

Washington State Ferries  
**2040 Long Range Plan**

*Appendix F: Ridership Forecast  
Memo*



This document provides summary results from the first stage (i.e., Stage 1) of the ferry ridership forecasting analysis in support of the Washington State Department of Transportation Ferries Division (WSF) Long Range Plan (LRP) update. Summary findings from Stage 1 forecasting analysis and supporting demographic forecasts are presented below followed by a sensitivity analysis of Stage 1 forecasting result using the latest (2017) population forecasts from the Office of Fiscal Management (OFM) for the Island and Jefferson counties.

# Summary Findings

Stage 1 ridership forecasts are presented in Table 1. They are contrasted with change in the historical ferry ridership and demographic forecasts as well as implied change in annual ridership projected from the WSF econometric model. Key findings are as follows:

- Historical growth in ridership has varied between -1.5 and +2.0 percent over the past 24 years.
- Demographic annual growth between now and 2040 within the WSF service area is forecast to be about 1.0 percent for population, 1.2 percent for households, and 1.3 percent for employment.
- Consistent with this demographic growth, annual ferry ridership is expected to grow by about 1.2 percent annually, or about 30 percent overall between now and 2040.
- This ridership growth rate is consistent with the annual ridership growth projections from the WSF econometric model for 2029.

**Table 1. Growth Comparison in Demographic and Ferry Ridership Forecasts**

Description/Period	% Overall Growth	% Annual Growth
<b>Historical Ferry Ridership Growth</b>		
1993-2006	2.5%	0.2%
1999-2006	-10.2%	-1.5%
2006-2013	-6.1%	-0.9%
2013-2017	8.1%	2.0%
<b>Demographic Forecasts</b>		
Population (2017-2040)	25%	1.0%
Households (2017-2040)	32%	1.2%
Employment (2017-2040)	35%	1.3%
<b>WSF Planning Model—Total PM Peak (3-7) Period Stage 1 Ferry Ridership Forecasts<sup>1</sup></b>		
2017-2040	30%	1.2%
<b>WSF Econometric Model—Annual Ferry Ridership Forecasts</b>		
Alternative 1 (2017-2029) <sup>1</sup>	10%	0.8%
Baseline (2017-2029) <sup>2</sup>	18%	1.4%

<sup>1</sup>Assumed 2.5% per year fare increase (constant real fares)

<sup>2</sup>Assumed no fare increase.

# Ferry Ridership Forecasting Overview

The foundation of the LRP is a thorough understanding of present and future customers of the system. An understanding of current ridership was developed through a variety of research efforts, including focus groups and rider surveys. For an understanding of future customers, the WSF Travel Forecasting Model will be used to develop future ridership demand forecasts. The model was updated using new rider survey information expanded to reflect 2017 ferry ridership, as well as updated land-use forecasts and network assumptions from the Puget Sound Regional Council (PSRC) and outlying jurisdictions. The WSF ferry ridership forecasting involves a two-staged process:

- In the first stage of forecasting, base year PM peak period origin-destination ferry riders (collected in 2013) are grown using projected rate of growth exhibited in land-use forecasts for the WSF service areas.
- In the second stage of forecasting, the WSF planning model will be used to allocate total PM ferry riders estimated in Stage 1 of forecasting among ferry routes using route-specific service attributes as well as prevailing transit service and congestion levels on the land side.

Specific methodological descriptions for the WSF planning model are included in the *Ferry Travel Forecasting Methodology Report* (February 2015).

## Demographic Forecast Inputs to Stage 1 Forecasting

This section describes the demographic inputs used to produce total PM peak ferry ridership forecasts for 2030 and 2040 ferry ridership.

Latest demographic forecasts were obtained from local jurisdictions. This included the four counties comprising the Puget Sound Regional Council (PSRC) forecast area. For the purpose of ridership forecasting analysis, the demographic forecasts were allocated into 57 districts. Of the 57 districts, 42 are within the PSRC forecast area.

Figure 1 shows the 57-district boundaries.

For other areas of Western Washington within the WSF service area, forecasts are from local sources when available. Available forecasts from local jurisdictions are compared to population forecasts from OFM and to employment forecasts from the Employment Security Department (ESD). The local forecasts are generally found to be consistent with OFM and ESD forecasts, with occasional missing data points, such as households, which must be estimated using available household size data.

For areas within Washington but external to the WSF service area, OFM and ESD forecasts are used directly, with households extrapolated from available household size data. For the three districts, external to Washington, complete and well-documented forecasts are readily available from the metropolitan planning organizations in those three areas. Of the 57 districts, 7 are external to the WSF service area, of which there are 4 in Washington, 2 in British Columbia, and 1 in Oregon. Table 2 provides a complete description of the sources for the demographic forecasts assembled to support the Stage forecasting analysis.

Table 3 summarizes the details of the demographic data from the above sources at county-level, as translated into growth factors for the WSF service area for 2017 to 2030 and for 2017 to 2040. Except for Island County, total growth projected for employment for the WSF service area counties varies between 12 to 27 percent in 2030 and 28 to 44 percent in 2040 as shown in Table 3. In general, higher overall growth in employment is projected for the four counties of the PSRC area, plus Thurston County, and somewhat lower for the remainder of the service area. Population growth forecasts are much more evenly spread over the service area, except for somewhat lower growth expected in Island and San Juan Counties.

Table 4 shows detailed breakdowns of population growth by three age groups for each county from OFM. The projected percent overall growth (and percent annual growth) in population within the WSF 12-county service area across the three age groups (0 to 17, 18 to 64, and 65 and over), respectively, are

- For 2030, 11 percent (0.8 percent), 7 percent (0.5 percent), and 55 percent (3.5 percent)
- For 2040, 16 percent (0.7 percent), 15 percent (0.6 percent), and 77 percent (2.5 percent)

Table 5 shows available total and retail employment for each county from ESD for 2015 and 2025. Additional demographic forecasts shown in Table 4 and Table 5 supplement the forecasts in Table 3. Demographic growth for the 18-to-64 population age group is more associated with employment and households growth, while the over-65 population age group is more associated with households and retail employment growth.

# Stage 1 Ridership Forecasting Summary Results

This section describes the resulting ferry travel forecasts for 2030 and 2040 reflecting the effects of projected demographic growth. Table 6 shows resulting Stage 1 ferry travel demand for an average weekday PM peak period in 2030 and in 2040. Overall travel growth above the base year totals almost 14 percent for 2030 and over 30 percent for 2040. The ferry travel growth rates in Table 6 derive directly from the demographic forecasts highlighted in Table 3, Table 4, and Table 5 and are in close agreement with the demographic forecast growth. The resulting travel growth is also in line with overall growth forecasts for both highway demand and transit demand developed in planning studies by other agencies.

Table 6 also illustrates the effects of significant demographic shifts towards an older regional population base, especially between today and 2030. Current PM peak-period ferry demand includes 18.1 percent riders in the 65-and-over category, but increasing to 20.8 percent in that category by 2030. Lack of additional growth beyond 2030 is primarily related to OFM demographic forecasts, which incorporate national trends tracking the post-war baby boom generation through its life cycle.

## Summary Conclusion

These Stage 1 forecasts provide a solid basis for the travel pattern analysis and input into the route-level forecasting (Stage 2) using the WSF planning model. The resulting Stage 1 platform is accurately based on the best available demographic data and may be used for forecasting future ferry travel demand with high confidence.

Figure 1. 57-District Boundary Map

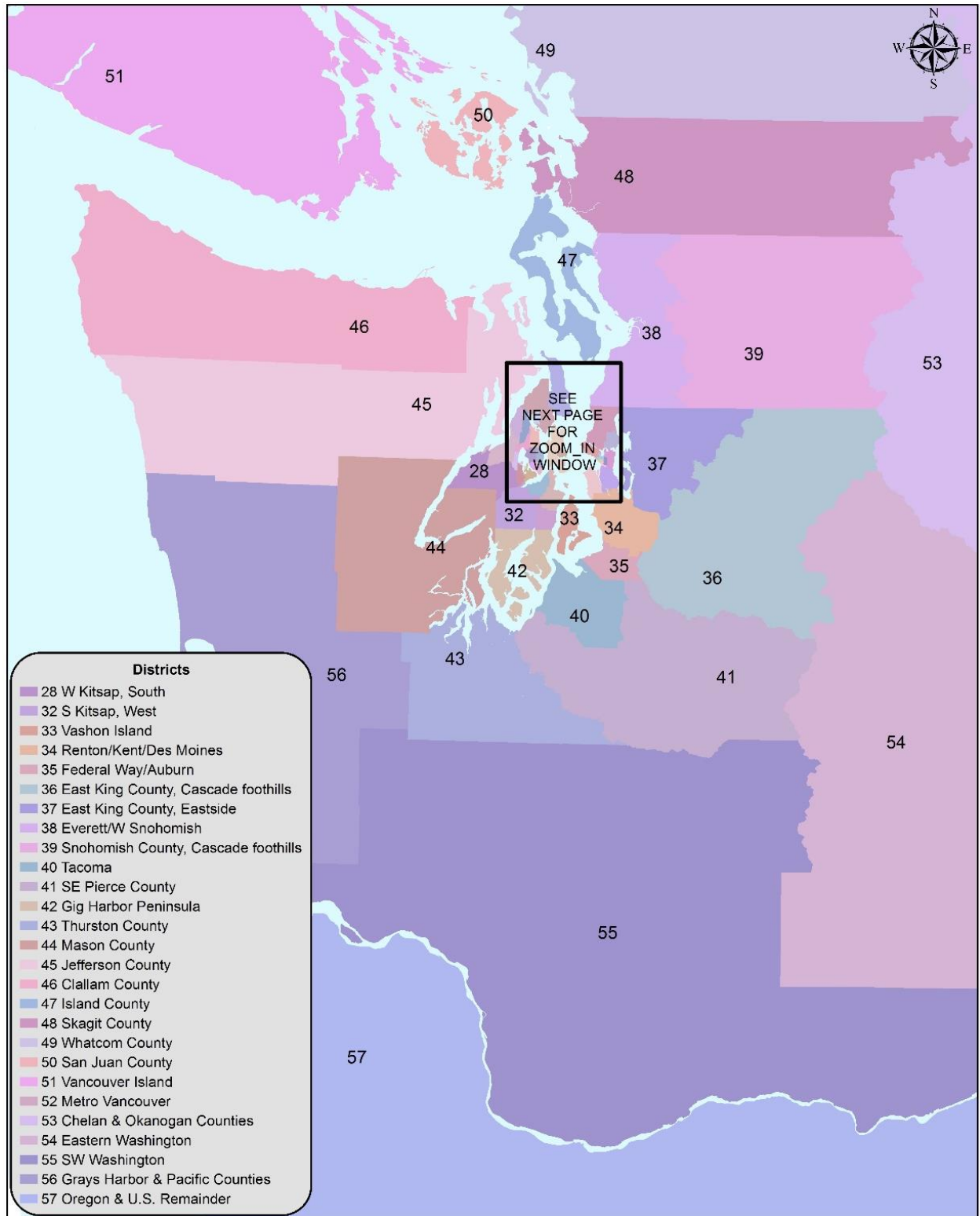
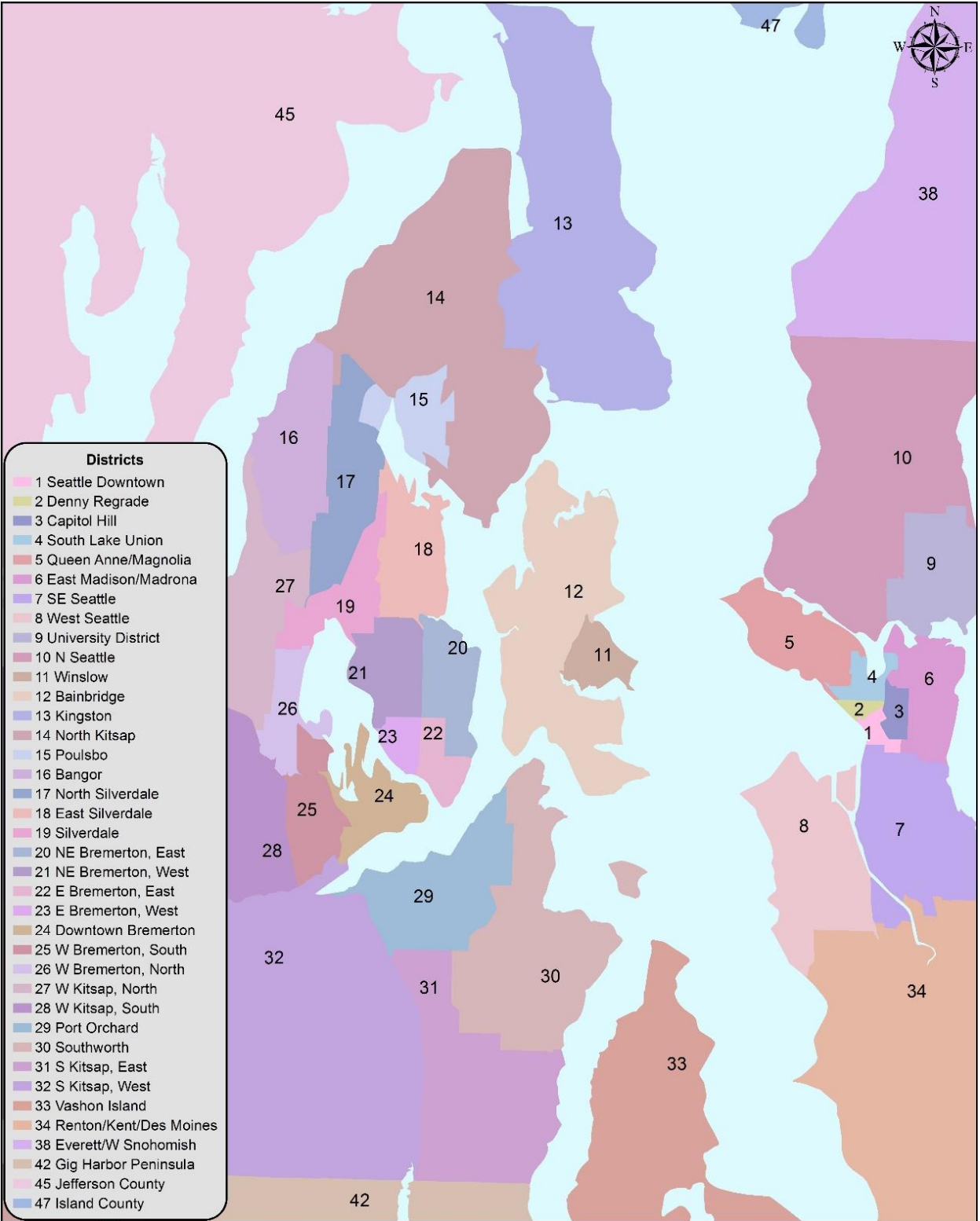


Figure 1. 57-District Boundary Map (continued)





**Table 2. Demographic Forecast Input Assumptions to Ferry Ridership Forecasting**

WSF Service Area (County)	Demographic Forecasts Status
King Kitsap Snohomish Pierce	Latest 2030 & 2040 population, households and employment forecasts from Puget Sound Regional Council (PSRC) – August 2017 (population consistent with OFM's medium range forecasts)
Thurston	Latest 2030 & 2040 population, households and employment forecasts from Thurston Regional Planning Council (TRPC) – July 2017 (population consistent with OFM's medium/high range forecasts)
Mason	2030 & 2040 population and employment forecasts were not available. Instead, OFM medium population and ESD employment forecasts were used. Households are estimated using OFM's population in conjunction with Kitsap's household size.
Jefferson	2030 & 2040 population and employment forecasts were not available. Instead, OFM medium population and ESD employment forecasts were used. Households are estimated using OFM's population in conjunction with Kitsap's household size.
Clallam	2030 & 2040 population and employment forecasts were not available. Instead, OFM medium population and ESD employment forecasts were used. Households are estimated using OFM's population in conjunction with Kitsap's household size.
Island	Latest 2030 & 2040 population and employment forecasts from Island County's Comprehensive Plan – October 2016. Households are estimated using forecast population in conjunction with Kitsap's household size. (population consistent with OFM's medium range forecasts)
Skagit	Latest 2030 & 2040 population and employment forecasts from Skagit Council of Governments (SCOG) – March 2017. Households are estimated using forecast population in conjunction with Kitsap's household size. (population consistent with OFM's medium range forecasts)
Whatcom	Latest 2030 & 2040 population, households and employment forecasts from Whatcom Council of Governments – June 2017 (population consistent with OFM's medium range forecasts)
San Juan	Latest 2030 & 2040 population from San Juan County's adopted forecast for the ongoing Comprehensive Plan Update – July 2017. Households are estimated using population forecasts in conjunction with Kitsap's household size. Employment forecasts from Washington State's ESD. (population consistent with OFM's medium/high range forecasts)
External Geographic Areas	
Chelan/Okanogan Eastern Washington SW Washington Grays Harbor/Pacific	Latest OFM medium population and ESD employment forecasts were used. Households are estimated using OFM's population in conjunction with Kitsap's household size.
Portland/U.S.	Latest 2030 & 2040 population, households and employment forecasts from Portland Metro – 2015
Vancouver Island	Latest 2030 & 2040 population, households and employment forecasts from Capital Regional District, Victoria, BC – 2015
Metro Vancouver	Latest 2030 & 2040 population, households and employment forecasts from Metro Vancouver – 2015

**Table 3. Total Households, Population, and Employment Forecasts for 2017, 2030, and 2040**

WSF Service Area (County)	2017			2030			Growth Factors: 2030 over 2017		
	Households	Population	Employment	Households	Population	Employment	Households	Population	Employment
King	880,500	2,108,700	1,432,400	1,009,500	2,314,500	1,599,200	1.15	1.10	1.12
Kitsap	103,800	268,100	105,900	128,000	326,600	121,300	1.23	1.22	1.15
Snohomish	297,200	784,600	319,000	357,900	927,200	365,600	1.20	1.18	1.15
Pierce	328,500	855,800	357,400	410,700	983,100	405,500	1.25	1.15	1.13
Thurston	113,000	276,900	139,800	145,000	349,000	177,800	1.28	1.26	1.27
Mason	24,700	63,600	22,100	29,500	75,300	26,100	1.19	1.18	1.18
Jefferson	12,300	31,700	10,800	15,500	39,500	12,500	1.26	1.25	1.16
Clallam	29,000	74,900	25,700	35,700	91,000	29,700	1.23	1.21	1.16
Island	31,400	81,100	24,300	33,700	86,000	25,500	1.07	1.06	1.05
Skagit	48,700	125,600	51,200	57,200	145,900	62,100	1.17	1.16	1.21
Whatcom	87,000	213,900	89,700	104,300	250,500	110,600	1.20	1.17	1.23
San Juan	6,400	16,500	7,700	7,300	18,500	9,000	1.14	1.12	1.17

WSF Service Area (County)	2017			2040			Growth Factors: 2040 over 2017		
	Households	Population	Employment	Households	Population	Employment	Households	Population	Employment
King	880,500	2,108,700	1,432,400	1,085,800	2,451,000	1,875,100	1.23	1.16	1.31
Kitsap	103,800	268,100	105,900	156,500	376,800	149,400	1.51	1.41	1.41
Snohomish	297,200	784,600	319,000	399,400	1,045,000	458,900	1.34	1.33	1.44
Pierce	328,500	855,800	357,400	466,200	1,085,100	498,100	1.42	1.27	1.39
Thurston	113,000	276,900	139,800	164,000	394,000	199,700	1.45	1.42	1.43
Mason	24,700	63,600	22,100	34,000	82,100	29,200	1.38	1.29	1.32
Jefferson	12,300	31,700	10,800	18,000	43,500	13,900	1.46	1.37	1.29
Clallam	29,000	74,900	25,700	41,300	99,600	32,900	1.42	1.33	1.28
Island	31,400	81,100	24,300	37,100	89,400	26,500	1.18	1.10	1.09
Skagit	48,700	125,600	51,200	67,100	161,700	70,500	1.38	1.29	1.38
Whatcom	87,000	213,900	89,700	117,800	282,200	127,500	1.35	1.32	1.42
San Juan	6,400	16,500	7,700	8,000	19,400	10,100	1.25	1.18	1.31

**Table 4. Total OFM Population Forecasts by Age Group for 2017, 2030, and 2040**

WSF Service Area (County)	2017			2030			2040		
	0 to 17	18 to 64	65 & over	0 to 17	18 to 64	65 & over	0 to 17	18 to 64	65 & over
King	447,300	1,418,400	271,500	495,000	1,514,000	422,100	520,500	1,626,700	480,800
Kitsap	55,700	159,800	51,700	61,600	170,500	80,400	64,800	183,200	91,600
Snohomish	178,200	500,400	106,300	197,200	534,100	165,300	207,400	573,800	188,300
Pierce	206,500	531,700	119,600	228,600	567,500	185,900	240,300	609,800	211,800
Thurston	60,600	169,700	46,900	67,100	181,200	72,900	70,500	194,700	83,100
Mason	12,300	36,700	14,600	13,600	39,100	22,700	14,300	42,000	25,800
Jefferson	4,100	16,500	11,100	4,600	17,600	17,300	4,800	18,900	19,700
Clallam	12,900	40,400	21,600	14,300	43,100	33,500	15,000	46,400	38,200
Island	16,300	47,500	20,700	18,100	50,700	32,200	19,000	54,400	36,600
Skagit	27,700	71,800	24,900	30,700	76,600	38,700	32,300	82,300	44,100
Whatcom	43,900	134,900	37,300	48,600	144,100	58,000	51,100	154,800	66,100
San Juan	2,200	9,100	5,300	2,500	9,800	8,200	2,600	10,500	9,400

WSF Service Area (County)	% Distribution of Population (2017)			% Distribution of Population (2030)			% Distribution of Population (2040)		
	0 to 17	18 to 64	65 & over	0 to 17	18 to 64	65 & over	0 to 17	18 to 64	65 & over
King	21%	66%	13%	20%	62%	17%	20%	62%	18%
Kitsap	21%	60%	19%	20%	55%	26%	19%	54%	27%
Snohomish	23%	64%	14%	22%	60%	18%	21%	59%	19%
Pierce	24%	62%	14%	23%	58%	19%	23%	57%	20%
Thurston	22%	61%	17%	21%	56%	23%	20%	56%	24%
Mason	19%	58%	23%	18%	52%	30%	17%	51%	31%
Jefferson	13%	52%	35%	12%	45%	44%	11%	44%	45%
Clallam	17%	54%	29%	16%	47%	37%	15%	47%	38%
Island	19%	56%	24%	18%	50%	32%	17%	49%	33%
Skagit	22%	58%	20%	21%	52%	27%	20%	52%	28%
Whatcom	20%	62%	17%	19%	57%	23%	19%	57%	24%
San Juan	13%	55%	32%	12%	48%	40%	12%	47%	42%

**Table 5. ESD Retail and Total Employment Estimates for 2017 and 2025**

Workforce Development Area (WDA)	ESD Estimated Retail Employment		ESD Estimated Total Employment		% Retail Employment		Average Annual Growth Rate (%)	
	2017	2025	2017	2025	2017	2025	Total Employment	Retail Employment
							2017 to 2025	
Benton-Franklin	26,406	29,405	138,541	152,227	19.1%	19.3%	1.18%	1.35%
Eastern Washington	15,985	17,067	91,554	100,356	17.5%	17.0%	1.15%	0.82%
North Central Washington	26,814	28,559	144,157	156,720	18.6%	18.2%	1.05%	0.79%
Northwest	47,106	50,746	198,139	217,725	23.8%	23.3%	1.19%	0.93%
Olympic Consortium	34,688	37,656	143,991	157,014	24.1%	24.0%	1.09%	1.03%
Pacific Mountain	48,266	52,165	211,131	232,359	22.9%	22.5%	1.20%	0.98%
Pierce County	80,772	88,085	346,824	386,642	23.3%	22.8%	1.37%	1.09%
Seattle-King County	311,275	341,690	1,498,436	1,687,002	20.8%	20.3%	1.49%	1.17%
Snohomish County	74,443	81,745	334,287	361,629	22.3%	22.6%	0.99%	1.18%
South Central	29,176	31,056	161,187	171,270	18.1%	18.1%	0.76%	0.78%
Spokane	60,715	66,007	255,574	283,466	23.8%	23.3%	1.30%	1.05%
SW Washington	53,673	58,320	227,158	253,107	23.6%	23.0%	1.36%	1.04%
Washington State	814,569	888,335	3,772,380	4,185,022	21.6%	21.2%	1.31%	1.09%

Source: Employment and employment growth rates estimated by Washington State’s Employment Security Department (ESD), released in 2017.  
<https://fortress.wa.gov/esd/employmentdata/reports-publications/industry-reports/employment-projections>

**Table 6. Summary of Stage 1 Forecasting Results for Years 2030 and 2040 by Age Group**

	Age Group 1 (0 to 17 years)	Age Group 2 (18 to 64 years)	Age Group 3 (65 & over)	Total
<b>Base Year (2017)</b>				
PM peak (3 to 7) period ferry trips	1,312	19,532	4,595	25,439
% of total	5.2%	76.8%	18.1%	100.0%
<b>Stage 1 Forecasts</b>				
PM origins (HHs/EMP combination)	100% Households	20% Households + 80% Total Employment	50% Households + 50% Retail Employment	
PM destinations (HHs/EMP combination)	100% Households	80% Households + 20% Total Employment	50% Households + 50% Retail Employment	
<b>Year 2030</b>				
PM peak (3 to 7) period ferry trips	1,467	21,520	6,038	29,025
% of total	5.1%	74.1%	20.8%	100.0%
% change to Base Year (2017)	11.8%	10.2%	31.4%	14.1%
<b>Year 2040</b>				
PM peak (3 to 7) period ferry trips	1,607	24,605	6,918	33,130
% of total	4.9%	74.3%	20.9%	100.0%
% change to Base Year (2017)	22.5%	26.0%	50.6%	30.2%

# Sensitivity Analysis of Stage 1 Ridership Forecasts

The Stage 1 forecasting analysis was performed using available demographic forecasts from local jurisdictions and other sources including OFM. Sources of demographic forecasts used in the Stage 1 forecasting analysis are highlighted in Table 2. OFM released their latest population forecasts in December 2017. A sensitivity test of Stage 1 ridership forecasting was performed using 2017 OFM population forecasts for the Island and Jefferson counties as shown in Table 7.

**Table 7. Population Forecasts for Island and Jefferson Counties**

County	Local Jurisdiction Forecasts			OFM Medium Forecasts (2016)			OFM Medium Forecasts (2017)		
	2017	2030	2040	2017	2030	2040	2017	2030	2040
Island	81,100	86,000	89,400	84,500	100,900	110,100	82,800	89,800	94,500
Jefferson	Not Available			31,700	39,500	43,500	31,400	36,300	39,900
	Growth Factors over 2017			Growth Factors over 2017			Growth Factors over 2017		
Island	1.06		1.10	1.19		1.30	1.08		1.14
Jefferson	Not Available			1.25		1.37	1.16		1.27

Using 2017 OFM population forecasts for the Island and Jefferson counties had an insignificant effect in Stage 1 forecasts presented in Table 6. Total PM peak Stage 1 forecast was changed only by:

- 16 trips for 2030 (from 29,025 to 29,009); and
- 12 trips for 2040 (from 33,130 to 33,142).

In light of this finding, the Stage 1 ridership forecasts shown in Table 6 didn't need to be altered.

However, given the relatively low population projections for Island County, by working with Island County staff and elected officials, WSF will utilize the slightly higher projections for the Mukilteo/Clinton route from the Snohomish County forecasting model.