1.0 Executive Summary

Formed in 1951, the Washington State Ferry (WSF) system is the largest ferry system in the U.S. and the third largest in the world. WSF serves about 24 million passenger and vehicle trips per year on 10 ferry routes[1] with nearly 500 sailings per day. The system serves eight Washington counties and the province of British Columbia with 20 ferry terminals from Point Defiance in the south to Sidney, B.C. in the north. This system is presented in Figure 1.1.

Figure 1.1 Washington State Ferry System Map

[1] The Fauntleroy-Vashon-Southworth triangle route is considered to be one route in this definition, but is documented separately for the purposes of this report.

In 2004, the Washington State Legislature enacted a provision [ESHB 2474, Section 506] focused on the creation of a coordinated, integrated marine and landside multimodal transportation system to connect the State's people, jobs and communities. The proviso calls for a long-range plan and supporting strategy to provide "policy guidance to define and maximize efficient delivery of quality marine transportation service to the traveling public." The strategy should identify "the most appropriate means of moving foot passengers across central Puget Sound," using WSF vessels, alternative operators, or a hybrid combination of both, in the short and longer-term.[2]

Ongoing efforts to manage existing demand, program service to meet future growth, secure new capital funds, reduce operating costs, and maintain an aging fleet and terminal facilities require WSF to understand the needs and travel patterns of its customers. This report documents the most recent comprehensive, systemwide travel survey conducted by the WSF to support these ongoing planning and operations efforts.

1.1 PURPOSE OF THE STUDY

Washington State Ferries (WSF) conducts periodic origin and destination travel surveys every six or seven years to capture accurate measures of its customers' travel patterns. In the fall of 2006, WSF conducted their most recent origin-destination onboard survey. This survey allows WSF to accomplish the following objectives:

- Match services with customer needs;
- Run an efficient ferry operation; and
- Update data inputs to ferry travel model for use in WSF Long-Range Plan.

In addition, these surveys will support analysis of terminal capital improvement projects, complementary vehicle and passenger-only ferry services, efficiency and accountability mandates, and cost-recovery factors. The onboard survey included stakeholder consultation within and outside WSF to provide input to the survey design. The products of the travel survey is a complete and organized survey dataset available to the public and ferry management for operational and planning purposes. This survey reports on the analysis and presentation of survey findings, including trend comparisons with previous surveys.

[2] Washington State Department of Transportation, *Ten-Year Passenger Strategy for Washington's Multimodal Ferry Transportation System: Executive Summary*, prepared by Berk & Associates for the Washington State Ferries, January 2005.

1.2 PREVIOUS SURVEY EFFORTS

The 2006 survey represents an update to the previous 1999 and 1993 onboard surveys conducted by WSF. There also was a previous onboard survey in 1984. In addition, WSF conducted a small sample survey in 2003 for the South Sound routes. These surveys are described below.

In May and August of 1984, an onboard origin-destination survey of ferry users was conducted on all WSF routes. Both weekday and weekend users were surveyed. The tabulations of origins and destinations from this survey were not coded to a fine level of detail and are not comparable to current 2006 survey results, so are not included as comparisons in this report.

In 1993,[3] an onboard origin-destination survey of ferry users was conducted on WSF routes during May and August. For the May survey, ferry riders during the p.m. peak-period on a Sunday and Tuesday were surveyed on all of the ferry routes in order to capture both weekday and weekend travel patterns. A follow-up survey was then administered to p.m. peak-period riders in August on the more tourism-recreation-oriented, five most northern routes. The 1993 survey data was compiled for use in comparing to the current 2006 survey contained in this report using the May data to represent average daily weekday and weekend travel patterns. A total of 15,750 questionnaires were completed and returned in this survey and of these, 13,832 surveys were usable for analysis. These data were not expanded, so the comparisons are made primarily on the distribution of trips with different characteristics, rather than with the actual trips. The weekend comparisons were not always comparable because the 1993 survey collected data on a Sunday and the 2006 survey collected weekend data on a Saturday.

In May 1999,[4] an onboard origin-destination survey of ferry users was conducted on all WSF routes. Surveys were collected on one midweek day (Tuesday, Wednesday, or Thursday) and a Sunday. Travel information was collected for the weekday p.m. peak-period, the remaining nonpeak p.m. hours of the day and Sunday. Survey sampling was similar to the 2006 survey, by surveying all sailings in the p.m. peak-period and 50 percent of the sailings in the p.m. offpeak-period and on Sunday in a six-hour block to maximize boardings. The 1999 survey data also was compiled for use in comparing to the current 2006 survey contained in this report using the May data to represent average daily weekday and weekend travel patterns. A total of 18,000 questionnaires were completed and returned for this survey and of these, 15,092 were usable for analysis. The weekend comparisons also were not always comparable because

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[3] Washington State Ferries 1993 Origin-Destination Surveys, Final Report; prepared by Parsons Brinckerhoff Quade & Douglas, Inc. and Pacific Rim Resources, March 1994.

[4] Washington State Ferries 1999 Travel Survey Analysis and Results Report, prepared by Parsons Brinckerhoff Quade & Douglas, Inc., June 2000.

the 1999 survey collected data on a Sunday and the 2006 survey collected weekend data on a Saturday.

The WSF 2003 South Sound Survey[5] was undertaken to collect travel information during the p.m. peak hours targeted to five South Puget Sound routes. Two main objectives of the 2003 p.m. half-day survey include: to examine whether ferry user travel patterns have changed since 1999; and to provide data to help understand how ferry travelers align themselves on the mainland with respect to the ferry terminals in West Seattle and Downtown Seattle. The data from the 2003 survey were not used to compare to the 2006 survey because it was not a systemwide, comprehensive survey and inconsistencies in survey methodology make direct comparisons problematic.

1.3 KEY FINDINGS AND TRENDS

There are many significant findings from the 2006 origin-destination onboard survey. And, since there have been two previous surveys with similar survey designs, we also can identify significant trends that have occurred in the past 13 years (since 1993). Ridership has increased from 1993 to 1999, but declined since 1999, so we have highlighted trends from 1999 to 2006 where useful to understand this ridership trend. These key findings and trends provide a strong background for identifying potential policy implications, which are discussed in the next section.

1.3.1 Systemwide Trends

Cost Trends

Many of the significant findings of this and previous surveys are related to travel cost, for two reasons: because cost is a significant component of any trip-making decision for the user and because the State has the ability to set policies related to cost, thereby affecting both revenues and travel behavior. The key systemwide trends related to cost are as follows:

- Average fares in 2006 were $10.49 for vehicles and $5.76 for passengers. Passenger fares increased 43 percent from 1999 to 2006, from an average of $4.02 round trip (in 2006 dollars). Vehicle fares increased 39 percent from 1999 to 2006, from an average of $7.55 one-way (in 2006 dollars). Passenger fares are quoted round trip because they are only charged in one direction; vehicle fares are quoted as one-way because they are charged in both directions.
- Parking costs at ferry terminals are reported to average $6 per day for those

[5] Washington State Ferry System, South Sound Ferry Routes Travel Survey: Technical Report of Methods, prepared by Nustats, March 2004.

who paid to park. If this is added to the passenger fare, ferry riders who park and walk onboard will pay $12 compared to the average vehicle fare of $22 for a round trip.

- Ferry riders reported almost twice as much annual household income, on average, as the average Puget Sound resident. On average, ferry riders make $96,000 per year in household income (self-reported) and the average Puget Sound household makes $53,000 per year (self-reported)[6]. Wealthier households are less sensitive to cost increases than other households. In 1999, ferry riders made an average of $91,000 per year in household income (self-reported) and the average Puget Sound household made $50,000 per year (self-reported).
- Ferry riders also tend to own more cars than the average Puget Sound resident; a fact that is typically highly correlated with household income. Ferry riders own 2.4 vehicles per household on average and the regional average is 1.8 vehicles per household. This statistic is likely contributing to the finding that 27 percent of weekday walk-on passengers keep a vehicle at their destination terminals and 21 percent of weekend walk-on passengers keep a vehicle at their destination terminals. This extra vehicle allows the rider to have the convenience and cost-savings of walking onboard the ferry, while still having the flexibility to drive to their destination. In 1999, ferry riders owned 2.2 vehicles per household.

Purpose and Mode Trends

Over time, ferry riders have shifted their trip purpose and boarding mode. While these shifts are minor in terms of overall impact, the trend over time may have operational and program implications for the ferry system. Here are significant findings related to trip purpose and mode:

- The ferry system serves more shopping and recreation trips than any other trip purpose on an average daily basis (49 percent). Work trips constitute 28 percent of total ferry travel (both weekdays and weekends) and personal business/other trips make up the remaining 23 percent.
- Work trips continue to dominate the weekday travel (58 percent) but have been declining as a percent of total trips since 1993 (68 percent) and 1999 (60 percent). This trend is consistent with national data on journey to work travel, which is declining as a share of all travel. The reduction in work travel is due, in part, to the fact that more people are telecommuting (20 percent of weekday riders said they telecommute at least one day a week). It also may be because more people work at home full-time and there are more job opportunities on the west side of Puget Sound, providing a greater

[6] Average household income for Puget Sound residents is provided by the Puget Sound Regional Council from analysis of the 1999 and 2006 regional household travel surveys.

chance of living and working on the same side of the Sound. This follows the national trend for working at home, which is growing faster than total worker growth.

- Workers also are more likely to ride the ferries more frequently than nonworkers. Weekday travelers are more likely to travel five days per week (32 percent use the ferries five or more days per week). Weekend travelers are most likely to travel only one day a week by ferry (67 percent). This indicates that the ferry system serves different travelers on the weekdays and weekends. Weekday travelers are traveling less frequently in 2006 (38 percent used the ferries five or more days per week in 1993 and 35 percent in 1999) but weekend travelers are traveling more often (18 percent of weekend travelers use the ferries three or more days per week in 2006, 19 percent use the ferries three or more days per week in 1999, and 13 percent use the ferries three or more days per week in 1993).
- There is a decreasing trend in ferry riders who walk onboard the ferry over time. In 1993, 43 percent of all weekday ferry riders walked onboard; in 1999, 33 percent of weekday passengers walked onboard; and in 2006, it is 27 percent. There is a corresponding increase in weekday passengers who board in a vehicle from 1993 to 1999 and 2006. The number of riders taking a bike on board has been relatively stable over time. The increase in driving onboard the ferry is consistent with the national trend towards driving compared to walking or carpooling. The weekend ferry riders who walk onboard decreases from 30 percent in 1993 to 20 percent in 2006.[7]
- There also is a decreasing trend in ferry riders who access the ferry by walking, biking, or taking transit. In 1993, 23 percent of all ferry riders walked, biked, or took transit to get to the ferry, in 1999, this was 16 percent, and in 2006, this was 17 percent.

Travel Time and Route Trends

Lastly, there are a few significant findings that relate to travel time or travel route. Some of these are new questions for the 2006 survey, so we do not know the trends, but the findings are useful nonetheless:

- The majority of ferry travelers return the same day using the same ferry route, as expected. The number of ferry riders who return on a different day has increased significantly in recent years (from 13 percent in 1999 to 25 percent in 2006 for weekday riders). This may be because with longer travel

[7] These trends are more comparable for weekdays because the 1999 and 1993 surveys were not expanded for weekends are therefore not as comparable. In 1999, the weekend surveys had 18 percent of passengers who walked onboard, which would indicate an increase between 1999 and 2006, but this increase is not supported by traffic statistics, which show a decline from 1999 to 2006, and it is therefore more likely a result of the fact that the 1999 weekend surveys were not expanded in 1999.

times (for the overall trip) and higher fares, some ferry riders are choosing to take fewer trips and stay longer.

- The 2006 survey also asked a question about whether travelers were on their preferred sailing; 28 percent of weekday travelers said that they would prefer a different sailing. This could be due to overcrowding on peak sailings, late arrivals, or other schedule conflicts (not related to the ferry schedule). Additional research on the underlying reasons for this would be helpful to explain this phenomenon.
- Average perceived wait times (all survey time periods) for the 2006 survey were 27 minutes for weekday travelers and 22 minutes for weekend travelers. Perceived wait times differ from actual wait times because they are based on survey responses and may not be as accurate as actual wait times. On average, this would indicate that most travelers only wait for the next boat on average rather than having to wait for an additional boat due to capacity limitations during October when the survey was conducted.

Geographic Trends

While there are minor changes in origins and destinations by route between the 1999 and 2006 surveys, these are not significantly different on a systemwide or corridor basis. Changes in geographic trends since 1999 by route are described in the route-level geographic analysis. There is an general trend by route that origins and destinations are more dispersed in 2006 than in 1999, presumably because development for both housing and employment is more dispersed.

1.3.2 Corridor Trends

There are four corridors in this analysis; each is distinct from the others except in one part of the system, where there is some competition between routes. Both the San Juan Islands corridor and the North Sound corridor are quite distinct in terms of the travelers they serve and so there is no competition or overlap between services in these markets. The Seattle-Bainbridge and Edmonds-Kingston routes in the Central Sound corridor also are distinct in the travelers they serve, meaning that travelers in these corridors are not likely to choose other ferry services. The Seattle-Bremerton route and the Fauntleroy-Southworth and Seattle-Vashon passenger-only ferry do compete to some degree for the same travelers, as evidenced by the travel market in South Kitsap County that travel on each of these routes for the same geographic trip patterns. Starting in 2001, the Fauntleroy to Southworth route fares were differentiated from the Seattle to Bremerton fares with the implement table of distance-based fares (Tariff Route Equity). The other South Sound routes are relatively distinct in terms of the travelers they serve.

Weekly Travel Trends

The following summarizes key findings from corridor and route-level analysis for frequency of travel by day of week:

- The South Sound corridor has the highest frequency of weekday travel with 43 percent of travelers using ferries five or more days per week compared to other corridors. San Juan Islands corridor has the lowest frequency of travel with only nine percent of travelers using ferries five or more days per week. North Sound and South Sound corridors are in-between with 24 percent and 36 percent, respectively, of travelers using ferries five or more days per week. These statistics track closely with the percent of work travel in each corridor, as expected.
- Weekend travelers appear to be a separate market from weekday travelers in all the corridors except the San Juan Islands corridor, where weekday travel frequency at the same level as weekend frequency. Weekend travelers are most likely to travel only one day per week in all corridors, with San Juan Islands corridor at 84 percent, North Sound corridor at 63 percent, Central Sound corridor at 69 percent, and South Sound corridor at 55 percent.
- The vast majority of travelers return on the same day using the same ferry route in all corridors, as expected, except in the San Juan Islands corridor where more than half the travelers return on a different day. Interesting, though, is the fact that the number of return trips on a different day is increasing in recent years for weekdays in all corridors. Weekday travelers are more likely to return on the same day in all corridors when comparing 1999 surveys with 2006 data, as follows:, San Juan Islands corridor increases from 41 percent in 1999 to 52 percent in 2006, North Sound corridor increases from 18 percent in 1999 to 27 percent in 2006, Central Sound corridor increases from 10 percent in 1999 to 24 percent in 2006, and South Sound corridor increases from 7 percent in 1999 to 16 percent in 2006.

Purpose and Mode Trends

The following summarizes key findings from corridor and route-level analysis for trip purpose and mode trends:

- The South Sound corridor has the highest percent of weekday work trips (74 percent) and the San Juan Islands have the lowest percent of work trips (40 percent). Central Sound corridor has 60 percent work trips and North Sound corridor has 58 percent work trips. All of the corridors have a declining percent of work trips since 1993 and 1999 except the San Juan Islands, which has an increasing share of work trips. All of the corridors have a healthy percent of telecommuting, ranging from 19 to 22 percent of all weekday travelers saying that they telecommute at least one day per week. While we hypothesize that this percent of telecommuting has increased since 1993, thus explaining at least part of the decline in work trips, we do not have data on telecommuting from the previous surveys.
- There is a consistent increase in weekday ferry riders boarding in a vehicle and a corresponding decrease in weekday ferry riders who walk on board between 1993, 1999, and 2006 for all corridors. The San Juan Islands corridor increases from 78 percent in 1993 to 89 percent in 1999 and 85 percent of weekday travel in 2006. The North Sound corridor increases from 79 percent

in 1993 to 85 percent in 1999 to 86 percent of weekday travel in 2006. The Central Sound corridor increases from 45 percent in 1993 to 54 percent in 1999 to 63 percent of weekday travel in 2006. The South Sound corridor increases from 55 percent in 1993 to 77 percent in 1999 to 79 percent of weekday travel in 2006. The increases range from 7 to 24 percent increase in passengers boarding in a vehicle in this 13-year timeframe.

- There are quite a few people who keep a vehicle at the destination ferry terminal to use to get to their destination after walking onboard the ferry. This is highest at the San Juan Islands corridor, where 50 percent of weekday walk-on passengers keep a vehicle at their destination. In the other corridors it also is high, in North Sound corridor, 45 percent of weekday walk-on passengers keep a vehicle at their destination; in Central Sound corridor, 23 percent of weekday walk-on passengers keep a vehicle at their destination; and in South Sound corridor, 32 percent of weekday walk-on passengers keep a vehicle at their destination.

Time-of-Day Trends

Time-of-day trends were particularly difficult to identify because of the differences between the survey data collection and expansion processes. These differences (described in Section 2) include collecting data on Saturday instead of Sunday and expanding to the full day traffic counts instead of expanding to half-day traffic counts. Noting these differences, we have still identified some trends worth evaluation. Time-of-day evaluations were focused on weekday p.m. peak time periods. The following summarizes the key findings from the corridor and route-level analysis for time-of-day trends:

- P.m. peak period travel heading westbound on weekdays has increased from 67 to 76 percent systemwide between 1999 and 2006. This increase in p.m. peak westbound travel occurs on most routes in the system.
- 41 percent of daily travel occurs in the p.m. peak period, which includes work and school trips as well as many non-work trips.

Some of the key findings were based on questions that were not asked in 1999 or 1993, so trends for these findings are not available. Potential policy implications of these findings are discussed in the next section.

1.4 POLICY AND PROGRAMMING IMPLICATIONS

The purpose of this analysis report is to present key findings and detailed data obtained from the 2006 origin-destination onboard survey. The key findings and detailed data may then be used by WSF and other interested agencies to inform future planning and operations decisions related to ferry services. And while the purpose of this analysis is not to make any specific policy or programming recommendations, we can identify the potential implications of the key findings for future policy and programming considerations.

Ferry riders are traveling less frequently now than they were in 1993 and 1999. This is a combination of the fact that there are fewer work trips (i.e., five-day per week riders), and more people are returning on a different day. Policies that are aimed at commuters will have less overall impact than they would have in the past. Policies aimed at nonworkers will have more impact as time goes on. Additional market research on the most effective policies for nonworkers may be useful.

Ferry riders are more likely to drive a vehicle onboard now than they were in 1993 and 1999. The decrease in work trips and a corresponding decrease in ferry riders who use the ferry five days per week are likely contributing factors. This, in combination with less flexibility as a walk-on rider, will continue to encourage travelers to drive onboard. Vehicle fares have been increasing at about the same rate as passenger fares (39 percent increase since 1999 for average weighted vehicle fares compared to 43 percent increase for passenger fares) so this is not likely a major factor. Policies that take into account the total cost (including parking cost, transit fares, etc.) will more likely be effective. Policies that are aimed at reducing costs for transit access (like a transfer fare) or increasing costs for driving (like higher vehicle fares) may be used to promote walking onboard. Policies aimed at increasing riders to walk onboard should also take into account the effects on revenues, since passenger fares are not as high as vehicle fares.

A significant number of walk-on ferry riders keep a vehicle at their destination terminal. Policies that take into consideration this egress opportunity can be used to either promote this activity (to gain more walk-ons) or constrain this activity (to promote more walk and transit egress). Further research may be needed to better understand this phenomenon.

There are a significant number of ferry travelers who would prefer to travel on a different sailing. The underlying reasons for this result are not well understood, so additional research on this topic is recommended. But policies that are aimed at improving customer satisfaction should be aimed specifically at improving this statistic.

The focus of the data collection was not on customer satisfaction, so the survey did not capture the fact that ferry travel as a means of transportation is well-regarded in the Puget Sound region. Travel time on the ferries is not perceived as onerously as it is when spent in traffic on congested highways. Policies that promote this quality of life and other aspects of customer satisfaction can also be used to address some of the trends found in the onboard survey.

The Puget Sound Regional Council conducted a household and stated-preference survey of residents in the Puget Sound region in 2006, which will offer insight on the attitudes and modal choices of transit riders, but the sample of ferry riders is too small to provide separate insight on ferry riders. The format and design of this stated-preference survey is recommended for additional market surveys that the WSF may conduct, because it can provide considerable insight on the attitudes and modal choices of ferry riders. It can be used to compare ferry riders with other Puget Sound travelers with regards to attitudes toward travel and modal choices.

1.5 CONTENTS OF THE REPORT

This report contains five main topics of analysis beyond this summary:

- Section 2 documents survey methods;
- Section 3 reports systemwide market trends;
- Section 4 analyzes corridor markets;
- Sections 5 through 8 report on individual analysis of each corridor and each route in the corridor; and
- Section 9 presents an analysis of additional data collected for Seattle-bound routes (Seattle-Bainbridge, Seattle-Bremerton, Fauntleroy-Vashon, Fauntleroy-Southworth, and Seattle-Vashon Passenger-Only) on primarily detailed access and egress characteristics.

The corridors and routes reported in Sections 5 through 8 include the following structure:

- San Juan Islands corridor (Anacortes-San Juan Islands, Anacortes-Sidney routes);
- North Sound corridor (Mukilteo-Clinton, Port Townsend-Keystone routes);
- Central Sound corridor (Edmonds-Kingston, Seattle-Bainbridge, Seattle-Bremerton routes); and
- Sound Sound corridor (Fauntleroy-Vashon, Fauntleroy-Southworth, Vashon-Southworth, Seattle-Vashon Passenger-Only, Pt. Defiance-Tahlequah routes).

Survey forms used in the data collection effort are provided in Appendix A. District and traffic analysis zone maps are provided in Appendix B.