Alaska Marine Highway System Tariff Analysis

Prepared for

Alaska Department of Transportation & Public Facilities

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Prepared by

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In association with

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Executive Summary

Northern Economics, Inc. completed a rate study for the Alaska Department of Transportation and Public Facilities, Alaska Marine Highway System (AMHS) in 2008. The study looked at the rates of alternative modes of transportation within the study area and rates for similar ferry systems in comparison to AMHS tariffs. Since that rate study was conducted, there have been no changes made to AMHS's tariff structure, except for tariffs created for new routes.

This tariff analysis looks at the changes made over the last six years by AMHS's direct competitors and similar ferry systems around the world. The study also reviews the changes that the market has experienced since AMHS last adjusted tariffs. This analysis also looks at the rate anomalies on comparable routes within AMHS's systems. Some of the key takeaways highlighted throughout the report are:

- AMHS has kept tariffs static since its last increase of 3.2 percent in 2007.
- Since 2007 the United States (U.S.) has experienced an annual average inflation rate of 2.08 percent.
- The Consumer Price Index in Alaska has increased by 12 percent and the Producer Price Index for marine transport services in the U.S. has increased by 19 percent since 2007.
- Since 2008, AMHS's average operating expenditures per nautical mile have increased by 33 percent.
- Passenger tariffs of comparable ferry systems have increased by an average of 21 percent since 2008.
- Passenger vehicle tariffs of comparable ferry systems have increased by an average of 7 to 10 percent since 2008.
- Cabin tariffs of comparable ferry systems have been much more variable, with a wide range of changes that average 60 percent for inside berths to 41 percent for outside berths, since 2008.
- Alternative freight and cargo rates have increased over the past six years by as much as 236 percent per nautical mile.
- Many comparable systems used in this analysis charge different tariffs for commercial and public customers, and the tariffs for commercial customers are almost always higher.

This study also looks at the development and implementation of a change in tariff policy with the goal of creating a fair and equitable tariff structure. After reviewing transportation industry standards and a conducting a comparative analysis, the study team recommends AMHS do the following:

- Bring in outlying tariffs so that the average tariff per nautical mile is within 25 percent of the average tariff per nautical mile for the route distance and region
- Adopt a formulaic approach to setting tariffs
- Adopt a two-tiered tariff structure that accommodates the difference in demand during the summer and winter seasons, with higher tariffs in the summer season. The study team recommends passenger seasonal adjustments between 0–30 percent and seasonal vehicle

adjustments between 30–40 percent. These recommended ranges are based on an analysis of the Washington State Ferries and BC Ferries, who have implemented seasonally adjusted tariffs. Setting the lower bounds of the recommended seasonal adjustment at zero instead of three or five percent gives AMHS more freedom to assess what routes are most impacted by seasonal traffic, for both passenger and vehicles, and adjust accordingly. This also presents the option for some tariffs to remain constant year-round if AMHS does not deem a seasonal adjustment appropriate.

- Set a target farebox recovery rate and review and update tariffs annually to adjust for changes in capital and operating cost. Based on industry averages, the study team recommends a target farebox recovery rate between 39–65 percent.
- Differentiate between commercial and passenger vehicle tariffs. The study team recommends that commercial vehicle tariffs be 60–120 percent higher than passenger vehicle tariffs.
- Adopt a premium tariff for dedicated and express route types. The study team recommends starting with a 10 percent premium for express, dedicated, and highly utilized routes.

The ad hoc approach to tariffs that AMHS has employed in the past has resulted in a structure with substantial variations in tariffs between routes. Our proposal for bringing the outlying tariffs in line with the average tariff per nautical mile and for the adoption of formulas for establishing passenger and other tariffs is intended to allow incremental increases in all tariffs, which can be more evenly distributed over AMHS routes. The recommended tariff structure will also be more equitable, transparent, and easier for customers to understand.

Findings

The analysis uses current rates for comparable ferry systems and routes to assess how passenger tariffs have changed since the 2008 study. The 11 ferry systems used in each analysis are:

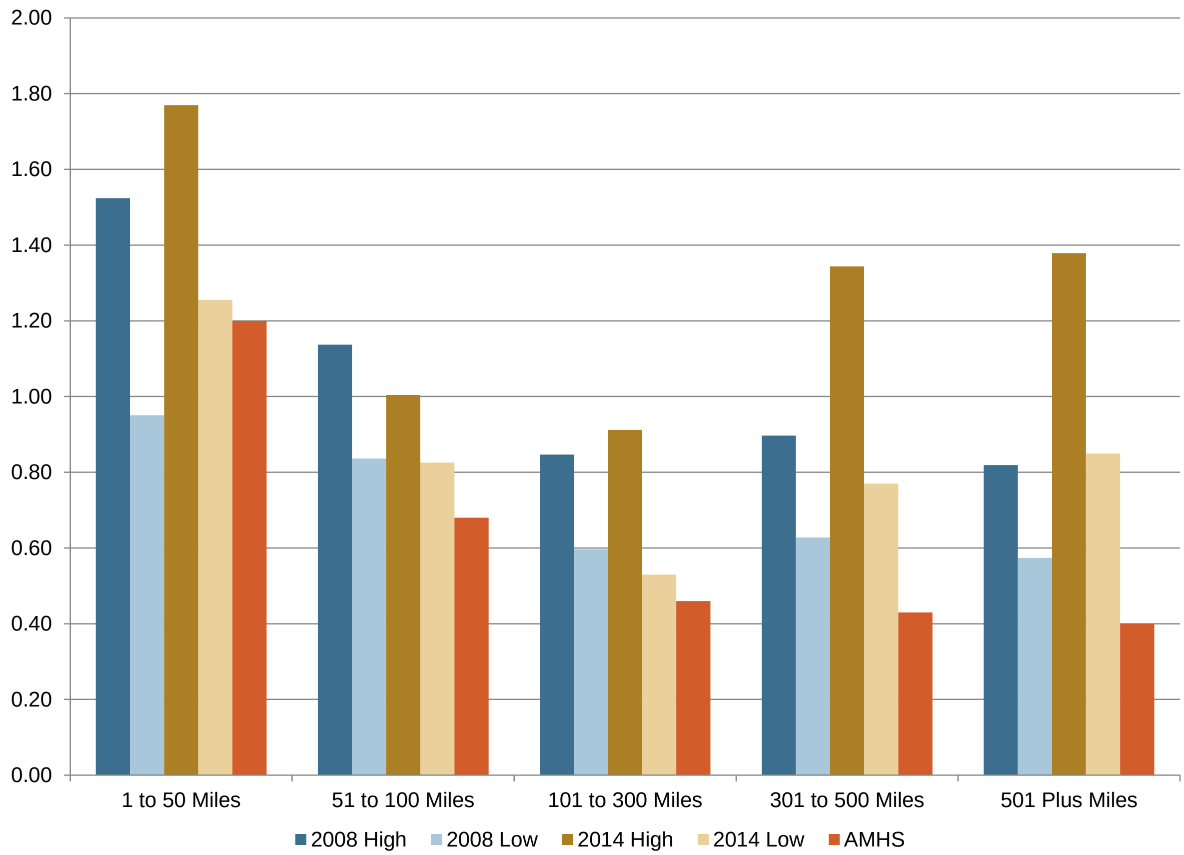
- BC Ferries
- Brittany Ferries
- DFDS Seaways
- Hurtigruten
- Irish Ferries
- Marine Atlantic
- Moby Lines
- P&O Ferries
- Stena Line
- TT-Line
- Viking Line

Sample tariffs were collected during both peak (high) and off-peak (low) seasons to illustrate the average range in tariff prices in the following five distance categories:

- 0 to 50 nautical miles
- 51 to 100 nautical miles
- 101 to 300 nautical miles
- 301 to 500 nautical miles
- 501-plus nautical miles

In each of the five distance categories displayed in Figure ES-1, AMHS's average passenger tariff per nautical mile is less than the low (off-peak) average of the comparable systems in 2014. In 2008, AMHS's average passenger tariff per nautical mile was lower than the low average passenger tariff per nautical mile in each distance category with the exception of the 1 to 50 mile category, but with the increasing trend in average passenger tariff prices over the past 6 years, AMHS has dropped below the average of the comparable systems in this category as well. The 10 ferry systems used in this comparative analysis (DFDS excluded) had an average tariff per nautical mile increase of 21 percent across all of the distance categories considered over the past 6 years, whereas AMHS tariffs have remained static.

Figure ES-1. Passenger Tariff per Nautical Mile Comparison



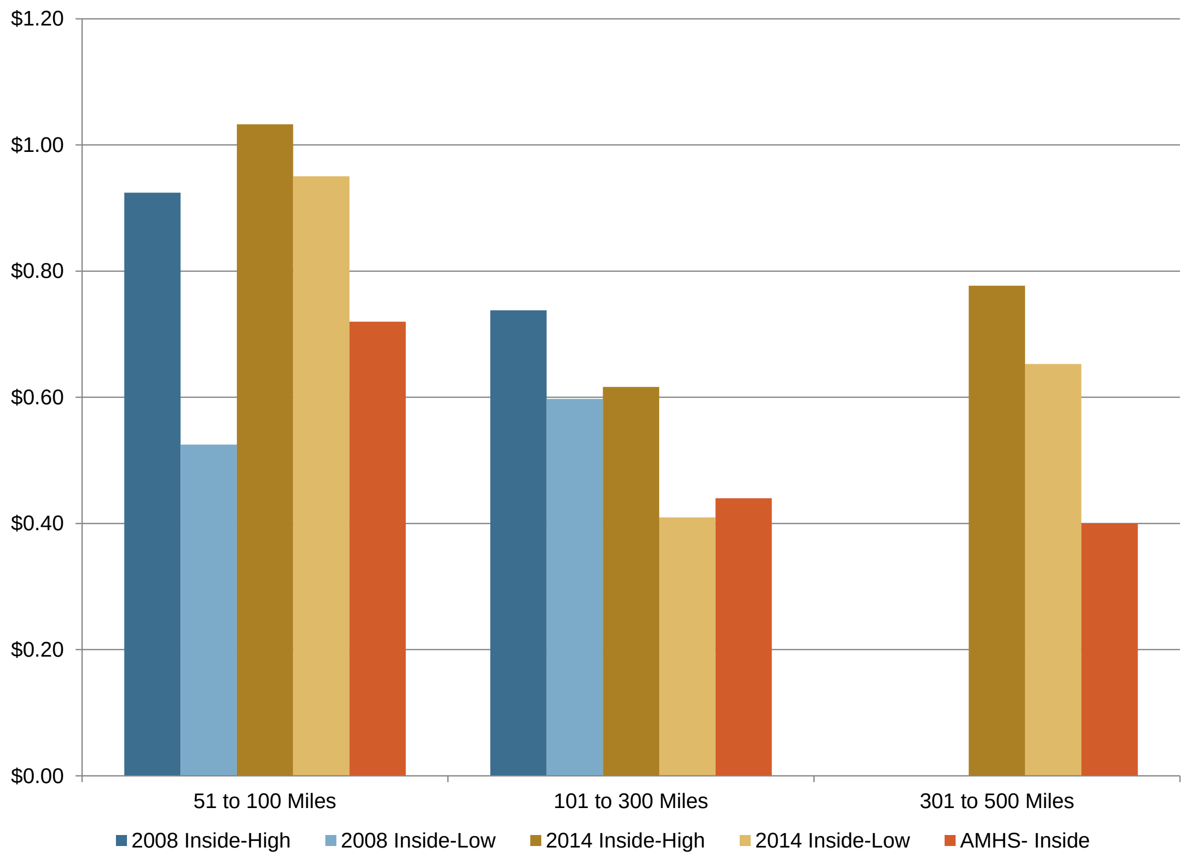
Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Figure ES-1 also illustrates the relationship between the tariff per nautical mile and the distance of the route. As routes increase from 1 to 100 miles, there is a downward trend in the average tariff per nautical mile, but as routes increase from 101 to 501-plus miles, there is an upward trend. This u-shaped trend accurately reflects the costs associated with operating routes of various distances. Up to a certain point, around 101 to 300 miles, the cost associated with operating a route increases at a lesser rate than the route distance increases, causing the average tariff per nautical mile to decrease. For routes over 300 miles, the cost to operate these longer routes starts to increase at a greater rate than the increasing distance, thus causing the average cost per nautical mile to increase.

When compared to the average inside cabin tariff per nautical mile of 11 comparable ferry systems in both 2008 and 2014, AMHS's tariff is lower than both the high and low averages in two of the three distance categories assessed and falls in between the high and low averages in the remaining category (101 to 300 miles).

Figure ES-2 displays the average inside cabin tariff per nautical mile of the nine comparable systems (Hurtigruten and P&O Ferries excluded) as well as the unchanged AMHS average inside cabin tariff per nautical mile.

Figure ES-2. Inside Cabin Tariff per Nautical Mile Comparison

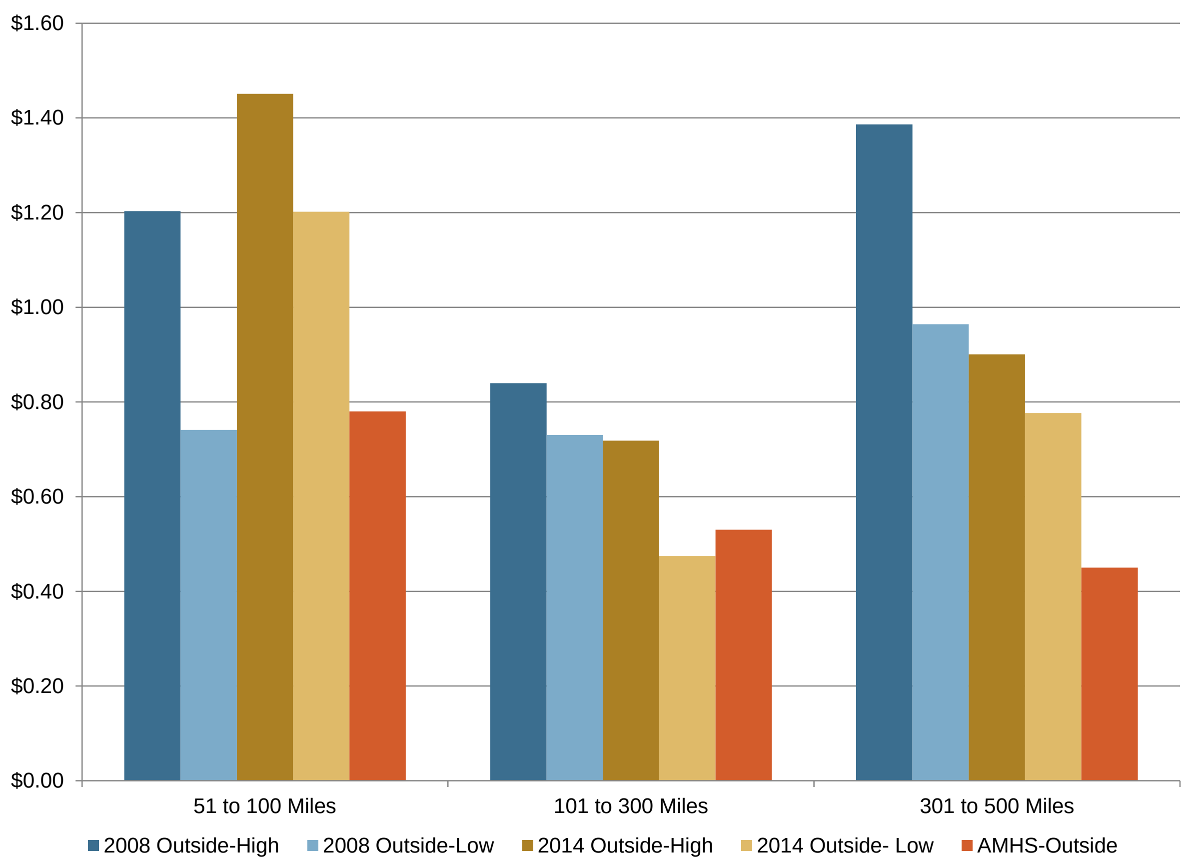


Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines.

The outside cabin tariffs charged by similar systems have seen an increasing trend for routes with distances less than 50 nautical miles, and a decreasing trend on routes longer than 51 nautical miles. Figure ES-3 displays the high and low average outside cabin tariff per nautical mile in 2008 and 2014 for nine comparable ferry systems (Hurtigruten and P&O Ferries excluded), as well as the average outside cabin tariff per nautical mile charged by AMHS. The average outside cabin tariff per nautical mile charged by AMHS is still lower than the average tariff for comparable ferry systems in each distance category, even though the average outside cabin tariffs of comparable ferry systems have seen decreases.

Another notable difference between AMHS and many of the ferry systems used in this analysis is the requirement for passengers to purchase a cabin on longer routes. Currently AMHS does not require the purchase of a cabin on any of its routes and provides a passenger-only tariff option on each route.

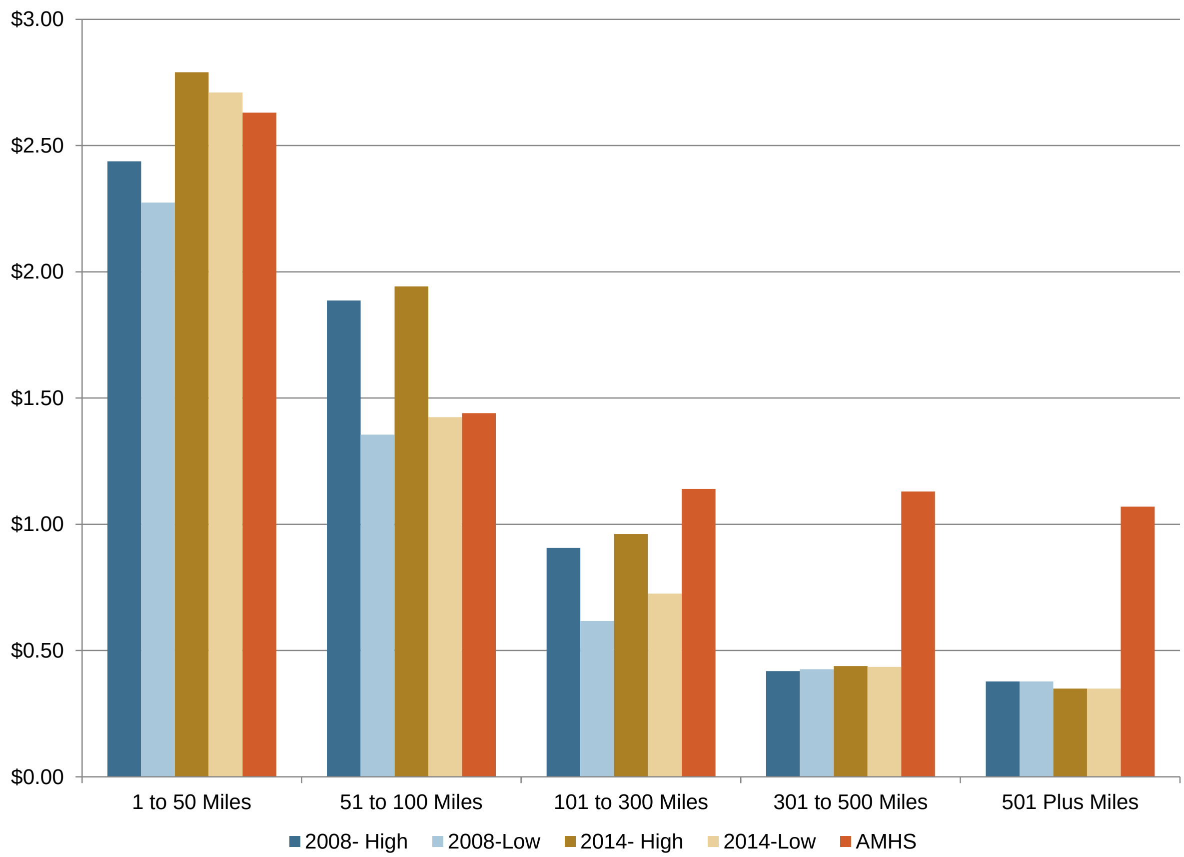
Figure ES-3. Outside Cabin Tariff per Nautical Mile Comparison



Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Figure ES-4 displays the high and low average vehicle tariff per nautical mile for the 11 comparable ferry systems analyzed in this study for 2008 and 2014, as well as AMHS's average vehicle tariff per nautical mile, which has remained constant during this time period. For route distances less than 100 miles, AMHS's tariff is relatively close to the low average charged by comparable systems. For routes longer than 101 miles, AMHS's vehicle tariffs are higher than the other ferry systems used in this comparison.

Figure ES-4. Vehicle Tariff per Nautical Mile Comparison



Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

It should be noted that the majority of the comparable ferry systems used in this analysis have different tariff structures for commercial customers and the traveling public, whereas AMHS does not currently distinguish between the two markets. When comparing tariffs for a vehicle of similar size, the commercial tariffs are almost always higher than the tariff charged to the traveling public. Figure ES-4 displays the average tariff per nautical mile that would be charged to the traveling public.

Another way to compare AMHS to other ferry systems is to look at farebox recovery rates. The farebox recovery rates displayed in Table ES-1, from a report published by Sheinberg Associates in 2014 for the Inter-Island Ferry Authority, represent the portion of operating expenditures that are covered by operating revenues. In 2010 the average farebox recovery rate for North American ferry systems was 49 percent and AMHS's farebox recovery rate was 26 percent. That means that AMHS was able to cover 26 percent of its operating expenditures with its operating revenues.

Table ES-1. Farebox Recovery Comparison (2010)

Passenger/Vehicle Ferry System	Farebox Recovery Rate FY2010 (%)	Ownership
Stena Lines	138	Private
Irish Ferries	108	Private
Steamship Authority	100	Public
Brittany Ferries	98	Private
Inter-Island Ferry Authority	77	Public
BC Ferries	69	Public/Private
Golden Gate Ferries	68	Public
Washington State Ferries	65	Public
North American Average	**49**	
Alaska Marine Highway System	26	Public
North Carolina Ferries	6	Public

Source: Washington State Department of Transportation. 2010, Sheinberg Associates. 2014

AMHS has kept tariffs static since its last increase of 3.2 percent in 2007. Since 2007, the U.S. has experienced an average annual inflation rate of about 2.08 percent, the Consumer Price Index has increased by 12 percent, and the Producer Price Index for maritime transport services has increased by 19 percent. Also, since 2008, AMHS's average operating expenditure per nautical mile has increased by 33 percent.

Recommendations

The study team recommends that AMHS first address the variation between tariff prices per nautical mile so that routes within the same distance category are within 25 percent of the average tariff per nautical mile. These changes would more easily facilitate the implementation of a formulaic tariff structure and will allow increases in tariff prices to be more evenly distributed over AMHS's routes.

Table ES-2 displays the routes that are more than 25 percent below the average tariff per nautical mile for their distance category in at least one of the four tariff categories analyzed in this study. The route that deviates most from the average tariff per nautical mile is the Hoonah to Tenakee route. Currently the tariff for this route charges passengers $31 for a route that is 49 nautical miles in distance, or $0.63 per nautical mile. The average tariff per nautical mile for routes that are 0 to 50 nautical miles in distance is $1.21, and in order to bring this route in line with the average, AMHS would have to raise the tariff to $59.29. It also should be noted that the majority of the routes that are below the average tariff per nautical mile are located in Southeast Alaska.

Table ES-2. 2014 Routes below Average Range (% difference)

Area	Route	Passenger	19 ft. Vehicle	Outside Berth	Inside Berth
Southeast Feeder	TKE to ANG	-38.94	—	—	—
Southeast Inside Passage	PSG to WRG	-44.51	-48.30	-44.14	-38.04
Southwest	AKU to UNA	-52.51	—	-71.19	—
Southeast Inside Passage	GUS to PEL	-53.54	-51.04	—	—
Southeast Feeder	HNH to JNU	-50.55	-51.04	-48.33	-41.25
Southeast Feeder	HNH to TKE	-56.39	—	-51.50	-44.85
Southcentral	CDV to TAT	-31.06	-27.13	—	—
Southwest	CBY to FPS	-18.56	-17.88	-26.61	—
Southeast Feeder	ANG to HNH	-25.02	-22.17	—	—
Southeast Inside Passage	ANG to SIT	-25.23	-21.59	—	—
Southeast Inside Passage	ANG to JNU	-32.10	-24.57	—	—
Southeast Inside Passage	KTN to WRG	-40.49	-28.38	—	—
Southwest	SDP to KCV	-26.97	-17.80	-5.25	—
Southwest	KOD to OLD	-37.02	17.35	-34.22	—
Southeast Inside Passage	KAE to SIT	-31.52	-34.59	-6.75	2.56
Southeast Inside Passage	HNH to SIT	-33.26	-36.25	-12.31	-3.90
Southeast Inside Passage	KTN to SIT	-22.52	-22.64	-26.56	-17.43
Southcentral	KOD to WTR	-27.19	-26.87	-18.67	—
Southeast Feeder	HNH to KTN	-15.34	-10.00	-27.27	-22.43
Southcentral	YAK to VDZ	-36.52	-27.49	-39.37	—

Note: dashes indicate that the specific service is not offered on that route
Source: Developed by Northern Economics, Inc. based data from AMHS

This study also identifies routes that are more than 25 percent above the average tariff per nautical mile in each distance category. Table ES-3 displays the routes that are above the average range of tariff per nautical mile in one of the four categories analyzed. The route with the largest deviation is the Annette Bay to Ketchikan route, which currently has a passenger tariff of $23 for an 8 mile route, or $2.88 per nautical mile. The average tariff on routes 0 to 50 nautical miles is $1.21, which would mean the tariff for this route would be $9.68 if it were aligned with the average tariff. The majority of the routes above the average tariff per nautical mile are located outside of Southeast Alaska. The study team suggests addressing these higher outliers by holding these rates until these rates fall in line with the formulaic rate for the route.

Table ES-3. 2014 Routes above Average Range (% difference)

Area	Route	Passenger	19ft Vehicle	Outside Berth	Inside Berth
Southeast Inside Passage	ANB to KTN	98.19	57.33	—	—
Southeast Inside Passage	HNS to SGY	64.39	24.84	76.17	107.87
Southwest	ORI to OUZ	74.99	73.25	72.85	—
Southwest	KOD to OUZ	62.49	60.87	60.50	—
Southcentral	HOM to SDV	33.82		32.18	—
Southcentral	TAT to VDZ	56.68	65.61	—	—
Southeast Inside Passage	JNU to GUS	—	—	35.22	28.40
Southcentral	TAT to WTR	95.99	32.55	—	—
Southcentral	CHB to WTR	90.14	98.84	—	—
Southcentral	VDZ to WTR	63.33	—	—	—
Southcentral	CHB to VDZ	46.43	52.97		—
Southcentral	CDV to CHB	31.33	37.02		—
Southcentral	CDV to WTR	31.33	—	—	—
Southwest	FPS to UNA	48.78	46.06	53.42	—
Southeast Inside Passage	KTN to PSG	—	—	—	31.63
Southeast Inside Passage	JNU to KAE	—	26.66	—	25.34
Southwest	KOD to SDV	40.72	39.34	50.81	—
Southwest	ORI to SDV	39.56	38.20	49.58	—
Southeast Inside Passage	JNU to PSG	—	—	—	24.23
Southwest	HOM to ORI	—	—	26.35	—
Southwest	HOM to OUZ	—	—	26.35	—
Southwest	OLD to SDP	48.98	51.99	58.42	—
Southcentral	WTR to YAK	28.52	35.13	40.98	—

Note: dashes indicate that the specific service is not offered on that route
Source: Developed by Northern Economics, Inc. based on data from AMHS

Due to the wide range of variation between tariffs that are currently in place, the study team recommends that these outliers be brought within the range of average tariff per nautical mile using incremental changes over multiple years. Spreading out these changes over time will mitigate the potential for shocking a specific market and seeing a negative impact on ridership. The tariffs that deviate most from the average should be adjusted over a longer period, whereas tariffs that are closer to the average range can be adjusted more quickly. Tariff outliers on the high end of the spectrum could also be frozen while other tariffs are increased until they are brought more closely in line with the average.

Next, the study team recommends that AMHS adopt a formulaic approach to set tariffs that takes into account fixed costs, distance-based charges, and adjustments for premium service. This approach would be equitable, transparent, and easy to adjust to reflect changes in routes and inflation. It is recommended that AMHS use operating costs and a revenue goal to determine the coefficients for each formula. Further, it is recommended that separate formulas be developed for passengers, cabins, and vehicles to reflect each category's unique cost structure. AMHS can then use a phased implementation over multiple years to bring current tariffs in line with the formula-based tariffs, avoiding the risk that large increases could have a marked effect on ridership.

Figure ES-5 displays the study team's recommended formula for determining passenger tariffs. This formula should address the fixed fees associated with passenger traffic, variable distance-based costs, premium service adjustments, and a seasonal component (with summer tariffs set higher than winter tariffs).

Figure ES-5. Recommended Formula for Determining Passenger Tariffs

Source: Northern Economics, Inc., 2014

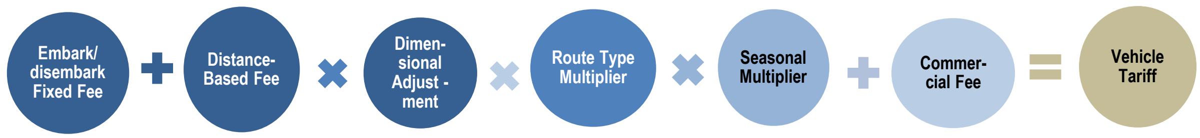
The study team's recommendation for calculating cabin tariffs would have similar components to the passenger tariffs, but with some differences. It should also continue to be a prerequisite requirement that customers purchase a passenger tariff before being able to purchase a cabin tariff. Figure ES-6 shows the recommended formula for calculating cabin tariffs.

Figure ES-6. Recommended Formula for Determining Cabin Tariffs

Source: Northern Economics, Inc., 2014

The car deck on AMHS ferries is used by both the traveling public and commercial entities, and often reaches capacity first. The study team recommends using the formula shown in Figure ES-7 to set vehicle tariffs for both public and commercial users.

Figure ES-7. Recommended Formula for Determining Vehicle Tariffs



Source: Northern Economics, Inc., 2014

Many of the ferry systems analyzed in the comparative analysis section of this report have implemented separate commercial and public rates for vehicles. This difference is often achieved by adding extra fees and restrictions onto commercial vehicles, and in most cases is based on the weight of the vehicle. This same concept could be applied to the containerized and non-containerized cargo transported by AMHS. The "Commercial Fee" in Figure ES-7 is an additional fee that would be charged to commercial customers who typically transport heavier loads.

The study team also suggests increasing tariffs in order to maintain financial sustainability. This recommended tariff increase should be implemented over a number of years to prevent a shock to AMHS's current customer base and a negative effect on ridership. Once AMHS tariffs are brought more closely in line with current market conditions, the study team suggests smaller annual adjustments to maintain AMHS' financial position. This recommended tariff increase and the recommended switch to a formulaic tariff structure can easily be implemented at the same time to facilitate a smoother transition process.

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Abbreviations

ADOT&PF	Alaska Department of Transportation & Public Facilities
AMHS	Alaska Marine Highway System
BART	Bay Area Rapid Transit
CMAQ	Congestion Mitigation and Air Quality
CPI	Consumer Price Index
ft	foot
FTA	Federal Transit Administration
NM	Nautical Mile
NY MTA	New York Metropolitan Transit Authority
PPI	Producer Price Index
SFO	San Francisco International Airport
TRE	Tariff Route Equity
U.S.	United States
VTA	Valley Transport Authority
WMATA	Washington Metropolitan Area Transit Authority
WSF	Washington State Ferries

1 Introduction

The Alaska Department of Transportation and Public Facilities, Alaska Marine Highway System (AMHS) operates 11 vessels and serves 35 communities, with over 3,500 miles in routes stretching from Bellingham and British Columbia through the inside passage of Southeast Alaska, across the gulf of Alaska, and across Price William Sound and out to the Aleutian Chain. AMHS originally serviced only eight communities when it first started in 1963, and as city pairs and vessels were added to the system, tariff categories were also added to accommodate for every possible travel pattern within the system. This resulted in a very complex and rigid tariff structure. This structure is not only hard to manage, but also difficult for customers to understand.

Past tariff increases at AMHS have been set and implemented at the discretion of the commissioner and were driven by a number of variables. In the 1990s, tariffs were raised significantly each year, as much as 10 percent annually, resulting in a noticeable decrease in ridership. The last tariff increase implemented by AMHS was in 2007 at a rate of 3.2 percent. This increase did not have a negative impact on ridership. It is important that AMHS have a tariff structure that allows for easy implementation of adjustments to keep up with inflation and increasing costs, and avoids larger, less frequent corrections which have historically impacted revenues negatively through a decrease in ridership. It is also import that AMHS have a fair and equitable tariff structure that is transparent and easy for customers to understand.

Northern Economics, Inc. completed a rate study for AMHS in 2008. The study looked at the rates of alternative modes of transportation within the study area and rates for similar ferry systems in comparison to AMHS's tariffs. This study also looked at rate anomalies on routes of similar length within the AMHS system. Since that rate study was conducted, there have been no changes made to AMHS's tariff structure.

This tariff analysis looks at the changes made over the last six years by AMHS's direct competitors and similar ferry systems around the world. It also looks at the development and implementation of a change in tariff policy with the goal of creating a fair and equitable tariff structure. The analysis from this study recommends a formulaic approach that can be applied uniformly across all routes to allow AMHS to target its revenue goals.

This report contains information and data on fares for all route segments within the AMHS service area, rates for alternative modes of transportation within the study area, and rates for similar ferry systems around the world. AMHS fares analyzed are for the summer of 2014 (May–September). Fares for the other ferries and marine carriers were also collected within this same time period. Fares for air transport are for travel in March 2014. Three different tariff areas are analyzed in this report: Passenger, Cabin, and Car Deck. This report also presents transportation industry standards on fare structures based on a literature review and interviews with industry professionals.

2 Comparative Analysis

AMHS has a very limited number of direct competitors in the markets that it operates in. In many cases, the only alternative service available for passengers is air transportation, since many of the communities serviced by AMHS are not connected to a road system. For commercial vehicle services, the only direct competitors for most of AMHS's customers are private marine shipping companies. The following section compares AMHS to both its direct competitors as well as other comparable ferry systems that operate in different service areas.

2.1 Ferry Systems Used in Comparison

The following 11 ferry systems are used in this comparative analysis. Although they all operate in different parts of the world, there are aspects of each of these systems that are similar to AMHS. Data from these same 11 ferry systems were collected for the 2008 Rate Analysis and were available for our study team to use in this study. These historical data allowed the study team to look at the trends in tariff prices of comparative systems over the past six years in relation to AMHS's unchanged tariff prices.

BC Ferries

British Columbia Ferry Services, Inc., or BC Ferries, is a Canadian provincial crown corporation that provides all major passenger and vehicle ferry services for coastal and island communities in the Canadian province of British Columbia. BC Ferries has become the largest passenger ferry line in North America and the second largest in the world, boasting a fleet of 35 vessels, and operates 25 routes, serving 47 locations on the British Columbia coast. Some routes see high volumes, but many others are lightly used. There is one berthed service between Prince Rupert and Port Hardy (BC Ferries 2014).

Marine Atlantic, Inc.

Marine Atlantic, Inc. is a Canadian federal crown corporation that is mandated under the Terms of the Confederation to maintain a year-round ferry service between the mainland and Newfoundland. The corporation owns and operates four ice-class vessels. Its three passenger vessels are the MV Atlantic Vision, MV Blue Puttees, and MV Highlander, all three of which offer both two- and four-berth options. The MV Leif Ericson is a dedicated commercial freighter that operates between North Sydney and Port aux Basques and primarily carries drop trailers and restricted commodities, with a capacity of approximately 80 drop trailers (Marine Atlantic 2014).

DFDS Seaways

DFDS Seaways has seven vessels with berthed services and car decks that are used throughout northern Europe. The two vessels operating on the Newcastle to Amsterdam route have capacities of 600 vehicles each, with passenger capacity ranging from 1,620 to 2,053. The Newcastle to Bergen service has a capacity of 1,760 passengers. Vehicle capacity, if any, is not listed on the website. The Harwich to Esbjerg service employs a vessel with a capacity of 435 vehicles and 600 passengers. The Copenhagen and Oslo service uses two ships with capacities of 450 cars and 2,026 passengers, and 365 cars and 2,100 passengers, respectively. DFDS Seaways is a passenger service subsidiary of DFDS Group, and profit and earnings by this ferry service are not broken out of the parent company's earnings (DFDS Seaways 2014).

Moby Lines

Moby Lines (Moby Lines S.P.A.) is an Italian shipping company that operates ferries and cruise ferries between the Italian mainland and the islands of Elba, Sardinia, and Corsica. The company was founded in 1959 under the name Navigazione Arcipelago Maddalenino (NAVARMA for short). In 1982 the company acquired a ferry, renamed it M/S Moby Blu, and painted the "blue whale" livery that later came to characterize Moby Lines. Moby Lines currently has a fleet consisting of five fast cruise ferries, two cruise ferries and six smaller ferries that operate 12 routes (Moby Lines 2014).

Stena Line

Stena Line is an international transport and travel service company and one of the world's largest ferry operators. The company provides service in Scandinavia, the North Sea, and the Irish Sea. Stena Line operates 23 ferry routes and has a fleet of 39 vessels including fast ferries, traditional passenger and vehicle ferries, and RoPax ferries for freight and passengers. This company provides ferry services in Sweden, Denmark, Norway, Great Britain, Ireland, Germany, the Netherlands, and Poland (Stena Lines 2014).

Hurtigruten

Hurtigruten serves 35 ports on the west and north coasts of Norway, between Bergen and Kirkenes, with 12 vessels. It provides twice-daily service to each port, with one vessel going northbound and the other traveling southbound. The vessels make an 11-day round trip starting at Bergen, traveling to Kirkenes, and then returning (Hurtigruten 2014).

Viking Lines

Viking Lines is a Finnish company that operates passenger and cruise ferries and provides cargo services in the northern Baltic Sea. The route network services seven ports with a fleet of seven vessels consisting mostly of traditional passenger ferries. The fleet's passenger capacity ranges from 950 to 2,600 and vehicle capacities range from 100 to 450 vehicles (Viking Lines 2014).

Irish Ferries

Irish Ferries is an Irish shipping company founded as a joint venture between Irish Shipping, Lion Ferry, and Fernley & Eger in 1973. The company offers ferry services from Ireland to France and England, with a route system that includes six ports serviced by five vessels. The Irish Ferries fleet consists of one fast ferry and three cruise ferries, one of which is the world's largest car ferry. The fast ferry, the Jonathan Swift, operates two return sailings daily between Dublin and Holyhead, and can carry 800 passengers and 200 vehicles. The three cruise ferries' capacities range from 1,450 to 2,200 passengers and 580 to 1,350 vehicles (Irish Ferries 2014).

TT-Line

TT-Line is a German shipping company that offers direct ferry and cargo service between Germany and Southern Sweden. The company's vessels are the most modern fleet servicing Sweden with an average vessel age of only seven years. TT-Line has 6 vessels serving 5 ports and offers up to 20 departures a day. The company transports an average of nearly 700,000 passengers and over 300,000 cargo units annually. The company has made a bold move in the ferry industry by adopting a modern fleet policy emphasizing innovative technologies that benefit the environment and its customers. TT-Line has received numerous awards for its environmental commitment and promoting innovation in the transportation industry (TT-Line 2014).

Brittany Ferry

Brittany Ferries is a French transport company that operates passenger and cargo services in Great Britain, France, Ireland, and Spain. Brittany Ferry's route network services 11 ports with a fleet of 10 vessels, including fast ferries, classic cruise ferries, and one cargo ship. Brittany Ferries offers a wide range of vessel types and sizes. There is one fast ferry in the fleet with capacity for 850 passengers and 235 vehicles. There are seven classic cruise ferries with passenger capacities ranging from 1,200 to 2,400 people and vehicle capacities ranging from 410 to 800 vehicles. The cargo vessel is the newest member of the Brittany fleet and can handle a wide range of cargo types and up to 230 passengers (Brittany Ferries 2014).

P&O Ferries

P&O ferries, originally called the Peninsular and Oriental Steam Navigation Company, currently operates 6 routes between the United Kingdom to Ireland and continental Europe. With a fleet of 15 ships, P&O Ferries transports over 9 million passengers, 1.5 million cars and 2 million trucks each year. P&O can trace its operations back as far as 1837.

It also should be noted that Washington State Ferries as well as other U.S. ferry systems are not included in the comparative analysis, but are included Section 3's discussion of fare policies. The route distances and frequency of service provided by the Washington State Ferries as well as other U.S. ferry systems are structurally different from AMHS and do not lend themselves to a comparison based on the measures used in the following sections.

2.2 Passenger Tariffs

The study team collected current rates for comparable ferry systems and routes to assess how passenger tariffs have changed over the past six years, since the 2008 Rate Study. Sample tariffs were collected during both peak (high) and off-peak (low) seasons to illustrate the average range in tariff prices. It should be noted that many of the ferry systems assessed in this comparison use pricing models similar to most major airlines, with prices fluctuating depending on the reservation date relative to the sailing date, the demand for passenger tariffs on that specific sailing date, and the time of year. This pricing model is significantly different from the model currently used by AMHS and the study team does not think it would be appropriate for AMHS to adopt this travel demand management model at this time. If AMHS were to adopt a formulaic approach, this may be a useful system for AMHS to consider; however, making the switch from the current static tariff system to a very fluid system would be a shock to current customers and could have a negative impact on ridership. The study team used similar dates and lead times as the data collected in 2008 for the 2014 data, but there are external factors that may have influenced tariff prices that the study team is unable to control. For this reason there may be some variation between the 2008 and 2014 data collected, since it is unlikely that the same demand is present.

The average tariff prices per nautical mile displayed in Table 1, below, show that the majority of the ferry systems analyzed in the 2008 Rate Study have raised their passenger tariffs per nautical mile over the past six years, whereas AMHS passenger tariffs have remained constant over the same period. Hurtigruten, which operates ferry routes most similar to AMHS's, increased its passenger tariff by an average of about 30 percent. It should be noted that the study team was only able to collect data for passenger tariffs on the Hurtigruten routes that do not require passengers to purchase a cabin tariff as well. It should be noted that DFDS Seaways is excluded from this comparison because it requires customers to purchase a cabin and does not have a passenger-only tariff option on the routes used for this analysis.

Table 1. Passenger Tariff Comparison

	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High (%)	Average per NM-Low (%)
BC Ferries						
1 to 50 Miles	6.91		9.00		30	
51 to 100 Miles	0.27	0.24	0.35	0.30	29	26
101 to 300 Miles	0.77	0.38	1.07	0.42	39	9
Average	1.80	0.29	2.37	0.34	32	19
Brittany Ferries						
51 to 100 Miles	1.61	0.91	0.65	0.49	-59	-47
Hurtigruten						
1 to 50 Miles	1.37	0.96	1.59	1.31	16	37
51 to 100 Miles	1.32	0.93	1.34	1.12	2	20
101 to 300 Miles	1.24	0.80	1.30	0.73	5	-9
301 to 500 Miles	0.90	0.63	1.34	0.77	50	23
501-plus Miles	0.82	0.57	1.38	0.85	68	48
Average	1.09	0.76	1.42	0.99	30	31
Irish Ferries						
51 to 100 Miles	0.83	0.83	0.68	0.68	-18	-18
Marine Atlantic						
51 to 100 Miles	0.31	0.31	0.45	0.44	46	42
101 to 300 Miles	0.30	0.30	0.41	0.40	38	34
Average	0.30	0.30	0.43	0.42	42	38
Moby						
1 to 50 Miles	1.06	0.78	1.48	1.08	40	37
51 to 100 Miles	0.95	0.58	1.40	0.61	47	6
101 to 300 Miles	0.56	0.29	0.60	0.34	7	19
Average	0.69	0.40	0.84	0.48	22	22
P&O						
51 to 100 Miles	2.01	2.01	0.67	0.67	-67	-67
Stena Lines						
1 to 50 Miles	0.89		0.72	0.47	-19	
51 to 100 Miles	0.87		0.78	0.77	-10	
101 to 300 Miles	0.41		0.37	0.32	-8	
Average	0.64		0.57	0.51	-11	
TT-Line						
51 to 100 Miles	0.55	0.55	0.40	0.40	-28	-28
Viking Lines	0.20	0.18	0.75	0.23	268	26
51 to 100 Miles	0.20	0.18	0.75	0.23	268	26
Grand Total	1.06	0.73	1.30	0.88	22	21

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Table 2 uses the same data set that was used to render Table 1, but displays the average passenger tariff per nautical mile by distance category across all carriers. With the exception of the 51 to 100 mile category and the low average for the 101 to 300 mile category, the average passenger tariff per nautical mile has increased in every distance category since 2008. The largest average increase can be seen in the longer distance categories (301 to 500 miles and 501-plus miles).

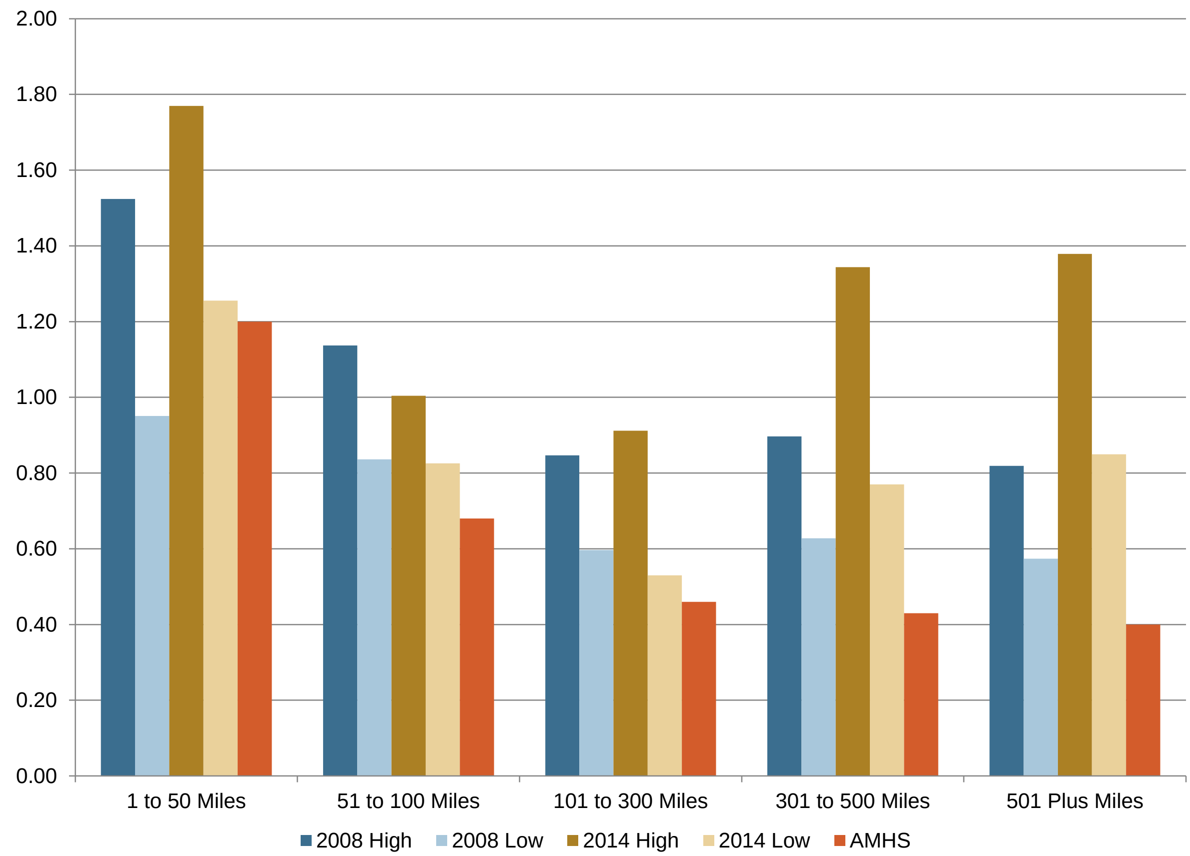
Table 2. Comparable Ferry Systems—Passenger Tariffs 2008–2014

	2008		2014		% Change	
Distance Category	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High (%)	Average per NM-Low (%)
1 to 50 Miles	1.52	0.95	1.77	1.26	16	32
51 to 100 Miles	1.14	0.84	1.00	0.83	-12	-1
101 to 300 Miles	0.85	0.60	0.91	0.53	8	-11
301 to 500 Miles	0.90	0.63	1.34	0.77	50	23
501-plus Miles	0.82	0.57	1.38	0.85	68	48
Total	**1.06**	**0.73**	**1.30**	**0.88**	**22**	**21**

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

When compared to comparable ferry systems, AMHS's tariffs have remained consistently lower than even the low range of tariffs per nautical mile. Figure 1 displays the average passenger tariff per nautical mile of the 10 comparable ferry systems analyzed in this study by distance category, as well as AMHS's average passenger tariff per nautical mile in each distance category. This figure looks at both the trends in passenger tariffs within the 10 comparable systems, as well as the average passenger tariff per nautical mile in relation to the average tariff rate charge by AMHS.

Figure 1. Average Tariff per Nautical Mile—Passenger Tariffs



Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

In each of the five distance categories displayed in Figure 1, AMHS's average passenger tariff per nautical mile is less than the low (off-peak) average of the comparable systems in 2014. In 2008, AMHS's average passenger tariff per nautical mile was lower than the low average passenger tariff per nautical mile in each distance category with the exception of the 1 to 50 mile category, but with the increasing trend in average passenger tariff prices over the past 6 years, AMHS has dropped below the average of the comparable systems in this category as well.

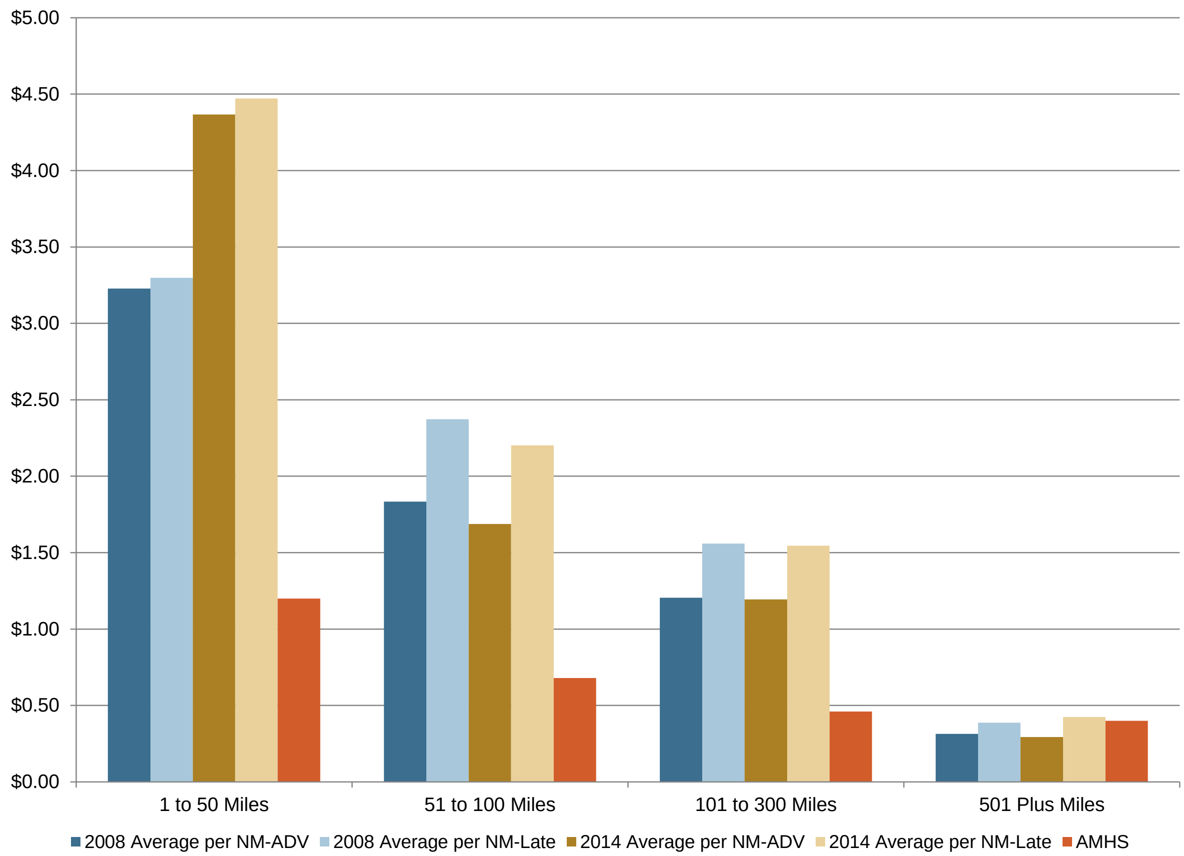
Figure 1 also illustrates the relationship between the tariff per nautical mile and the distance of the route. As routes increase from 1 to 100 miles, there is a downward trend in average tariff per nautical mile, but as routes increase from 101 to 501-plus miles, there is an upward trend. This u-shaped trend accurately reflects the costs associated with operating routes of various distances. Up to a certain point, around 101 to 300 miles, the costs associated with operating a route increase at a lesser rate than the route distances increase, causing the average tariff per nautical mile to decrease as route distances increase. Beyond 300 miles, the cost to operate these longer routes starts to increase at a greater rate than the increasing distance, causing the average cost per nautical mile to increase. The differing costs to operate routes of various distances are reflected in the average tariff per nautical mile.

Figure 2 displays the average price per nautical mile for an advanced purchase airline ticket (2 months), a last minute (same week) purchase airline ticket, and AMHS's passenger tariff. The study team gathered quotes from six passenger airlines serving Alaska to calculate the averages:

- Alaska Airlines
- Wings of Alaska
- Grant Aviation
- Era Aviation
- Homer Air
- Smokey Bay Air Taxi

When compared to regional passenger airline fares, AMHS's average tariff per nautical mile is still significantly lower on routes in each of the distance categories analyzed, with the exception of the 501-plus mile category. This price difference is most pronounced when comparing routes that are between 1 and 50 miles in distance. Some notable trends in passenger airline fares over the past six years are a 35 percent increase in ticket prices for both advanced and late purchases on routes between 1 and 50 miles, and a very slight decrease (between 1 percent and 9 percent) in the price for both advanced and late purchased airline tickets for routes longer than 51 miles. This figure also suggests that fixed costs, like airport landing fees and terminal leases, have a large impact on the average price per mile. On longer flights, these fixed costs can be distributed over a larger number of miles, resulting in airlines paying a lower average cost per mile for flights in the 501-plus mile category. This cost savings is reflected in the average price per mile of longer flights being lower than flights with shorter distances.

Figure 2. Airfare Comparison



Source: Developed by Northern Economics, Inc. based on data from multiple service providers

In evaluating the disparities between the average costs per nautical mile via ferry versus air travel, it may also be important to consider some additional costs for travelers who travel via ferry (in additional time). For example, a one-way ferry transit from Bellingham to Juneau on 25 April 2014 would cost $326.00, but it would also require (for many travelers) the purchase of an inside stateroom for three-night accommodations, at $308.00, effectively doubling the cost. Meals would also have to be included. By contrast, an Alaska Airlines advance purchase of a one-way ticket is the most economical tariff for travel on the same day at $243.70 plus tax and fees. For these reasons, AMHS should keep passenger tariffs low relative to air travel due to the value of time and other expenses associated with travel. The decision to travel on AMHS instead of an alternative form of transportation such as air is not only a function of cost but is also dependent upon the services desired by the customer. Each mode of transportation offers a unique set of services and these inform purchasing decisions more than simply price alone.

2.3 Cabin Tariffs

Using the same comparable ferry systems and five distance categories, the study team compared current inside cabin tariffs to the quotes originally collected for the 2008 Rate Analysis. Table 3 displays high and low averages for inside cabin tariffs that were collected in 2008 as well as the updated high and low averages collected in 2014 and the percent change between the two.

P&O Ferries is excluded in this comparison because it does not offer comparable inside cabins on the routes used in this analysis.

Table 3. Inside Cabin Tariff Comparison

	Inside Cabin Tariff- 2 Berth					
	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High (%)	Average per NM-Low (%)
BC Ferries						
51 to 100 Miles	0.65		0.81	0.75	24	
101 to 300 Miles			0.33	0.31		
Average	0.65		0.57	0.53	-13	
Brittany Ferries						
51 to 100 Miles	0.89	0.62	1.22	1.04	37	69
DFDS Seaways						
101 to 300 Miles	0.89	0.53	0.79	0.58	-11	9
301 to 500 Miles			0.78	0.65		
Average	0.89	0.53	0.79	0.60	-12	14
Hurtigruten						
1 to 50 Miles	1.95	1.00	6.42	3.29	230	231
51 to 100 Miles	1.10	0.56	3.84	1.96	248	246
101 to 300 Miles	0.52	0.27	1.67	0.86	222	224
301 to 500 Miles	0.44	0.23	1.38	0.74	213	227
500 Plus Miles	0.39	0.20	1.37	0.79	249	295
Average	0.63	0.32	2.14	1.15	239	256
Irish Ferries						
51 to 100 Miles	0.97	0.88	0.60	0.60	-37	-32
Marine Atlantic						
51 to 100 Miles	1.30	0.65	0.54	0.54	-58	-17
101 to 300 Miles			0.61	0.61		
Average	1.30	0.65	0.58	0.58	-56	-12
Moby						
51 to 100 Miles	0.75	0.38	0.68	0.45	-10	20
101 to 300 Miles	0.44	0.22	0.71	0.30	62	37
Average	0.60	0.30	0.70	0.33	18	9
Stena Lines						
101 to 300 Miles	0.79	0.75	0.44	0.44	-44	-40
TT-Line						
51 to 100 Miles	0.80	0.52	0.70	0.70	-13	35
Viking Lines						
51 to 100 Miles	1.18	0.44	2.31	2.38	95	436
Grand Total	0.67	0.36	1.84	1.03	175	188

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

The Hurtigruten ferry system appears to have changed its reservation system since the data from the 2008 Rate Study were collected, combining passenger tariffs into cabin tariffs on routes that require passengers to purchase cabins. This differs from AMHS and other comparable systems that do not require that passengers to purchase cabins on their longer routes. The study team does not think that the Hurtigruten cabin data collected (highlighted in Table 3) are suitable for comparison. For this reason the Hurtigruten data (both 2008 and 2014) have been omitted from the data set used to create Table 4 and Figure 3.

Over the past six years, the average tariff per nautical mile has increased for inside cabins on shorter distance routes (51 to 100 miles), and decreased on longer routes (101 to 300 miles). It should be noted that not all of the five distance categories are represented in Table 4 due to the absence of inside cabin tariffs on shorter routes (1 to 50 miles) and the omission of Hurtigruten's inside cabin tariffs.

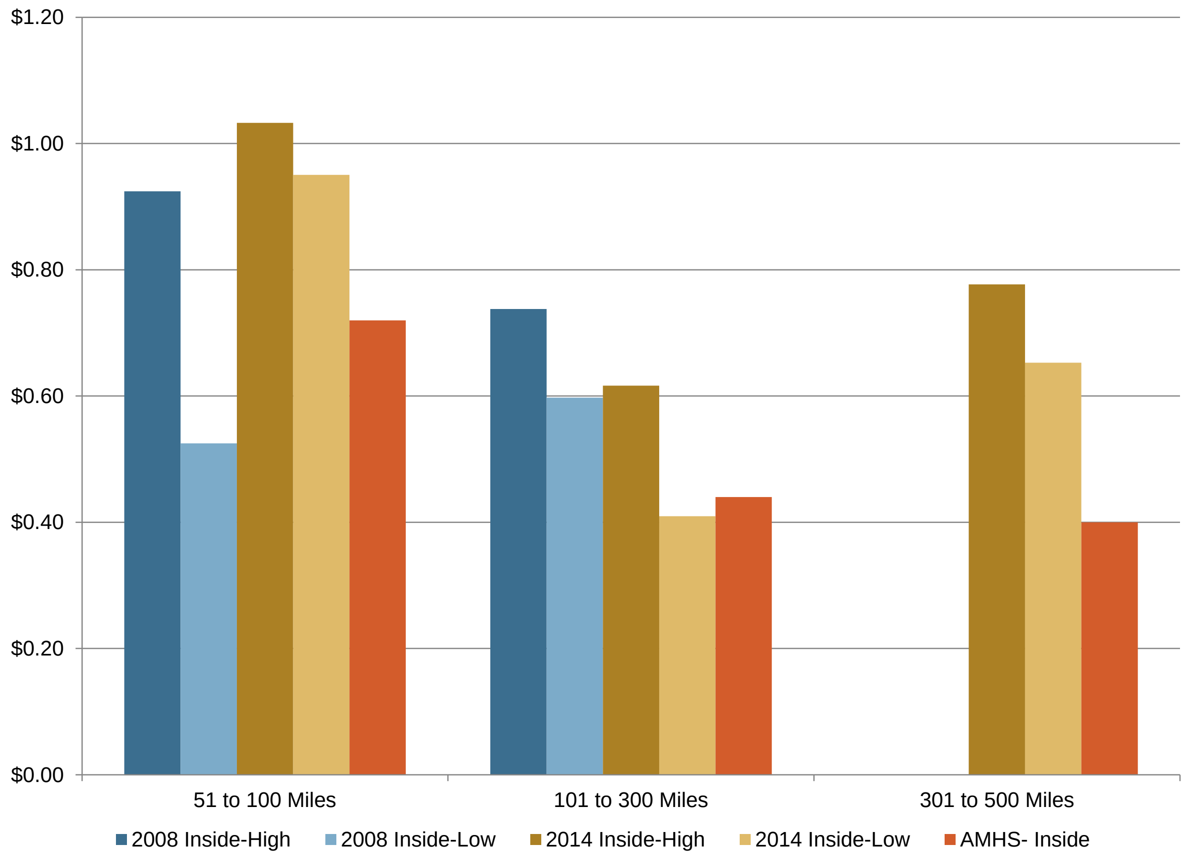
Table 4. Comparable Ferry Systems—Inside Cabin Tariffs 2008-2014

	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High(%)	Average per NM-Low (%)
51 to 100 Miles	0.92	0.52	1.03	0.95	12	81
101 to 300 Miles	0.74	0.60	0.62	0.41	-16	-31
301 to 500 Miles			0.78	0.65		

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

When compared to the average inside cabin tariff per nautical mile of nine comparable ferry systems in both 2008 and 2014, AMHS's average inside tariff per nautical mile is lower than both the high and low averages in two of the three distance categories assessed and falls in between the high and low averages in the remaining category (101 to 300 miles). Figure 3 displays this difference in cabin tariffs. By keeping its tariffs constant over the past six years, AMHS has fallen even further below the average inside cabin tariffs charged by comparable systems, which have been steadily increasing.

Figure 3. Average Tariff per Nautical Mile—Inside Cabin Tariffs



Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Similar to Table 3, Table 5 compares the average outside cabin tariff per nautical mile charged by comparable ferry systems in 2008 to those charged by the same ferry systems in 2014. As mentioned previously, the Hurtigruten ferry system appears to have changed its reservation system (highlighted below) and the study team does not believe these data to be suitable for comparison. P&O Ferries is not included in this comparison because it does not offer comparable outside cabin tariffs on the routes used in this analysis.

Table 5. Outside Cabin Tariff Comparison

	Outside Cabin Fare—2 Berth					
	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High (%)	Average per NM-Low (%)
BC Ferries						
51 to 100 Miles			0.86	0.97		
101 to 300 Miles			0.44	0.35		
Average			0.65	0.66		
Brittany Ferries						
51 to 100 Miles	1.05	0.74	1.35	1.19	29	61
DFDS Seaways						
101 to 300 Miles	1.15	0.81	1.22	0.83	6	3
301 to 500 Miles	1.39	0.96	0.90	0.78	-35	-19
Average	1.27	0.89	1.12	0.81	-12	-8
Hurtigruten						
1 to 50 Miles	2.04	1.13	7.73	3.88	280	243
51 to 100 Miles	1.16	0.64	4.61	2.29	299	256
101 to 300 Miles	0.54	0.30	2.01	1.00	268	231
301 to 500 Miles	0.46	0.26	1.65	0.86	257	234
500 Plus Miles	0.41	0.23	1.61	0.91	292	299
Average	0.66	0.37	2.55	1.33	286	263
Irish Ferries						
51 to 100 Miles	1.43	1.34	0.95	0.95	-34	-30
Marine Atlantic						
51 to 100 Miles	1.30	0.65	1.28	1.28	-1	95
101 to 300 Miles	0.61	0.61	0.61	0.61	1	1
Average	0.95	0.63	0.95	0.95	-1	50
Moby						
51 to 100 Miles	0.75	0.38	0.67	0.46	-11	22
101 to 300 Miles	0.44	0.22	0.71	0.30	62	37
Average	0.60	0.30	0.70	0.33	18	10
Stena Lines						
101 to 300 Miles	0.95	0.91	0.52	0.52	-45	-43
TT-Line						
51 to 100 Miles	0.87	0.52	0.70	0.70	-20	35
Viking Lines						
51 to 100 Miles	2.14	0.81	4.56	2.89	113	256
Grand Total	0.73	0.43	2.20	1.21	203	180

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Similar to the result of the inside cabin tariff comparison, the average outside cabin tariffs per nautical mile have increased on shorter distance routes (51 to 100 miles) and decreased on longer distance routes (101 to 500 miles). Only three out of the five distance categories are displayed in Table 6 due to the availability of outside cabin tariffs offered by comparable systems and the omission of the Hurtigruten ferry system data.

As with Table 4 and Figure 3 above, the Hurtigruten data highlighted in Table 5 have been omitted from the data set used to make Table 6 and Figure 4 (on the following page).

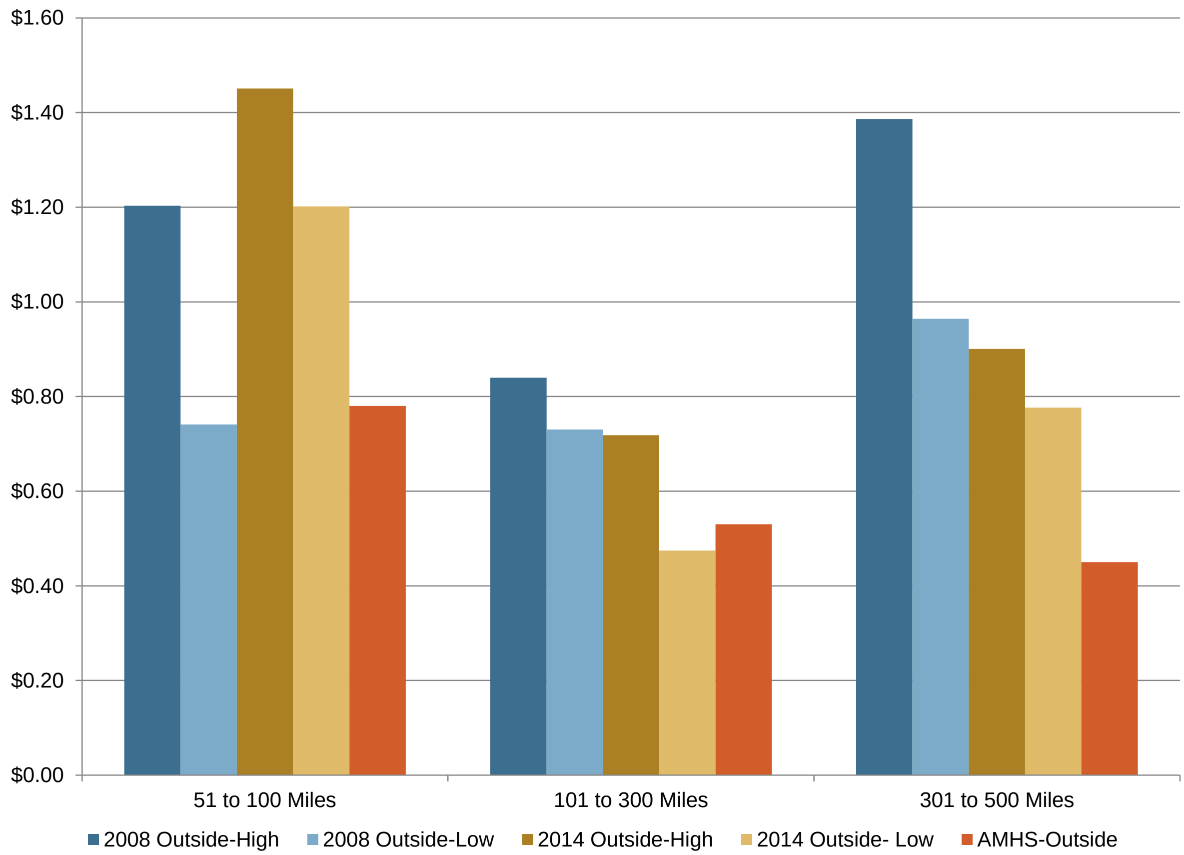
Table 6. Comparable Ferry Systems—Outside Cabin Tariffs 2008-2014

	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High(%)	Average per NM-Low (%)
51 to 100 Miles	1.20	0.74	1.45	1.20	21	62
101 to 300 Miles	0.84	0.73	0.72	0.47	-14	-35
301 to 500 Miles	1.39	0.96	0.90	0.78	-35	-19

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Figure 4 displays the high and low average outside cabin tariff per nautical mile in 2008 (blue) and 2014 (gold) for nine comparable ferry systems (Hurtigruten and P&O Ferries excluded), as well as the average outside cabin tariff per nautical mile charged by AMHS (orange). In the 50 to 100 mile distance category, the average outside cabin tariff per nautical mile has increased, but the average tariffs on routes in the 100 to 300 mile distance category and the 301 to 500 mile category have decreased. The average outside cabin tariff per nautical mile charged by AMHS is still lower than the average per nautical mile tariff for comparable ferry systems in each distance category, even though the average outside cabin tariffs of comparable ferry systems have seen decreases.

Figure 4. Average Tariff per Nautical Mile—Outside Cabin Tariffs



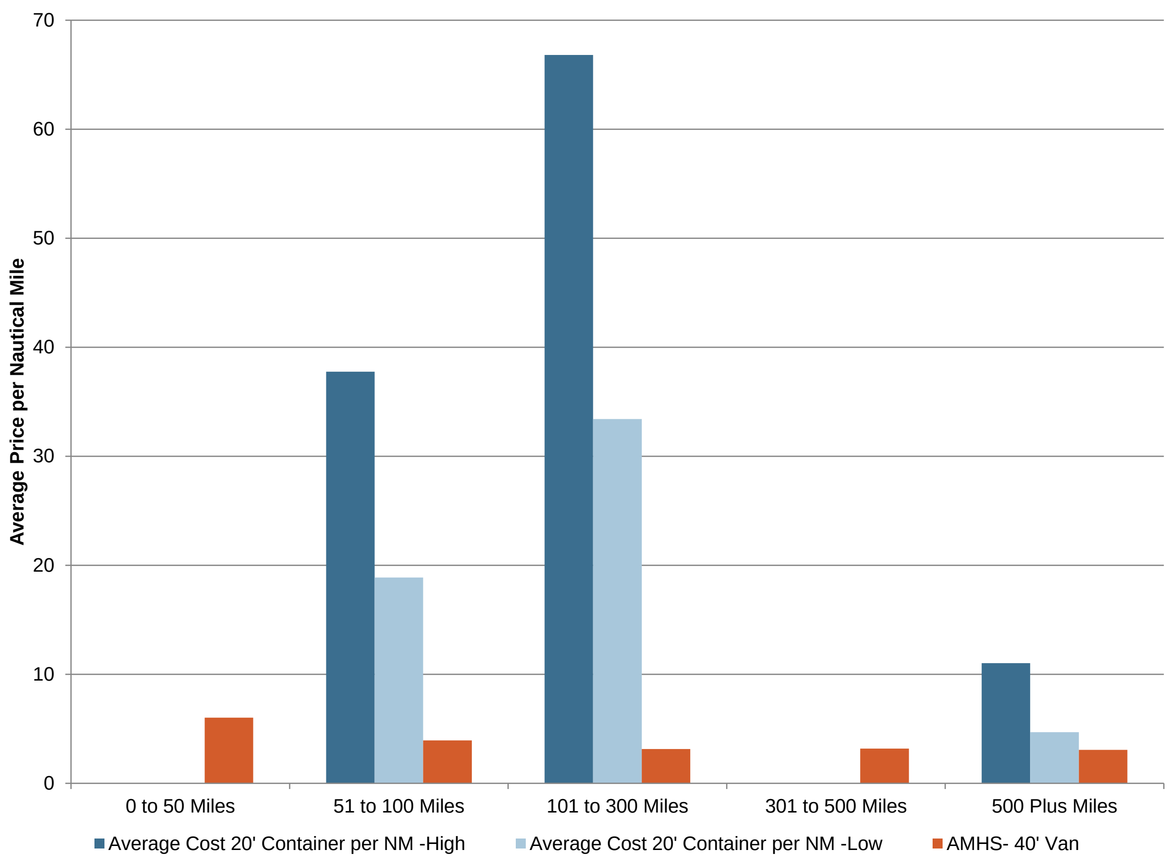
Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

2.4 Car Deck

Compared to the alternative maritime cargo shipping options in the region, the van tariffs offered by AMHS on average are much less expensive. Figure 5 displays the high and low average cost per nautical mile for alternative maritime shipping methods in the region as well as the average van tariff per nautical mile charged by AMHS. Quotes collected from Alaska Marine Lines, Lynden, and Northland Services were used to calculate the average cost per nautical mile for the shipping alternatives.

Alternative freight and cargo rates have increased significantly over the past 6 years; in some cases the price per nautical mile increased as much as 236 percent. The study team collected quotes from the same shipping companies, and used the same units of measurement as the 2008 Rate Study. The quotes collected from regional shippers were for a standard 20-foot container of "non-perishable household goods" weighing 10,000 to 20,000 pounds (the minimum weight required by most shippers). A standard shipping container is 20ft x 8ft x 8ft, whereas AMHS's van tariff allows for vans/containers up to 40ft x 8ft x 8ft. It also should be noted that freight carriers primarily base their rates on the weight and the dimensions of a container, whereas AMHS only has dimensional restrictions. The high and low values displayed in Figure 5 show the difference in price depending upon the weight of the container. The "low" value is the average price per nautical mile for containers weighing 10,000 pounds and the "high" value is the average price per nautical mile for containers weighing 20,000 pounds.

Figure 5. Cargo/Marine Freight Comparison



Source: Developed by Northern Economics, Inc. based on data from multiple service providers

It also should be noted that many of the systems analyzed in this comparison use different criteria and categories for vehicles, so the study team used the tariff category that was most comparable to AMHS's "up to 19 feet" in length category. It also should be noted that many of the comparable systems analyzed in this study charge different tariffs for their commercial and public customers, and commercial tariffs are almost always higher than the tariffs charged to the traveling public.

Table 7 displays the criteria used by some of the comparable systems to set both passenger and commercial vehicle tariffs. AMHS does not make the distinction between commercial and public vehicles and the data collected for the following tables are the tariffs that would be charged to the traveling public.

Table 7. Comparable Systems' Vehicle Tariff Criteria

Ferry System	Passenger Vehicles	Commercial Vehicles	Comparison
BC Ferries	Fixed fares up to 20ft and per foot variable for each additional foot	Cost per foot (same as variable rate applied to passenger fares over 20ft)	Commercial fares for a 20ft vehicle would be over double the cost of a 20ft passenger vehicle
Brittany Ferries	Fares are based on length and height of vehicle	Fare based on length, height, and width of vehicle	Rates of commercial vehicles are higher and the addition of a third size restriction increases the number of rate categories
Irish Ferries	Fares based on vehicle category (car, motorbike, camper, etc.) with length and height restrictions	Fares based on length (by meters)	Commercial rates are higher than rates for comparably sized passenger vehicles
Marine Atlantic	Fares based on vehicle category (auto, auto long, motorbike, van…etc.) with length restrictions	Fares based on vehicle length categories with additional charges for handling (load & unload), accompanying driver, and dangerous goods	Commercial fares are typically higher than passenger fares especially if any additional fees apply.
P&O Ferries	Fares based on vehicle categories with height and length restrictions	Rates based on length and height of vehicle. Driver accommodation are offered at a discounted rate	Commercial fares are higher, but they offer designated driver cabins and meal service at a discounted rate.
Viking Line	Fares based on vehicle categories with height and length restrictions	Fares based on weight plus addition fixed fees for dangerous materials, handling, etc.	Commercial fares are typically higher than comparable passenger vehicles.

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Table 8, on the following page, displays high and low average tariffs per nautical mile for vehicles that are less than 19ft in length for 11 comparable ferry systems. The majority of comparable ferry systems have increased their average tariff per nautical mile for passenger vehicles slightly since 2008, with an average across all systems and distances between 7 and 10 percent. This trend is not as pronounced as the increasing trend in passenger tariffs discussed in the previous section, and some of the comparable ferry systems have slightly decreased passenger vehicle tariffs over the past six years.

Table 8. Vehicle Tariff Comparison

	2008		2014		% Change	
	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High ($)	Average per NM-Low ($)	Average per NM-High (%)	Average per NM-Low (%)
BC Ferries						
51 to 100 Miles	0.95	0.85	1.20	1.05	26	24
101 to 300 Miles	1.12	1.12	1.84	1.69	65	51
Average	1.04	0.85	1.52	1.37	47	62
Brittany Ferries						
51 to 100 Miles	3.71	2.42	3.56	1.96	-4	-19
DFDS Seaways						
101 to 300 Miles	0.41	0.33	0.54	0.44	33	34
301 to 500 Miles	0.41	0.47	0.64	0.61	57	30
Average	0.41	0.40	0.57	0.50	41	25
Hurtigruten						
1 to 50 Miles	2.34	2.34	2.75	2.75	17	17
51 to 100 Miles	0.98	0.98	1.10	1.10	12	12
101 to 300 Miles	0.55	0.55	0.61	0.61	12	12
301 to 500 Miles	0.42	0.42	0.42	0.42	-1	-1
501-plus Miles	0.38	0.38	0.35	0.35	-7	-7
Average	1.01	1.01	1.13	1.13	12	12
Irish Ferries	2.68	1.97	3.05	2.49	14	27
51 to 100 Miles	2.68	1.97	3.05	2.49	14	27
Marine Atlantic						
51 to 100 Miles	0.88	0.88	1.14	1.14	30	30
101 to 300 Miles	0.62	0.62	0.81	0.81	30	30
Average	0.75	0.75	0.97	0.97	30	30
Moby						
51 to 100 Miles	3.16	1.55	2.12	0.83	-33	-46
101 to 300 Miles	1.51	0.74	1.26	0.69	-16	-7
Average	2.06	1.01	1.80	1.00	-13	-1
P & O Ferries						
51 to 100 Miles	2.56	2.56	3.31	2.71	29	6
Stena Lines						
1 to 50 Miles	3.72	1.35	2.57	1.63	-31	21
51 to 100 Miles	4.14	1.59	3.59	2.20	-13	38
101 to 300 Miles	1.46	0.77	1.26	0.69	-14	-9
Average	2.72	1.13	2.30	1.38	-16	22
TT-Line						
51 to 100 Miles	2.22	1.94	3.41	0.81	54	-58
Viking Lines						
51 to 100 Miles	1.26	0.61	1.10	0.95	-13	55
Grand Total	1.28	1.08	1.37	1.18	7	10

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Comparable ferry systems have increased average passenger vehicle tariffs per nautical mile since 2008 in each of the distance categories seen in Table 9 with the exception of the 501-plus miles category, which had an average decrease of seven percent. The average vehicle tariff per nautical mile on shorter routes appears to have increased more than the average vehicle tariff per nautical mile on longer routes.

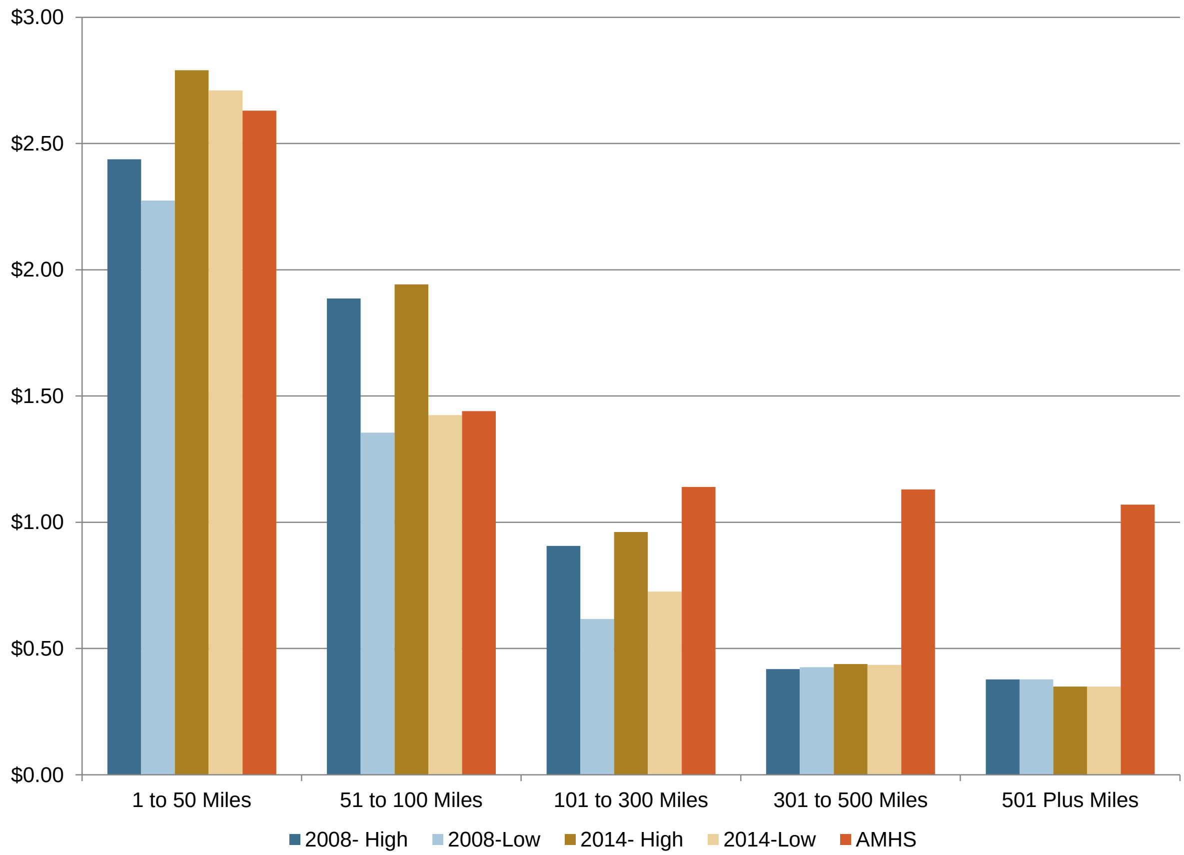
Table 9. Comparable Ferry Systems- Vehicle Tariffs 2008-2014

	2008		2014		% Change	
Distance Category	**Average per NM-High ($)**	**Average per NM-Low ($)**	**Average per NM-High ($)**	**Average per NM-Low ($)**	**Average per NM-High (%)**	**Average per NM-Low (%)**
1 to 50 Miles	2.44	2.27	2.79	2.71	14	19
51 to 100 Miles	1.89	1.36	1.94	1.42	3	5
101 to 300 Miles	0.91	0.62	0.96	0.73	6	18
301 to 500 Miles	0.42	0.43	0.44	0.43	5	2
501-plus Miles	0.38	0.38	0.35	0.35	-7	-7
Total	**1.28**	**1.08**	**1.37**	**1.18**	**7**	**10**

Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

Figure 6 displays the high and low average vehicle tariff per nautical mile for the 11 comparable ferry systems analyzed in this study for 2008 and 2014, as well as AMHS's average vehicle tariff per nautical mile, which has remained constant during this time period. For route distances less than 100 miles, AMHS's average vehicle tariff per nautical mile is relatively close to the low average tariff per nautical mile charged by comparable systems. For routes longer than 101 miles, AMHS's vehicle tariffs per nautical mile are higher than the other ferry systems used in this comparison.

Figure 6. Average Tariff per Nautical Mile—Vehicle Tariffs



Source: Developed by Northern Economics, Inc. based on data from multiple ferry lines

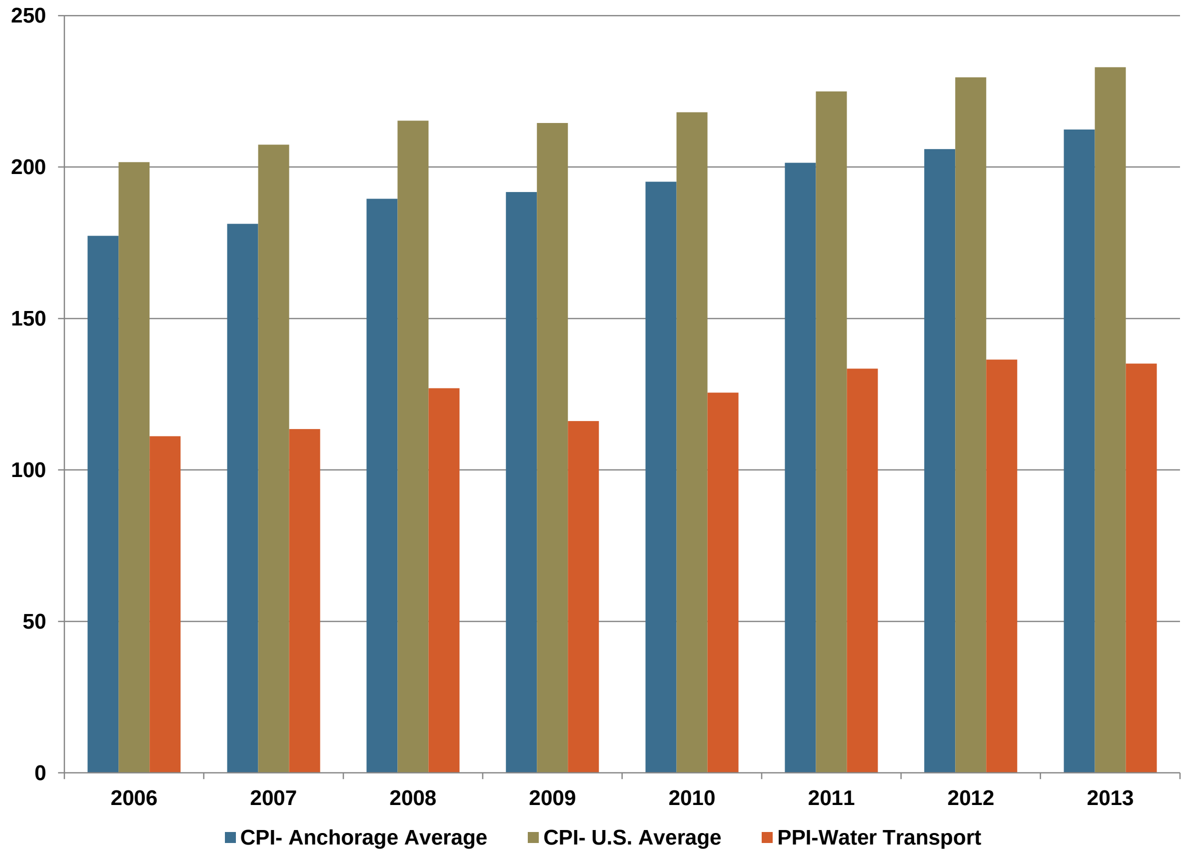
Unlike many of the comparable ferry systems analyzed in this section, many of the communities serviced by AMHS are not located on the road system, and car deck space is often the first thing that fills up on AMHS ferries. It also should be noted that some of the comparable ferry systems used in this analysis have shifted their focus to capture a larger segment of the tourism market, which tends to use the car deck less often than commuters and cargo-based travel in most places.

2.5 Tariff Rates Compared to Inflation and Other Measures

AMHS has kept tariffs static since its last increase of 3.2 percent in 2007. Since 2007, the United States has experienced an average annual inflation rate of about 2.08 percent. This essentially means that by keeping tariff prices constant over the last six years, tariffs are now worth less than they were in 2007. For example, if adjusted for inflation, the $107 tariff charged on the route from Juneau to Ketchikan in 2007 would be $120.22 today.

Economic indicators commonly used to look at the variation of prices in a marketplace are the consumer price index (CPI) and producer price index (PPI). The CPI is a measure of the average change in prices paid by consumers for a market basket of consumer goods and services, and the PPI is a measure of the selling price received by producers of goods and services. Figure 7 illustrates the increasing trends in the CPI, both at a national and city level, as well as the increasing trend in PPI for water transport services. Since the last tariff increase was implemented in 2007, the average annual CPI for the United States has increased by 12 percent and the average annual PPI for marine transport services following a similar trend has increased by 19 percent.

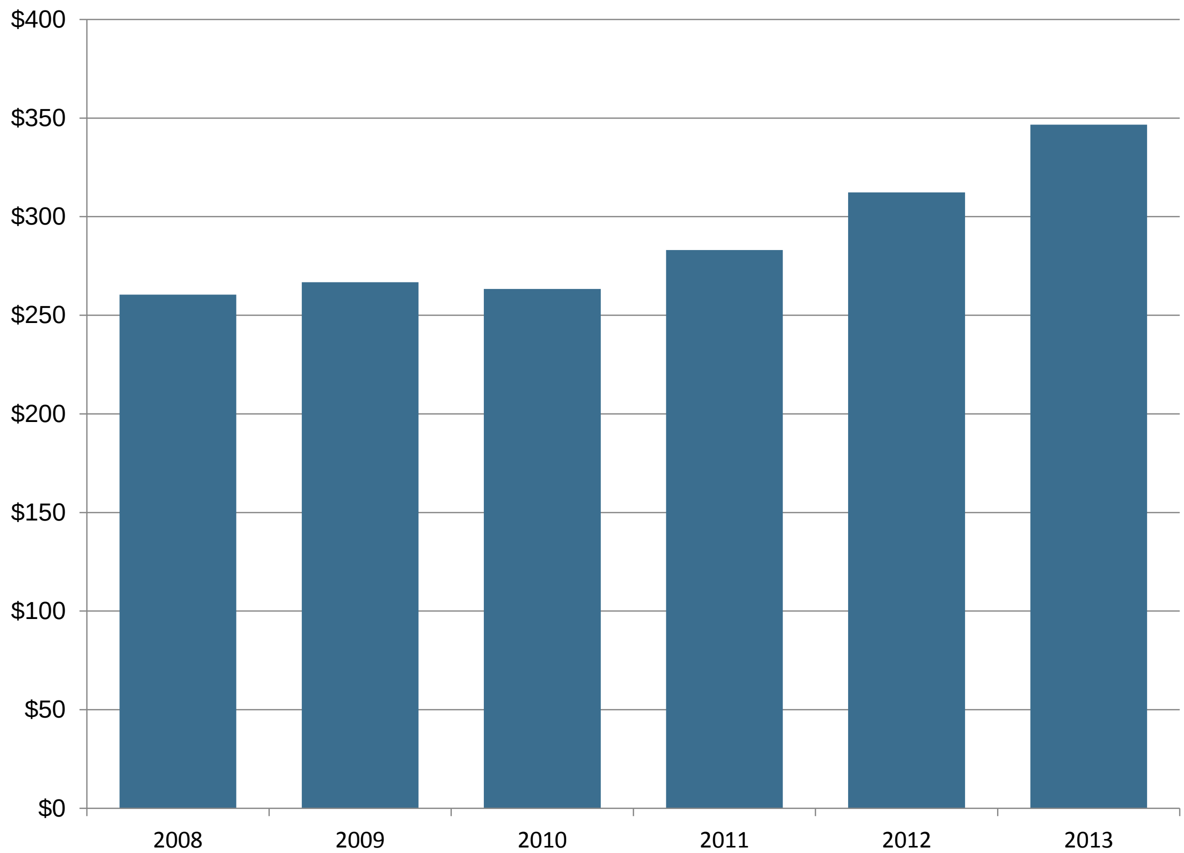
Figure 7. CPI and PPI Trends



Source: United States Dept. of Labor: Bureau of Labor Statistics, 2014

Along with industry and regional trends, it is also important to look at the trends AMHS has experienced over the past six years. Figure 8 displays the average operating expenditure per nautical mile for the past six years. These data points were calculated by dividing the total annual operating expenditures that are published in AMHS's annual financial report by the total number of vessel miles reported in AMHS's annual traffic volume report. Since 2008, the average operating expenditure per nautical mile has increased by 33 percent. This increase in average operating expenditure per nautical mile can be attributed to a decreasing trend in total vessel miles per year due to reduced funding and increasing annual operating expenditures, primarily due to older vessels that need to spend more time out of service.

Figure 8. AMHS Average Operating Expenditure per Nautical Mile



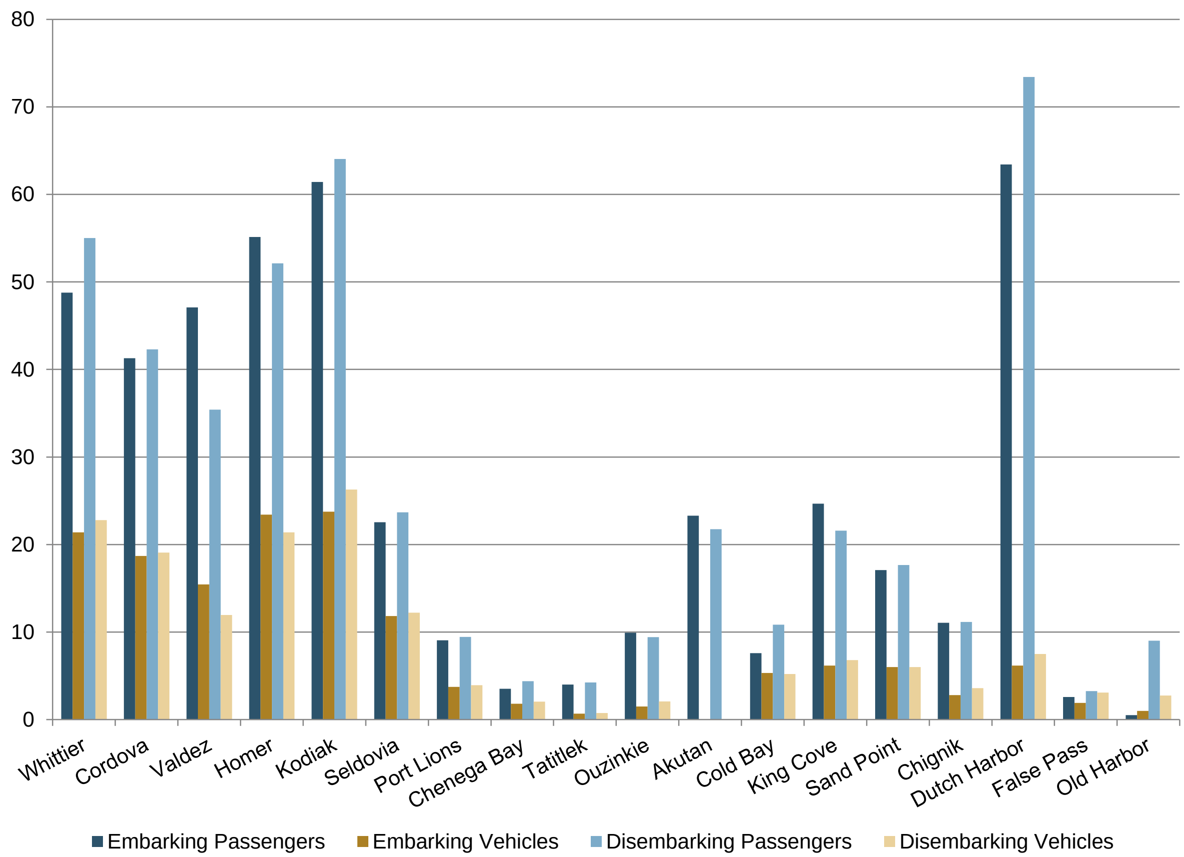
Source: Developed by Northern Economics, Inc. based on data from AMHS

2.6 Demand

The demand for transportation is typically derived from the desire to consume non-transportation related products and services and engage in non-transportation related activities. Many transportation services, including AMHS, provide a critical link between education, work, recreation, healthcare and social/cultural activities. Many communities serviced by AMHS are not connected by road, and air transportation is the only alternative to the ferry services offered by AMHS.

Figure 9 displays the average number of embarking and disembarking passengers and vehicles per trip for each of the ports serviced by AMHS's Southwest routes in 2012.The majority of Southwest ports have a very similar average number of embarking and disembarking vehicles, but there are a couple of ports that have a notable imbalance in embarking and disembarking passengers. For example on average 12 more people embarked than disembarked in Valdez, and in Dutch Harbor on average 10 more people disembarked than embarked in 2012.

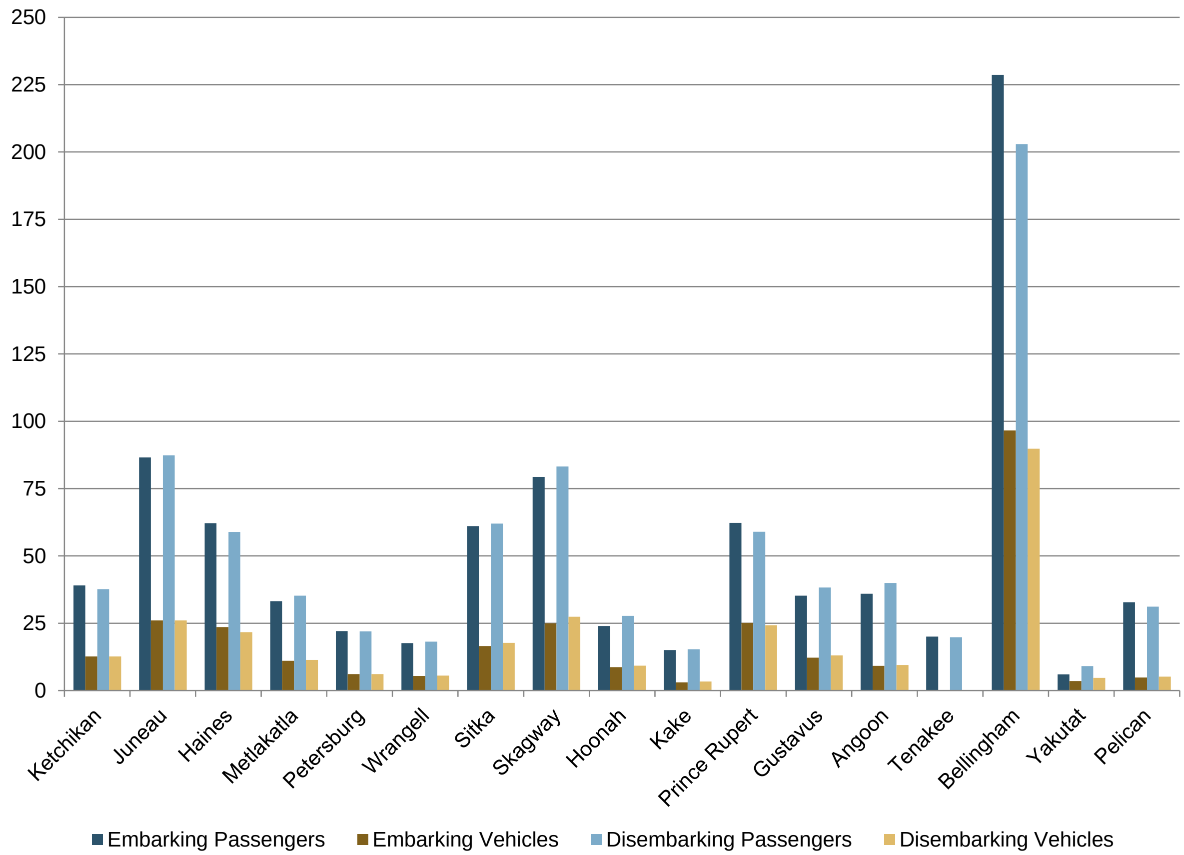
Figure 9. Average Passengers and Vehicles per Southwest Departure (2012)



Source: Developed by Northern Economics, Inc. based on data from AMHS

Figure 10 displays the average number of embarking and disembarking passengers and vehicles per trip for each of the ports serviced by AMHS's Southeast routes in 2012. Bellingham, by far, had the most embarking and disembarking passengers and vehicles per trip on average with an average of over 225 passengers per trip and about 95 vehicles per trip. It should be noted that some of these averages are influenced by available capacity; for example, Yakutat is part of a popular cross-gulf route and there is often a limited amount of space available for passengers and vehicles to embark and disembark at this port.

Figure 10. Average Passengers and Vehicles per Southeast Departure (2012)



Source: Developed by Northern Economics, Inc. based on data from AMHS

Both Figure 9 and Figure 10 allow us to look at the current average demand per trip at each port. It also gives us a snapshot of the average distribution between passengers and vehicles disembarking and embarking at each port.

A more detailed display of ridership and capacity for each AMHS link can be found in Appendix A. The full Annual Traffic Volume Report can be found online at http://www.dot.state.ak.us/amhs/reports.shtml. The link volume summaries look at the number of tariffs sold in relationship to the number of tariffs available. This allows for a comparison between the quantity available and the quantity demanded. In 2013 AMHS's Southeast routes carried 35.2 percent of their total passenger capacity and 64.7 percent of their total vehicle capacity. The Southwest routes carried 18.6 percent of their total passenger capacity and 57.3 percent of their total vehicle capacity, and the Cross Gulf routes carried 27.6 percent of their total passenger capacity and 88.2 percent of their total vehicle capacity.

It should be noted that the average passengers and vehicles displayed in Figure 9 and Figure 10 do not take into account the frequency of the trips to each community. The frequency of service impacts the average passenger and vehicle tariffs sold and changes from year to year.

2.7 Price Elasticity of Demand

Price elasticity is a measure of the relative response of consumers to changes in price. Demand is considered inelastic if a change in price results in a relatively smaller change in the quantity purchased. Demand is considered elastic if a change in price results in a relatively larger change in quantity purchased. If prices are increased and demands are inelastic, than revenues will increase. If prices are increased and demand is elastic, than revenues will decrease.

Transportation literature indicates that the demand for ferry services is typically inelastic (Pratt, 2004). The Long Range AMHS Business Plan prepared by Erickson & Associates in 1993 estimated the price elasticity of AMHS's existing system to be -0.69 for vehicles tariffs and -0.56 for passenger tariffs (Erickson & Associates 1993). These estimates mean that for every 1 percent increase in tariffs, there will be a 0.69 percent decrease in demand for vehicle tariffs and a 0.56 percent decrease in demand for passenger tariffs. Since the decrease in demand is estimated to be lower than the increase in price, Erickson & Associates predict an increase in revenues with an increase in tariffs.

A study prepared by InterVISTAS Consulting Inc. for the BC ferries in 2011 estimated the price elasticity of passenger tariffs to be between -0.12 and -0.56 (InterVISTAS Consulting Inc. 2011). These price elasticity estimates were tested against the changes in passenger tariffs between 2004 and 2011 and the corresponding changes in ridership. The results of this comparison further supported their estimates.

In 2013, the Alaska Department of Transportation and Public Facilities (ADOT&PF) contracted with HDR and Northern Economics, Inc. to develop the Supplemental Environmental Impact Statement of the Juneau Access Improvement Project. The elasticity study conducted for this project found that under the existing conditions, in general, passenger traffic on AMHS ferries appears to be relatively inelastic, the price responsiveness for cars and RVs appears to be closer to unitary elasticity (i.e. elasticity estimates around -1.0), and container van traffic is fairly elastic. It should be noted that this study did not look at the entire AMHS ferry system, but rather a small subset that fell within the Juneau Access Improvement Project's study area. Port pairs of different regions of the state may have very different price elasticity. A number of variables including available transportation alternatives and the different types of commerce that occur in each community will have an impact on the price elasticity in each of these tariff categories, so the study team does not recommend viewing the estimates below as typical for AMHS's entire system, but rather as a snapshot of a certain area served by AMHS.

Table 10 displays the estimated price elasticity for three AMHS port pairs that were analyzed in the Juneau Access Improvement Project. It should also be noted that because of the small number of data points involving individual port pairs for vans, the estimates were aggregated and a single elasticity estimate was developed.

Table 10. Price Elasticity Estimates for Internal Lynn Canal Travel by Fare Type and Port Group

Port Pairs	Passengers	Cars	RVs	Vans
Haines and Skagway	-0.355	-0.816	-0.050	-2.997
Juneau and Haines	-0.520	-1.284	-1.051	-2.997
Juneau and Skagway	-0.492	-1.336	-0.978	-2.997

Source: Northern Economics, Inc., 2013

To further demonstrate the impact of fare elasticity on passenger ridership, the study team constructed Table 11, which displays the estimated effect of a 10 percent and 20 percent price increase on passenger tariffs using the price elasticity estimates under the existing conditions developed for the Juneau Access Improvement Project. Since passenger fares are relatively inelastic, increasing passenger tariffs will most likely cause ridership to decrease, but at a relatively smaller rate. For example, if the passenger tariff between Juneau and Skagway were to increase by 1 percent, then the model predicts that the number of passengers will decrease by 0.492 percent.

Table 11. Actual Passengers in 2011 and Predicted Passengers with Fare Increases

			With 10% Fare Increase		With 20% Fare Increase	
Port Pairs	Passengers in 2011	Fare Elasticity Estimate	Predicted Passengers	Net Decrease	Predicted Passengers	Net Decrease
Haines and Skagway	13,747	-0.355	13,259	488	12,771	976
Juneau and Haines	42,173	-0.520	39,980	2,193	37,787	4,386
Juneau and Skagway	24,142	-0.492	22,954	1,188	21,766	2,376
Total Traffic and Average Elasticity	**80,062**	**-0.483**	**76,193**	**3,869**	**72,324**	**7,738**

Source: Northern Economics, Inc., 2013

Although there has not been a price elasticity study conducted in recent years specifically for AMHS, the studies mentioned above provide a look at broad industry trends and the possible impact of changes in tariff prices on ridership.

3 Fare Policies in the Transit Industry

3.1 Introduction and Overview

This section provides an overview of transit fare practices in the U.S. transit industry plus examples from Canada, as called for in the work plan for this study. The intent of this section is to provide information on the following:

- What is the current state of practice in the U.S. transit industry with regard to fare policy?
- What elements of current fare practice—fare formulas, fare instruments, funding mechanisms, fare setting policies, etc.—could provide useful information to AMHS either currently for setting a tariff structure or in the future for considering options for paying for operating costs?

Transit fares are an important source of revenue for transit agencies. In general, larger agencies get a higher percentage of their operating funds from fares than smaller agencies. As operating expenses increase or funding from government agencies decreases, transit operators will typically respond with some combination of: 1) raising fares, and 2) cutting service.

The following are several examples of increased costs or reduced public funding that have caused transit agencies to increase fares or reduce service:

- **Labor costs:** Labor costs have increased due to increasing wages or, more recently, increasing costs of retirement benefits.
- **Insurance costs:** Insurance costs have been a significant outlay especially for smaller transit agencies. Increased insurance costs have caused some agencies to either seek increased revenues through fares and public funding, or to cut service.
- **Fuel costs:** The rise in fuel prices over the past decade has had a significant effect on transit operating expenses.
- **Public funding:** The recent recession provided numerous examples of transit agencies that faced decreasing support from public funds. Many agencies reduced service one or more times, and at the same time raised fares in order to meet their operating budgets.

Some transit advocates have argued for sharply reduced fares or even zero fares to encourage travelers to use transit. But various studies and past experience with reduced or free fares has shown that reducing fares does little to increase transit patronage (Pratt 2004). Cities that had implemented free-fare zones in the downtown area, such as Seattle and Portland, have eliminated these programs in favor of gaining more fare revenue to support service.

Section 3.2 summarizes the results of this section by discussing the applicability of U.S. transit industry experience to AMHS tariff policy. The remainder of section 3 provides detailed discussions in the following areas:

- **Types of fare structures:** Illustrates types of structures in use to compare and contrast to the current tariff structure of AMHS. Although most transit operators charge flat fares, some have fare structures that more closely reflect the marginal cost of providing certain types of service. Some services, like Washington State Ferries, have higher peak season fares to partially offset the higher cost of providing additional service, which typically includes costs of additional staff and overtime costs.

- **Fare paying instruments and their effect on fares:** Effective use of fare instruments can provide a means of both making fare collection more efficient as well as marketing transit service to different rider market segments.
- **Special fare types:** Special fare types include senior and handicapped fares as well as fares for special service types.
- **Fare revenue in relation to other funding sources for transit operations:** Public funding for AMHS is provided entirely by the State of Alaska. Most transit operators in the U.S. receive local funding
- **Other issues in setting fares:** These include timing and amount of fare changes.

3.2 Application of Transit Industry Practices to AMHS Tariffs

A number transit industry practices do not apply to AMHS. Compared to a typical transit system, AMHS has much longer trip lengths and lower frequency of operations. And an AMHS rider uses the system at a much lower rate (e.g., once a week, once a month, or less frequently) than the typical U.S. transit rider (once a weekday or more). AMHS does bear a significant similarity to many other transit systems in that many of its riders have no workable or affordable alternative to the service.

These differences notwithstanding, some transit industry experience may help inform future changes to AMHS tariff policy. The remainder of Section 3.2 summarizes those aspects of current transit industry experience that may be directly relevant to AMHS. The sections following this one go into each of these in greater detail.

3.2.1 Transit Operating Funding

Funding sources for transit operations vary by state, type of metropolitan area, and type of system, including particular modes of operation. Public funding for AMHS comes entirely from the State of Alaska; in that respect it differs from most U.S. transit systems, which get much of their public funding from local sources. Nonetheless, as discussed further on, in some states all or most of the public funding comes directly from the state.

On average most U.S. transit systems get 20–40 percent of their operating expenses from fares (the so-called “farebox recovery ratio”). AMHS currently averages about a 26 percent farebox recovery ratio, which is well within the transit industry norm. Although the farebox recovery ratio for AMHS may seem low compared to other ferry systems, AMHS differs significantly from most of these systems in that the passenger market for AMHS has a significantly higher proportion of persons who have no feasible alternative to using AMHS. Hence, comparing the AMHS farebox recovery ratio to that for U.S. transit systems in general would appear to be more appropriate.

3.2.2 Fare Formulas

Although most transit operators in the U.S. charge flat fares, there are notable exceptions, particularly in the case of rail and ferry systems. For example, BART (San Francisco Bay Area) and

WMATA (Washington, DC metro area) charge fares based on distance; in both cases the mileage charge falls off for longer distance trips. BART also provides an example of how a transit operator will modify the fare structure to reflect additional operating costs; in the case of BART this includes additional costs for providing service through the transbay tube linking Oakland to San Francisco, and additional costs incurred going into San Francisco Airport. Such an approach shows how additional operating costs can be accounted for in a consistent way. For example, some AMHS routes may incur additional costs because of characteristics of the places they travel from or to; these costs could be added to a distance-based formula and would be justified by the principle that fare differentials should at least partly follow cost differentials.

Washington State Ferries has adopted a Tariff Route Equity policy in which price relationships between routes are made proportional to the service time being used by the customer. Fares for the main routes are set to meet the fare recovery standards; other routes are priced proportionally to those routes based on sailing time. This may suggest a similar policy for AMHS, in that fares could be set for the major routes, and fares for other routes could be set based on comparing sailing time to that of the major routes.

Charging higher fares during times of peak demand is seldom used by U.S. transit systems, but is an economically efficient way to better match fares to incremental costs. WMATA, unlike most U.S. transit systems, has implemented a peak-period fare surcharge. This surcharge reflects the increased costs of providing peak-period service: more operators, more rolling stock, and additional support staff. Similarly, Washington State Ferries, like AMHS, has higher fares during the peak season to reflect the increased incremental cost of providing additional service.

Experience from the transit industry strongly suggests that the fare formula should be as simple as possible so that it can be easily communicated to the riding public.

3.2.3 Fare Instruments

Fare instruments are an important means of allowing transit operators to tailor fare structures to different market segments. The most common variation from the normal fare structure is to have fare instruments tailored to the frequent rider market, in which frequent riders receive some discount on fares.

Monthly passes, the most common means of providing for the frequent rider market, do not appear to be feasible for AMHS. But other types of reduced fares for frequent riders, such as providing a discount for passengers who pay for multiple rides in advance, may be a means of targeting the frequent rider market for AMHS; putting a time limit on using multiple-ride purchases (e.g., three or six months) may also be desirable to ensure that the advance purchase rides are used within a reasonable time. We expect that the new AMHS reservation system would be capable of being programmed to provide for multi-ride purchases.

3.2.4 Other Issues

Timing and amount of fare changes are critical issues in implementing transit fare policy. Experience in the transit industry overwhelmingly indicates that it is better to have many, but small fare increases than few, but large fare increases. This would suggest the practicality of programmed fare increases at a minimum of every two years to keep up with changes in the consumer price index.

Many transit operators in tourist areas also work hand-in-hand with local tourist bureaus to encourage visitors to use transit. For example, both New York and San Francisco have tourist web pages that provide direct links to transit fare purchases for tourists. Our review of the TravelAlaska.com web site indicated that it is difficult to find information on AMHS directly from the site. Providing a direct link to AMHS on the TravelAlaska.com home page would make it easier for tourists to find out about and use AMHS.

3.3 Funding Sources for Transit and Relation to Fares

3.3.1 Funding Sources

There are a number of funding sources that are available for funding transit operating expenses, depending on the agency type and location.

- **Directly generated revenue:** These consist of fares and other direct revenue sources such as advertising.
- **Federal:** Federal sources include Federal Transit Administration (FTA) Section 5307 funding and other sources such as Congestion Mitigation and Air Quality funds.
- **State:** Some states provide assistance for transit operations from general funds or special taxes dedicated to transit. For example, some states have used revenue from motor vehicle excise taxes or special sales taxes to provide a funding stream for operating assistance.
- **Local:** As the term implies, local funding is highly dependent on the willingness of the locality to fund transit operations. For example, in the San Francisco Bay Area, several counties have a special sales tax to fund BART operations, and some bridge toll revenues are used to fund transbay transit service.

Table 12 shows average transit agency operating revenues by source. As expected, average agency transit operating expenses sharply for agencies with larger service area population. Part of this is due to the differing nature of transit rider markets in smaller and larger areas. In smaller areas, most transit riders are what are known as *transit captives*, i.e., persons who have no other choice of mode due to low auto ownership or low income. Larger areas such as Chicago and New York have a much higher proportion of *choice riders*, i.e., riders who have the option to drive but use transit instead.

Table 12. Average Agency Operating Revenue Sources by Service Area Size

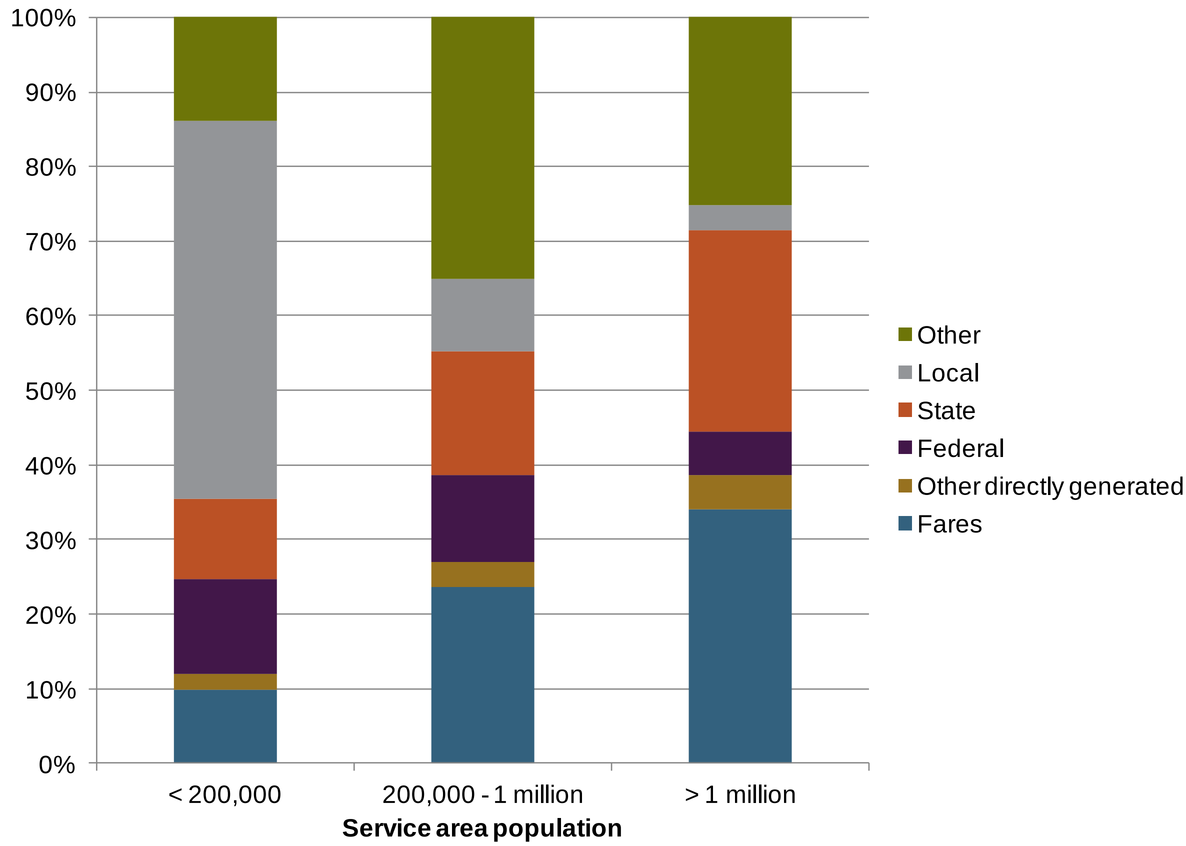
Service area population	Number of agencies	Average agency operating expense source ($000)						Total
		Directly generated						
		Fares	Other	Federal	State	Local	Other	
< 200,000	467	746	156	950	812	3,811	1,048	7,524
200,000–1 million	231	7,943	1,130	3,952	5,622	3,253	11,825	33,725
> 1 million	107	106,778	14,103	18,569	84,705	10,396	79,120	313,670

Source: National Transit Database, 2012.

Figure 11 shows the percentage of transit operating revenue by source. In general:

- Fares account for a much higher proportion of operating expenses in more populous service areas than in smaller areas.
- Federal and local assistance as a proportion of operating revenue tend to decline with increasing service area population.
- The proportion of state assistance increases with increasing population.

Figure 11. Percent of Operating Expenses by Source, by Agency Service Area Size



Source: National Transit Database, 2012.

It should be noted that AMHS receives federal funding through the Federal Highway Trust Fund since it is considered a "marine highway" instead of funding through the Federal Transit Administration like many other U.S. ferry systems. Funding from the Federal Highway Trust Fund can only be used for capital costs and cannot be used for operational costs as the Federal Transit Administration funds can be.

Sources of public operating funds vary considerably by state. As shown in Table 13, some states such as Alabama, Florida, and South Carolina provide nearly all public funding through the state; several other states such as Massachusetts, Minnesota, New York, and Wisconsin provide a significant portion of public funding through the state.

Table 13. Sources of Public Operating Funding for Transit by State

State	Public Funding Source (%)		
	State	Local	Other
Alabama	90	1	9
Arizona	2	98	0
California	4	76	20
Colorado	2	33	66
Connecticut	0	100	0
Florida	74	26	0
Georgia	1	1	98
Iowa	0	100	0
Illinois	0	100	0
Indiana	0	100	0
Massachusetts	48	52	0
Michigan	21	11	69
Minnesota	43	57	0
Montana	0	100	0
North Carolina	84	16	0
New Jersey	0	47	53
New Mexico	22	78	0
New York	48	52	0
Ohio	0	100	0
Oregon	0	100	0
Pennsylvania	0	100	0
South Carolina	100	0	0
Tennessee	10	90	0
Texas	0	34	66
Utah	0	31	69
Virginia	32	68	0
Washington	0	40	60
Wisconsin	63	5	33

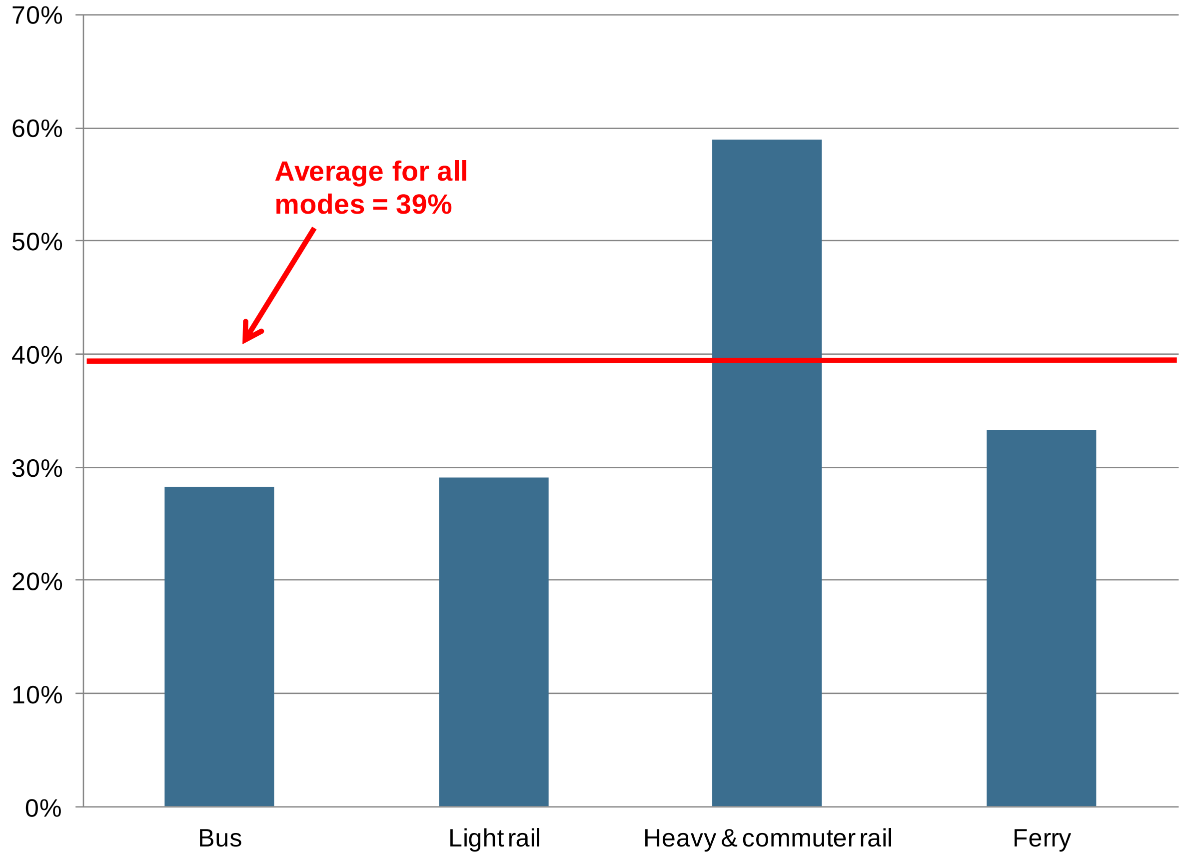
Source: National Transit Database, 2012

3.3.2 Fares as a Proportion of Operating Revenue

As noted above, fares tend to account for a larger proportion of operating revenue in larger urban areas. Transit in smaller areas transit tends to carry mostly “captive” riders, and therefore tends to be more of a minimal “lifeline service”. As shown in Figure 11, fares in smaller urban areas account for about 10 percent of operating revenues, whereas in larger urban areas they account for over 30 percent of operating revenues.

The farebox recovery ratio displays the percentage of operating costs covered by revenues from tariff sales. Farebox recovery also varies by type of mode. Figure 12 shows the national averages for farebox recovery for bus, light rail, commuter and heavy rail, and ferries.[1]

Figure 12. Average Farebox Recovery Ratio by Mode (2012)



Source: National Transit Database, 2012. Excludes special services such as paratransit and taxi.

[1] Discrepancies between this and the preceding figure are because the farebox recovery by mode excludes demand-responsive service, which has a lower farebox recovery ratio, and because these are total national fare revenues divided by total national operating expenses by mode, which gives a higher weight to larger transit systems that have higher farebox recovery ratios.

Table 14 displays the farebox recovery rate from 10 different ferry systems during FY 2010 including AMHS. Both public and privately owned ferry systems are included in this table and, as one may expect, private ferry systems tend to have higher farebox recovery ratios than public systems. During FY 2010, the average farebox recovery rate for ferry systems operating in North America was 49 percent. This means that on average, 49 percent of operating expenses were covered by operating revenues and the remaining 51 percent of operating expenses were covered by other revenue sources. The farebox recovery rate for AMHS in Table 14 was calculated by dividing the revenue from ticket sales by the total expenditures published in AMHS's annual reports and does not account for revenues from stateroom sales, passenger services sales, facility rentals, or concession fees.

Table 14. Farebox Recovery Rate Comparison (2010)

Passenger/Vehicle Ferry System	Farebox Recovery Rate FY2010 (%)	Ownership
Stena Lines	138	Private
Irish Ferries	108	Private
Steamship Authority	100	Public
Brittany Ferries	98	Private
Inter-Island Ferry Authority	77	Public
BC Ferries	69	Public/Private
Golden Gate Ferries	68	Public
Washington State Ferries	65	Public
North American Average	**49**	
Alaska Marine Highway System	26	Public
North Carolina Ferries	6	Public

Source: Washington State Department of Transportation. 2010, Sheinberg Associates. 2014

To take a closer look into AMHS's farebox recovery rates, the study team calculated the farebox recovery rate for each of its vessels over the past six years (Table 15). These ratios were calculated using the estimated total annual operating time for each vessel and the annual operating expenditures by vessel that is published in AMHS's annual financial reports. These calculations do not take into account the annual overhaul costs provided in the capital budget. The estimated annual operating time for each vessel was derived from the number of trips per year on each route and the average time at dock.

Table 15. AMHS Farebox Recovery Rate by Vessel

	2008	2009	2010	2011	2012	2013
Vessel			**(%)**			
Aurora	37	29	40	31	35	33
Chenega	35	36	30	34	34	27
Columbia	73	86	83	75	75	82
Fairweather	32	21	26	23	17	20
Kennicott	29	34	30	40	47	43
Leconte	21	26	25	16	26	21
Lituya	62	54	56	51	60	57
Malaspina	80	78	79	65	49	37
Matanuska	62	43	49	38	52	52
Taku	33	38	35	26	25	24
Tustumena	35	45	39	33	34	29

Source: Developed by Northern Economics, Inc. based on data from AMHS

The farebox recovery rate varies greatly from vessel to vessel. The Columbia has consistently had the highest farebox recovery rate and in 2013, operating revenues covered 82 percent of operating expenditures. The Fairweather and Leconte have some of the lowest farebox recovery rates, and in 2013 only 20 percent of these vessels' operating expenditures were covered by operating revenues. These farebox recovery rates are primarily affected by the routes the vessels operate and the amount of time the ferry is operational rather than the vessels themselves. The trends seen in this table over the past six years can also be explained by changes in the routes each vessel is operating on. For example, the decrease in farebox recovery rates for the Malaspina can be attributed to its use as a summer shuttle in Lynn Canal and the increase in the Kennicott's farebox recovery rates can be linked to the addition of the summer express route.

3.4 Transit Industry Fare Practices

3.4.1 Fare Structures

Types of fare structures commonly used by U.S. transit operators are summarized in Table 16.

Table 16. Common Types of Fare Charging Methods

Fare type	Description	Examples
Flat fare	Uniform fare for all trips regardless of length.	San Francisco Muni, New York MTA (local bus/subway), Boston (MBTA)
Zone fare	Service area divided into zones; fare based on number of zones traveled	AC Transit (Oakland, CA) transbay service, Seattle Metro service across Lake Washington.
Distance-based	Charge based on distance traveled. Typically applies to rail and ferry systems only.	BART (San Francisco Bay Area), LA
Special service fares	Fares for special services such as express bus, special buses to work locations	NY MTA (New York City) special fares for express buses; VTA (San Jose, CA) special fares for express bus service.
Time of day/ seasonal	Higher fares during peak times or seasons when demand is high	WMATA (Washington DC) peak period fares; Seattle Metro peak period fares; Washington State Ferries summer fare surcharge

- **Flat fares** are the most common fare charging method in use today, especially for bus modes, where distance-based charging is difficult to implement. All riders pay the same fare regardless of length of trip or time of day.
- **Zone fares** provide a means of charging more for longer distance trips. Passengers traveling to more than one zone typically pay an extra fare for each zone traveled.
- **Distance-based fares** are common on rail and ferry systems, where individual trip length is simple to monitor. These are typically implemented as fixed station-to-station fares that are set based on the interstation distance.
- **Special fares** are charged for some special services run by transit operators such as express buses or special long-distance runs, such as a commuter service to a specific workplace location or service to an airport.
- **Time of day or seasonal fares** are used by some agencies to recover increased costs of providing more service when demand is high. For example, Washington (DC) Metropolitan Area Transit Authority (WMATA) Metro rail service runs on reduced headways during peak periods, which increases its operating costs; WMATA therefore charges higher fares during the peak.

Some transit agencies, especially those that operate multiple modes, may use a combination of the above methods. For example, WMATA's Metro rail fares are both distance-based and time-based, while bus fares are fixed throughout the day regardless of distance.

3.4.2 Examples of Fare Structures

Transit agencies that do not charge flat fares must typically come up with a rationale for setting fares that is understandable to the public and is perceived as fair. Hence, some agencies have codified their fares in simple formulas. The following are several examples of fare formulas adopted by transit agencies that show both distance-based and time-based fares.

3.4.2.1 Bay Area Rapid Transit

BART provides train service on a 104 mile system in the San Francisco Bay Area. There are 44 stations in the system. About half of the patronage on BART is across San Francisco Bay; during the morning commute period almost half the trips crossing from the East Bay to San Francisco are made on BART. Average weekday patronage is over 400,000.

BART was originally built to serve the three counties that voted in 1960 to fund the service. These three counties passed a special sales tax to support BART service. Service was later extended beyond the original three "BART counties" that do not provide direct support to BART. Hence, passengers who board the system in other counties are typically charged higher fares.

Table 17 shows the current formula used by BART to calculate fares. Note that the fare per mile decreases for longer distance trips over 14 miles. This example is also worth noting because it shows how a distance-based formula can be modified to account for special costs incurred by the system. For example, a premium for trips to San Francisco International Airport (SFO) is applied to help offset the additional cost to BART to go to the airport.[2]

Table 17. BART Fare Formula

Type	Application	Amount
Trip length	Minimum Fare: Up to 6 miles	$1.85
	Between 6 and 14 miles	$1.93 + 14.1¢/mile
	Over 14 miles	$3.04 + 8.5¢/mile
Surcharges	Transbay	$0.94
	Daly City[a]	$1.08
	San Mateo County[a]	$1.37
	Capital[b]	$0.13
	Premium fare applied to trips to/from SFO	$4.27
Speed differential	Charge differential for faster or slower than average trips, based on scheduled travel time	±5.4¢/minute

[a] San Mateo County, which includes Daly City, is not one of the three counties that provides sales tax support for BART.
[b] Special capital surcharge for persons in the three counties that provide sales tax support for BART.
Source: San Francisco Bay Area Transportation District, Planning Department.

[2] The BART extension to SFO was funded in part by money from the Federal Aviation Administration. In return, BART was required to pay an annual rent to the airport and to give a 25 percent fare discount to airline employees.

3.4.2.2 Washington Metropolitan Area Transit Authority Metro Rail

WMATA Metro rail is a heavy rail system that provides service in the metropolitan Washington DC area. There are 86 stations and the average weekday patronage is 700,000.

Metro rail fares are based on both distance and time of day. As shown in Table 18, the mileage charge decreases for longer trips. Peak fares are higher to help offset the cost of the additional service provided during the peak periods.

Table 18. WMATA Metro Rail Fare Formula

	Peak	Off-peak
Flat fare for first 3 miles of travel	$2.10	$1.70
Incremental fare for additional miles above 3 and up to 6	$0.316/mile	$0.237/mile
Incremental fare for additional miles above 6	$0.280/mile	$0.210/mile
Maximum fare cap, regardless of distance	$5.75	$3.50

Source: Washington Metropolitan Area Transit Authority.

3.4.2.3 Washington State Ferries

Washington State Ferries (WSF) is the largest ferry system in the United States, serving eight counties within Washington and the Province of British Columbia in Canada. The system has 10 routes and 20 terminals that are served by 22 vessels. The system carried over 22 million riders in 2013.

Service is currently priced seasonally: Summer and Winter. Summer fares are about 25 percent higher than winter fares. Fare instruments such as multi-ride passes are available to regular riders, which offsets the higher summer fares.

WSF fares are set to meet state mandated revenue targets. WSF has adopted a fare structure based on sailing time as follows:

> Tariff Route Equity (TRE), an equitable time-based fare structure, was introduced in June 2001. The intent of TRE was to develop a fare structure where price relationships between routes were proportional to the amount of service time being used by the customer. Under TRE, Central Sound route fares (Edmonds/Kingston, Seattle/Bainbridge, and Seattle/Bremerton) are set via the general fare increase. All other routes are priced proportionally based on sailing time (WSF 2010).

Increasing fuel costs have added significantly to WSF operating costs. WSF is considering a fuel surcharge to offset increased fuel costs. WSF is also considering going to a three-season fare system: peak (summer), shoulder (fall and spring), and base (winter).

3.4.3 Special Fares

The following special fare groups are recognized by some or most transit agencies:

- **Elderly and disabled:** FTA regulations state the following with regard to elderly and disabled fares:

> For fixed route service supported with Section 5307 assistance, fares charged elderly persons, persons with disabilities, or an individual

> presenting a Medicare card during off peak hours will not be more than half the peak hour fare.[3]

Taken literally, this means that a transit agency is only required to charge half the peak fare to elderly and disabled riders during the off peak. In practice, most transit agencies apply a 50 percent fare discount for seniors and handicapped persons across the board regardless of time of day.

The typical age for elderly is 65, although some transit agencies have lower ages such as 62 or even 60. Disabled riders are usually required to present certification from a doctor that they are disabled, although some states require transit agencies to grant handicapped status to anyone holding a valid handicapped parking placard.

- **Youth:** Youth fares are usually, but not always, set to be the same as fares for the elderly and disabled. Youth fares typically apply to riders aged 5–17.
- **Young children:** Children under 5 years of age who are accompanied by an adult are often allowed to ride for free.

3.4.4 Traveling Public vs. For Profit

Many of the ferry systems analyzed for the comparative analysis charge different vehicle tariffs for the traveling public and commercial customers. AMHS currently does not distinguish rates between these two customer groups. BC Ferries, Brittany Ferries, Irish Ferries, Marine Atlantic, P&O Ferries and Viking Lines all charge commercial customers a higher vehicle tariff than the traveling public. Unlike passenger vehicle fares that use size-based categories, commercial vehicle tariffs are typically charged using a fixed variable cost that is dependent upon the size and/or weight of the vehicle.

3.4.5 Fare Payment Methods

Fare payment methods have changed greatly in recent years, providing more flexibility for riders to pay their fare and simultaneously lowering the cost of fare collection for transit agencies.

- **Cash fares** account for a lower percentage of fare revenue than they did previously, in part because of the availability of more convenient fare payment methods. Some systems such as BART and WMATA Metro do not allow cash fares, requiring the user to buy a ticket in advance. Many transit agencies have other fare payment methods that result in lower costs to regular riders who use them instead of cash fares.
- **Multi-ride tickets or tokens** are offered by some transit agencies to allow riders to pre-purchase fares, often at a lower price than paying the cash fare. Some multi-ride tickets are date-stamped and must be used up within a fixed period of the first ride.

  As noted above, some systems like BART and WMATA Metro rail do not allow cash fares, but require the rider to purchase a ticket in advance. A ticket can be bought for any value the rider desires and is debited each time the user rides the system; riders can add value to tickets that are close to being used up.

[3] FTA Section 5307 funds provide capital and operating funds to transit agencies in urbanized areas.

As a variation, higher value multi-ride tickets can be discounted to encourage regular use. BART, for example, offers a 6 percent fare discount on high-value ticket purchases (e.g., a rider can pay $60 for a ticket that is good for $64 in fares).

- **Monthly passes** are used mainly on systems with flat or zone fares. They are typically priced slightly less than the cost of 40 one-way rides. Monthly passes also facilitate transfers between different routes.
- **Smart cards** are increasingly being used by transit systems because they reduce the cost of fare collection and they can be set to be automatically loaded with additional value when their value drops below a certain point. Smart cards also provide an easy means of paying fares for trips that use different transit services; any transfer discounts can be easily implemented on a smart card. Some agencies encourage smart card use by providing special discounts or by charging extra for other fare payment methods; WMATA Metro rail, for example, adds a $1 surcharge for trips made using the older tickets rather than its smart card. Some transit agencies are now providing their monthly passes through smart cards only.
- **Special fares and passes** are offered by some transit agencies to encourage employers and other institutions to get their employees to use transit. For example:
    - AC Transit's EZ Pass program allows employers to buy a block of monthly passes for their employees. Prices depend on the location of the employer and the number of passes purchased. Employers either offer passes for free as a benefit or allow employees to pay for the passes with pre-tax dollars through payroll deductions.
    - Some transit operators in towns with large college populations will negotiate with colleges to allow students to ride for free on showing a student ID; examples include University of Wisconsin, Madison, University of Illinois in Champaign-Urbana, and University of California, Berkeley. The cost is typically paid for by student fees.
- **Tourist tickets and passes** are offered by transit operators in areas with high tourist visitation like New York and San Francisco. These come in a variety of forms, such as single or multi-day passes or ticket books with a fixed number of rides. These are often marketed through visitor and convention bureaus and travel agencies. These instruments are typically priced at or slightly below the rate an individual would pay if he took an average number of rides on the system each day. The main advantage of these tickets and passes is greater convenience for the user.

Common types of fare payment methods are summarized in Table 19.

Table 19. Common Types of Fare Payment Methods

Payment type	Description	Notes
Cash	Uniform fare for all trips regardless of length.	Some systems such as WMATA Metro rail do not accept cash directly; the user must buy a ticket.
Multi-ride tickets or tokens	Fixed number of rides purchased in advance.	AC Transit (Oakland, CA) transbay service, Seattle Metro service across Lake Washington.
Monthly pass	Pass can be used for any number of rides in a month.	Mostly used on systems with flat or zone fares. Less suitable for distance-based fares.
Smart card	Smart card with pre-loaded value.	Users can arrange for auto-load of additional value via credit card.
Special fares and passes	Special passes or fares for groups such as university students or employees participating in an employee pass program.	Some transit agencies in towns with high college student populations allow college students to ride for free; the cost us usually funded by student fees.
Tourist tickets and passes	Special tickets sold to tourists, typically as a multi-ride ticket or pass good for a fixed number of days.	Mostly used in large urban areas with high tourist visitation. Typically priced at or slightly below the rate a passenger would pay for an average number of rides per day. Main advantage is convenience.

3.4.6 Lessons on Fare Policy from Transit Industry Practice

Transit agencies' history with implementing fare increases and other changes has provided a body of experience on good practices. Transit agencies periodically face the choice of increasing fares or cutting service in response to increased costs or reduced public funding. Most transit fare increases are accompanied by a slight decrease in patronage followed by a recovery in patronage over a 3–6 month period.

The following are elements of good practices on implementing fare changes:

- **Continually monitor and project all sources of operating revenue.** Fare increases should be planned well in advance, with adequate time for notifying the public and getting public input. Having a well-documented case for a fare increase can go a long way to addressing concerns by the public.
- **Do not increase fares too much at one time.** A past example from BART provides a good lesson in this regard (Reinke 1988). BART had been experiencing a steady increase in patronage from 1981 through 1985, until a 30 percent fare increase was implemented. BART patronage decreased by about 10 percent and did not recover even 18 months after the fare increase. Measurement of patronage changes for origin-destination pairs with different fare increases showed that fare elasticities were higher for higher percentage fare increases.
- **Program fare increases to go up with inflation.** As a result of its experience with the 1985 fare increase, BART has programmed biennial fare increases to keep pace with the consumer price index. WMATA Metro rail has also adopted a similar policy of pre-programmed fare increases at regular intervals.

- **Use a consistent fare formula as a basis for fare increases.** This applies to systems with distance-based or time-based fares. By having a consistent fare formula and simply increasing all fare components by a similar amount, it is much easier for the riding public to understand the basis for a fare increase. The fare formulas for BART and WMATA Metro provide consistent bases for future fare increases. Similarly, the Tariff Route Equity principle adopted by WSF provides a single organizing principle for implementing any fare changes in an easily understandable manner.
- **Promote transit service through tourist information sources.** Transit operators in areas with high tourism will often market their service through tourist bureau sites; New York and San Francisco are two examples where the transit operators market their services through tourist sites. We observed that AMHS is not prominently featured on the TravelAlaska.com website. Providing a more accessible link to the new AMHS reservation system through the TravelAlaska.com website would provide greater exposure of the AMHS system to tourists who may not be aware of it.

4 Recommendations

The analysis from this study recommends a formulaic approach to setting tariffs that can be applied uniformly across all routes to allow AMHS to target its revenue goals. This approach is not only transparent and easy for customers to understand, it also allows for AMHS to easily make adjustments in order to keep up with increasing costs and inflation.

Before applying a formula tariff structure, the study team recommends that AMHS first address the variation between tariff prices per nautical mile identified in the 2008 Rate Study, so that routes within the same distance category are within 25 percent of the average tariff per nautical mile. These changes would more easily facilitate the implementation of a formulaic tariff structure and will allow increases in tariff prices to be more evenly distributed over AMHS's routes.

Table 20 displays the routes that are more than 25 percent below the average tariff per nautical mile for their distance category in at least one of the four tariff categories analyzed in this study. The route that deviates most from the average tariff per nautical mile is the Hoonah to Tenakee route. Currently the tariff for this route charges passengers $31 for a route that is 49 nautical miles in distance, or $0.63 per nautical mile. The average tariff per nautical mile for routes that are 0 to 50 nautical miles in distance is $1.21, and in order to bring this route in line with the average AMHS would have to raise the tariff to $59.29.

Table 20. 2014 Tariffs below Average Range (% difference)

Area	Route	Passenger	19 ft. Vehicle	Outside Berth	Inside Berth
Southeast Feeder	TKE to ANG	-38.94	—	—	—
Southeast Inside Passage	PSG to WRG	-44.51	-48.30	-44.14	-38.04
Southwest	AKU to UNA	-52.51	—	-71.19	—
Southeast Inside Passage	GUS to PEL	-53.54	-51.04	—	—
Southeast Feeder	HNH to JNU	-50.55	-51.04	-48.33	-41.25
Southeast Feeder	HNH to TKE	-56.39	—	-51.50	-44.85
Southcentral	CDV to TAT	-31.06	-27.13	—	—
Southwest	CBY to FPS	-18.56	-17.88	-26.61	—
Southeast Feeder	ANG to HNH	-25.02	-22.17	—	—
Southeast Inside Passage	ANG to SIT	-25.23	-21.59	—	—
Southeast Inside Passage	ANG to JNU	-32.10	-24.57	—	—
Southeast Inside Passage	KTN to WRG	-40.49	-28.38	—	—
Southwest	SDP to KCV	-26.97	-17.80	-5.25	—
Southwest	KOD to OLD	-37.02	17.35	-34.22	—
Southeast Inside Passage	KAE to SIT	-31.52	-34.59	-6.75	2.56
Southeast Inside Passage	HNH to SIT	-33.26	-36.25	-12.31	-3.90
Southeast Inside Passage	KTN to SIT	-22.52	-22.64	-26.56	-17.43
Southcentral	KOD to WTR	-27.19	-26.87	-18.67	—
Southeast Feeder	HNH to KTN	-15.34	-10.00	-27.27	-22.43
Southcentral	YAK to VDZ	-36.52	-27.49	-39.37	—

Note: dashes indicate that the specific service is not offered on that route

Source: Developed by Northern Economics, Inc. based on data from AMHS

This study also identifies routes that are more than 25 percent above the average tariff per nautical mile in each distance category. Table 21 displays the routes that are above the average range of tariff per nautical mile in one of the four categories analyzed. The route with the largest deviation is the Annette Bay to Ketchikan route, which currently has a passenger tariff of $23 for an 8 mile route, or $2.88 per nautical mile. The average tariff on routes 0 to 50 nautical miles is $1.21, which would mean the tariff for this route would be $9.68 if it were aligned with the average tariff.

Table 21. 2014 Tariffs above Average Range (% difference)

Area	Route	Passenger	19ft Vehicle	Outside Berth	Inside Berth
Southeast Inside Passage	ANB to KTN	98.19	57.33	—	—
Southeast Inside Passage	HNS to SGY	64.39	24.84	76.17	107.87
Southwest	ORI to OUZ	74.99	73.25	72.85	—
Southwest	KOD to OUZ	62.49	60.87	60.50	—
Southcentral	HOM to SDV	33.82		32.18	—
Southcentral	TAT to VDZ	56.68	65.61	—	—
Southeast Inside Passage	JNU to GUS	—	—	35.22	28.40
Southcentral	TAT to WTR	95.99	32.55	—	—
Southcentral	CHB to WTR	90.14	98.84	—	—
Southcentral	VDZ to WTR	63.33	—	—	—
Southcentral	CHB to VDZ	46.43	52.97		—
Southcentral	CDV to CHB	31.33	37.02		—
Southcentral	CDV to WTR	31.33	—	—	—
Southwest	FPS to UNA	48.78	46.06	53.42	—
Southeast Inside Passage	KTN to PSG	—	—	—	31.63
Southeast Inside Passage	JNU to KAE	—	26.66	—	25.34
Southwest	KOD to SDV	40.72	39.34	50.81	—
Southwest	ORI to SDV	39.56	38.20	49.58	—
Southeast Inside Passage	JNU to PSG	—	—	—	24.23
Southwest	HOM to ORI	—	—	26.35	—
Southwest	HOM to OUZ	—	—	26.35	—
Southwest	OLD to SDP	48.98	51.99	58.42	—
Southcentral	WTR to YAK	28.52	35.13	40.98	—

Note: dashes indicate that the specific service is not offered on that route
Source: Developed by Northern Economics, Inc. based on data from AMHS

Due to the wide range of variation between tariffs that are currently in place, the study team recommends that these outliers be brought within the range of average tariff per nautical mile using incremental changes over multiple years. Spreading out these changes over a longer time period will mitigate the potential for shocking a specific market and seeing a negative impact on ridership. The tariffs that deviate most from the average should be adjusted over a longer period, whereas tariffs that are closer to the average range can be adjusted more quickly. Tariff outliers on the high end of the spectrum could also be frozen while other tariffs are increased until they are brought more closely in line with the average.

Next, the study team recommends adopting a formulaic tariff structure that accounts for both fixed and distance-based variable costs. The formulas in the following sections do not apply multi-component discounting, but instead are specific to each of the service categories provided. The study team does not recommend using any form of multi-component discounting since each of the recommended tariff equations will only address the resources and costs of the specific service provided. For example, the components in the passenger tariff calculation do not overlap with any of the components used in the cabin tariff calculation. Eliminating multi-component discounts will also allow for more a transparent and more easily understood tariff structure. The following sections detail the components that we recommend including in each of the tariff categories listed below.

4.1 Passengers

The study recommends a formula for setting passenger tariffs that addresses the fixed fees associated with passenger traffic, variable distance-based costs, premium service adjustments and a seasonal component. Figure 13 illustrates the recommended formula to calculate passenger tariffs.

Figure 13. Recommended Formula to Determine Passenger Tariffs

Source: Northern Economics, Inc., 2014

The embark/disembark fixed fee would be based on costs associated with the use of the ports of call, including facility maintenance fees. This fee should not be specific to each port, but rather an average or distributed total cost associated with using each port. Administrative (e.g. reservations, ticketing, scheduling) and marketing fees could also be added into this fixed fee that will be applied to all fares. (If, in the future, AMHS has routes that do not require reservations or other specific administrative costs, a different embark/disembark fixed fee could be developed that is consistent with the cost recovery goal.) The distance-based fee would be a variable cost that will be determined by the distance category of the route and the region in which the route operates. This variable cost would be multiplied by the distance of route and would account for variable costs, such as fuel, associated with each route. The route type multiplier accommodates for the different types of services offered by AMHS (traditional, express, daily service, etc.). The route type multiplier would be 1 for traditional routes, but would be greater (i.e. 1.12 or 1.3) for premium services such as express routes. The final component listed in the equation in Figure 13 is the seasonal multiplier, which would be used to accommodate a two-tiered seasonal structure that would increase the tariff in response to the increased demand during the peak summer season.

4.2 Cabins

The study team's recommended equation for calculating cabin tariffs would have similar components to the passenger tariffs, but with some differences. Figure 14 displays the recommended formula for calculating cabin tariffs

Figure 14. Recommended Formula to Determine Cabin Tariffs

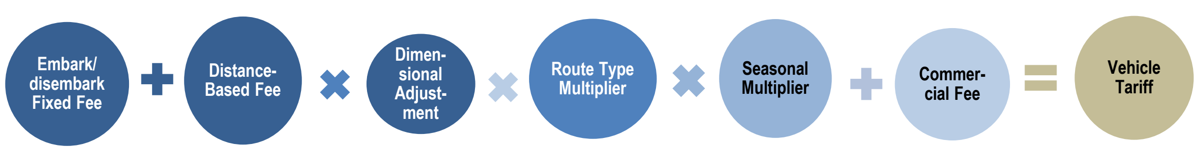
Source: Northern Economics, Inc., 2014

The cabin type fee would account for the fixed fees associated with cabin rentals depending on cabin type and the level of service provided (number of beds, inside vs outside, etc.) and the distance-based fee would account for the costs that vary depending on distance and length of the route. This distance-based fee will also take advantage of the increased demand for cabins on longer routes. The seasonal multiplier would be used to accommodate the differing demand during the peak summer season and the slower winter season. The route type multiplier would accommodate for the different types of routes offered by AMHS including traditional, express, and dedicated service. The study team has also excluded any multi-discounting associated with cabin tariff purchases in conjunction with other tariff types to facilitate a more transparent tariff structure that will also be easier for customers to understand.

4.3 Car Deck

The car deck on AMHS ferries is often one of the first things to fill up and is used by both the traveling public and commercial entities. The study team recommends using a formula similar to the one displayed in Figure 15 to set vehicle tariffs for both public and commercial users.

Figure 15. Vehicle Tariff Calculation



Source: Northern Economics, Inc., 2014

One of the components that could be included in the tariff calculation is an embarkation and disembarkation fixed fee, which will cover fixed costs including administration and time at dock loading and unloading. Another equation component that should be considered is a variable cost based on the route distance and the region in which the route operates. This distance-based fee should be based on the average tariff per nautical mile of routes that are similar in length and serve the same region. It is also recommended that length be the determining measurement criteria for passenger vehicles on the car deck; this component can be seen in the equation above labeled "dimensional adjustment." For commercial vehicles, the study team recommends using both height and length as the determining criteria, which will allow AMHS to more accurately charge for the variety in the size of commercial containers that are not seen in passenger vehicles. Another option to differentiate commercial tariffs from passenger vehicle tariffs would be to add in weight-based fees. This would require that AMHS purchase the equipment necessary to weigh each commercial vehicle before this plan could be implemented. This same concept could be applied to the containerized and non-containerized cargo transported by AMHS. AMHS could benefit from creating two different tariff structures for the car deck area used by the traveling public and commercial customers, which would also prevent AMHS from further undercutting competing commercial shippers who are currently unable to compete with AMHS on a price basis.

The study team also recommends using a route type multiplier, which would stay at 1 for traditional routes and be a larger number for express routes and dedicated routes that offer a premium service. Also, similar to passenger and cabin tariff formulas, a seasonal multiplier should also be included to take advantage of demand during the peak season and incentivize customers when demand is lower during the off-peak season. The final formulaic component in Figure 15 is the commercial fee. This fee would be charged to commercial customers wanting to use onboard power, most likely for refrigerated trucks, and would be charged on a per hour basis.

Although vehicle tariffs appear high in the comparative analysis section of this report (see Figure 6), the study team does not recommend that AMHS decrease them. Compared to substitutes available in AMHS's markets, the vehicle tariffs currently in place are still lower than many of the other comparable services offered in AMHS's market.

4.3.1 Commercial Vehicle Adjustment

It is common for ferry service providers to charge different rates for commercial and passenger vehicles. This difference in tariff prices is often achieved by assigning different measurement criteria to the different vehicle types. Passenger vehicle tariffs tend to be a flat fee based on the length and height of an average passenger vehicle with an addition variable cost charged for vehicles that exceed that average. Commercial vehicle tariffs are commonly a fixed variable fee based on the length of the vehicle. Brittany Ferries, DFDS Seaways, BC Ferries, Irish Ferries, and Marine Atlantic all charge separate tariffs for commercial and passenger vehicles and commercial tariffs are on average between 60–120 percent higher than passenger vehicle tariffs for vehicles of similar size. The study team recommends that AMHS implement a similar 60–120 percent higher commercial vehicle fee. This increase should be administered gradually over multiple years to mitigate the risk of shocking a specific market.

4.4 Seasonal Adjustments

Many of the ferry systems analyzed in this report charge higher tariffs during peak times of traffic. Similar to AMHS, both the Washington State Ferry System and BC Ferries experience higher traffic volumes during the summer months. Washington State Ferries holds passenger tariffs constant throughout the year and increases vehicle tariffs during their peak season, whereas BC ferries increases both passenger and vehicle tariffs during their peak season. During these peak months these two systems increase passenger fares by 0–30 percent and increase vehicle fares by 30–40 percent. The study team recommends that AMHS implement a tariff adjustment during the peak summer season between 0 and 30 percent to take advantage of the increase in demand and scarcity of available space on the routes it offers. Setting the lower bounds of the recommended seasonal adjustment at zero instead of three or five percent gives AMHS more freedom to assess what routes are most impacted by seasonal traffic, for both passenger and vehicles, and adjust accordingly. This also presents the option for some tariffs to remain constant year-round if AMHS does not deem a seasonal adjustment appropriate. The study team suggests that this adjustment be added gradually over multiple years.

4.5 Route Type Adjustment

The study team was also tasked with identifying route type adjustments for the dedicated routes and express routes offered by AMHS. Express routes are mentioned briefly in Table 16 in the Transit Industry Fare Practices section of this report, and are commonly seen in bus transport systems. Two transit systems that currently implement a route adjustment for express routes are the NY Metropolitan Transit Authority (NY MTA) and the Valley Transport Authority (VTA) in San Jose, California. Both of these transit systems offer "express" routes during peak times (rush hours) that have fewer stops than the normal routes offered other times of the day. Both the NY MTA and VTA charge twice as much for "express" tickets as their normal passenger fares. Another comparison that can be made when looking at route options with fewer stops and shorter travel times is Alaska Airlines' direct flights versus the "milk run" route between Anchorage and Seattle. Unlike the express routes offered by NY MTA and VTA, it is more expensive to fly from Anchorage to Seattle on a route with more stops than a direct route between the two cities. The fares for a single passenger trip on both the traditional (more stops) and express routes (fewer stops) for each of the transit providers discussed above are displayed in Table 22.

Table 22. Traditional vs. Express Passenger Fares

Service Provider	Traditional Route (more stops) ($)	Express Route (fewer stops) ($)	Percent Difference (%)
NY MTA	2.50	6.00	140
VTA	2.00	4.00	100
Alaska Airlines	383.80	246.30	-36

Note: the Alaska Airlines entry compares the "milk run" (ANC-JNU-SIT-KTN-SEA) as the "traditional" route to a direct flight (ANC- SEA) as the "express" route based on fares for February 9, 2015.
Source: NY MTA, 2014. VTA, 2014 and Alaska Airlines, 2014.

Since there are a number of factors contributing to the express routes addressed above, including traffic patterns, time of day, and customer demand, it is hard to isolate what portion of the increase in fares (or decrease in the case of Alaska Airlines) can be attributed to providing routes with fewer stops and a shorter overall transit time.

The study team also researched premiums being applied to fares on dedicated routes, like the service provided between Metlakatla/Annette Bay and Ketchikan, but was unable to find a suitable comparison on which to base a route type adjustment. Another option that could be used as a basis for a route type adjustment is utilization. A premium could be applied to tariffs on routes that have a higher average utilization rate, like some of the mainline routes operated by AMHS. The study team recommends implementing a 10 percent premium on routes that offer services that go beyond the traditional routes offered by AMHS. This could include express routes, dedicated routes and highly utilized routes. The study team also recommends tracking the impact of the recommended 10 percent premium so that it can be more accurately calibrated and adjusted to better meet customer demands.

4.6 Setting a Farebox Recovery Goal

The study team also recommends that AMHS set a target farebox recovery goal and track its farebox recovery rate on an annual basis. Based on industry averages discussed in section 3.3.2, the study team suggests adopting a farebox goal of between 39–65 percent for the system as a whole, which could also be considered for individual routes. This goal should take into account the anticipated volume of tariff sales, the amount of subsidies expected, and operating costs.

4.7 Tracking Tariffs to Inflation Measures

The CPI, PPI, and average operating expenditure per nautical mile all suggest that AMHS increase its tariffs in order to maintain financial sustainability. The recommended increase in tariffs should be spread over multiple years to prevent shocking the market, and once tariffs are brought in line with current market conditions, the study team recommends smaller annual increases (or decreases) to maintain its financial position. This strategy will allow AMHS to avoid a “catch up” situation, similar to the current predicament, and will allow changes in tariffs to easily be absorbed by customers.

4.8 Travel Agent Commissions

Over the past decade, major airline carriers have cut their commission programs for travel agents. This change was brought on by a trend of steady decline in revenues throughout the airline industry and the increased use of online reservation services. Similarly, during the Alaska Legislative session for Fiscal Year 2014, AMHS saw a significant reduction in its operating budget ($3.5 million) and as a result has decided that commissions will no longer be paid for bookings of Alaska residents traveling within the state of Alaska (ADOT&PF 2013). This reduction in commissionable bookings falls in line with transportation industry trends and the study team supports this decision. Going forward, it would be useful for AMHS to track commissionable sales and to see what percentage of total sales they account for and the total amount of commissions paid out every year. This will be helpful in assessing the effectiveness of the remaining commissionable programs in the future. An audit of the administrative costs associated with handling consumer purchases versus travel agent purchases may also provide valuable information to evaluate the benefit AMHS receives from travel agent commissions.

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6 Appendix A: 2013 Link Volume Summaries

The follow section contains the link volume summary reports by region from AMHS's 2013 Annual Traffic Volume Report, which are referenced in section 2.6 of this report.

Southeast Alaska Link Volume

LINK	PASSENGER			VEHICLE			TRIPS	LINK LENGTH	VESSEL MILES
	Count	Miles	Capacity	Count	Miles	Capacity			
ANGOON-HOONAH	188	11,844	27.9%	33	2,331	33.0%	3	63	189
ANGOON-JUNEAU	3,147	245,466	27.7%	765	64,116	45.8%	52	78	4,056
ANGOON-TENAKEE	1,330	46,550	11.9%	345	12,670	21.4%	49	35	1,715
BELLINGHAM-KETCHIKAN	13,790	8,205,050	49.1%	5,652	3,396,260	94.9%	60	595	35,700
HAINES-JUNEAU	42,350	2,879,800	35.5%	13,468	943,092	60.1%	321	68	21,828
HAINES-SKAGWAY	23,597	306,761	21.7%	7,612	98,254	37.3%	291	13	3,783
HOONAH-ANGOON	591	37,233	21.9%	113	8,064	28.4%	12	63	756
HOONAH-JUNEAU	7,999	383,952	28.2%	2,974	143,712	64.5%	107	48	5,136
HOONAH-KAKE	358	41,528	44.8%	68	7,772	44.5%	2	116	232
HOONAH-SITKA	3,284	387,512	34.9%	1,014	123,664	55.9%	26	118	3,068
HOONAH-TENAKEE	1,174	57,526	14.7%	238	12,887	20.6%	35	49	1,715
JUNEAU-ANGOON	3,208	250,224	33.6%	779	63,492	55.4%	44	78	3,432
JUNEAU-HAINES	41,517	2,823,156	34.8%	12,823	907,324	57.3%	321	68	21,828
JUNEAU-HOONAH	9,386	431,756	26.8%	2,998	140,438	53.9%	137	46	6,302
JUNEAU-KAKE	3,017	343,938	26.2%	1,012	117,306	46.1%	30	114	3,420
JUNEAU-KETCHIKAN	1,827	429,345	22.6%	678	167,085	55.4%	18	235	4,230
JUNEAU-PELICAN	199	18,109	11.1%	55	4,004	21.0%	8	91	728
JUNEAU-PETERSBURG	5,950	731,850	27.4%	1,862	229,887	46.7%	60	123	7,380
JUNEAU-SITKA	20,452	2,699,664	37.3%	6,989	944,196	67.8%	176	132	23,232
JUNEAU-SKAGWAY	301	24,381	71.7%	43	4,131	70.0%	2	81	162
JUNEAU-TENAKEE	1,619	101,997	20.8%	377	25,452	33.6%	34	63	2,142
JUNEAU-YAKUTAT	2,631	594,606	29.2%	1,191	266,454	88.9%	20	226	4,520
KAKE-HOONAH	284	32,944	63.1%	54	6,264	64.4%	1	116	116
KAKE-JUNEAU	2,607	297,198	17.3%	880	99,408	30.1%	42	114	4,788
KAKE-PETERSBURG	5,704	370,760	23.3%	1,844	116,350	39.2%	66	65	4,290
KAKE-SITKA	4,660	535,900	23.9%	1,536	169,050	41.1%	52	115	5,980
KETCHIKAN-BELLINGHAM	12,486	7,429,170	43.8%	5,131	3,187,415	84.9%	61	595	36,295
KETCHIKAN-JUNEAU	1,918	450,730	28.4%	592	146,640	59.0%	15	235	3,525
KETCHIKAN-METLAKATLA	7,467	119,472	24.9%	2,201	40,688	61.1%	240	16	3,840
KETCHIKAN-PRINCE RUPERT	8,005	728,455	19.4%	3,452	295,568	44.4%	103	91	9,373
KETCHIKAN-WRANGELL	22,016	1,959,424	29.7%	8,061	703,990	54.2%	179	89	15,931
METLAKATLA-KETCHIKAN	7,079	113,264	23.6%	2,063	38,640	57.3%	240	16	3,840
PELICAN-JUNEAU	157	14,287	8.7%	41	2,821	15.5%	8	91	728
PETERSBURG-JUNEAU	16,664	2,049,672	39.0%	5,863	720,657	67.2%	100	123	12,300
PETERSBURG-KAKE	6,268	407,420	17.9%	2,308	141,960	34.2%	95	65	6,175
PETERSBURG-WRANGELL	20,701	848,741	28.2%	7,816	316,110	53.2%	177	41	7,257
PRINCE RUPERT-KETCHIKAN	7,962	724,542	18.9%	3,487	294,476	44.0%	105	91	9,555
SITKA-HOONAH	3,497	412,646	34.6%	1,271	152,338	65.2%	28	118	3,304
SITKA-JUNEAU	10,352	1,366,464	33.3%	2,675	372,768	53.6%	126	132	16,632
SITKA-KAKE	3,712	426,880	30.4%	969	109,250	41.1%	34	115	3,910
SITKA-PETERSBURG	10,746	1,676,376	34.9%	4,371	688,740	65.9%	67	156	10,452
SKAGWAY-HAINES	22,509	292,617	20.6%	6,761	90,025	33.0%	292	13	3,796
SKAGWAY-JUNEAU	305	24,705	72.6%	38	3,483	60.7%	2	81	162
TENAKEE-ANGOON	1,177	41,195	10.8%	332	11,760	20.9%	48	35	1,680
TENAKEE-HOONAH	702	34,398	13.2%	268	12,936	35.3%	23	49	1,127
TENAKEE-JUNEAU	2,100	132,300	19.6%	353	24,822	22.8%	47	63	2,961
WRANGELL-KETCHIKAN	20,809	1,852,001	28.4%	7,906	696,959	53.8%	177	89	15,753
WRANGELL-PETERSBURG	21,532	882,812	29.1%	7,799	313,609	52.4%	179	41	7,339
YAKUTAT-JUNEAU	1,887	426,462	30.0%	795	181,026	84.8%	14	226	3,164
SITKA-ANGOON	2,003	134,201	43.4%	443	31,624	65.0%	22	67	1,474
BELLINGHAM-PRINCE RUPERT	211	109,298	46.9%	87	47,656	103.3%	1	518	518
JUNEAU-GUSTAVUS	3,950	244,900	24.7%	1,371	84,072	58.9%	69	62	4,278
GUSTAVUS-JUNEAU	4,522	280,364	21.1%	1,853	114,080	59.3%	86	62	5,332
GUSTAVUS-PELICAN	276	12,696	12.0%	59	2,024	17.8%	10	46	460
PELICAN-GUSTAVUS	283	13,018	12.3%	66	2,208	20.0%	10	46	460
HOONAH-GUSTAVUS	659	15,157	14.5%	319	7,130	48.3%	20	23	460
GUSTAVUS-HOONAH	411	9,453	18.3%	180	3,864	54.6%	10	23	230
PETERSBURG-KETCHIKAN	262	29,344	30.9%	92	11,088	45.6%	2	112	224
YAKUTAT-GUSTAVUS	473	83,721	15.0%	393	70,092	83.7%	7	177	1,239
KETCHIKAN-ANNETTE BAY	8,424	67,392	25.8%	2,465	23,024	63.0%	261	8	2,088
ANNETTE BAY-KETCHIKAN	7,943	63,544	24.2%	2,428	22,680	61.5%	263	8	2,104
ANGOON-SITKA	1,991	133,397	43.1%	496	34,304	72.8%	22	67	1,474
KETCHIKAN-PETERSBURG	262	29,344	32.8%	84	9,072	55.5%	2	112	224
KETCHIKAN-SITKA	14	3,192	3.1%	7	1,596	10.7%	1	228	228
TOTAL	442,905	45,932,104	35.2%	150,298	17,084,858	64.7%	5,115	-	370,620

Southwest Alaska Link Volumes

LINK	PASSENGER			VEHICLE			TRIPS	LINK LENGTH	VESSEL MILES
	Count	Miles	Capacity	Count	Miles	Capacity			
CHENEGA BAY-CORDOVA	23	2,231	9.2%	17	1,552	52.4%	1	97	97
CHENEGA BAY-KODIAK	1,016	204,216	12.5%	780	136,881	64.7%	18	201	3,618
CHENEGA BAY-WHITTIER	1,077	72,159	12.9%	659	39,463	53.2%	19	67	1,273
COLD BAY-KING COVE	127	3,175	9.4%	55	1,325	27.4%	3	25	75
CORDOVA-CHENEGA BAY	8	776	1.6%	8	679	12.3%	2	97	194
CORDOVA-TATITLEK	116	5,800	3.9%	51	2,500	12.8%	12	50	600
CORDOVA-VALDEZ	4,400	325,600	19.5%	1,599	114,996	50.3%	100	74	7,400
CORDOVA-WHITTIER	7,406	718,382	17.0%	3,576	337,269	58.7%	191	97	18,527
HOMER-KODIAK	4,175	567,800	21.6%	2,117	269,144	70.9%	50	136	6,800
HOMER-PORT LIONS	770	103,180	25.3%	435	53,198	67.3%	19	134	2,546
HOMER-SELDOVIA	1,983	33,711	11.0%	1,336	21,216	44.9%	59	17	1,003
KING COVE-COLD BAY	141	3,525	10.4%	60	1,500	29.9%	3	25	75
KING COVE-SAND POINT	250	24,500	18.5%	72	7,350	36.0%	3	98	294
KODIAK-CHENEGA BAY	923	185,523	11.4%	587	104,520	48.6%	18	201	3,618
KODIAK-HOMER	3,888	528,768	19.1%	2,001	249,560	62.7%	55	136	7,480
KODIAK-PORT LIONS	390	10,530	22.2%	177	4,779	47.4%	11	27	297
PORT LIONS-HOMER	469	62,846	19.5%	267	33,232	52.3%	15	134	2,010
PORT LIONS-KODIAK	485	13,095	21.7%	246	6,264	51.6%	14	27	378
SAND POINT-KING COVE	257	25,186	19.0%	89	9,212	44.5%	3	98	294
SELDOVIA-HOMER	1,867	31,739	10.6%	1,198	19,074	40.9%	58	17	986
TATITLEK-CORDOVA	109	5,450	4.0%	57	2,700	15.8%	11	50	550
TATITLEK-VALDEZ	163	3,586	3.4%	68	1,430	10.8%	21	22	462
VALDEZ-CORDOVA	3,650	270,100	16.6%	1,471	105,154	47.6%	97	74	7,178
VALDEZ-TATITLEK	173	3,806	4.0%	81	1,650	14.4%	19	22	418
VALDEZ-WHITTIER	10,686	833,508	30.0%	3,344	260,052	69.7%	147	78	11,466
WHITTIER-CHENEGA BAY	1,153	77,251	14.6%	858	50,384	73.2%	18	67	1,206
WHITTIER-CORDOVA	8,466	821,202	19.1%	3,778	357,542	61.1%	194	97	18,818
WHITTIER-VALDEZ	6,958	542,724	20.0%	2,432	194,844	52.1%	143	78	11,154
CHENEGA BAY-VALDEZ	6	522	2.4%	7	522	20.5%	1	87	87
VALDEZ-CHENEGA BAY	176	15,312	39.1%	75	5,916	111.4%	1	87	87
KODIAK-SELDOVIA	734	88,814	11.7%	366	40,535	39.0%	14	121	1,694
CHENEGA BAY-HOMER	94	-	10.4%	87	-	65.2%	2	-	2
HOMER-CHENEGA BAY	44	-	9.8%	51	-	76.5%	1	-	1
OLD HARBOR-KODIAK	75	7,500	16.7%	49	5,000	73.0%	1	100	100
OLD HARBOR-SAND POINT	36	10,476	8.0%	53	16,587	79.3%	1	291	291
KODIAK-OLD HARBOR	56	5,600	12.4%	64	6,800	94.9%	1	100	100
SAND POINT-OLD HARBOR	58	11,020	12.9%	44	8,550	64.9%	1	190	190
PORT LIONS-OUZINKIE	539	7,007	33.7%	264	3,211	77.7%	10	13	130
OUZINKIE-PORT LIONS	331	4,303	20.7%	178	2,171	52.4%	10	13	130
KODIAK-OUZINKIE	600	8,400	37.5%	219	3,024	64.4%	10	14	140
OUZINKIE-KODIAK	781	10,934	48.8%	290	3,878	85.2%	10	14	140
SELDOVIA-KODIAK	697	84,337	10.3%	414	46,585	41.2%	15	121	1,815
COLD BAY-DUTCH HARBOR	90	16,560	6.7%	24	4,600	12.0%	3	184	552
KODIAK-SAND POINT	152	54,264	16.9%	62	22,491	46.5%	2	357	714
SAND POINT-KODIAK	81	28,917	9.0%	32	12,138	23.8%	2	357	714
DUTCH HARBOR-COLD BAY	79	14,536	5.9%	25	4,416	12.2%	3	184	552
TOTAL	**66,758**	**5,848,871**	**18.6%**	**29,723**	**2,573,894**	**57.3%**	**1,392**	**-**	**116,256**

Cross Gulf Link Volumes

LINK	PASSENGER			VEHICLE			TRIPS	LINK LENGTH	VESSEL MILES
	Count	Miles	Capacity	Count	Miles	Capacity			
WHITTIER-YAKUTAT	2,079	627,858	25.7%	1,054	320,120	87.4%	18	302	5,436
YAKUTAT-WHITTIER	2,237	675,574	29.2%	1,018	303,510	89.4%	17	302	5,134
YAKUTAT-VALDEZ	153	43,605	34.0%	56	14,820	84.0%	1	285	285
HOMER-YAKUTAT	154	-	17.1%	74	-	55.0%	2	-	2
CHENEGA BAY-YAKUTAT	37	-	8.2%	49	-	72.8%	1	-	1
YAKUTAT-CHENEGA BAY	85	-	9.4%	64	-	47.8%	2	-	2
TOTAL	**4,745**	**1,347,037**	**27.6%**	**2,315**	**638,450**	**88.2%**	**41**	**-**	**10,860**