.

Historically, WSF has focused on a facility approach. For example, during the 1990s, WSF was pursuing a multimodal terminal strategy that would have provided a significant increase in the holding capacity at a number of terminals. The total cost of this program was estimated at approximately $1 billion in year of expenditure dollars.

More recently, given the significant reduction in WSF's dedicated capital funding, a much less ambitious program of improvements has been identified that would address vehicle queuing outside terminals, primarily with remote holding facilities. This approach, which is designed to mitigate terminal traffic impacts at a low cost, is estimated to cost approximately $280 million in capital costs.

In contrast, a vehicle reservation system would have much more modest acquisition and operating costs. Terminal updates and system capital investments required to implement a vehicle reservation system are estimated to be approximately $18 million ($11.5 million for terminal modifications systemwide, and $6.5 million for the reservation system and back office equipment, software and systems, including design and contingencies). In addition, a vehicle reservation system is expected to require $1 million per biennium in

operating costs (operating costs will be more fully evaluated as part of the pre-design report.). This investment effectively mitigates the terminal congestion problem, and in comparison to the other options, is much less costly.

Doing nothing about terminal congestion would allow terminal traffic to back up further into local communities, but this would only increase the problems cited above, and would continue to transfer the cost of terminal congestion to local communities.

When compared to the other alternatives ($280 million to as much as $1 billion), and considering its effectiveness with respect to demand management and benefits to communities around the ferry terminals, an $18 million initial investment in a vehicle reservation system is a very cost-effective option. However, many ferry customers have concerns about how a reservation system would work for them. Because of this, WSF will take a route-by-route approach in order to determine the feasibility of a reservation system. Before a new reservation system is implemented, a pre-design report will be presented to the Legislature. The Legislature will decide whether there is sufficient merit to the system, and must approve it if the system is to go forward.

Reservation Systems In Use Elsewhere

Most large ferry systems around the world have reservation systems, and their methods and experiences have created a knowledge base that will help WSF implement its own system. Many of the ferry systems using reservations are similar in size to WSF, and have a mix of commuter and tourism ridership as well. Several ferry systems in North America as well as the rest of the world were contacted to see how they administer reservations and the policy issues they addressed.

WSF studied these operations when evaluating the feasibility of the system proposed for this Revised Draft Plan. The ferry systems of interest were:

- BC Ferries (Western Canada) – BC Ferries operates in geographical proximity to WSF's service area.
- iDO (Istanbul, Turkey) – iDO's reservation system is robust, real-time, and largely web-based.
- Wightlink (Isle of Wight, Great Britain) – Wightlink has some commuter-based ridership, similar to many of WSF's routes. Their reservation system is deployed broadly throughout their routes.
- Steamship Authority (Martha's Vineyard, Nantucket, Massachusetts) – an island based service similar to the San Juan Islands route serving local residents and seasonal tourists.

- Scandlines (Germany) – a variety of services including shorter commuter based routes and longer multiple hour crossings that are more oriented towards tourism and freight.
- Delaware River Bridge Authority (Cape May to Lewes, linking Delaware to New Jersey) – primarily recreational route with some commercial traffic.
- Bay Ferries (Nova Scotia) – access for island residents and tourist traveling from Prince Edward Island.
- Black Ball (Port Angeles to Victoria, B.C.) – primarily tourist and commercial traffic across the US/Canada border.

A summary of what was learned follows:

- The reasons the reservation systems were developed include customer convenience, more efficient management of traffic, and the elimination of traffic queues in communities where there are ferry terminals.
- The length of time reservations have been in place ranges from several decades for the more established systems to as little as five years. The systems with the longest history of reservations have updated their reservation system several times.
- The amount of space reserved varies by ferry system and routes within systems. Some sailings are reserved 100%, other systems have sailings with as low as 15% reserved.
- Customers make reservations on-line, by phone or, in some cases, in person. The percentage of on-line versus phone varies by system, but as a rule the newer systems have a higher percentage of on-line reservations than systems that have been in place for several decades.
- As they approach the terminal, there are a variety of ways the different ferry systems check people in – ranging from manually checking in with an attendant to fully automated. The latter can include a transponder in the car, a magstripe card with a personal identification number, or a printed booking with a barcode that is scanned. For security reasons, the system cannot be fully automated – there will always be an attendant at WSF terminals.
- All systems require some sort of deposit, to minimize the no-show rate. Some systems charge extra for reservations. One system discounts reserved travel (compared to first come/first serve) if it is booked online.
- Most of the ferry systems contacted have flexible operating policies about the variability of the customers' return trip home (for example, in case of a traveler with reservations getting stuck

in traffic, working later than anticipated, or if a doctor's appointment runs longer than anticipated). If a reservation is missed, most systems put the traveler on the next available sailing with no financial penalty. Several systems indicated that returning travelers often return via an earlier sailing than the one originally reserved – and that they can accommodate the traveler with available space.

Systemwide Elements of a Vehicle Reservation System

While implementation details and schedules will vary from route to route based upon the unique ridership and operating characteristics of the individual routes and terminals, there are some common issues that would need to be addressed at each terminal:

- Percent of reserved spaces by sailing time, which would vary by route and sailing time.
- Preference given to spaces for:
  - Emergency vehicles
  - Vanpools and carpools
  - Commuters and frequent users on designated sailings
  - Local residents
  - Commercial traffic
- Reservation fees and partial or entire pre-payment of fares. WSF does not plan to charge a fee for use of a reservation system, but would charge a portion of the fare or the entire fare at the time a reservation is made.
- Timing and phase-in of the system. This would occur gradually, as reservations are tailored to each route and sailing time and customers become more accustomed to the system.
- How WSF could pursue opportunities to leverage WSDOT investments in central back office systems as they become available.

Key Implementation Issues of a Vehicle Reservation System

Initial WSTC survey results and feedback received during public comment found that customers typically did not view a vehicle reservation system favorably. Customers also noted that a reservation system must be dynamic and interactive, showing people how much space is still available, and frequent users should be able to book multiple sailings.

WSF recognizes that for it to be successful, a vehicle reservation system must be designed to work well for its customers as well as addressing the system's demand management needs. While potential implementation issues and operating policies will be addressed in more detail as part of a pre-design effort, WSF has critically analyzed reservation systems employed by other ferry systems and its own experience at Port Townsend-Keystone and Anacortes-Sidney to identify preliminary operating policy issues and key concerns frequently raised by customers.

- How would the customer make and complete a reservation? As noted above, a vehicle reservation system would not require a fee, but would require a form of pre-payment, most likely all or part of the vehicle fare. Cutoff times for making a reservation and for showing up to use the reservation on a particular sailing would be developed with community input as the system is phased in over time. Operationally, the lower the percent of capacity reserved, the more in advance the arrival would need to be, so stand-by vehicles could be loaded in time to meet the schedule. These times would be subject to review and evaluation as part of the system design process.
- What happens if a user misses a reservation? The system would need to have policies guiding how this would work for the customer, for example by transferring the reservation to another sailing, obtaining a credit for a future sailing, receiving a refund, or arriving for the next sailing with priority status in the standby lane. If advance notice was not given, or if the arrival cutoff time was missed, the system would have to have policies on what happens; for example, would the user join the standby line and travel on the next available sailing, and at what point would the user lose some or all of the pre-payment?
- What happens if the ferry system cancels a sailing? WSF would need methods to accommodate passengers with reservations, such as diverting them to alternate routes where possible or giving refunds or credits. When service was restored, how will customers with reservations on earlier sailings be given priority over those with reservations on later sailings?
- Would policies be different for residents, frequent users, and tourists? It will be possible to have a resident and/or frequent user program that would set aside a share of each sailing to give priority to these users for high demand and commute sailings. Customers enrolled in a resident or frequent user program would also be able to make multiple reservations at one time.
- How would a vehicle reservation system differ by route? Many facets of the vehicle reservation system would differ by route.

These include advance arrival requirements, the percentage of each sailing that is reserved, and the percent of each sailing set aside for residents or frequent users.

- How can the ferry system ensure a vehicle reservation system will work? A working vehicle reservation system would begin by identifying the "right" technology, and then making the necessary facility improvements to accommodate the chosen reservation system. The vehicle reservation system will be implemented slowly, with only specific sailings requiring reservations on select routes at first. As operational issues are identified and resolved, routes and sailings will gradually be added to the system. This full system roll out would likely take several years, with input from stakeholders on each route
- How do customers deal with the loss of spontaneity? Although customers will have to change their approach to using WSF, the reservation system will actually improve customers' abilities to make spontaneous travel decisions. A reservation system would reduce the instances where a customer decides to take a ferry on the spur of the moment, only to arrive at the terminal and find the sailing full. Using the system, the user could find out ahead of time if space is available on the sailing, and reserve that space if desired. If space was not available, the user could make a reservation on the next available sailing and spend the waiting time productively instead of at the terminal.
- Finally, how will we measure success? WSF would develop a set of measurements to indicate how well the system is functioning to meet customer needs as well as addressing demand management effectiveness. These measures would be used to make adjustments to reservation system policies and operations.

Given the significant operational change it represents, implementation of a vehicle reservation system would happen gradually, in a phased approach.

Future reservation system uses

WSF expects a reservation system to be a key element in its marketing program. Ideally, it would be linked with other State facilities, such as parks.

13. OTHER OPERATIONAL STRATEGIES

In addition to the 90 operational strategies originally considered for inclusion in this Plan, other strategies believed to have significant cost efficiency benefits (though little to no effect on demand management) were also identified.

13.1 Fuel Saving Strategies

Fuel costs comprise a significant portion of WSF's operating costs. The JTC Vessel Study evaluated strategies to conserve fuel consumption.

WSF has also identified a number of actions it can take to conserve fuel and reduce operating costs, and it has already acted on many of them.

Exhibit 18 below details the fuel conservation strategies that WSF has already identified.

Exhibit 18
Fuel Conservation Initiatives

Vessel Class	Fuel Saving Initiative	Predicted Savings	Status
Vessel Specific Strategies			
Jumbo Mark II	Upgrade voltage regulators to run vessels on two engines, without using a third during landings	181,300 gal/year for 3 ferries	In preliminary design phase (vessels already running on 2 engines except during landings)
Jumbo Mark I	Upgrade control systems to run vessels on 3 engines instead of 4	142,000 gal/year for 2 ferries	Install on both vessels in 2009
Super Class	Upgrade engines and associated systems to enable running on 2 engines instead of 4	387,000 gal/year for 3 ferries	Install on Kaleetan in late 2009, Yakima in 2010
Issaquah Class	Change heating system from diesel to steam	30,000 gal/year per vessel	Install on Issaquah in early 2009, other vessels to follow
Systemwide Strategies			
	Develop alternate tie-up method for vessels, allowing a reduction in shaft speed (or shut down of shafts) while docked	145,000 gal/year per vessel	Investigating alternatives for prototype installation
	Slow vessels down 0.5 to 1.0 knots (see “Boat Speed” below)	Up to 2.5% savings for 0.5 knot reduction and 5% for 1.0 knot reduction	WSF will strategically implement vessel speed reductions during non-peak periods in the Winter 2009 schedule

Boat Speed

The travel speed of vessels is a major factor affecting fuel consumption. As travel speeds increase, so does fuel consumption. Following this logic, it may be beneficial to reduce the speed of boats, especially during off-peak times. The Long-Range Plan incorporates speed reduction strategies which will vary on a route-by-route basis, as appropriate. These reductions will likely be focused on off-peak seasons and times, to reduce operating costs while minimizing negative impacts to customers.

13.2 Other Strategies

In addition to fuel cost saving strategies, WSF is examining ways to more aggressively expand non-fare operating revenue streams. Some avenues for consideration might include:

- Concession sales in terminals and on vessels. WSF currently generates a small portion of its operating revenues from the sale of concessions on vessels and in terminals. It will pursue strategies to grow this revenue stream.
- Naming rights. WSF has received inquiries and expressions of interest from private parties in buying naming rights. WSTC has been directed by the Legislature to consider selling naming rights.
- Advertising. WSF currently generates a small portion of its operating revenues from the sale of advertising space on vessels and in terminals. It will continue to pursue these activities and explore ways to grow advertising revenues.
- Co-development Opportunities. WSF has identified three potential terminals where co-development opportunities might be a feasible option. Such opportunities would enable WSF to leverage private sector investment in capital facilities (see sidebar on page 98 for more information).

Future Role of Passenger-Only Ferries

As per the legislative direction provided during the 2006 session, the Plan assumes that WSF will not provide passenger-only ferry (POF) service. Where local providers view POF service as a way to improve service or fill potential gaps, it is expected that locally-funded POF service will be evaluated and pursued.

WSF and Passenger-Only Ferries

WSF provided POF service between Vashon and downtown Seattle between 1990 and 2008, until July 2008 when King County took over the service. In recent years the future of POF service in the region has been the subject of extensive policy activity and debate:

- In 2000, the Joint Legislative Task Force on Ferry Funding recommended that WSF not add any new POF routes and that the Legislature remove barriers to privately-operated POF services.
- In 2003, Kitsap Transit entered into agreements with two private ferry operators to provide POF service to Kitsap County, with service beginning in 2004.
- In 2005, WSF responded to the Legislature's request for a 10-year POF strategy, proposing an expanded "triangle" POF service between Seattle, Southworth, and Vashon as the best short-term solution for future growth.
- In 2005, the Legislature commissioned a Passenger-Only Ferry Task Force to determine the future of POF. The Task Force's report was inconclusive, and the Legislature re-visited the issue in 2006.

Bills passed by the 2006 Legislature directed WSF to maintain the Seattle-Vashon POF service until either King or Kitsap County creates a ferry district and assumes responsibility for the service. The Legislature also directed WSF to sell the Snohomish and Chinook passenger-only ferries and deposit the proceeds into a Passenger Ferry Account, which in the future will be used for operating or capital grants to POF systems. The Snohomish and Chinook were sold in 2009. King County has created a ferry district and has contracted with WSF to operate a route between Seattle and Vashon. The King County Ferry District will assume responsibility for Vashon to Seattle service on September 26, 2009.

14. PRICING

Legislative direction on pricing strategies

- Recognize that each travel shed is unique, and might not have the same farebox recovery rate and the same pricing policies
- Use data from the current market survey conducted by the WSTC
- Be developed with input from affected ferry users by public hearing and by review with affected ferry advisory committees, in addition to the market survey
- Generate the amount of revenue required by the biennial transportation budget
- Consider impacts on users, capacity, and local communities
- Keep the fare schedules as simple as possible
- Consider options for using pricing to level vehicle peak demand
- Consider options for using pricing to increase off-peak ridership

Within the context of this Long-Range Plan, there are two key objectives associated with pricing strategies: (1) to generate sufficient revenue to meet the fare revenue requirement of the biennial transportation budget, and (2) to help meet the demand management goals of ESHB 2358.

Revenue Requirements

The biennial transportation budget sets a revenue target for the ferry system. To meet this target, general fare increases above the 2.5% annual inflationary increases might need to be enacted.

General Fare Increases and Elasticity Effects

WSF ridership and fare history has shown that demand for ferry service is sensitive to fares, and for this reason, general fare increases can also have demand management benefits. As prices increase in real terms, total ferry system riders are likely to decrease. Similarly, if prices decrease, demand for services will increase. These changes in ridership relative to changes in prices are referred to as elasticity effects. It is important to note that price is only one factor impacting ridership.

To assess changes in ridership resulting from general fare changes, this analysis relies on the ferry system's revenue model, constructed using a long history of short-term demand responses to actual fare increases. Where possible, elasticity coefficients and mode shift information from the WSTC customer survey were also incorporated.

A more detailed discussion of ferry system elasticity effects is included in Appendix F.

Transportation Demand Management

In addition to meeting revenue goals, fare policy will need to incorporate demand management strategies. The demand leveling called for by ESHB 2358 will be accomplished primarily through the extensive use of a vehicle reservation system, and the following analysis details options and incentives WSF can use in conjunction with a vehicle reservation system to elicit mode shifts and other desirable behavior.

WSDOT Survey Inputs and Effectiveness Analysis

Where possible, the WSTC customer survey was used to assess the effectiveness of potential pricing strategies. The survey identified customers' willingness and ability to shift travel times and mode as well as their price sensitivity. The conjoint analysis, a survey module designed to analyze customers' mode shift decisions as they relate to

price, was used to develop elasticity coefficients for subcategories of customers. The onboard survey results and conjoint analysis form the basis of the analysis that follows on the effectiveness of specific pricing strategies.

> **Implementation of Tariff Changes**
>
> Any changes in existing ferry fares are subject to WAC revisions policies.
>
> Public outreach is an important part of fare updates and will be undertaken before any fare changes can occur.

14.1 Pricing and a Vehicle Reservation System

As proposed, there will be no additional fees associated with the vehicle reservation system. Though the WSTC survey showed that a significant portion of customers would be willing to pay for a reservation that guarantees their spot on a vessel (and thus validated the value inherent in such a system), there will be no charge. There were two primary reasons for this decision.

The vehicle reservation system is the primary adaptive management strategy being proposed in this plan. In order to ensure broad acceptance of this strategy and minimize negative impacts to customers, there will be no additional fees. In addition, not charging a reservation fee will prevent people from queuing at the terminal for standby space in order to avoid paying extra.

14.2 Fuel Surcharge

Fuel is a large portion of the ferry system's operating costs. The volatile cost of fuel adds uncertainty to WSF's operating expenses, and in recent years has led to decreasing farebox recovery rates. For WSF to have self-sustaining operations, the risk associated with fluctuating fuel costs needs to be mitigated.

To mitigate this fuel risk, WSF could implement a fuel surcharge that would automatically adjust fares up and down to reflect increases and decreases in fuel prices above a pre-determined base fuel price. Under this program, a customer's total fare would be subject to automatic increases in periods of rapid fuel price escalation, effectively passing on this direct operating expense to those benefiting from the service. The surcharge would be reduced when fuel prices fell.

A key analytical question involves how to determine the current base fuel price from which future fuel surcharges would be pegged. For the purposes of this Plan it is assumed that the base price of fuel be set at a price equal to the average fuel costs as defined by the inflation-adjusted average cost of diesel from 1952 to 2008 ($2.15 per gallon), the time period over which the State has owned and operated the ferry system.

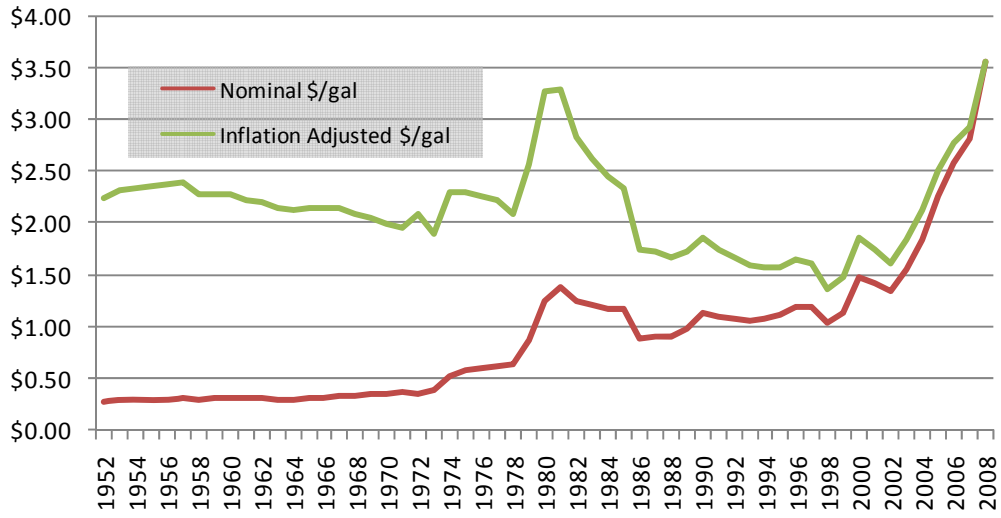
As shown in Exhibit 19 below, with a few notable exceptions, the average per gallon price of diesel fuel has been relatively stable over

the period in question. As a result, setting the base price to the long-term inflation-adjusted price of fuel would incorporate the "typical" level of fuel costs experienced by WSF.

A fuel surcharge would be introduced to the extent that the actual current cost of diesel would differ substantially from this long-term average.

The 2009-11 transportation budget requires that, if the WSTC considers implementing a fuel surcharge, it must first submit an analysis and business plan to OFM and the Legislature.

Exhibit 19
Historic Fuel Prices (1952-2008)



Source: Energy Information Administration, 2008.

14.3 Other Pricing Strategies

In addition to the key strategies outlined above, a number of other strategies were considered as part of this effort. While the ferry system does not intend to implement these strategies immediately, it does intend to re-visit these ideas regularly with public input.

In the near term, the strategies discussed above will be the system's primary area of focus. Depending upon actual experience with a vehicle reservation system and some of the other strategies, the ferry system may need to implement other adaptive management strategies. A complete list and analysis of other pricing strategies considered can be found in Appendix K.

Some of the pricing strategies evaluated would be difficult to implement given that WSF only collects fares in one direction on many routes. For this reason, one-point toll collection issues were

also evaluated as part of this long-range planning process. For more detail on one-point toll collection, please see Appendix L.

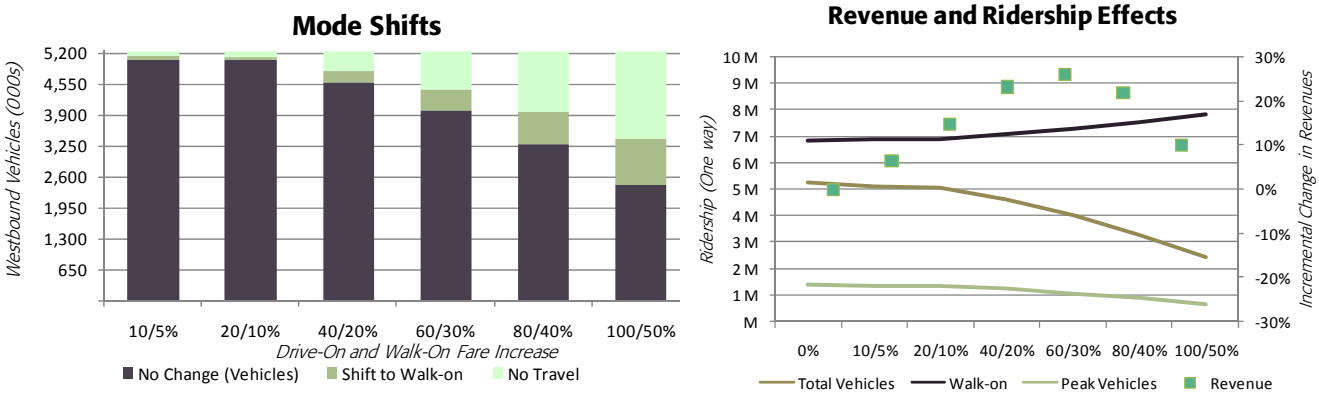
The three strategies discussed below have been brought forward because they have demand management benefits and are narrowly targeted strategies that together could be revenue neutral while providing benefits to local customers. As such, they are likely to be considered for implementation prior to other ideas.

Differential Vehicle and Passenger Pricing

Differential vehicle and passenger pricing refers to how specific fare categories will be increased to achieve the annual fare increase required to meet Transportation Budget revenue requirements. Increasing passenger fares at a slower rate than vehicle fares allows the differential between the two fare categories to grow more rapidly, creating a stronger pricing incentive for mode shift.

Based on the fare sensitivity and mode shift findings from the WSTC survey, Exhibit 20 shows the expected outcome of such a strategy. It is important to note that the fare increases (expressed as percentage increase over base fare) represent the total expected inflation-adjusted increase over the 22-year planning horizon. Any fare increases will be implemented gradually and with public input.

Exhibit 20
Estimated Effects of Differential Vehicle and Passenger Fare Increases



As shown above, this strategy has a couple of key advantages. First of all, an increasing differential between vehicle and passenger fares does, in fact, cause vehicles to mode shift, and secondly, the strategy is revenue positive (although less so at high ends of the scale). It is important to note that these price increases are intended to occur over the 22-year planning horizon.

Taking, for example, a scenario where vehicle fares increase by 10% while passenger fares increase by 5%, the ferry system might expect 70,000 annual vehicle trips to switch to walk-on, while losing over 100,000 vehicle trips altogether. The incremental effect is a decrease in vehicle trips and an increase in passenger trips (because the shift from vehicles is greater than the passengers leaving the system due to price increases), with a small decrease in total riders. Revenue effects are positive, and under this scenario, are expected to provide about a 6% annual increase.

It should be noted that this analysis is using short term elasticity effects from the WSTC customer survey, and there is much greater uncertainty about these effects in the long run.

The Legislature specifically directed that vehicles and passenger fares be changed by the same percentage. This pricing strategy will not be used, but remains in the toolbox for future consideration.

Seasonal Surcharge

WSF's fare structure currently contains a seasonal surcharge component. From the months of May to October, the cash fare is increased on all routes by 25% and on Anacortes-San Juan Islands routes by 35%. Because customers who use the frequent user and multi-ride fare purchase options are exempt from this surcharge, it has the effect of targeting recreational users.

Actual ridership trends show a seasonal peak that is not evenly spread between May and October. July and August represent the "peak of peak" with much higher proportions of cash-paying recreational users. As vehicle capacity constraints are significantly worse during these months, WSF should consider adding a third level to its seasonal pricing structure that allows for a higher surcharge during July and August.

Because this surcharge would target just a small portion of riders (discretionary trips in July and August), revenue impacts are also small, though there would be some demand management benefits. Assuming a July/August cash fare surcharge of an additional 10%, WSF might expect to increase total annual revenues by approximately 1% (based upon elasticity assumptions from the WSF revenue model). With respect to ridership effects, this same scenario would have the effect of decreasing July/August vehicle ridership by 0.5-1.0%, depending upon the route. Routes with more summertime tourist traffic, like Anacortes and Port Townsend, would see larger effects.

Small Car Discounts

WSF already charges vehicles based on their size, and a small car discount would be a special incentive to encourage people that must drive-on to take smaller cars, allowing more vehicles to fit on deck. It has the advantage of increasing vessel carrying capacity by reducing average vehicle size and providing a lower cost vehicle option that still offers a demand management benefit to the system.

As with the July/August summer surcharge, a small car discount would target a very small portion of total riders. Depending on how the discount is set and what size vehicle would qualify, it could attract some new riders to the system, but would likely draw most of its participants from the pool of standard vehicles. The net revenue effects would therefore be negative but probably on a very small order of magnitude (1-2% systemwide assuming the size cut-off is quite restrictive).

A policy decision exists around the definition of a “small car.” Most newer vehicles classified as “subcompact” have a length at or just over 13 feet, though some very small commuter cars that are popular in Europe and Asia are being successfully introduced to the US market. There are also significant operational issues associated with small car prices. The ticket seller would need a means of determining vehicle size. Without a definite means of measuring car length, each seller would have to estimate size or be able to recognize qualifiying makes and models. This is currently a problem in distinguishing between vehicles over and under 20 feet. Ultimately this would lead to more time at the toll booth and fare disputes.

Non-Resident Pricing

Another strategy that may have some demand management benefits and takes a different approach to fare equity is a non-resident pricing program. Per initial research, such a program might be feasible as long as “non-resident” is defined as out-of-state.

The revenue impact such a policy might have is uncertain, and WSF will continue to evaluate this option for potential future implementation. As with pricing by size, non-resident differentials have implementation issues. Ticket sellers do not see license plates and do not ask for driver licenses. License plate recognition equipment is available, but is expensive.

Pricing Strategies for Future Consideration

Once WSF has fully implemented the proposed vehicle reservation system and the effects on demand management are understood, it may be necessary or beneficial to consider some of the other pricing strategies which were shown to be effective in leveling demand, but

would likely have had more significant impacts on customers. These could include:

- **Congestion pricing.** The pricing strategy with the greatest potential to shift travel behavior is congestion pricing. If reservations alone are not sufficient to shift demand then it may be necessary to evaluate a reservations plus variable congestion pricing approach.
- **Vehicle frequent-user policies.** The current frequent user policies are assumed to continue for the purposes of this Plan. A result of this assumption is that a significant number of vehicle trips are paying the same price regardless of when they travel. To achieve its demand management goals it may become necessary to revisit this policy and vary frequent-user fares based on congestion pricing principles.
- **Progressive pricing for larger vehicles.** The concept underlying the small vehicle discount would also apply to the possibility of charging proportionally more for larger vehicles as well, in order to accommodate more total vehicles (especially during peak periods)
- **Variable pricing among routes within a travel shed.** If travel patterns are not sufficiently rebalanced through reservations alone, it may be desirable to consider a pricing mechanism to encourage the use of underutilized routes where customers have a choice (i.e. Bremerton versus Bainbridge or Point Defiance-Tahlequah versus Vashon-Fauntleroy).