Draft: Reshaping the Alaska Marine Highway System

Prepared for

Alaska Department of Transportation and Public Facilities

January 2020

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Please cite as: Northern Economics, Inc. *Draft: Reshaping the Alaska Marine Highway System*. Prepared for Alaska Department of Transportation and Public Facilities. January 2020.

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Abbreviations

2-on/2-off	Two-weeks on/two-weeks off
AMHS	Alaska Marine Highway System
CFR	Code of Federal Regulations
COI	Certificate of Inspection
DOT&PF	Alaska Department of Transportation & Public Facilities
FHWA	Federal Highway Administration
FY	Fiscal year
IBU	Inland Boatmen's Union
IFA	Inter-Island Ferry Authority
K-TCorp	Kennicott-Tustumena Corporation
LCC	Lynn Canal Corporation
MetCorp	Metlakatla Corporation
M.E.B.A.	Marine Engineers' Beneficial Association
MM&P	International Organization of Masters, Mates, and Pilots
NHS	National Highway System
PWS	Prince William Sound
SATP	Southeast Area Transportation Plan
SCFC	Southcentral Ferries, Inc.
SE	Southeast
SEFC	Southeast Ferries, Inc.
SOLAS	Safety of Life at Sea
SW	Southwest
USCG	United States Coast Guard
WSB	Warm Springs Bay

AMHS Community Port Codes

Community	Port Code	Community	Port Code	Community	Port Code
Akutan	AKU	Juneau	JNU	Sandpoint	SDP
Angoon	ANG	Kake	KAE	Seldovia	SDV
Bellingham	BEL	Ketchikan	KTN	Sitka	SIT
Chenega Bay	CHB	King Cove	KCV	Skagway	SGY
Chignik	CHG	Kodiak	KOD	Tatitlek	TAT
Cold Bay	CBY	Metlakatla	ANB	Tenakee Springs	TKE
Cordova	CDV	Old Harbor	OLD	Unalaska/Dutch Harbor	UNA
False Pass	FPS	Ouzinkie	OUZ		
Gustavus	GUS	Pelican	PEL	Valdez	VDZ
Haines	NHS	Petersburg	PSG	Whittier	WTR
Homer	HOM	Port Lions	ORI	Wrangell	WRG
Hoonah	HNH	Prince Rupert	YPR	Yakutat	YAK

Executive Summary

ES-1 Introduction and the Purpose and Need for this Analysis

This report provides a detailed analysis of the financial impact of several options for reshaping the Alaska Marine Highway System (AMHS). This study has been undertaken to support the Alaska Department of Transportation & Public Facilities (DOT&PF) in identifying potential reductions of the state's financial obligation and liability as it pertains to AMHS.

In February 2019, Governor Dunleavy unveiled his proposed budget based on five tenets (Office of Governor Michael J. Dunleavy 2019b):

- Expenditures cannot exceed existing revenue;
- The budget is built on core functions that impact a majority of Alaskans;
- Maintaining and protecting our reserves;
- The budget does not take additional funds from Alaskans through taxes or the PFD;
- It must be sustainable, predictable and affordable.

The Governor's budget summary (Office of Governor Michael J. Dunleavy 2019a) highlights AMHS's position and the need for this study:

> The Department of Transportation & Public Facilities currently has 10 ferries serving 35 ports in Alaska, Prince Rupert, B.C., and Bellingham, WA. The AMHS is heavily subsidized by State of Alaska General Funds; its fare box recovery rate in FY2018 was 33.3%. Ridership is trending down; 2018 passenger capacity was 42.6% and vehicle capacity was 51.6%. The department will work with a marine consultant to investigate options available for moving the AMHS towards privatized service or service provided by public/private partnership, with the intent of reducing the State's financial obligation and/or liability. For example, there may be routes where a smaller vessel could provide more reliable and less costly transportation services.

Though the budget statement that led to this study highlights a public/private partnership as one option for addressing AMHS's financial challenges, the scope of this study is much broader. It provides an analysis of eleven options for changes to the system, relying on extensive data analysis, community and industry interviews, past studies, and quantitative modeling.

AMHS is a complex system of vessels, facilities, schedules, and routes; employees and labor unions; resident, non-resident, and business users; and passenger, vehicle, and cargo transport. Changes to any part of the system can have impacts beyond that immediate change. This report presents a rigorous, data-driven analysis of potential changes to AMHS and what they mean to the state's financial obligation.

This study used AMHS data for fiscal year (FY) 2009–2018 as the basis for existing conditions, along with information gathered from a survey and a series of interviews with mayors and other leaders of communities served by AMHS; a series of interviews with members of the transportation industry soliciting their views on potential alternatives to AMHS; and a statewide telephone survey of residents.

ES-2 Means Used to Assess Options

The objective of this study is to identify potential reductions in the state's financial obligation and/or liability as they relate to AMHS. Achieving that goal will require increases in revenues, reductions in cost, or a combination of the two. The following "levers" were used to assess the options studied in this analysis.

Increasing fares is the most direct way to boost revenue. Customers' response to fare increases will depend on the elasticity of demand[1] with respect to the cost of a ticket. Historically, for most AMHS routes, both passenger and vehicle demand are inelastic, meaning that price increases generally result in increases in total revenue with a few exceptions: 1) passenger fare increases on the Southwest (SW) route to or from Kodiak resulted in less revenue; 2) passenger fare increases on the Cross-Gulf routes resulted in less revenue overall unless the fare increases were limited to travel to or from Bellingham. Price changes for passengers on SE Feeder routes to Sitka neither increased nor deceased revenue in a notable way.

In addition to simply adjusting fares to increase revenues, AMHS could employ more "dynamic" pricing strategies that adjust prices during periods when demand is high (or low), or when ticket sales for particular sailings reach predetermined levels.

Given the size of AMHS's operating losses, reducing costs may be more important than increasing revenues if AMHS is to become less dependent on funding from the State of Alaska. Cost reductions could be realized through different strategies:

- Reduce the number of vessels in the AMHS fleet
- Reduce the number of operating days
- Reduce the number of hours the vessel operates
- Reduce the number of times ferries call at a given community
- Eliminate ports and communities from service
- Contract out passenger services to private contractors
- Reduce onboard staffing levels
- Change the operating parameters of the Vessel
- Reduce rates of pay of AMHS employees

The analysis used an array of assumptions to estimate vessel operating cost reductions. These estimates are intended for comparison and, if any one of the options were actually implemented, AMHS would need more precise data and analysis to assess financial impacts. A key assumption is that AMHS, or the eventual owner of AMHS vessels, would have the flexibility within U.S. Coast Guard regulations to determine the number of hours that each vessel would operate, the number of cabins it would have on offer (if any), and the size of the crew that would be utilized. These factors are subject to negotiated labor agreements with three marine unions. While this analysis takes no position with respect to these agreements, it assumes that in the future AMHS or the eventual owners of AMHS ferries would negotiate the manning levels for each vessel for a minimum of two services levels that could be utilized during the course of a given year.

[1] The elasticity of demand is a measure used to show the responsiveness of the quantity demanded when there is a change in the price. Normally when the price increases, the quantity demanded decreases—this is a basic principal of economic theory. If there is a 10 percent price increase and the quantity demanded decreases by less than 10 percent, demand is said to be inelastic. If instead the quantity demanded decreases by more than 10 percent, then demand is said to be elastic. If demand is inelastic, a price increase will result in an increase in total revenue.

ES-2.1 Quantitative Assessments and Model Calibration Using FY 2018 Operations

The quantitative assessments utilize a three-step process to estimate the impacts of each option:

1) Develop a hypothetical sailing schedule for each vessel and route group to match the parameters specified in the option and calculate the change in number of sailings to each city pair relative to the average from July 1, 2009 to December 31, 2018. The hypothetical sailing schedule is also used to calculate the number of operating days for each vessel utilized.
2) Estimate the change in the number of passengers, vehicles and cabins and resulting revenues using regression models developed specifically for each route group.
3) Estimate the operating costs for labor, fuel, and other expenses of each vessel utilized under the option using the cost-reduction assumptions described earlier.

The study team developed regression models[2] explicitly for use in the AMHS Reshaping Study utilizing data from July 1, 2008 through December 31, 2018 to forecast passenger and vehicle counts and revenues under the options. Each regression model also includes two key variables of interest which serve as the basis for estimating revenue in this study's quantitative assessments: 1) the number of sailings provided; and 2) the prices for AMHS service. In addition, the regression models account for changes in the seasonality of service, by recognizing the percentage of sailings in the peak (June-August) and winter (November–March) seasons.

Each model is specific to a particular route group and predicts the quantity for AMHS passenger and car deck service while accounting for seasonal influences like higher levels of traffic during the summer tourism months, low travel during winter months, and the effect of inflation on fares over time. Additionally, the models consider what services and infrastructure are available to AMHS travelers in both the departure and arrival city. Each regression model uses variables to account for access to hospitals, jet runways, regional hubs, major metro areas (Bellingham or Anchorage), and the contiguous road system.

Separate models have been constructed for both passenger service and car deck service across each of the eight defined route groups. Models were not developed for cabins revenues—for purposes of this analysis it is assumed that cabin revenues change in proportion to changes in passenger revenues. Changes in revenue are estimated by constructing a hypothetical weekly schedule (based on the constraints of each alternative option) and applying the level of service and seasonal changes from that schedule to the regression model. The output of the regression models are estimates of passenger and car deck volumes and revenues. Cabin revenues are estimated as a proportion of passenger revenues.

ES-2.1.1 Calibration of Regression Models to FY 2018 Operations

During FY 2018, AMHS collected $47.3 million in vessel-based revenue, as reported by AMHS (2019b). However, the traffic and volume data provided by AMHS indicate revenues of only $45.3 million in FY 2018—approximately $2 million less than the actual revenue—the difference is attributed to vessel-based sales of food, beverages, and other amenities. In the regression model for FY 2018, the $2 million in other revenue is distributed across route groups based on passenger and cabin revenue. In model results of change scenarios, other revenue is estimated as a proportion of passenger and cabin revenue.

The regression models used to assess revenues within the analyzed options have also been calibrated to account for natural errors in the regression analyses using FY 2018 as the baseline. To calibrate the

[2] Regression models are a statistical method of analyzing data that are used for predictions and forecasting in a variety of industries.

models, the study team input schedules (service levels) and prices that mirrored actual values for FY 2018 into the regression models. The model output produced a total revenue estimate of $47.7 million after inclusion of estimates for on-board food and beverage purchases. Aggregating across all regions and revenue classes the model is very accurate, underestimating FY 2018 revenues by only $418,000 or 0.9 percent of FY 2018 revenues. However, the errors are not evenly distributed throughout the individual route group models and the study team does not wish to overestimate revenues or costs when examining the changes envisioned under the various options. Therefore, the revenue estimate for each quantitative assessment is modified by dividing modeled outputs for each route group by the calibrating deflators. As an example, the total projected revenue for FY 2018 from the regression model is $46.9 million. Dividing that result by 99.1 percent yields $47.3 million (i.e. $46,898÷ 99.1% = $47,316).

Actual vessel expenses in FY 2018 were $142.0 million (AMHS 2019b), compared to modeled expenses of $144.1 million. The operating cost calculator generates estimates that are approximately 1.5 percent greater than the actual vessel operating costs reported by AMHS (2019b) for FY 2018. For purposes of this study it is assumed that system-wide and shore-based shared expenses change in direct proportion to vessel operating costs.

ES-3 Options to Reshape AMHS

The scope of work for this study specified 11 options, as described below. This text for each option was derived from a combination of RFP and contract language early in the project.

1. Reshape the entire AMHS operation by selling or giving all vessels and terminals to a private entity to run whatever service they can justify economically.
2. Reshape parts of the AMHS by selling or giving some vessels and terminals for the specific purpose of providing service to certain communities, for example communities that are not on the National Highway System (NHS).
3. Transfer AMHS assets to a public corporation that would provide service based on a fixed or zero General Fund amount. The corporation board would set service levels, fares, and employee pay.
4. Lease vessels and terminals to a private entity, public corporation or non-profit entity to run as a for-profit business with the state responsible only for vessel and terminal overhaul and refurbishment.
5. Sell or lease vessels to a private entity, public corporation or non-profit entity while retaining the terminals as a state asset.
6. AMHS continues as a state entity but is directed by the Legislature[3] to drop or reduce specific high cost, low volume runs on the assumption that these communities would be serviced by the private sector with its own equipment.
7. AMHS continues as a state entity but contracts out for service to lower volume, expensive routes on the basis that a private entity would use smaller vessels and less expensive crews. Vehicle and passenger service could be provided by different vessels.

[3] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

8. Privatize all or some onboard passenger services: stateroom housekeeping, meal service, bars, gift shops, etc.
9. Implement further fare increases, including across the board increases, increases on more expensive runs, demand pricing for high demand periods or events, demand pricing based on percent of remaining vessel capacity, etc.
10. Legislature-directed[4] renegotiation of marine union contracts to reduce vessel operation costs.
11. Evaluate any potential route changes that would reduce the operating cost, especially utilizing existing road links and potential future road links.

This study used a two-tiered evaluation for each of the 11 options. After an initial review of each option, they were pared down to a set of options that warranted further study. Through the course of the study, research and interviews with members of industry and the public informed that paring process. Ultimately, it was decided to address each of the 11 options, but with assumptions based on research and interviews to limit each option to the conditions that would make it most viable. Further, while this study addresses each option, less viable options and those without data to conduct a meaningful analysis are given a less rigorous examination.

The following sections present an analysis of each of the 11 options.

ES-3.1 Option 1: Sell or Give all Vessels and Terminals to a Private Entity

Over the last five years, operating revenues have been 35 to 40 percent of operating expenses. Increasing fares to eliminate the operating loss using data from FY 2018 without any reduction in cost would require on average a revenue increase of 200 percent. Alternatively, operating expenses would need to be reduced by 67 percent if there were no changes in revenue. Realistically it is more feasible to recognize that the significant cost reductions needed to reduce or eliminate the subsidy would also result in lower levels of service and lower levels of revenues. As shown in Table 30, if revenues were reduced by 50 percent and costs were reduced by 83 percent the subsidy would be eliminated. If cuts to revenues were smaller (i.e. a 25 percent reduction) then costs would only need to be cut by 75 percent to eliminate the subsidy.

Even with the changes considered, the ferry system would still be dependent on federal and state funding for refurbishment and replacement of vessels and terminals. If the ferries and terminals were given to a private entity, those capital replacement costs, along with the property taxes that would be levied locally, would result in unsustainable losses. No business owner would accept all AMHS assets with the intent to provide service as the system currently operates, since it would not be possible to do so and earn even a modest rate of return to account for the risk. The only buyer that might be willing to accept the assets would do so with the intent of reselling them for a profit (such as for scrap) rather than providing ferry service to AMHS communities.

IFA is a regional example of Option 1. Even with its beneficial arrangement with the state, IFA receives an ongoing subsidy from the state of approximately $250,000 per year used as needed as a match for federal funds for major vessel and terminal maintenance. While IFA's revenues are less than annual operating costs, they are currently able to cover operating expenses by drawing down accrued savings.

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Given that the goal is to eliminate the subsidy while still having a minimum level of ferry service, the option to privatize the ferry system is not suitable for further consideration because it would likely result in no ferry service at all.

ES-3.2 Option 2: AMHS will Retain Selected Terminals and Vessels to Provide Service for Specific Defined Purposes

Two sub-options are discussed under Option 2. Option 2A focuses on providing service to AMHS ports on the National Highway System (NHS), while Option 2B focuses on providing service to the nearest roadhead. ES Table 1 lists AMHS ports on the NHS, while ES Table 2 list roadless communities currently served by AMHS.

ES Table 1. AMHS Ports that are also on the National Highway System

NHS Communities in Southeast Alaska						
Haines	Skagway	Auke Bay/Juneau	Sitka	Petersburg	Wrangell	Ketchikan
NHS Communities in Southcentral Alaska				NHS Communities in Washington		
Kodiak	Homer	Whittier	Valdez	Bellingham		

ES Table 2. Roadless Communities Currently Served by AMHS

AMHS Roadless Communities in Southeast Alaska						
Yakutat	Juneau/Auke Bay		Petersburg	Wrangell	Ketchikan	Metlakatla
Kake	Angoon	Sitka	Hoonah	Gustavus	Pelican	Tenakee Springs
AMHS Roadless Communities in Southcentral Alaska						
Cordova		Tatitlek		Chenega Bay		Old Harbor
Seldovia		Kodiak		Ouzinkie		Port Lions
AMHS Roadless Communities in Southwest Alaska						
Chignik	Sand Point	King Cove	Cold Bay	False Pass	Cold Bay	Unalaska

Both 2A and 2B would reduce the operating subsidy relative to operating subsidy from FY 2018 actuals, but subsidies would still be higher than the FY 2020 operating budget. The analysis finds that Option 2A would reduce the operating subsidy by 25 percent from the FY 2018 level, though it would be 43 percent higher than the FY 2020 level. Option 2B would reduce the operating subsidy by 36 percent from the FY 2018 level, but the subsidy would be 26 percent higher than the FY 2020 level.

ES-3.3 Option 3: Transfer AMHS Assets to One or More Public Corporations or Port Authorities

Two sub-options are analyzed: Option 3A, a single public corporation similar to that proposed under the AMHS Reform Project; and Option 3B, multiple regional public corporations/port authorities.

Option 3A mirrors the AMHS Reform Project, an initiative led by the Southeast Conference that recommended AMHS be changed to a public corporation governance structure. One of the preeminent arguments of the Reform Project is that a system shielded from periodic political changes would have greater stability and therefore efficiency. Ultimately the public corporation would still be subject to

funding through the Alaska Legislature,[5] but would have greater latitude in instituting changes in the system. Conclusions from the qualitative assessment of Option 3A are that most, if not all, of the changes suggested in the AMHS Reform Project could be undertaken by AMHS, particularly with legislative direction, including the concept of an empowered Board of Directors. If these changes were undertaken by AMHS as a state agency, many of costs of transitioning to a public corporation could be avoided.

The quantitative assessment for Option 3A, with operating parameters developed by the study team, estimates that with a 25 percent general increase in fares, the operating subsidy would be reduced by 28 percent from the FY 2018 level, although this would be a 42 percent increase from the FY 2020 subsidy.

Under Option 3B, multiple regional public corporations and/or port authorities would take ownership of AMHS assets—both vessels and terminals—with the goal of providing at least minimal levels of ferry service to communities that are currently part of AMHS. Several regional entities have expressed interest in acquiring AMHS assets and operating independent ferry regional systems, particularly if future service cuts result in complete elimination of service to specific regions.

The analysis considered two variants of Option 3B: Option 3B-1, in which there would be six highly regionalized ferry systems, and Option 3B-2, in which there would be two broader systems operating in Southeast Alaska and Southcentral Alaska. The operating parameters for Option 3B-1 are the same as used for Option 3A and focuses on challenges related to resource sharing and the apportionment of subsidies to multiple entities. Option 3B-2 as specified would result in an overall subsidy that is 50 percent lower than the FY 2020 subsidy, accomplished primarily through reductions in Mainline service. Note that operational assumptions used in 3A, 3B-1, or 3B-2 could all be utilized by AMHS assuming that union contracts are renegotiated to allow the necessary flexibility.

ES-3.4 Option 4: Lease Vessels and Terminals to a Private Entity

Option 4 uses an iterative approach to search for operating parameters that would enable a private entity to operate AMHS vessels and terminals at a reasonable rate of return relative to its operating costs. The iterative process represents a series of steps which are cumulative, meaning that each iteration is an additional change to the model and the conditions of previous iterations still apply.

The assessment of Option 4 leads to the conclusion that even if vessels and terminals are leased to private entities, and the entire capital burden is covered by the State of Alaska, it is unlikely that a private for-profit entity would accept the responsibility of running all or any portion of the AMHS system using current vessels and terminals. The two routes that come closest to breaking even (Metlakatla-Ketchikan and Lynn Canal) would not be able to break even unless wages were reduced to levels that may not be realistic, even with the elimination of unions.

ES-3.5 Option 5: Lease Vessels but not Terminals to a Private Entity

Option 5 is considered as a special case of Option 4. Under this Option the terminals are considered eligible for federal aid, but this also means that additional state employees would be required and costs to the state would be higher than under Option 4. If there were additional uses for the state-owned terminals that would result in a meaningful impact to revenues and costs, the market would have already indicated demand for that activity in the past. Given that this is not the case, it does not appear that

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retaining ownership of the state terminals would result in any different outcome from that shown in Option 4.

ES-3.6 Option 6: The Legislature Directs[6] AMHS to Drop or Reduce Service to High-Cost, Low-Volume Ports

Under this option the legislature would make a determination and publicly announce that it will discontinue ferry service to selected communities at a specified date in the future. It is assumed that the end date would be no less than one full fiscal year from the announcement. This one-year transition period would allow private service providers to form in the communities where service has been discontinued.

While Option 6 specifically calls out high-cost, low-volume runs, the study team has found that none of the route groups defined in the analysis have revenues that exceed their nominal operating costs let alone their fully loaded operating costs once shared costs are included. If it is assumed that at least some level of service should continue to all of the route groups currently served by AMHS, then there are some individual communities that stand out as being particularly costly to serve given the revenues they generate: Pelican, Tatitlek, Port Lions, Ouzinkie, Seldovia, and Old Harbor. Eliminating AMHS stops to these communities could undoubtedly generate cost savings for AMHS or other operators of the ferry system. However, savings could only be realized if more cost-effective sailings replace those that are dropped, or if union agreements were to be renegotiated to allow operations managers to take advantage of the potential cost savings.

Private entities interviewed during this study have indicated a willingness to provide these alternative transportation services particularly transportation of passengers only (in passenger-only ferries) or transportation of cargo and vehicles without passengers (using barges). Combining passengers with cargo and vehicles is problematic from a regulatory standpoint, however, and changing from the combined service provided by AMHS ferries to passenger-only and cargo or vehicle-only service could impact ridership patterns. In the SE Feeder routes specifically, demand for passenger service is driven to some extent by the ability to also take a vehicle for use in the destination community to address multiple needs during a single trip (e.g., adding a shopping trip to appointments or other personal matters, using one's own vehicle). If only passenger service were available along these routes, water-based options would compete with much faster—and likely competitively priced—air travel.

ES-3.7 Option 7: Contracted Vessel Service Routes

Option 7 is similar to Option 6 except that under Option 7 the state would explicitly award contracts to private sector entities to provide additional transportation services to the communities for which AMHS service is discontinued. It is assumed that the state would award contracts to bidders that provide what is deemed by reviewers as the greatest level of service at the lowest cost to the state. The analysis assumes that private sector vessels that provide service to these "former AMHS communities" would be non-union vessels. If contracts with private operators cost the state no more than the nominal expenditures of AMHS in providing services to these communities, then—assuming that AMHS provides additional and more effective service to its remaining communities—it is likely that operational subsidies would be reduced.

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ES-3.8 Option 8: Privatize Onboard Passenger Services

In this option we provide a high-level quantitative assessment of the cost savings that could be generated by privatizing onboard services. The state is working to address the issue of manning requirements with the unions, which is a key prerequisite for contracting out passenger services. While the current marine union agreements do not allow the state to contract out onboard passenger services to private contractors, it is reasonable to assume a scenario similar to Washington State Ferries, wherein the employees would still be Inland Boatmen's Union members even though they were employed by a private contractor.

Even with potential labor cost savings, it is estimated that passenger services on all routes required a subsidy of $14.6 million in FY 2018. Because it appears that passenger revenues do not fully offset passenger service labor costs, private contractors bidding for the right to provide those services would likely be asking for payment from the state rather than providing a payment to the state. Therefore, while it may be possible to reduce AMHS costs through privatization, the private contractors that take over these services are likely to require continued subsidized support from the state.

ES-3.9 Option 9: Fare Increases

This option comprises several independent assessments of pricing strategies. The analysis documents the effects of fare increases that have been implemented over the last several years with the goal of determining whether fare increases have resulted in higher revenues overall (i.e. demand is inelastic as had been predicted in previous price elasticity studies). It also examines several additional pricing strategies that would increase prices on selected routes and time periods that are more heavily used by non-residents and the potential effectiveness of capacity-based and date-based pricing strategies that result in higher prices when capacity becomes limited or when tickets are purchased closer to departure dates.

The analysis of AMHS data indicates that increasing prices would result in higher overall revenues for most of the route groups while decreasing prices would result in lower overall revenues. These results agree with the findings of previous studies; demand for ferry service is generally inelastic and additional increases are likely to further increase total revenue. The main document describes routes that would benefit from these price changes.

If the state wishes to strategically increase prices so that the negative consequences to Alaska residents are minimized, then we would recommend raising prices on routes or seasons in which local resident traffic is relatively low. The analysis indicates that Alaska residents' utilization of AMHS service also varies significantly for northbound and southbound mainline trips between the same cities. For example, Alaska residents make up a much larger share of revenues on sailings from Haines to Bellingham than from Bellingham to Haines. If minimizing negative consequences to Alaska residents is important, pricing strategies should be tailored to individual route groups and seasons.

ES-3.10 Option 10: Renegotiation of Marine Union Contracts

Most of the options that have been assessed would require renegotiation of marine union contracts. The state's negotiating position would be much stronger if it were specifically directed by the Legislature.[7] See the main document for a summary of the assumed changes to manning requirements

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under the various options. In general, the options assume that vessels would be allowed to operate under at least two different sets of operating parameters within the year.

ES-3.11 Option 11: Potential Route Changes Taking Advantage of Existing or Future Land-based Infrastructure

Option 11 includes assessments of options that would rely on infrastructure development or greater utilization of existing infrastructure. Although there are many such potential developments, the analysis specifically examines the following: 1) a ferry terminal at Cascade Point on Berners Bay; 2) a road to Warm Springs Bay from Sitka; 3) a road from Kake to the north end of Wrangell Narrows; 4) a road from Tenakee Springs to Hoonah; 5) using the road between Homer and Whittier to reduce cost of Cross-Gulf sailings. Note that infrastructure investment using funding from the state can typically be used to leverage much larger levels of federal funding.

Lynn Canal Terminal at Cascade Point: Moving Lynn Canal operations out to Cascade Point would reduce the operating subsidy by $576,000 to $693,000 per year.

Warm Springs Bay Road and Terminal: Development of a road to Warm Springs Bay with an associated ferry terminal would result in meaningful cost savings for AMHS.

Kake to Petersburg Road and Shuttle Ferry: Development of a road and shuttle ferry between Kake and Petersburg would generate an estimated cost savings of $745,000 based on FY 2018 operating schedules. It is also likely that demand for ferry services originating from or destined to Kake would be reduced.

Tenakee Springs to Hoonah Road: Development of a road between Tenakee Springs and Hoonah would generate an estimated cost savings of $417,000 based on FY 2018 operating schedules.

Utilizing the Road Between Homer and Whittier: Including Homer, Kodiak, and Chenega Bay in Cross-Gulf sailings adds approximately 36 hours to Cross-Gulf sailings and adds at least $574 to the cost of tickets for two adults with a full-size SUV. Dropping the Homer–Whittier portion of the Cross-Gulf sailings would also mean the elimination of regular sailings to Chenega Bay.

ES-4 Conclusions and Recommendations

Reducing the AMHS operating subsidy to $24.0 million will be extremely difficult if there is also a desire to provide minimum levels of service to existing AMHS communities.

Option 3B-2 was the only studied option that achieved the target subsidy level and also provided minimum levels to most (but not all) communities currently served by AMHS. That option required a 5 percent reduction of vessel-based wage rates and 25 percent general increase in fares and other major vessel operation changes that would require renegotiation of union labor agreements. Under Option 3B-2, several route groups go without any service for extended periods of time. External service on the mainline runs to Bellingham and Prince Rupert is severely curtailed with service provided only by the *Kennicott* in conjunction with its Cross-Gulf service. Other larger SE communities are limited to service within Alaska, and service to SE Feeder communities would be reduced to a very limited number of trips each year. Prince William Sound and Homer-Kodiak would be without service from December 22 through April 27, and there would only be two trips scheduled to SW Alaska.

Selling or leasing AMHS assets to private entities is not feasible if minimum levels of service are also stipulated. Even without the stipulation of minimum service levels, Option 4 determines that private companies would find that operations in Lynn Canal and Metlakatla-Ketchikan are the only currently

services routes for which ferry service could be provided at break-even levels of costs and revenues. ES Table 3 summarizes the revenues, operating expenditures, and subsidies of options for which quantitative assessments were developed.

ES Table 3. Results of Options for which Full Quantitative Assessments were Developed

Option	Operational Scenario	Fare Changes Relative to FY 2018	Wage Rate Change Relative to FY 2018	Vessel Based Revenues ($1,000s)	Operating Expenditures ($1,000s)	Operating Profit (or Subsidy) ($1,000s)	Change in Subsidy Relative to FY 2020 Budget
2A	Provide service to National Highway System ports. Drop service to Prince Rupert, SE Feeder routes, SW Alaska and Cross-Gulf routes	–	–	$34,950	$106,072	($71,121)	+48%
2B	Provide service to nearest road head. Drop service to Bellingham, and Whittier except in Cross-Gulf routes. *Hubbard* replaces the *Tustumena*.	–	–	$29,048	$89,441	($60,393)	+26%
3A	A single public corporation runs the ferries and provides service to existing AMHS communities. Cost reduction measures include use of day-boats and two-week-on/two-week -off service to SE Feeder routes.	+25%	–	$45,198	$113,671	($68,473)	+42%
3B-1	Multiple public corporations run the ferries. Service same as Options 3A, but with a 5 percent reduction in wage rates relative to FY 2018.	+25%	(-5.0%)	$45,198	$110,045	($64,847)	+35%
3B-2	Two public corporations run the ferries & reduce subsidy to target of $24.05 million with 8.7 percent wage-rate reduction. Service continues to most AMHS ports.	+25%	(-8.7%)	$23,578	$47,632	($24,054)	(-50%)
4 with Subsidy	Private company leases vessels; minimizes subsidy while cutting wage-rates no more than 10% from FY 2018 levels. All service is cut except between Metlakatla/Ketchikan	+16%	(-10%)	$1,218	$1,590	($372)	(-99%)
11A	AMHS operates ferries with same parameters from Option 3A except a new terminal at Cascade Point is used for Lynn Canal service.	+25%	–	$44,392	$112,116	($67,724)	+41%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Based on the assessment conducted, the study team provides the following recommendations. Please see the main document for details about each recommendation:

1) Increase prices. The regression models developed by the study team indicate that revenues would increase if prices were strategically increased. Use the available data, as the study team has done, to determine which routes are likely to benefit from price increases and which are not.

2) When making changes to service levels, schedules, or prices, study the results with a focus on the impacts on the operating subsidy.

3) When reducing service, look for ways to reduce the number of sailings and operating costs while trying to provide some regular level of service to each region if possible.

4) Operate vessels as 12-hour or 14-hour day-boats whenever and wherever the sailing times and regulations will allow, even if this means moving from daily roundtrips to daily one-way trips. In

general, it appears that total costs would be reduced more than revenues, even if costs of watch crews, lodging, and per diem are included.

5) If port calls to individual communities are to be eliminated, look to cut communities that make it difficult to offer 12-hour or 14-hour day-boat service to higher volume routes. Consider whether communities that are dropped might be potential candidates for service from private operators. private operators. Example communities are Ouzinkie, Port Lions, Old Harbor, Seldovia, Tatitlek, Chenega Bay, Pelican and Tenakee Springs.

6) Provide long-term contracts to private operators to serve communities such as those listed above. With a stable operating environment, private operators may be able to develop profitable services to these, as well as potentially other unserved communities. Even if these services were partially subsidized by the state, the overall subsidy provided for ferry services could likely be reduced.

7) Consider additional infrastructure to reduce operational costs. State investments in infrastructure are typically able to leverage much larger levels of federal funding. Examples include a) development of the terminal at Cascade Point; b) development of the road to Warm Spring Bay with a terminal; c) development of the road between Kake and Wrangell Narrows

8) Look for ways to cut Cross-Gulf and Mainline costs, increase Cross-Gulf and Mainline utilization, and/or increase Cross-Gulf and Mainline revenues.

9) Southwest communities would be adequately served by AMHS if there were two trips out to Unalaska per year. Since car-deck capacity is a limiting factor on these runs, raising the car-deck prices would generate more revenue and help offset costs. This route would undoubtedly be a good one to use dynamic pricing. Start with relatively high rates and increase rates as space fills.

10) Work with communities and/or regional economic development associations to help reduce food and lodging costs of AMHS crews when schedule and cost constraints dictate that day-boat vessels overnight in communities that are not considered their home port.

11) Consider the privatization of night crews and lay-up crews. This would be similar to the concept of privatizing passenger staff.

12) Work to add flexibility to union agreements that would allow AMHS vessels to operate with smaller crews and fewer days in order to align operational capacity with demand. Overtly recognize in the union agreements that demand for ferry services is highly seasonal and that in order for AMHS to minimize its operational subsidies and to continue to operate, vessels need to have the flexibility to change operating parameters during the course of the year.

13) Look to incorporate concepts developed in the AMHS Reform Project that aim to promote and implement a long-term vision and strategy for AMHS while limiting the influence of short-term changes in the pollical or fiscal climate.

14) The legislature should consider creation of an appointed board of directors for AMHS that it is empowered to approve operating plans and capital initiatives. The board should have staggered terms, which would promote long-term stability.

1 Introduction and the Purpose and Need for this Analysis

This report provides a detailed analysis of the financial impact of several options for reshaping the Alaska Marine Highway System (AMHS). This study has been undertaken to support the Alaska Department of Transportation & Public Facilities (DOT&PF) in identifying potential reductions of the state's financial obligation and liability as it pertains to AMHS.

In February 2019, Governor Dunleavy unveiled his proposed budget based on five tenets (Office of Governor Michael J. Dunleavy 2019b):

- Expenditures cannot exceed existing revenue;
- The budget is built on core functions that impact a majority of Alaskans;
- Maintaining and protecting our reserves;
- The budget does not take additional funds from Alaskans through taxes or the PFD;
- It must be sustainable, predictable and affordable.

The Governor's budget summary (Office of Governor Michael J. Dunleavy 2019a) highlights AMHS's position and the need for this study:

> The Department of Transportation & Public Facilities currently has 10 ferries serving 35 ports in Alaska, Prince Rupert, B.C., and Bellingham, WA. The AMHS is heavily subsidized by State of Alaska General Funds; its fare box recovery rate in FY2018 was 33.3%. Ridership is trending down; 2018 passenger capacity was 42.6% and vehicle capacity was 51.6%. The department will work with a marine consultant to investigate options available for moving the AMHS towards privatized service or service provided by public/private partnership, with the intent of reducing the State's financial obligation and/or liability. For example, there may be routes where a smaller vessel could provide more reliable and less costly transportation services.

Though the budget statement that led to this study highlights a public/private partnership as one option for addressing AMHS's financial challenges, the scope of this study is much broader. It provides an analysis of eleven general options for changes to the system with a primary objective of reducing the AMHS operating subsidy by 50 percent from the fiscal year (FY) 2020 operating budget (i.e., to $24.0 million). The assessment of options relies on extensive data analysis, community and industry interviews, past studies, and quantitative modeling.

AMHS is a complex system of vessels, facilities, schedules, and routes; employees and labor unions; resident, non-resident, and business users; and passenger, vehicle, and cargo transport. Changes to any part of the system can have impacts beyond that immediate change. This report presents a rigorous, data-driven analysis of anticipated changes to AMHS and what it means to the state's financial obligation.

2 Overview of Existing Conditions through Fiscal Year 2018

This chapter summarizes the existing conditions for the AMHS using data for FY 2009–2018. The section also provides summaries of information gathered during the course of this study including: a) a summary of information collected through a survey and a series of interviews with mayors and other leaders of communities served by AMHS; b) a series of interviews with members of the transportation industry soliciting their views on potential alternatives to AMHS; and c) a summary of responses from a statewide telephone survey that asked Alaskans about their use of and perspectives on AMHS. The remainder of this section is organized as follows:

- **Section 2.1** provides an overview of service levels measured in operating days by vessels and illustrates changes in the level of service over the past ten and a half years.
- **Section 2.2** provides a summary of the fiscal status of AMHS from FY 2009 through FY 2018.
- **Section 2.3** defines the eight route groups that are a key analytical parameter used in this analysis and provides summaries of passenger and vehicle volumes and revenues for each group.
- **Section 2.4** provides a summary of the surveys and interviews from community leaders reflecting their insights on the interactions between AMHS and individuals and businesses within their community.
- **Section 2.5** provides highlights from interviews with key informants and businesses that may be able to supplement marine transportation alternatives within AMHS service regions.
- **Section 2.6** summarizes the results of a statewide telephone survey of Alaska residents.

Appendix A provides additional details on passenger and vehicle volumes and revenues by origin and destination.

Appendix B contains detailed profiles of the communities served by AMHS, as well as those communities which are closely associated to AMHS communities by geography and infrastructure—i.e. roads and/or Inter-Island Ferry Authority (IFA) service. Each profile includes demographic information including historic estimates and forecasts of population, school enrollment, and employment information. The profiles also summarize an investigation of alternative transportation methods like waterborne freight and airfare rates available during both the summer and winter seasons. Community-level AMHS revenue and volume data summaries are also provided in Appendix B with a series of tables and figures. Finally, the appendix contains a technical summary of the docking and loading facilities used by AMHS in each community.

Appendix C contains statistical details of the sixteen route-based regression models that were used to estimate revenues for the operating schedule developed in the assessment of options.

2.1 Summary of AMHS Service Levels

Table 1 shows the number of vessel operating days by AMHS vessel over time, along with a grand total of operating days each fiscal year. Vessel operating days peaked in FY 2011 at 2,698 and have decreased over time to 2,005 in FY 2018.

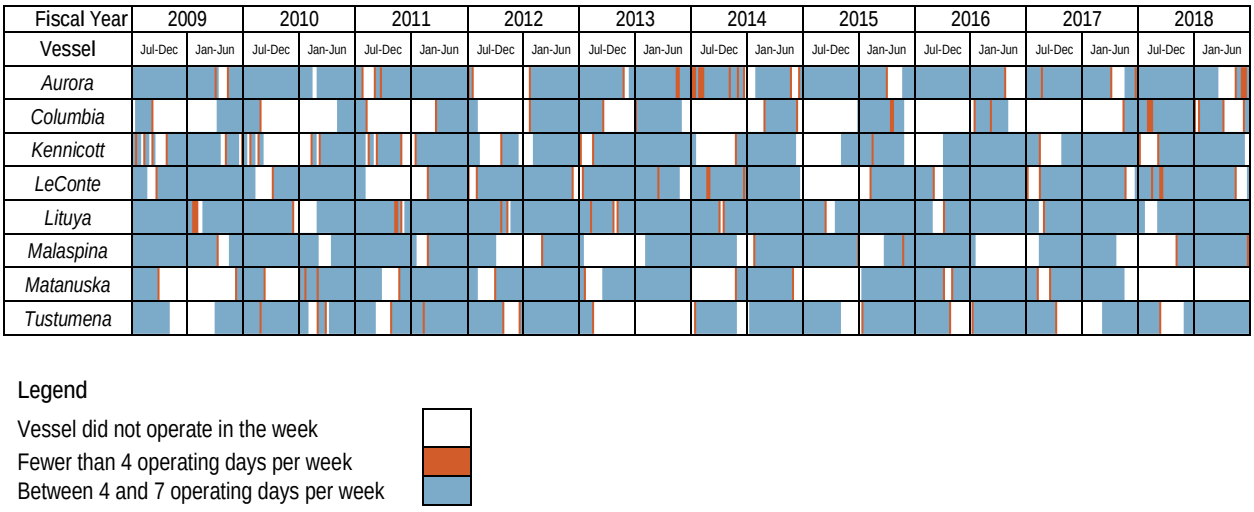
Table 1. Number of Vessel Operating Days by Vessel in FY 2009–2019

Vessel	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018 as % of 2009
Aurora	306	334	306	159	311	267	322	287	272	287	94%
Columbia	133	100	123	185	250	79	156	109	81	235	177%
Kennicott	275	143	287	239	317	227	206	233	287	301	109%
LeConte	329	288	142	333	313	312	118	332	318	314	95%
Lituya	266	208	262	258	253	255	245	242	258	234	88%
Malaspina	325	321	324	200	132	291	289	304	171	157	48%
Matanuska	97	238	306	303	302	206	128	333	318	122	126%
Tustumena	208	313	303	305	122	207	287	283	250	234	113%
Other Vessels	675	627	645	711	614	613	651	194	143	121	18%
Total	2,614	2,572	2,698	2,693	2,614	2,457	2,402	2,317	2,098	2,005	77%

Data Source: AMHS (2019a).

Figure 1 represents weekly vessel activity over time, with horizontal scales for both the calendar year and the State of Alaska fiscal year. The table area is shaded to reflect the number of days a vessel operated in any given week. Areas with no shading (white) mean that the vessel did not operate, while shaded areas illustrate when the vessel operated one to four days per week (orange) and four to seven days per week (blue).

Figure 1. Active AMHS Vessel Operating Schedule July 2008–December 2019



Data Source: AMHS (2019a)

The analyses within this chapter also account for seasonal fluctuations in travel that are often associated with tourism. The peak season includes June, July, and August, while the winter season spans from November through March. The remaining months of April, May, September, and October are considered "shoulder" months with varying levels of service and traffic depending on year and route.

The upper portion of Table 2 shows the number of vessel days operated within each season and by fiscal year, which includes contracted and other vessels that are no longer operating in AMHS. The lower portion of the table shows the percentage of days where vessels operated within each season, as compared to the

total number of vessel days that could have been operated (i.e. every vessel operated every day of the year), and accounts only for vessels that are currently operating in AMHS. AMHS vessels are operational for a much higher percentage of days during peak months (78 to 96 percent) and much lower operational capacity in the winter months (44 to 64 percent).

Table 2. AMHS Vessel Operating Days by Season in FY 2009–2018

Season	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018 as % of 2009
Number of Operating Days of All AMHS Vessels											
Total Days	2,614	2,572	2,698	2,693	2,614	2,457	2,402	2,317	2,098	2,005	77%
Peak	894	909	977	954	899	852	869	753	636	627	70%
Shoulder	810	852	921	936	874	791	776	781	717	696	86%
Winter	910	811	800	803	841	814	757	783	745	682	75%
Vessel Operating Days as a Percentage of Total Potential Operating Days											
Total Days	66%	67%	70%	68%	68%	63%	60%	73%	67%	65%	97%
Peak	88%	90%	95%	96%	88%	83%	89%	84%	79%	78%	88%
Shoulder	59%	63%	70%	74%	71%	59%	58%	74%	69%	67%	113%
Winter	59%	55%	55%	46%	55%	55%	44%	64%	58%	54%	93%

Data Source: AMHS (2019a).

The vessels in the AMHS fleet have a wide range of capacity in terms of passenger, cabins and available car-deck space. These varying capacities allow AMHS to provide a variety of services to the wide range of AMHS communities. Levels of capacity are also key indicators of operating costs, which will be discussed in the following section. Table 3 provides specifications of AMHS vessels and includes information for the *Chenega* and *Fairweather,* which are no longer part of the AMHS fleet, but which are referenced in this report.

Table 3. AMHS Vessel Specifications and Capacity

Vessel Name	Vessel Class	Normal Crew Complement	Service Speed (knots)	Fuel Use (gallons/hr)	Passengers	Car Deck (lane feet)	Staterooms
Aurora	Day-boat	24	14.5	190	250	660	N/A
Chenega	Shuttle	10	32.0	600	210	620	N/A
Columbia	Mainline	63	17.3	397	499	2,660	104
Fairweather	Shuttle	10	32.0	600	210	620	N/A
Hubbard	Day Boat	14	16.5	250	290	850	N/A
Kennicott	Mainline	55	16.75	354	450	1,560	109
LeConte	Day-boat	24	14.5	188	225	660	N/A
Lituya	Shuttle	5	11.5	55	125	300	N/A
Malaspina	Mainline	47	16.5	270	450	1,675	72
Matanuska	Mainline	48	16.5	234	450	1,675	106
Tazlina	Day Boat	14	16.5	250	290	850	N/A
Tustumena	Mainline	38	13.3	151	160	680	24

Note: The *Hubbard* is not actually listed in the data source, but it has same design as the *Tazlina* and therefore it is assumed it has the same capacity. The *Chenega* and *Fairweather* are no longer part of the AMHS fleet, but because they are referred to in this report they have been included in the table.

Source: AMHS (2019d).

2.2 Summary of Financial Operations

Table 4 summarizes information from the Alaska Marine Highway Fund Annual Report (AMHS 2019b). The table shows operating revenues and expenses on a vessel-by-vessel basis for vessels that were active in FY 2018, as well as all other revenues and shared vessel-based and shore-based expenditures FY 2009–2018. The operating revenues generated by AMHS vessels totaled over $47 million in FY 2018. However, total operating expenses have exceeded revenues consistently over the last ten years, resulting in annual losses. As summarized in Table 4, AMHS had an operating loss (subsidy) of $94.7 million in FY 2018.

Note that the two rows in the operating expense portion of Table 4 are not specific to individual vessels. "Other Vessel-Based Expenses" include annual maintenance expenditures and watch crew labor expenditures that are necessary when vessels are not operating. Over FY 2009–2019 "Other Vessel-Based Expenses" averaged 17 percent of annual expenditures. Expenses in the "Shore-based Support Services" row, including shoreside costs at terminals, costs of the reservation system, marine engineering expenses, operations management, reservations and marketing, and other support services, accounted for an average of 13 percent of annual expenditures.

The bottom section of the table provides an estimate of net operating income and computes the annual operating subsidy of AMHS as a system. In this section all shared costs have been added to individual vessels in proportion to their operating costs each year. The bottom line of the table shows the operating subsidy that has been required each year. The FY 2018 subsidy is 0.7 percent less than the subsidy from FY 2009, and 9.1 percent less than the average over the 10 years shown ($104.1 million).

In the past, it appears that AMHS has had a focus on high-revenue routes—the Mainline routes from Skagway to Bellingham and Prince Rupert, and the Cross-Gulf routes running from Kodiak through Whittier and Juneau to Bellingham—and preserving service to them. In fact, the four vessels operating in the Mainline and Cross-Gulf routes (*Columbia*, *Malaspina, Matanuska,* and *Kennicott*) have accounted for an average of 68 percent of the revenue from FY 2009 through FY 2018. But they have also accounted for 53 percent of expenditures (including shared costs), and 47 percent of the operating subsidy. If these four vessels were eliminated from the AMHS system, the FY 2018 operating subsidy would in theory have been reduced to $41.2 million, $53.4 million less than the FY 2018 subsidy.

Table 4. Vessel Operations Financial Summary, FY 2009–2018

Vessel / Source	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Operating Revenue by Vessel ($1,000s)										
Aurora	$2,191	$3,115	$2,522	$1,898	$2,679	$2,421	$4,059	$2,721	$3,228	$3,458
Columbia	$9,713	$7,924	$8,939	$13,014	$16,635	$6,682	$11,778	$7,471	$5,500	$10,929
Kennicott	$5,182	$3,125	$7,154	$8,151	$9,195	$8,425	$8,265	$7,705	$11,198	$9,873
LeConte	$1,808	$1,757	$794	$2,537	$2,006	$2,499	$854	$3,634	$4,015	$4,356
Lituya	$639	$620	$724	$822	$774	$769	$848	$812	$1,117	$1,069
Malaspina	$10,980	$11,446	$10,520	$5,765	$3,133	$12,051	$11,036	$11,316	$7,481	$7,785
Matanuska	$3,094	$6,211	$6,100	$9,003	$9,217	$7,154	$3,989	$7,192	$7,863	$4,329
Tustumena	$2,992	$3,525	$3,318	$3,755	$1,875	$2,106	$3,828	$3,566	$2,865	$2,981
Other Vessels & Revenue	$9,599	$8,192	$7,626	$8,741	$7,720	$8,769	$9,239	$2,740	$2,492	$2,537
Total Revenues	$46,200	$45,914	$47,697	$53,684	$53,234	$50,877	$53,896	$47,157	$45,759	$47,316
Operating Expenses ($1,000s)										
Aurora	$7,649	$7,720	$8,065	$5,380	$8,104	$7,013	$6,446	$6,264	$7,051	$8,569
Columbia	$11,231	$9,587	$11,861	$17,292	$20,380	$9,706	$15,757	$14,312	$13,297	$19,131
Kennicott	$15,091	$10,557	$18,022	$17,341	$21,170	$16,468	$15,031	$17,074	$18,121	$20,549
LeConte	$6,912	$7,070	$4,858	$9,807	$9,533	$9,915	$6,677	$9,087	$9,511	$10,374
Lituya	$1,189	$1,114	$1,415	$1,381	$1,367	$1,195	$1,224	$963	$1,065	$1,197
Malaspina	$14,065	$14,558	$16,147	$11,843	$8,573	$16,929	$15,313	$14,794	$8,215	$12,185
Matanuska	$7,260	$12,611	$16,246	$17,390	$17,669	$14,644	$10,683	$17,078	$15,909	$7,729
Tustumena	$6,642	$9,114	$10,068	$10,978	$6,527	$9,966	$10,569	$10,884	$10,644	$11,316
Unlisted Vessels	$28,006	$25,457	$26,823	$33,932	$31,892	$32,367	$31,102	$14,207	$10,387	$6,981
All Shared Costs	$43,517	$42,472	$45,227	$45,698	$47,313	$47,819	$47,996	$40,524	$40,729	$43,981
Total Expenses	$141,562	$140,260	$158,732	$171,042	$172,528	$166,022	$160,798	$145,187	$134,929	$142,012
Operating Income by Vessel with Shared Costs Assigned Proportionally ($1,000s)										
Aurora	($8,853)	($7,958)	($8,757)	($5,443)	($8,487)	($7,429)	($5,130)	($5,968)	($6,872)	($8,955)
Columbia	($6,503)	($5,827)	($7,648)	($10,582)	($11,446)	($6,951)	($10,683)	($12,382)	($13,546)	($16,785)
Kennicott	($16,607)	($12,017)	($18,049)	($15,512)	($19,974)	($14,705)	($13,162)	($15,980)	($14,758)	($19,895)
LeConte	($8,172)	($8,384)	($6,000)	($10,845)	($11,129)	($11,427)	($8,664)	($8,971)	($9,608)	($10,672)
Lituya	($1,078)	($978)	($1,255)	($1,062)	($1,110)	($909)	($897)	($524)	($408)	($665)
Malaspina	($9,328)	($9,435)	($12,061)	($10,396)	($8,679)	($11,727)	($10,793)	($9,206)	($4,286)	($9,867)
Matanuska	($7,388)	($11,877)	($16,619)	($14,727)	($15,128)	($13,414)	($11,239)	($16,498)	($14,925)	($6,868)
Tustumena	($6,598)	($9,547)	($10,762)	($11,225)	($7,118)	($11,892)	($11,238)	($11,532)	($12,381)	($13,412)
Unlisted Vessels	($30,836)	($28,323)	($29,885)	($37,564)	($36,223)	($36,691)	($35,097)	($16,968)	($12,386)	($7,577)
Total Operating Income/Subsidy	($95,362)	($94,346)	($111,035)	($117,358)	($119,294)	($115,145)	($106,902)	($98,030)	($89,170)	($94,696)

Source: Northern Economics analysis using data from AMHS (2019b).

The bottom line of Table 4 documents the total operating subsidy required by AMHS for FY 2009–2018. AMHS required an annual operating subsidy averaging $104.1 million. One of the primary goals of this study is to find ways to reduce the subsidy provided to AMHS within the state's annual operating budget,

with an overall goal to cut the subsidy by at least 50 percent from the $48.1 million FY 2020 operating budget. Thus, an operating subsidy of $24.0 million is considered the target for this project.

The left-hand portion of Table 5 below shows the loss each vessel generated in FY 2018 for each $1,000 of revenue. By this measure, the *Lituya* comes closest to breaking even, losing only $120 per $1,000 of revenue. Again, this is an operating loss; even if vessels generate modest net income from operations, the system would still operate at a loss if operating income does not cover the additional shared operating expenses, which in FY 2018 were $43.9 million.

The right-hand portion of Table 5 shows the changes that would be required to attain the target subsidy of $24.0 million through an increase in revenues only, or alternatively though a reduction in expenditures only. Either revenues need to increase by $70.7 million or expenses need to decrease by the same amount, or there needs to be some combination of the two. Revenues would need to increase to $118.0 million (264 percent of FY 2018 revenues) if there were no reductions in expenditures to attain the target subsidy. Alternatively, expenditures would have to be reduced to $71.3 million (50 percent of FY 2018 expenses) to reduce the operating subsidy to $24.0 million.

Table 5. Revenue or Expense Changes Required to Meet Subsidy Reduction Target, Based on FY 2018

Vessel	Operating Revenue ($1,000s)	Vessel-based Operating Expenditures ($1,000s)	Net Operating Income ($1,000s)	Loss per $1,000 of Revenue ($)	Change Amount Necessary to Attain a Subsidy of $24.0 Million	
					By Increasing Revenue Only	By Decreasing Expenses Only
Aurora	$3,458	$8,569	($5,111)	($1,478)	$5,459	($4,486)
Columbia	$10,929	$19,131	($8,202)	($750)	$17,254	($10,016)
Kennicott	$9,873	$20,549	($10,676)	($1,081)	$15,587	($10,759)
LeConte	$4,356	$10,374	($6,018)	($1,382)	$6,877	($5,431)
Lituya	$1,069	$1,197	($128)	($120)	$1,688	($627)
Malaspina	$7,785	$12,185	($4,400)	($565)	$12,290	($6,380)
Matanuska	$4,329	$7,729	($3,400)	($785)	$6,834	($4,047)
Tustumena	$2,981	$11,316	($8,335)	($2,796)	$4,706	($5,925)
Unlisted Vessels	$2,537	$6,981	($4,444)	($1,752)	NA	NA
Other Vessel Based Expenses	–	$24,730	($24,730)		NA	($12,947)
Shore-based Support Services	–	$19,251	($19,251)		NA	($10,079)
AMHS Total	$47,316	$142,012	($94,695)	($2,001)	$70,696	($70,696)
					Resulting Revenues ($1,000s)	Resulting Expenditures ($1,000s)
					$118,012	$71,316

Source: Northern Economics analysis using data from AMHS (2019a and 2019b).

Table 6 summarizes additional AMHS (2019c) data on the percentage estimates of operating costs by cost category (labor, fuel, and other) for each of the vessels active at the end of FY 2018. Labor costs are by far the largest component of AMHS expenditures (66 percent of vessel-based operating cost) while fuel and other costs comprise much smaller percentages (24 percent and 10 percent respectively). If AMHS is to significantly reduce its operating costs, it will need to reduce the cost of labor. Based on the information in this table, AMHS vessel-based labor costs alone exceed its annual revenue by over $12.5 million.

A mixture of revenue increases and cuts to expenditures will undoubtedly be required to attain the target operating subsidy. However, the balance of revenues or expenses to operating losses does not provide a

definitive view of each ferry. Routes, pricing, and other factors also matter. For example, while the *Aurora* requires the second highest increase in revenues among current vessels to reach the subsidy target, it has the second lowest operating cost per day and the lowest operating cost per mile.

The reality of AMHS's financial situation is that it is highly unlikely that a single change to revenue or expenses, or a combination of smaller changes, will allow it to achieve the targeted subsidy. This report evaluates several options to improve AMHS's financial performance through changes to vessels, service, revenues and expenses, and ownership. Table 6 aids in this analysis by the summarizing the marginal impact of changes in operating patterns and service on individual ferries' expenses.[8]

Table 6. Operating Expense by Sailing Days and Miles, FY 2018

	FY18 Sailing		Percent of Costs			Operating Expense per Day ($/day)				Operating Expense per Mile ($/mile)			
Vessel	Days	Miles	Labor	Fuel	Other	Labor	Fuel	Other	Total	Labor	Fuel	Other	Total
Aurora	287	55,687	71	20	9	21,228	5,882	2,747	29,857	109.41	30.31	14.16	153.88
Columbia	235	67,012	61	29	10	49,659	23,853	7,897	81,409	174.15	83.65	27.69	285.49
Kennicott	301	79,146	64	26	10	43,419	18,023	6,827	68,269	165.13	68.54	25.96	259.63
LeConte	314	51,760	64	25	11	21,177	8,127	3,733	33,038	128.47	49.30	22.65	200.43
Lituya	234	7,496	71	16	13	3,642	803	670	5,115	113.70	25.07	20.92	159.69
Malaspina	157	42,746	66	25	10	50,991	19,015	7,606	77,611	187.28	69.84	27.94	285.06
Matanuska	122	31,346	67	23	11	42,129	14,571	6,652	63,352	163.97	56.71	25.89	246.57
Tustumena	234	39,523	75	17	8	36,269	8,269	3,820	48,359	214.74	48.96	22.62	286.31
Average of All Listed Vessels	236	46,840	66	24	10	31,829	11,760	4,739	48,328	160.03	59.13	23.83	242.98

Note: Percentages and costs per day and per mile in the bottom row are weighted averages.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

AMHS has provided additional information on the labor costs of onboard passenger services. This information is included in Table 7. Passenger service labor costs on vessels that offer cabins average 40 percent of daily labor costs; for day-boats, labor cost of passenger services is 20 percent of daily labor costs.

Table 7. Labor Costs of Onboard Passenger Services by Vessel from FY 2018

	Vessels that Offer Cabins					Vessels without Cabins			
Vessel	*Columbia*	*Kennicott*	*Malaspina*	*Matanuska*	*Tustumena*	*Aurora*	*LeConte*	*Lituya*	*Tazlina*
Cost per Day	$25,686	$20,657	$13,771	$19,757	$9,557	$5,771	$3,314	$0	$4,329
Percent of Labor Total	52%	48%	27%	47%	26%	27%	16%	0	20%

Source: Northern Economics analysis using data from AMHS (2019c).

2.3 Definitions of Route Groups and Summaries of Volume and Revenue

This analysis examines fare increases as well as schedule changes with reductions in port calls and in some cases the elimination of ferry services altogether. For the purposes of this analysis, the study team has divided AMHS service into eight route groups. Table 8 defines these route groups along with the primary vessel or

[8] Operating parameters similar to those shown in Table 5 were not available for the *Tazlina* and *Hubbard*. Therefore, operating parameters for these vessels have been developed by the study team based on parameters of the *Aurora,* modified by details in the AMHS Vessel Information Table (AMHS 2019d).

vessels used in that route group. The following sub-sections provide a summary of revenues and existing services provided within each of the eight groups.

Table 8. Route Group Definitions and the Vessels and AMHS Ports they Comprise

Name	Primary Vessels	Communities in the Route Group (with 3-letter Port Code)
Lynn Canal	*LeConte, Tazlina,* and Mainline vessels	Juneau (JNU), Haines (NHS), Skagway (SGY). See also the text below regarding travel to/from Haines and Skagway involving ports other than Juneau.
Mainline	*Columbia, Malaspina, Matanuska*	Juneau (JNU), Sitka (SIT), Kake (KAE), Petersburg (PSG), Wrangell (WRG), Ketchikan (KTN), Prince Rupert (YPR), Bellingham (BEL). Please note that Mainline ferries also provide service into Haines and Skagway. Passengers and vehicles moving to/from Haines and Skagway to Mainline communities other than Juneau are considered part of the Mainline traffic and revenues.
Southeast (SE) Feeder	*LeConte* with occasional service from Mainline and Lynn Canal vessels.	Hoonah (HNH), Gustavus (GUS), Pelican (PEL), Tenakee Springs (TKE), Angoon (ANG). Note that Juneau and Sitka also serve as primary hubs for communities served by the SE Feeder routes, and that occasionally Mainline vessels make port calls to these communities. All traffic and revenues that involve one of the SE Feeder communities as either the origin or destination is attributed to the SE Feeder route group.
Metlakatla	*Lituya*	Metlakatla (ANB). ANB stands for Annette Bay, the location of the terminal for Metlakatla, and that this route group also includes Ketchikan.
Prince William Sound (PWS)	*Aurora, Hubbard*	Whittier (WTR), Cordova (CDV), Valdez (VDZ), Tatitlek (TAT). Chenega Bay (CHB) which is located in the Southwest portion of PWS is considered part of the Cross-Gulf route group.
Homer-Kodiak	*Tustumena, Kennicott*	Homer (HOM), Kodiak (KOD), Seldovia (SDV), Ouzinkie (OUZ), Port Lions (ORI).
Southwest (SW)	*Tustumena, Kennicott*	Old Harbor (OLD), Chignik (CHG), Sandpoint (SDP), King Cove (KCV), Cold Bay (CBY), False Pass (FPS), Akutan (AKU), Unalaska/Dutch Harbor (UNA). Note that Homer and Kodiak are considered hub ports for the SW route group.
Cross-Gulf	*Kennicott*	Only two communities are considered to be exclusively in the Cross-Gulf route group—Yakutat (YAK) and Chenega Bay (CHB). Currently the primary west-to-east Cross-Gulf route runs from KOD-HOM-CHB-WTR-YAK-JNU and may continue on down to BEL.

Table 9 shows the number of vessel operating days by route group over time, along with a grand total of operating days for each fiscal year. The Mainline route group represents about one-third of vessel operating days within the system each year and is the largest of the route groups as measured by effort.

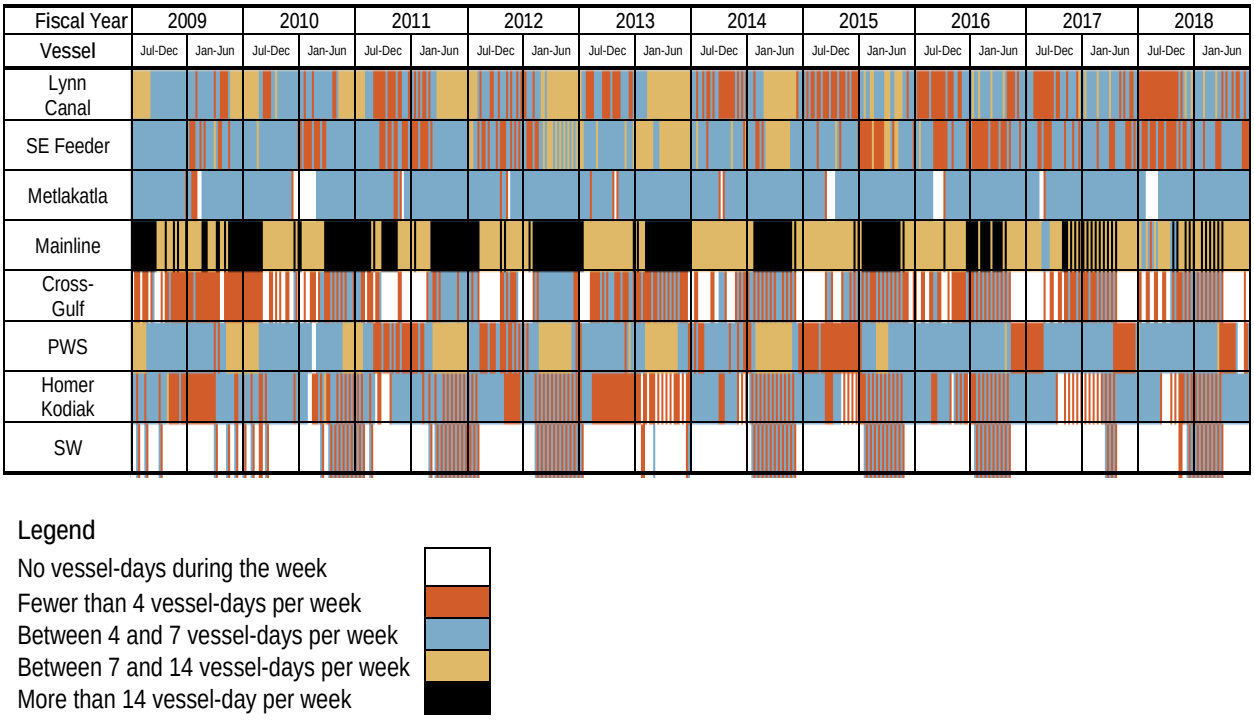
Table 9. AMHS Vessel Operating Days by Route Group in FY 2009–2018

Route Group	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018 as % of 2009
Lynn Canal	334	318	315	321	305	277	282	266	256	248	74%
SE Feeder	302	268	251	277	338	312	283	250	245	221	73%
Metlakatla	266	208	262	258	253	255	245	242	258	234	88%
Mainline	899	957	1,015	970	930	863	864	765	681	654	73%
Cross-Gulf	112	97	103	110	141	118	106	115	84	87	77%
PWS	418	373	407	409	426	390	329	367	294	294	70%
Homer-Kodiak	245	294	279	272	167	207	240	258	240	230	94%
SW	36	53	66	76	48	36	55	56	41	39	107%
All Route groups	2,614	2,572	2,698	2,693	2,614	2,457	2,402	2,317	2,098	2,005	77%

Data Source: AMHS (2019a).

Figure 2 represents weekly vessel activity over time, with horizontal scales for both the calendar year and the State of Alaska fiscal year. The table area is shaded to reflect the number of vessel operating days within a route group in any given week. Areas with no shading (white) mean that there was no service, while shaded areas illustrate an increasing level of service (orange to black). The level of service has decreased over time in most groups, especially in fiscal years 2016, 2017, and 2018.

Figure 2. Vessel Operations by Route Group July 2008–December 2018



Source: Northern Economics analysis using data from AMHS (2019a)

Table 10 and Table 11 (on the following page) show the compatibility of the AMHS ports with AMHS vessels. The tables include only those vessels that are currently in use or which are assumed available (e.g. *Hubbard*) for use in this analysis.

Table 10. Port Accessibility in Mainline, Lynn Canal, Metlakatla, and Southeast Feeder Route Groups

		Vessel								
Facility (CODE)	Route Group	*Aurora*	*Columbia*	*Kennicott*	*LeConte*	*Lituya*	*Malaspina*	*Matanuska*	*Tazlina & Hubbard*	*Tustumena*
Angoon (ANG)	SE Feeder	X			X	X*			X*	
Auke Bay (JNU)	Lynn Canal, Mainline, SE Feeder	X	X	X	X	X*	X	X	X*	
Auke Bay GITGOV (JNU)										X
Bellingham (BEL)	Mainline	X	X	X	X	X*	X	X	X*	
Gustavus (GUS)	SE Feeder	X	X*	X†	X	X*	X*	X	X*	
Haines (HNS)	Lynn Canal	X	X	X	X	X*	X	X	X*	
Hoonah (HNH)	SE Feeder	X			X	X*	X	X	X*	
Kake (KAE)	Mainline	X			X	X*	X	X	X*	
Ketchikan Berth 1-Main (KTN)	Mainline	X	X	X	X	X	X	X	X*	
Ketchikan Berth 2-South (KTN)	Mainline	X	X	X	X	X	X	X		X‡
Ketchikan Berth 3-Stern (KTN)	Mainline	X			X	X				
Metlakatla (ANB)	Metlakatla	X			X	X				
Pelican (PEL)	SE Feeder	X			X	X*				
Petersburg (PSG)	Mainline	X	X	X	X	X*	X	X	X*	
Prince Rupert (YPR)	Mainline	X		X	X	X*	X	X	X*	
Sitka (SIT)	Mainline	X	X	X	X	X*	X	X	X*	
Skagway (SGY)	Lynn Canal	X	X	X	X	X*	X	X	X*	
Tenakee Springs (TKE)	SE Feeder	X			X					
Wrangell (WRG)	Mainline	X	X	X	X	X*	X	X	X*	
Hollis (HOL)	IFA	X			X	X			X*	

Notes:

X indicates the vessel is compatible with this terminal.

* It is likely that the vessel is compatible with this terminal, but it has not been fully tested.

† *Kennicott* in Gustavus: *Kennicott* can only access the terminal in fair weather when there is no current due to poor line leads.

‡ *Tustumena* at Ketchikan Berth 2: The vehicle elevator & ramp does not match up with shore side transfer bridges and therefore Berth 2 can provide passenger access only.

Source: Reproduced from AMHS (2017).

Table 11. Port Accessibility in Southwest, Homer-Kodiak, and Prince William Sound Route Groups

		Vessel								
Facility (CODE)	Route Group	*Aurora*	*Columbia*	*Kennicott*	*LeConte*	*Lituya*	*Malaspina*	*Matanuska*	*Tazlina & Hubbard*	*Tustumena*
Akutan City Pier (AKU)	SW									X†
Akutan Trident Pier (AKU)	SW									X†
Chignik (CHG)	SW			X						X
Chenega Bay (CHB)	Cross-Gulf	X		X	X*					X
Cold Bay (CBY)	SW			X						X
Cordova Terminal (CDV)	PWS	X	X*	X	X	X*	X*	X*	X*	
Cordova Ocean Dock (CDV)	PWS			X						X
Dutch Harbor Berth 3 (UNA)	SW			X						X
Dutch Harbor, U.S. Coast Guard Piers 1&2 (UNA)	SW			X						X
False Pass (FPS)	SW									X
Homer Pioneer Dock (HOM)	Homer-Kodiak			X						X
King Cove (KCV)	SW			X						X
Kodiak Terminal (KOD)	Homer-Kodiak									X
Kodiak City Dock (KOD)	Homer-Kodiak			X						X
Old Harbor (OLD)	SW			X						X
Ouzinkie (OUZ)	Homer-Kodiak			X‡						X
Port Lions (ORI)	Homer-Kodiak			X						X
Sandpoint (SDP)	SW			X						X
Seldovia (SDV)	Homer-Kodiak			X						X
Tatitlek (TAT)	PWS	X		X	X*					X
Valdez Terminal (VDZ)	PWS	X	X*	X	X	X*	X*	X*	X*	
Valdez City Dock (VDZ)	PWS			X*						X
Valdez Container Pier (VDZ)	PWS			X*						X
Whittier Cruise Ship Pier (WTR)	PWS									X
Whittier (WTR)	PWS	X	X*	X	X	X*	X*	X*	X*	X§
Yakutat (YAK)	Cross-Gulf			X						X

Notes:

X indicates the vessel is compatible with this terminal.

* It is likely that the vessel is compatible with this terminal, but it has not been fully tested.

† *Tustumena* in Akutan: There are vehicle weight restrictions.

‡ *Kennicott* in Ouzinkie: *Kennicott* can only access the terminal during fair weather conditions, but only because of its poor fit (i.e. the *Kennicott* is too long to negotiate the turn-around at Ouzinkie during adverse conditions).

§ *Tustumena* in Whittier: The *Tustumena* does have a stern door for access to the terminal. In fair weather the vessel can use the Cruise Ship Dock with special Yokohama fenders in place.

Source: Reproduced from AMHS (2017).

Ticket and sailing data provided by AMHS (2019a) are used to construct Table 12, which provides revenue and volume from fiscal year 2009 through fiscal year 2018, for each of the defined route groups. Additionally, FY 2018 revenues are compared to the FY 2009–2018 average as a percentage. Values greater than 100 percent indicate that the FY 2018 revenue is higher than the average of the entire period. Passenger and cabin revenues are combined as a single row for each group; however, there are some route groups, like Metlakatla where cabins are not offered, and those rows are appropriately labeled.

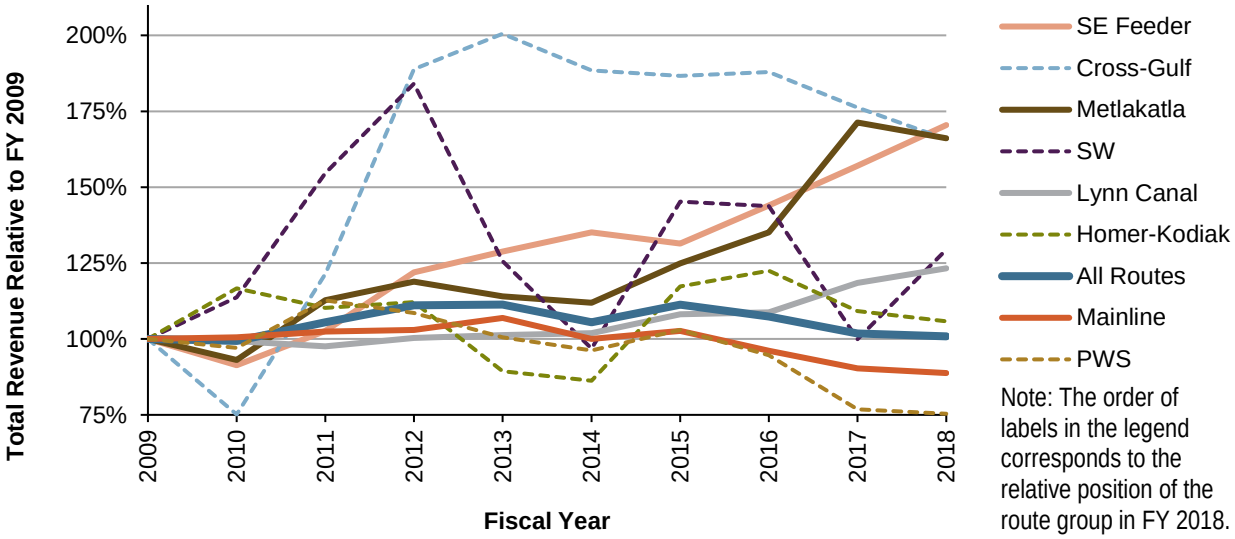
Table 12. Fiscal Year Revenues by Fare Class and Route Group

Fiscal Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2018 as % of 2009
Annual Revenue in Lynn Canal Route Group by Type ($1,000s)											
Passenger	$2,464	$2,408	$2,373	$2,403	$2,413	$2,446	$2,730	$2,858	$3,231	$3,388	137%
Vehicle	$2,408	$2,429	$2,381	$2,488	$2,523	$2,522	$2,540	$2,441	$2,543	$2,617	109%
Total	$4,872	$4,837	$4,754	$4,890	$4,936	$4,967	$5,270	$5,300	$5,774	$6,005	123%
Annual Revenue in SE Feeder Route Group by Type ($1,000s)											
Passenger	$551	$517	$556	$629	$648	$689	$664	$774	$889	$991	180%
Vehicle	$521	$462	$544	$678	$733	$758	$745	$770	$794	$835	160%
Total	$1,072	$979	$1,100	$1,307	$1,381	$1,448	$1,409	$1,543	$1,683	$1,827	170%
Annual Revenue in the Metlakatla Route Group by Type ($1,000s)											
Passenger	$348	$314	$394	$433	$417	$399	$484	$556	$748	$722	207%
Vehicle	$354	$339	$398	$402	$383	$386	$393	$392	$454	$444	125%
Total	$702	$653	$792	$835	$800	$785	$876	$948	$1,202	$1,165	166%
Annual Revenue in Mainline Route Group by Type ($1,000s)											
Passenger	$13,342	$13,240	$13,533	$13,378	$13,593	$12,895	$13,300	$12,619	$11,926	$11,757	88%
Vehicle	$13,783	$14,033	$14,242	$14,539	$15,409	$14,235	$14,554	$13,458	$12,580	$12,322	89%
Total	$27,125	$27,273	$27,774	$27,917	$29,002	$27,131	$27,853	$26,077	$24,506	$24,079	89%
Annual Revenue in PWS Route Group by Type ($1,000s)											
Passenger	$2,394	$2,164	$2,571	$2,486	$2,284	$2,278	$2,532	$2,333	$1,820	$1,750	73%
Vehicle	$2,215	$2,308	$2,624	$2,519	$2,351	$2,156	$2,215	$2,030	$1,723	$1,724	78%
Total	$4,609	$4,472	$5,196	$5,004	$4,636	$4,434	$4,746	$4,363	$3,543	$3,474	75%
Annual Revenue in Homer-Kodiak Route Group by Type ($1,000s)											
Passenger	$910	$997	$964	$960	$796	$724	$1,135	$1,204	$1,580	$1,411	155%
Vehicle	$1,767	$2,108	$1,975	$2,025	$1,621	$1,615	$2,043	$2,111	$2,641	$2,576	146%
Total	$2,677	$3,105	$2,940	$2,985	$2,416	$2,339	$3,178	$3,315	$4,222	$3,987	149%
Annual Revenue in SW Route Group by Type ($1,000s)											
Passenger	$315	$356	$493	$571	$374	$265	$501	$470	$338	$376	119%
Vehicle	$256	$294	$391	$481	$344	$288	$329	$352	$233	$364	142%
Total	$571	$650	$884	$1,052	$718	$553	$830	$822	$571	$740	121%
Annual Revenue in Cross-Gulf Route Group by Type ($1,000s)											
Passenger	$1,030	$887	$1,564	$2,484	$2,445	$2,446	$2,478	$2,507	$2,416	$2,184	212%
Vehicle	$1,841	$1,270	$1,921	$2,938	$3,311	$2,964	$2,883	$2,888	$2,641	$2,576	140%
Total	$2,871	$2,157	$3,484	$5,423	$5,757	$5,410	$5,360	$5,395	$5,058	$4,760	166%

Note: Passenger revenue includes revenue from cabins where applicable.
Source: Northern Economics analysis using data from AMHS (2019a).

Figure 3 shows percentage changes in revenue for each route group over time, using FY 2009 as the base year for calculating each percentage. To date, revenues in the SE Feeder routes have increased the most (170 percent) of any route group. Revenue in the Mainline routes, which makes up more than half of system-wide revenues, has decreased to 89 percent of FY 2009 revenue levels.

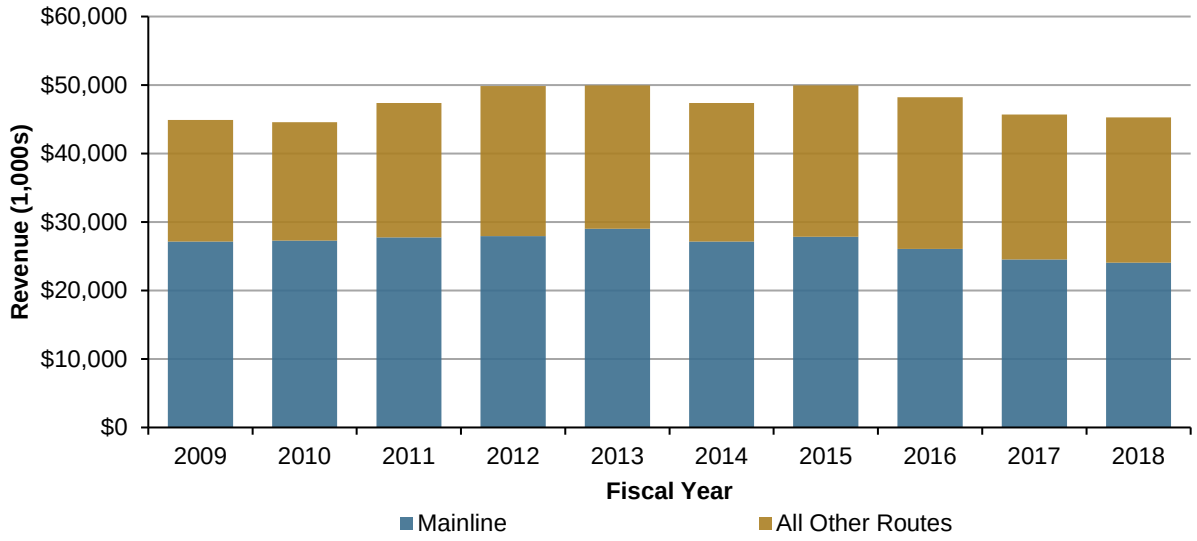
Figure 3. AMHS Revenue Changes from FY 2009 (Base Year)



Data Source: AMHS (2019a)

Figure 4 shows combined AMHS revenues for FY 2009–2018 and compares revenues from the Mainline routes to revenue from all other routes. Mainline and total revenues declined consecutively in each of the last four years (FY 2016 to 2018). These declines could be related in part to changes in fare pricing in FY 2016 and 2017, which is discussed further in Section 4.9.

Figure 4 AMHS Mainline and All Other AMHS Revenues, FY 2009–2018



Data Source: AMHS (2019a)

Table 13 summarizes revenue generated from local versus non-local ticket buyers from FY 2009 through April of 2016 (10 months of fiscal year 2016). Place of residence data for ticket buyers are not available after May 2016. In this analysis, local ticket buyers are defined as residents of either the departure or arrival city for any given sailing between two cities and are identified by the place of residence provided by the purchaser when the AMHS tickets were purchased. Local revenues are compared to revenue derived from residents of other places in Alaska, as well as ticket buyers residing outside of Alaska.

Table 13. Local/Non-Local Fiscal Year Revenue by Route Group

Route Group	Residency	2009	2010	2011	2012	2013	2014	2015	2016	Average
Lynn Canal	Local	47%	47%	47%	48%	50%	51%	51%	56%	49%
	Other Alaska	6%	5%	4%	4%	5%	4%	4%	4%	5%
	Outside Alaska	48%	48%	48%	48%	45%	45%	44%	40%	47%
	Total ($1,000s)	$4,872	$4,837	$4,754	$4,890	$4,936	$4,967	$5,270	$3,988	$4,932
SE Feeder	Local	83%	84%	81%	77%	78%	78%	79%	79%	80%
	Other Alaska	6%	6%	6%	8%	6%	8%	7%	8%	7%
	Outside Alaska	11%	10%	13%	15%	15%	15%	14%	13%	14%
	Total ($1,000s)	$1,072	$979	$1,100	$1,307	$1,381	$1,448	$1,409	$1,246	$1,242
Metlakatla–Ketchikan	Local	92%	90%	90%	91%	91%	93%	92%	92%	91%
	Other Alaska	4%	5%	4%	4%	4%	2%	3%	2%	3%
	Outside Alaska	5%	6%	6%	5%	5%	5%	6%	6%	5%
	Total ($1,000s)	$702	$653	$792	$835	$800	$785	$876	$757	$778
Mainline	Local	30%	31%	31%	31%	31%	32%	32%	33%	31%
	Other Alaska	9%	9%	8%	9%	9%	8%	8%	9%	9%
	Outside Alaska	61%	60%	61%	60%	60%	60%	60%	59%	60%
	Total ($1,000s)	$27,125	$27,273	$27,774	$27,917	$29,002	$27,131	$27,853	$20,501	$27,725
PWS	Local	27%	28%	27%	26%	29%	28%	30%	34%	28%
	Other Alaska	5%	5%	4%	5%	5%	4%	4%	4%	5%
	Outside Alaska	69%	67%	69%	69%	66%	68%	66%	62%	68%
	Total ($1,000s)	$4,609	$4,473	$5,196	$5,004	$4,636	$4,434	$4,746	$3,525	$4,728
Homer–Kodiak	Local	45%	46%	46%	46%	46%	50%	45%	49%	46%
	Other Alaska	4%	4%	4%	3%	3%	3%	3%	3%	4%
	Outside Alaska	50%	50%	50%	50%	50%	47%	52%	49%	50%
	Total ($1,000s)	$3,059	$3,570	$3,371	$3,430	$2,734	$2,638	$3,588	$3,051	$3,199
SW	Local	37%	42%	42%	42%	42%	42%	35%	40%	40%
	Other Alaska	7%	6%	7%	5%	7%	5%	6%	5%	6%
	Outside Alaska	56%	53%	51%	52%	52%	54%	59%	55%	54%
	Total ($1,000s)	$571	$650	$884	$1,052	$718	$553	$830	$559	$751
Cross-Gulf	Local	16%	15%	12%	14%	18%	17%	14%	12%	15%
	Other Alaska	12%	14%	16%	8%	5%	6%	4%	5%	8%
	Outside Alaska	73%	71%	72%	78%	77%	77%	81%	82%	76%
	Total ($1,000s)	$2,871	$2,157	$3,484	$5,423	$5,757	$5,410	$5,360	$3,276	$4,352

Notes:

1) Residency Data have not been reported by AMHS since the implementation of its new ticketing system in May 2016.
2) Since data for FY 2016 do not include May and June, the average percentage calculations are a weighted average based on revenue from FY 2009 to FY 2015.

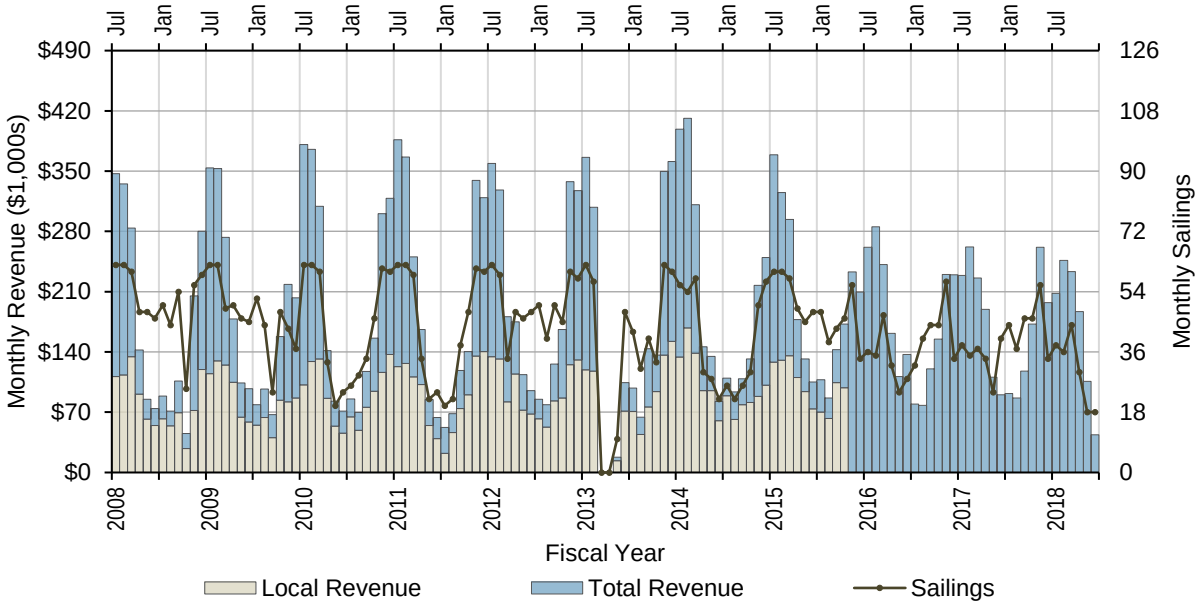
Source: Northern Economics analysis using data from AMHS (2019a).

One of the more striking features of the information presented in Table 13 is the difference in "local" ticket purchases across the different route groups. Sailings in the Metlakatla route group have the highest percentage of local ridership—over 90 percent of tickets are purchased by a resident of either the origin or destination communities. Similarly, 80 percent of the average ridership on the SE Feeder routes was locally based over the period for which data are available. On the other end of the spectrum, ridership on the Cross-Gulf, PWS, and the Mainline routes is predominately from patrons residing outside of Alaska—Outside residents comprised 76 percent of the Cross-Gulf revenue over the period shown; Outside Alaska residents also generated 68 percent of PWS revenue and 60 percent of Mainline revenue. Additional information regarding local and non-local patronage is provided in both Appendix A and Appendix B.

It is also important to note that there is considerable variation in local and non-local ridership within particular route groups. For example, from June 2008–April 2015, only 7 percent of patrons on the Valdez-Whittier run were local, while during the same period 39 percent of patrons on the Cordova-Whittier run were local. Additional details on travel to and from each AMHS community are available in Appendix B.

Figure 5 shows monthly sailings for travel between Cordova and Whittier in either direction and total monthly revenues, with revenues from local buyers shown when data are available. Total revenues for each month are represented by the blue vertical bars, with the portion of those revenues attributable to local buyers indicated by the tan portion of each bar. In this figure and in all similar figures, the dark olive line is the number of origin/destination city-pair combinations that occurred in the month. In the winter months (the "troughs" in the figure) revenue from local buyers makes up the majority of each bar, with a sizable portion of peak season (June, July and August) revenues also coming from local residents. Beginning in May of 2016 local buyer data are not available, so only the total revenue for each month can be shown. Figure 6 on the next page shows monthly revenues and sailings for travel between Valdez and Whittier—the contrast between the two figures with respect to local and total revenue is striking, as are the very low levels of revenue from any source during off-peak months on the Valdez-Whittier run.

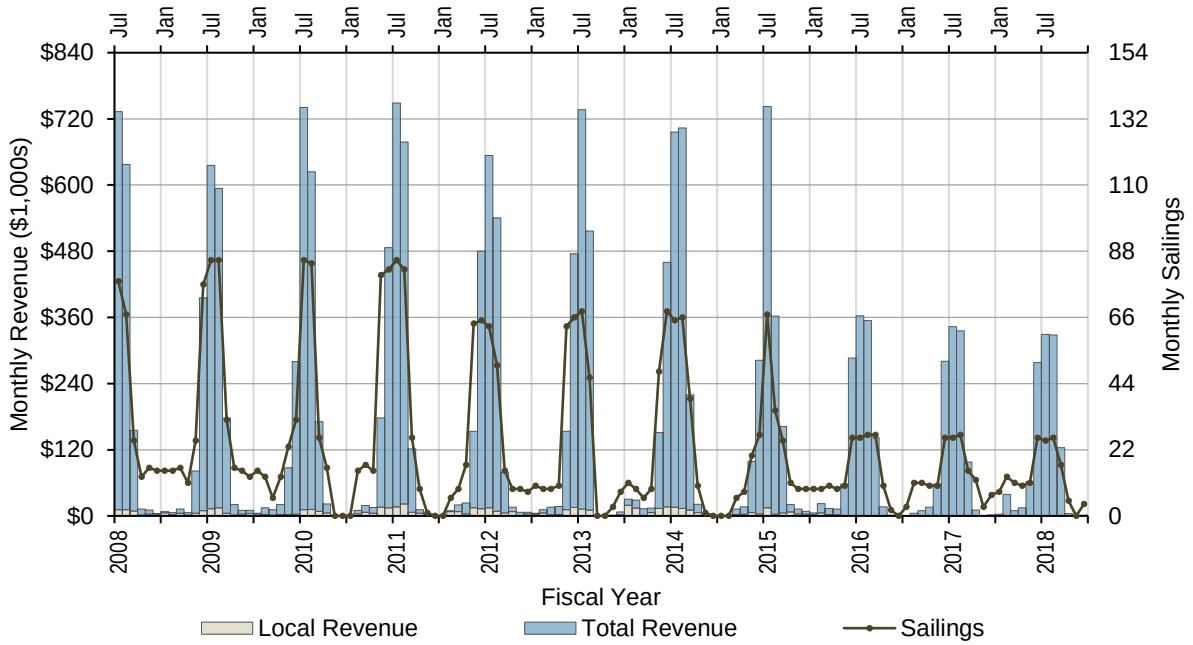
Figure 5. Monthly Local Resident and Total Cordova-Whittier Revenues and Sailings, by Fiscal Year



Notes: 1) Total revenues for each month are represented by the blue vertical bars, with the portion of those revenues attributable to local buyers indicated by the tan portion of each bar. The local revenue component has not been reported by AMHS since the implementation of its new ticketing system in May 2016. 2) Monthly City-Pair Sailings (the dark olive line) is the count of all combinations of origin/destination city-pairs in each vessel sailing.

Source: Northern Economics analysis using data from AMHS (2019a).

Figure 6. Monthly Local Resident and Total Valdez-Whittier Revenues and Sailings, by Fiscal Year



Notes: 1) Total revenues for each month are represented by the blue vertical bars, with the portion of those revenues attributable to local buyers indicated by the tan portion of each bar. The local revenue component has not been reported by AMHS since the implementation of its new ticketing system in May 2016. 2) Monthly City-Pair Sailings (the dark olive line) is the count of all combinations of origin/destination city-pairs in each vessel sailing.

Source: Northern Economics analysis using data from AMHS (2019a).

Most AMHS vessels operate within more than one of the eight route groups, with the *Lituya* being the exception and operating exclusively as the ferry between Metlakatla and Ketchikan. Table 14 provides a summary of fiscal year 2018 operations for each vessel and for each route group, with the upper portion of the table showing the number of operating days contributed by vessels within each group. Vessel operating costs per day are also shown in the table, and include the cost of labor, fuel, and other expenses, but do not include system-wide costs. Using the operating days and vessel costs per operating day, we calculate the total fiscal year 2018 operating costs within the lower portion of Table 14. Operating costs for the year are estimated by multiplying the number of operating days by the operating cost per day shown in the first (orange-shaded) row of the second part of the table. The table also provides subtotals by vessel and by route group for the fiscal year 2018 operating days and costs.

One of the key assumptions in developing operating cost estimates for each route group is the that there are many circumstances in which a vessel operates in more than one route group on a single day. For example, the *Matanuska* and *Malaspina,* which operate primarily in the Mainline route group, will often call at Sitka, Hoonah or Angoon, Juneau, and Haines and/or Skagway all in a single day. Here is a breakdown of their operational day:

- The vessels travel between Sitka and Juneau, and therefore they are contributing to the Mainline route group in terms of operating days, costs, and revenues.
- The vessels make a stop in Hoonah or Angoon, and therefore they are contributing to the SE Feeder route group in terms of operating days, costs, and revenues.
- The vessels travel between Juneau and Haines or Skagway, and therefore they are contributing to the Lynn Canal route group in terms of operating days, costs, and revenues.

In this example, the operating day is apportioned equally (i.e. one-third of a day) to all three routes regardless of the amount of time spent in each or the amount of revenue generated. A review of the table shows that about 48 percent of all operating costs can be attributed to the Mainline route group with Lynn Canal, Homer-Kodiak, and PWS each ranging between 10 and 13 percent of the total.

Table 14. Fiscal Year 2018 Operating Costs by Vessel and Route Group

Route Group	*Aurora*	*Columbia*	*Kennicott*	*LeConte*	*Lituya*	*Malaspina*	*Matanuska*	*Tustumena*	*Fairweather*	Total
FY 2018 Operating Days										
Lynn Canal	12.5	28.0	13.0	104.5	0	21.0	15.5	0	53.0	247.5
SE Feeder	21.5	0	0	193.0	0	0.5	5.5	0	0.5	221.0
Metlakatla	0	0	0	0	234.0	0	0	0	0	234.0
Mainline	3.0	207.0	176.0	16.5	0	135.5	101.0	0	14.5	653.5
PWS	241.0	0	0	0	0	0	0	0	53.0	294.0
Homer-Kodiak	0	0	29.5	0	0	0	0	200.5	0	230.0
SW	0	0	5.0	0	0	0	0	33.5	0	38.5
Cross-Gulf	9.0	0	77.5	0	0	0	0	0	0	86.5
Total	287.0	235.0	301.0	314.0	234.0	157.0	122.0	234.0	121.0	2,005
FY 2018 Operating Costs ($1,000s)										
Cost per Operating Day	29.9	81.4	68.3	33.0	5.1	77.6	63.4	48.4	53.2	N/A
Lynn Canal	373	2,279	887	3,452	0	1,630	982	0	2,818	12,422
SE Feeder	642	0	0	6,376	0	39	348	0	27	7,432
Metlakatla	0	0	0	0	1,197	0	0	0	0	1,197
Mainline	90	16,852	12,015	545	0	10,516	6,399	0	771	47,187
PWS	7,196	0	0	0	0	0	0	0	2,818	10,013
Homer-Kodiak	0	0	2,014	0	0	0	0	9,696	0	11,710
SW	0	0	341	0	0	0	0	1,620	0	1,961
Cross-Gulf	269	0	5,291	0	0	0	0	0	0	5,560
Total	8,569	19,131	20,549	10,374	1,197	12,185	7,729	11,316	6,433	97,483

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Table 15 provides community level revenue data for FY 2009–2018. While the assessment of reshaping options has a general focus on route groups, some of the options assessed require community-level data to provide context. The table has two parts—the upper part includes ports in the Southeast Region (including Bellingham and Prince Rupert); the lower part shows ports in the Southcentral/Southwest Region. To eliminate double counting, revenues are the average of both embarking and disembarking passengers and vehicles.[9] The last column shows the rank of each of the 35 ports in terms of revenue generated over the last four years of data (FY 2015–2018). Bellingham ranks as the highest revenue port in the AMHS system followed by Juneau and Haines. Kodiak and Homer generate the most revenue in the Southcentral/ Southwest Region but are the seventh and eight ranked ports statewide. Pelican—ranked 30—is the lowest

[9] Similar port level tables for each community in Appendix B sum both embarking and disembarking revenues.

ranked port in the Southeast region but generated more revenue than the combined total of the four lowest ranked ports (Akutan, False Pass, Tatitlek, Old Harbor).

Table 15. Revenues—Average of Embarking and Disembarking—by Port, FY 2009–2018

Port	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2018 ÷ FY 2009	Statewide Rank (FY 2015-2018)
Revenues by Port (Average of Embarking & Disembarking) in the Southeast Region ($1,000s)												
Angoon	$177	$168	$164	$167	$145	$162	$191	$186	$185	$219	123%	18
Bellingham	$8,032	$8,202	$8,895	$10,727	$10,732	$10,336	$11,033	$10,249	$9,751	$9,461	118%	1
Gustavus	$0	$0	$68	$176	$200	$212	$210	$239	$284	$298	NA	17
Haines	$4,642	$5,093	$5,155	$5,041	$5,229	$5,090	$5,382	$4,979	$5,132	$5,089	110%	3
Hoonah	$277	$239	$239	$238	$273	$310	$259	$308	$300	$299	108%	16
Juneau	$8,745	$8,179	$8,506	$8,324	$9,217	$8,101	$8,308	$8,194	$7,673	$8,025	92%	2
Kake	$206	$187	$197	$228	$210	$227	$182	$168	$165	$180	88%	20
Ketchikan	$4,168	$4,116	$4,136	$4,229	$4,289	$4,385	$4,155	$4,248	$4,058	$3,895	93%	4
Metlakatla	$351	$327	$396	$417	$400	$393	$438	$474	$601	$583	166%	15
Pelican	$43	$36	$35	$32	$37	$35	$33	$34	$29	$42	99%	30
Petersburg	$1,178	$1,156	$1,111	$1,123	$1,079	$1,063	$1,101	$1,045	$956	$884	75%	12
Prince Rupert	$2,505	$2,416	$2,462	$2,007	$1,970	$1,889	$1,792	$1,735	$1,917	$1,708	68%	9
Sitka	$1,333	$1,351	$1,387	$1,346	$1,504	$1,364	$1,330	$1,281	$1,365	$1,306	98%	10
Skagway	$2,412	$2,325	$2,339	$2,457	$2,454	$2,358	$2,537	$2,333	$2,281	$2,507	104%	6
Tenakee Spr.	$45	$53	$51	$57	$56	$46	$43	$44	$56	$63	141%	26
Wrangell	$789	$775	$773	$828	$858	$826	$844	$787	$755	$710	90%	14
Yakutat	$67	$60	$89	$95	$92	$82	$91	$80	$96	$93	140%	23
Revenues by Port (Average of Embarking & Disembarking) in the Southcentral/Southwest Region ($1,000s)												
Akutan	$16	$15	$21	$29	$14	$6	$16	$18	$11	$11	69%	32
Chenega Bay	$24	$20	$25	$40	$36	$36	$25	$30	$19	$16	65%	31
Chignik	$35	$52	$59	$69	$38	$25	$46	$42	$22	$33	NA	29
Cold Bay	$34	$32	$45	$57	$53	$34	$38	$57	$37	$66	191%	27
Cordova	$1,270	$1,299	$1,459	$1,371	$1,321	$1,234	$1,343	$1,323	$1,144	$1,133	89%	11
False Pass	$16	$11	$22	$23	$7	$8	$10	$12	$7	$8	53%	33
Homer	$1,680	$1,972	$1,952	$2,054	$1,669	$1,761	$2,114	$2,231	$1,902	$1,960	117%	8
King Cove	$56	$57	$83	$68	$72	$53	$70	$64	$53	$67	120%	24
Kodiak	$1,556	$1,754	$1,716	$2,008	$1,910	$1,808	$2,154	$2,317	$2,029	$1,971	127%	7
Old Harbor	$0	$0	$0	$1	$1	$5	$3	$4	$2	$3	NA	35
Ouzinkie	$0	$0	$0	$5	$9	$22	$37	$46	$42	$46	916%	28
Port Lions	$88	$120	$110	$104	$37	$61	$107	$123	$110	$103	117%	22
Sand Point	$45	$48	$80	$107	$74	$48	$70	$71	$41	$63	141%	25
Seldovia	$155	$155	$151	$143	$120	$110	$146	$157	$143	$131	84%	21
Tatitlek	$7	$7	$7	$7	$8	$5	$4	$8	$5	$6	89%	34
Unalaska	$130	$148	$193	$240	$151	$123	$207	$198	$143	$154	118%	19
Valdez	$1,329	$1,144	$1,392	$1,322	$1,131	$1,248	$1,174	$999	$723	$716	54%	13
Whittier	$3,398	$3,068	$4,034	$4,707	$4,550	$3,891	$4,441	$4,093	$3,640	$3,438	101%	5
Total Revenue	$44,808	$44,583	$47,348	$49,848	$49,948	$47,353	$49,933	$48,176	$45,675	$45,287	101%	NA

Notes: Does not include revenues from onboard sales of food, beverages and other items.
Source: Northern Economics analysis using data from AMHS (2019a).

Table 16 is organized the same as Table 15 but shows the number of AMHS port calls for FY 2009–2018. Over the last four years Ketchikan had an average of 250 more port calls than Haines, the second leading port. Juneau ranked third followed by Whittier, Petersburg, Wrangell, Skagway, and Kodiak. Bellingham, which generated by far the most revenue of any AMHS port, was the twenty-third ranked port in terms of port calls. The Southeast Region averaged 3,774 port calls per year over the last four years—70 percent of the 5,429 average for AMHS.

Table 16. Number of AMHS Port Calls, FY 2009–2018

Port	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2018 ÷ FY 2009	Statewide Rank (FY 2015-2018)
Number of AMHS Port Calls in the Southeast Region												
Angoon	130	121	116	113	119	120	120	106	110	107	82%	17
Bellingham	52	53	56	66	61	66	68	64	64	62	119%	23
Gustavus	–	–	28	85	114	114	107	106	98	97	NA	20
Haines	565	589	629	630	597	557	558	527	525	552	98%	2
Hoonah	236	226	186	208	236	196	189	161	154	127	54%	14
Juneau	483	470	492	454	466	429	414	388	356	336	69%	3
Kake	169	177	171	171	173	149	149	107	122	77	46%	16
Ketchikan	917	827	925	929	893	865	843	788	808	736	80%	1
Metlakatla	261	208	257	258	251	258	243	241	261	234	90%	9
Pelican	18	20	17	17	17	17	15	13	13	14	78%	31
Petersburg	381	417	418	401	394	363	363	323	279	258	68%	5
Prince Rupert	149	156	151	142	123	94	97	75	70	62	42%	22
Sitka	263	274	292	268	288	250	233	204	147	121	46%	11
Skagway	306	298	308	308	287	257	274	263	270	298	98%	7
Tenakee Spr.	105	105	99	101	108	110	106	93	104	94	90%	21
Wrangell	361	386	384	382	376	349	352	314	279	260	72%	6
Yakutat	36	20	25	33	46	33	28	27	23	26	72%	25
Number of AMHS Port Calls in the in the Southcentral/Southwest Region												
Akutan	12	18	22	26	12	10	18	18	14	12	100%	30
Chenega Bay	40	53	47	42	51	38	27	40	33	35	89%	24
Chignik	12	18	22	23	11	8	13	14	10	11	92%	32
Cold Bay	12	18	22	26	17	12	18	18	14	14	113%	27
Cordova	344	312	288	286	316	290	258	315	245	246	72%	8
False Pass	12	18	22	20	6	5	9	9	7	6	50%	34
Homer	270	293	285	274	156	204	238	243	229	224	83%	10
King Cove	12	18	22	25	17	12	18	18	14	13	108%	28
Kodiak	181	194	186	194	137	145	170	169	158	142	78%	13
Old Harbor	–	–	–	2	2	4	5	5	3	2	NA	35
Ouzinkie	–	–	–	8	18	43	88	119	108	111	NA	19
Port Lions	96	135	135	138	58	95	136	141	133	117	122%	15
Sand Point	12	18	22	25	17	12	18	19	14	13	108%	28
Seldovia	118	123	121	124	99	86	107	126	103	103	88%	18
Tatitlek	54	42	32	28	37	26	6	38	25	28	52%	26
Unalaska	6	9	11	13	8	6	9	9	7	7	117%	33
Valdez	341	294	348	295	246	261	206	202	136	133	39%	12
Whittier	412	383	409	403	448	342	331	373	298	308	75%	4
Total Port Calls	6,361	6,290	6,544	6,514	6,202	5,822	5,831	5,673	5,231	4,983	78%	NA

Source: Northern Economics analysis using data from AMHS (2019a).

Table 17 combines the previous two tables to show average revenues per port call for FY 2009–2018. Not surprisingly, Bellingham generates the highest revenue per port call at $152,600 in FY 2018. Number 2 is Prince Rupert at $27,500/call. Unalaska ranked thirty-third of 35 in terms of the number of port calls and third in terms of revenue per call, averaging $21,900 over its seven port calls in FY 2018. The bottom five ports under this measure are: Port Lions, Chenega Bay, Tenakee Springs, Ouzinkie, and Tatitlek.

Table 17. Average Revenue per Port Call by Port, FY 2009–2018

Port	FY 2009	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	FY 2018	FY 2018 ÷ FY 2009	Statewide Rank (FY 2015-2018)
Average Revenue per Port Call in the Southeast Region ($1,000s)												
Angoon	$1.36	$1.38	$1.41	$1.48	$1.22	$1.35	$1.59	$1.75	$1.68	$2.04	150%	25
Bellingham	$154.47	$154.75	$160.28	$162.52	$175.94	$157.80	$162.25	$161.41	$152.35	$152.59	99%	1
Gustavus	NA	NA	$2.41	$2.07	$1.76	$1.86	$1.96	$2.25	$2.90	$3.07	NA	21
Haines	$8.22	$8.65	$8.20	$8.00	$8.76	$9.14	$9.64	$9.46	$9.78	$9.22	112%	7
Hoonah	$1.17	$1.06	$1.29	$1.14	$1.16	$1.59	$1.38	$1.92	$1.95	$2.36	201%	24
Juneau	$18.11	$17.39	$17.29	$18.35	$19.79	$18.88	$20.06	$21.13	$21.55	$23.92	132%	4
Kake	$1.22	$1.06	$1.15	$1.33	$1.22	$1.52	$1.22	$1.58	$1.36	$2.34	191%	26
Ketchikan	$4.55	$4.98	$4.47	$4.56	$4.80	$5.07	$4.93	$5.39	$5.02	$5.30	116%	12
Metlakatla	$1.35	$1.57	$1.54	$1.62	$1.60	$1.52	$1.80	$1.97	$2.30	$2.49	185%	23
Pelican	$2.38	$1.81	$2.04	$1.85	$2.19	$2.04	$2.20	$2.65	$2.24	$3.03	127%	22
Petersburg	$3.09	$2.78	$2.66	$2.80	$2.74	$2.93	$3.04	$3.23	$3.43	$3.43	111%	17
Prince Rupert	$16.87	$15.49	$16.31	$14.18	$16.02	$20.09	$18.47	$23.14	$27.39	$27.54	163%	2
Sitka	$5.07	$4.93	$4.76	$5.02	$5.22	$5.47	$5.72	$6.28	$9.29	$10.84	214%	10
Skagway	$7.90	$7.80	$7.59	$7.98	$8.55	$9.17	$9.26	$8.89	$8.45	$8.41	107%	9
Tenakee Spr.	$0.43	$0.51	$0.51	$0.56	$0.52	$0.42	$0.41	$0.47	$0.54	$0.68	157%	33
Wrangell	$2.18	$2.01	$2.01	$2.17	$2.28	$2.37	$2.40	$2.51	$2.70	$2.73	125%	20
Yakutat	$1.85	$3.05	$3.61	$2.87	$1.99	$2.52	$3.25	$2.96	$4.16	$3.58	194%	16
Average Revenue per Port Call in the Southcentral/Southwest Region ($1,000s)												
Akutan	$1.31	$0.82	$0.94	$1.11	$1.18	$0.59	$0.91	$0.99	$0.77	$0.91	69%	30
Chenega Bay	$0.62	$0.38	$0.52	$0.96	$0.70	$0.95	$0.92	$0.75	$0.56	$0.45	73%	32
Chignik	$2.89	$2.89	$2.69	$3.01	$3.45	$3.07	$3.53	$3.00	$2.23	$3.04	105%	19
Cold Bay	$2.87	$1.76	$2.02	$2.24	$3.24	$2.83	$2.11	$3.19	$2.62	$4.87	169%	18
Cordova	$3.69	$4.16	$5.07	$4.79	$4.18	$4.26	$5.21	$4.20	$4.68	$4.61	125%	13
False Pass	$1.31	$0.64	$1.00	$1.13	$1.17	$1.68	$1.15	$1.31	$1.04	$1.40	107%	28
Homer	$6.22	$6.73	$6.86	$7.51	$10.70	$8.63	$8.90	$9.18	$8.33	$8.75	141%	8
King Cove	$4.68	$3.19	$3.76	$2.74	$4.24	$4.39	$3.92	$3.56	$3.77	$5.19	111%	14
Kodiak	$8.62	$9.04	$9.22	$10.35	$13.99	$12.47	$12.67	$13.71	$12.84	$13.93	162%	5
Old Harbor	NA	NA	NA	$0.61	$0.55	$1.13	$0.53	$0.70	$0.81	$1.58	NA	29
Ouzinkie	NA	NA	NA	$0.63	$0.48	$0.50	$0.42	$0.39	$0.39	$0.42	NA	34
Port Lions	$0.91	$0.89	$0.82	$0.76	$0.64	$0.65	$0.79	$0.87	$0.82	$0.88	96%	31
Sand Point	$3.74	$2.65	$3.64	$4.28	$4.33	$3.99	$3.89	$3.82	$3.01	$4.87	130%	15
Seldovia	$1.32	$1.26	$1.24	$1.15	$1.21	$1.29	$1.37	$1.24	$1.39	$1.27	96%	27
Tatitlek	$0.12	$0.16	$0.21	$0.26	$0.23	$0.18	$0.72	$0.22	$0.22	$0.21	171%	35
Unalaska	$21.62	$16.41	$17.58	$18.50	$18.82	$20.46	$22.97	$21.95	$20.37	$21.94	101%	3
Valdez	$3.90	$3.89	$4.01	$4.48	$4.61	$4.78	$5.71	$4.95	$5.34	$5.38	138%	11
Whittier	$8.26	$8.02	$9.87	$11.68	$10.17	$11.39	$13.42	$10.97	$12.22	$11.16	135%	6
Average (All)	$7.04	$7.09	$7.24	$7.65	$8.05	$8.13	$8.56	$8.49	$8.73	$9.09	129%	NA

Source: Northern Economics analysis using data from AMHS (2019a).

2.4 Summary of a Survey and Interviews of Community Leaders

In order to help inform the analysis on potential impacts of changes to AMHS operational patterns, Northern Economics contacted mayors, city managers, and other administrative officials in each Alaska community directly served by AMHS as well as the mayors of the Ketchikan Gateway Borough and Kodiak Island Borough to catalogue their views about the following:

- How the ferry system is used by residents, businesses, schools, and local governments
- Transportation alternatives to AMHS
- A workable minimum level of AMHS service
- Community tolerance for AMHS fare increases or service reductions
- Effects of reduced AMHS service
- Ideas for increasing the AMHS revenue stream and cutting costs

To collect the information, Northern Economics distributed written surveys and followed up with phone interviews. The level of participation varied, with 21 communities choosing to fill out the survey and participate in telephone interview; 10 communities choosing to submit a survey but not to participate in the interview; and 4 communities not providing responses. Table 18 shows community participation in the community leader survey by AMHS route group. For the purposes of this summary, each community is placed into only one route group. For example, Juneau is considered part of the Lynn Canal group, even though it is also a key AMHS terminal for the SE Feeder routes and the Mainline routes.

Table 18. Participation in Community Leader Survey and Phone Interviews

AMHS Route Group	Communities Served							
Lynn Canal	Juneau	*Haines*	Skagway					
Mainline	Kake	Sitka	Petersburg	*Wrangell*	Ketchikan	*Ketchikan Gateway Borough*		
SE Feeder	Angoon	Gustavus	Hoonah	Pelican	*Tenakee*			
Metlakatla and Cross-Gulf	Metlakatla	*Yakutat*						
PWS	Chenega Bay	Cordova	*Tatitlek*	*Valdez*	Whittier			
Homer-Kodiak	*Homer*	Seldovia	Ouzinkie	Port Lions	Kodiak City	Kodiak Island Borough		
SW	*Akutan*	*Chignik*	*Cold Bay*	*False Pass*	*King Cove*	*Old Harbor*	Sand Point	Unalaska

Legend: Yes, survey completed, yes interviewed
Yes, survey completed, no interview
No survey response, no interview

When asked about a hypothetical 10 percent fare increase, several communities indicated that this increase would not significantly change ridership due to high dependence on the ferry and limited or expensive alternatives. However, a few communities did indicate that ridership may decrease and that there is already a sentiment that AMHS fares are too high, especially for individuals with fixed incomes. We also anticipate that the practice of residents consolidating trips and doing errands on behalf of friends or family could become more common with increased fares.

Communities across each of the route groups proposed the following ideas for increasing AMHS revenue streams and cutting costs:

- reducing staff numbers, while still allowing for safe operations;
- introducing retail, food service, and alcohol sales on vessels

- improving consistency, reliability of service, and marketing outreach to attract more passengers;
- selling off extraneous land around the ferry terminals;
- using smaller ferries to serve the smaller communities;
- charging out-of-state passengers higher ticket prices;
- studying the possibility of restructuring the system in the Southeast region;
- prioritizing service to communities based on need;
- homeporting the ferry in Whittier for the Prince William Sound (PWS) group;
- contracting out port services;
- figuring out the best approach to change out crews while still keeping the ferry running;
- serving Kodiak Island communities using a day-boat (Homer-Kodiak group);
- selling advertising space on the ferries and terminals;
- consulting previous AMHS plans to learn more about effective suggestions that have been vetted, but are not being implemented;
- giving up ownership of the *Tustumena* and the responsibility of taking care of the crews [to a private entity], while providing a subsidy to keep the service in place.

The following sections summarize how the ferry is used, AMHS transportation alternatives, and minimum service needs for each route group. Detailed summaries for each of the community leader interviews are included in the community profiles in Appendix B.

2.4.1 Lynn Canal

Road access from Haines and Skagway requires driving through remote parts of Canada with long drive times to the rest of Alaska, so residents of these communities tend to travel to Juneau (accessible via ferry) for shopping, medical care, vehicle repairs, and access to government offices, such as the Division of Motor Vehicles. Schools in the Lynn Canal region frequently use the ferry to travel to sporting and other multi-school events and the region's many tourists take it when traveling between communities. Residents also use the ferry to access other communities in the region as road access is often nonexistent. The ferry is the preferred mode of travel because it is typically the lowest-cost option, allows passengers and their vehicles to depart and arrive together, and affordably accommodates large loads of groceries, building materials, and other items that are unavailable or significantly more expensive in the smaller communities. Alternatives to the ferry, like small planes and smaller watercraft, tend to be more expensive and susceptible to the region's harsh weather. A barge service goes to Juneau twice a week, and less frequently to Haines and Skagway, but does not accommodate passengers. The minimum levels of service that officials believe each community can tolerate vary somewhat, with close-to-daily service considered a requirement.

2.4.2 Mainline

None of the communities that participated in the survey from this group are connected to the road system, so they rely heavily on the ferry system. Most Mainline ferry residents do their shopping and other errands in Juneau, where food, services, and materials tend to cost less, but many medical patients are taken to Sitka. The region's schools travel on the ferry for sports, music and other extracurricular activities. Residents commonly use the ferry for the purchase and maintenance of vehicles. The ferry is usually more affordable and has a greater ability to transport cars, trucks, and other personal-use vehicles versus another watercraft or a small plane. Businesses and all levels of government use the ferry to ship large items, such as construction vehicles and materials, mammography machines, and commercially caught fish. Minimum

levels of service that could be tolerated by each community varied, but respondents felt that less frequent service is needed to Bellingham compared to more important destinations like Juneau.

2.4.3 Metlakatla and Cross-Gulf

Service to the Indian community of Metlakatla consists of a ferry, the *Lituya*, that runs between Metlakatla and Ketchikan. Metlakatla residents rely on the ferry to access services in Ketchikan such as medical care, the court system, and the Division of Motor Vehicles, as well as for student academic and athletic travel. Metlakatla's clinic often makes more than 1,000 referrals each year to medical facilities in Ketchikan with most patients travelling by ferry. The ferry is the only option to transport personal vehicles, which are used by residents for transportation in Ketchikan and to transport items from shopping trips, particularly large or bulk items, back to Metlakatla. The weekly barge service can carry vehicles and equipment, and a parcel delivery services does mass orders and delivers weekly. Some small businesses use both the ferry and barge service, but some businesses cannot wait for barge service to receive supplies. Floatplanes are an alternative to the ferry but are more vulnerable to inclement weather and are also more expensive, often double the price of the ferry. The current service of five days a week is the minimum Metlakatla can tolerate and community officials believe the service should be seven days a week. Officials noted that a reduction in service would restrict medical access, limit participation in recreational and cultural activities, and force people to incur additional travel costs, like staying overnight in other ports.

Yakutat is 200 miles across the Gulf of Alaska to the nearest road access. Tourists, researchers, newly hired personnel, and utility company staff travel to Yakutat on the ferry, and most of Yakutat's building materials are transported via ferry. The ferry is the only affordable way to transport vehicles and there are no auto repair shops in Yakutat. The Alaska Marine Lines barge is four times more expensive than the ferry and only runs once a month, so a vehicle shipped out for repair would not likely return for 2 to 3 months. Lodges, logging and mining companies use the ferry to access Yakutat's deep-water, ice-free port and from there send supplies and staff to Icy Bay, Dry Bay, and Yakataga. Yakutat Hardware, Yakutat Tlingit Tribe, and Yakutat Seafood also use the ferry to transport people and materials. For passengers, Alaska Airlines provides daily flights to Juneau and to Anchorage via Cordova. The community emphasized that they already have a limited ferry schedule and asked for no additional reductions in service since vehicle reservations are already difficult to schedule.

2.4.4 Southeast Feeder

Each of the communities in this group indicated that they depend heavily on the ferry for relatively affordable all-weather service to transport vehicles and other freight, shop, travel to medical appointments, receive visitors, and send students to sporting and academic events elsewhere in the Southeast region. Residents also use the ferry to transport the deceased back to their communities for ceremonies and burials. The ferry is also a key link to road systems. Officials spoke of the ferry as the lifeblood of their communities, saying their communities would be devastated both economically and psychologically if ferry service were to cease. Some communities are connecting points to the ferry for even smaller communities that do not receive ferry service. In addition, the ferry connects communities with limited or no barge service to those that can accommodate barges. Commercial entities including fish processers, local grocers, lodges, guides, and other tourist-focused operations rely on the ferry on the Southeast region. Local governments and housing authorities also rely on the ferry to move materials, vehicles, and staff. Minimum levels of service that could be tolerated varied by community. Some respondents proposed that schedules vary by season, while others prefer schedules to remain unaltered year-round. Some of the communities were conservative about the prospect of additional reductions to service, while others, including Angoon and Pelican, proposed fairly significant reductions in the number of sailings per year.

2.4.5 Prince William Sound

Residents of the communities in this group use the ferry for moving passengers, vehicles, food, and building materials and accessing the road systems in Whittier and Valdez to reach the Railbelt communities. Many residents use the ferry to reach Anchorage with their vehicles and families and consolidate medical visits, shopping, vehicle repair, and other errands into a single trip. The region's schools also use the ferry to transport students to athletic events in the Sound or on the road system. Commercial use of the ferry includes the retail and restaurant sectors, construction industry, and the fishing industry, particularly out of Cordova. Tourists, outdoor recreationalists, and PWS residents also use the ferry to access communities that are not on the road system for recreational opportunities and cultural events. Local governments and utilities use the ferry to haul heavy equipment, building materials and workers to and from projects. Transportation alternatives vary by communities. Valdez and Whittier both have access to the road system, barring road closures, so their own residents generally have less reason to rely on the ferry. Alaska Airlines provides passenger service with flights to Cordova but does not provide vehicle transport or affordable bulk item transport. If ferry service were cut further, the Cordova mayor indicated the community would attempt to pursue other transportation options, including additional air carriers and water taxi services, although he views the ferry as a core part of Alaskan life and the economy. For Chenega Bay and Tatitlek, the ferry's ability to affordably move vehicles and large shipments is unmatched by alternative transportation services. Officials believed that minimum service levels in the range from once a week for Chenega Bay to about three times a week for other communities would be tolerable.

2.4.6 Homer-Kodiak

Of the communities that participated in the survey from this group, only Homer is on the contiguous road system. Residents use the ferry to transport groceries, building materials, vehicles, and other large items. They also use it to travel to medical and other appointments and to access the international airport in Anchorage, and Coast Guard families stationed on Kodiak Island use the ferry to move their belongings during transfers. The ferry is the most cost-effective means for schools to send students to athletic, academic, musical, and other extracurricular events. Commercial ferry users include the tourism industry, which relies on the ferry to transport tourists, outdoor recreationalists, and heavy supplies (fuel, building supplies, large quantities of groceries). Local governments use the ferry to bring in food, office supplies, water treatment facility chemicals, tires, and other items needed to serve their communities. Grocery stories, bars, and restaurants all use the ferry to bring in goods and supplies. The region's commercial salmon crews also use the ferry in the summer. Alternative transportation options vary from one community to the next, but barge and jet service tend to be more expensive. Passengers can't ride with their vehicles on barges and sending heavy cargo on planes is unaffordable to most residents. Water taxis run between Seldovia and Homer but are also more expensive and can handle much less freight than the ferry. Acceptable minimum service levels vary by community. There is a general concern that cutting service back too much would cause outmigration at a level significant enough to damage the economies and characters of Homer-Kodiak communities.

2.4.7 Southwest

Residents in the Southwest communities use the ferry to visit other communities in the region, access medical care in Anchorage, and ship large items such as vehicles, furniture, appliances, and building materials to their homes. Residents tend to prefer the ferry over the barge for bringing in large items because the barge is more expensive. The smaller communities at the western end of the route use the ferry to shop for groceries in the hub community of Unalaska, whose retailers receive goods weekly on the Matson barge. Barge service is also available to residents of Unalaska for transporting goods, but rates are significantly more expensive than the ferry. The school district uses the ferry to take students between communities. Teachers relocating to and from the Southwest region use the ferry to move their vehicles and household goods. For

the fishing industry, Unalaska/Dutch Harbor relies more on barge services to transport processed fish products and Alaska Airlines jet service to move workers. However, fishing operations in the smaller communities do use the ferry to move their boats, nets, and other equipment. Tourists often travel to the region on a plane, then ride the ferry to Kodiak or Unalaska before catching another flight to Anchorage or elsewhere. Residents can access plane services that reach their destinations more quickly, but planes are significantly more expensive than the ferry, both for passengers and cargo. Minimum service requirements tend to be lower in the Southwest region than other AMHS regions, with the summer months being the priority for more sailings, though the number of sailings is already low compared to other AMHS regions. Communities request that the *Tustumena* be repaired or replaced.

2.5 Summary of Information Gathered During Interviews of Transportation Businesses

The study team's research of private entities and alternative travel methods included interviews with several representatives within the marine freight industry, tourism industry, and the economic development agency Southeast Conference. The primary objective in speaking with representatives of these companies and organizations was to determine how private industry might be able to supplement the transportation needs of coastal Alaska communities given a reduced AMHS. A complete list of interviews is shown below, and the highlights of those interviews are summarized in the remainder of this section.

- Matson, Inc.
- Southeast Alaska Lighterage
- Lynden Transport, Inc.
- Four Seasons Marine
- Allen Marine Tours
- Icicle Seafoods
- Gold Belt Inc.
- Inter-Island Ferry Authority, Dennis Watson
- Southeast Conference, Robert Venables
- Prince William Sound Economic Development District, Wanetta Ayers

Multiple interviewees noted that the current AMHS is not built around customer demand or customer service, and that route frequency and timing should be based on customer demand. Additionally, private entities would run the system as a business and would not have the same political or union constraints that the current system has, including the high cost of union labor. It was noted, however, that union agreements with ports would not change even if vessel ownership changes; union labor would therefore be a big challenge for privatization of the AMHS.

Multiple interviewees also observed that in order to be profitable the AMHS needs to focus on high demand, high volume routes, and that these profitable routes could potentially be operated by private entities. However, low demand routes would not be profitable would require a subsidy to for private operators to consider taking them over. Most interviewees suggested that the AMHS fleet should be a mix of large, slower vessels for freight/vehicles and smaller, faster vessels for passenger-only service. Larger vessels and routes with long runs are more costly to operate, in terms of both fuel and crew costs, so maximizing the use of smaller fast ferries operating as passenger day-boats would reduce costs.

The interviewees provided several other comments and suggestions regarding AMHS and potential improvements. One interviewee suggested that Native Corporations may be interested in supporting smaller

community ferry routes in certain low-volume traffic areas, which are currently at risk of losing service. Another interviewee suggested that AMHS could issue Requests for Proposals in the future for services on given routes that could be provided more cost-effectively by a private entity. Some members of private industry also noted that they are already considering alternatives to AMHS in order to meet their needs for freight transportation.

Multiple interviewees noted that the AMHS currently serves two principal purposes; 1) AMHS serves as a highway system for transporting commercial goods and local residents, and 2) AMHS serves as a system for transporting tourists. These two functions have conflicting interests and require different strategies to be implemented. Interviewees suggested reducing routes that mostly transport tourists if AMHS is actually focused on being a highway system instead of a tourist system. For example, reducing routes to Bellingham or Prince Rupert would decrease costs due to long run times and the expense of the large ferries required to make those runs.

2.6 Alaska Survey Responses on the Use and Perspectives of AMHS

Alaska Survey Research regularly conducts a quarterly survey of Alaska residents on a number of subjects. Northern Economics contracted with Alaska Survey Research to gather perspectives on potential changes in AMHS service and fares from a statewide sample of Alaska residents as compared to interviews conducted with individuals and businesses more directly involved with AMHS. The study team was able to prepare questions for inclusion in the survey to gain a statewide perspective on AMHS and did so in a cost-effective manner since it is a shared survey and this project only paid for the AMHS-specific questions. The survey was conducted from June 28 to July 8, 2019 and was used to evaluate how and why Alaska residents utilize services provided by AMHS, with emphasis on differences between residents of different regions. It is important to note that survey participants were chosen to reflect a statewide population, with 512 of the 736 respondents residing in Anchorage, the Matanuska-Susitna Borough, or Fairbanks.

On average, respondents of the Alaska survey went on 2.7 ferry trips within the last five years. A total of 237 respondents (31.5 percent) indicated they had taken one or more trips on AMHS ferries in the last five years with 18 percent taking three or more trips. The most commonly reported reasons for traveling via AMHS were for pleasure or recreation and a count by category is listed below, noting that respondents could provide as many reasons as they wished:

- Vacation/Tourism/Recreation (87)
- Visit friends and family (28)
- Business and work related (25)
- Because they could bring their vehicle (26)
- Quicker more convenient (14)
- Attend an event (19)
- Medical reasons (10)
- Moving (7)
- Shopping (6)

Table 19 shows detailed results of the survey and separates respondents by those who live in an AMHS port community (with or without contiguous road access) and those who live in non-AMHS communities. The upper portion of the table shows percentages for all respondents of the survey, while the lower portion shows percentages for respondents who made at least one ferry trip in the last five years.

The table shows that residents who live in communities without road access use AMHS more frequently, with 38.0 percent of respondents making 10 or more trips per year. About 44 percent of AMHS-community residents with road access reported not using AMHS in the last five years, compared with only about 15 percent of residents in roadless communities. The table also shows significant differences in residents traveling with vehicles, where nearly 70 percent of roadless community residents reported bringing their vehicle on AMHS compared to only 21.8 percent of road connected residents

Table 19. Summary Results from the Alaska Survey by Port and Road Access

	AMHS Community Residents		Non-AMHS Community	Total
	No Road	Road Connected		
		%		
All Respondents				
Areas of Alaska				
Southeast	74.5	16.4	1.3	10.3
Rural	9.6	N/A	9.8	9.5
Southcentral	15.9	83.6	25.5	26.4
Anchorage	N/A	N/A	47.7	40.6
Fairbanks	N/A	N/A	15.6	13.3
Total	100.0	100.0	100.0	100.0
Number of Ferry Trips in the Last Five Years				
None	15.4	43.6	75.5	67.5
1–2 Trips	9.2	17.36	13.9	13.5
3–9 Trips	37.4	14.0	7.1	10.8
10+ Trips	38.0	25.1	2.3	7.2
Not Sure	-	-	1.2	1.1
Total	100.0	100.0	100.0	100.0
Respondents Who Made At Least One Ferry Trip				
Number of Household Members on Trip				
One	34.8	41.9	44.0	41.0
Two	41.9	15.5	30.6	33.2
Three or More	23.3	42.5	24.4	25.2
Not Sure	-	-	1.0	0.6
Total	100.0	100.0	100.0	100.0
Drive a Vehicle or Traveling on Foot				
Drove Vehicle	69.9	21.8	63.7	63.3
On Foot	30.1	78.2	33.4	34.9
Not Sure	-	-	2.9	1.8
Total	100.0	100.0	100.0	100.0

Note: Totals may not add due to rounding
Data Source: Alaska Survey Research (2019).

Respondents who had travelled on AMHS in the last 5 years were asked if they would have travelled even if the number of available sailings were reduced by 50 percent, and nearly 50 percent said they would have still made the trip. Of those who would have still made the trip, more than 40 percent said they would have traveled even if there was no ferry service, by using some other mode of transportation. According to those respondents, the most likely alternative transportation methods were (in descending order) plane, road or car, private boat, and private plane, chartered boat or water taxi, and others.

All 736 respondents were asked if they favor or oppose the State of Alaska ending its support of AMHS. Fifty-nine percent indicated they opposed ending support, while 30 percent favored ending support and 11 percent answered they didn't know. When those who favored the end of State of Alaska support (or answered that they didn't know) were informed that the loss of support could result in higher prices to take the ferry or possibly fewer ferry options, 102 respondents changed their response, indicating that they would favor continuing State of Alaska support of AMHS.

3 Means Used to Assess Options to Reduce Marine Highway Dependence on State Funding

The objective of this study is to identify potential reductions in the state's financial obligation and/or liability as they relate to AMHS. Achieving that goal will require increases in revenues, reductions in cost, or a combination of the two. This section introduces the "levers" that affect revenues and costs for AMHS and describes the methodologies and assumptions that are used to assess the options studied in this analysis. These concepts are applied throughout the assessment of study and are not considered stand-alone options.

3.1 Potential Revenue Enhancement Measures

Increasing fares is the most direct way to boost revenue. Customers' responses to fare increases depend on the elasticity of demand[10] with respect to the cost of a ticket. Based on historic data provided by AMHS (2019a), the study team has found that for most routes served by AMHS, both passenger and vehicle demand is inelastic, meaning that price increases result in increases in total revenue.

Table 20 summarizes the revenue impacts of changes in fares for passengers and vehicles on a route-group basis. Regression models developed by the study team to assess impacts of price and schedule changes[11] were used to test whether a 10 percent price increase resulted in more or less revenue for each route group, or in some cases, specific market segments of route groups. If a 10 percent increase in fares generated greater overall revenue within the route group, then price increases are assumed to be appropriate if maximization of revenue is the goal.[12] Alternatively, if a 10 percent price increase results in revenue declines, then price increases are deemed inappropriate for that route group or route-group market segment. Further testing was undertaken to determine whether prices for the market segment should remain unchanged or if price reductions would be more appropriate.

In general, the study team found that price increases resulted in higher revenues with the following exceptions:

1) If mainline runs are limited to internal Alaska service only, then fare increases do not change passenger revenue and reduce vehicle revenues; vehicle fare reductions increase revenue.
2) Passenger and vehicle fares increases or decreases have no meaningful impact on revenue in SE Feeder routes to/from Sitka.
3) Vehicle fare increases between Juneau-Haines and Juneau-Skagway reduce revenues, while vehicle fare reductions increase revenues.

[10] The elasticity of demand is a measure used to show the responsiveness of the quantity demanded when there is a change in the price. Normally when the price increases, the quantity demanded decreases—this is a basic principal of economic theory. If there is a 10 percent price increase and the quantity demanded decreases by less than 10 percent, demand is said to be inelastic. If instead the quantity demanded decreases by more than 10 percent, then demand is said to be elastic. If demand is inelastic, a price increase will result in an increase in total revenue. As an example, assume that 50 candy bars are sold daily from a vending machine at a price of $1/bar, and that total revenue is $50. When the machine's owner increases the price to $1.25/bar (a 25 percent increase) the number of bars sold (the quantity demanded) drops to 45 per day (a 10 percent decrease), but the total revenue increases to $56.25. In this case, demand is inelastic and the increase in prices results in higher revenue for the owner.

[11] Additional details regarding these regression models are provided in Section 3.3 and in Appendix C.

[12] These pricing strategies recognize that the primary goal of this study is to reduce operating subsidies and increase revenue. Northern Economics' Tariff Analysis (2015) emphasized standardization of fares over revenue maximization.

4) Vehicle fare increases or decreases have no meaningful impact on revenue between Cordova-Whittier.

5) Passenger fare increases on SW routes to/from Kodiak reduce revenues while fare reductions increase revenues.

6) Passenger fare increases on general Cross-Gulf routes reduce revenues while fare reductions increase revenues.

It should be noted that the while the price change strategies are specific to the particular regression models developed for the quantitative analyses, the findings summarized in Table 20 can be applied more broadly. As an example, look at the strategy for fares on Mainline ferries. In general, the study team found that if the standard Mainline runs are maintained (i.e., the Mainline ferries run between Skagway in the north and Bellingham and Prince Rupert in the south, then price increases imposed on all city pairs will result in higher revenues. If Mainline service to both Bellingham and Prince Rupert is eliminated, and the Mainline ferries run only between Alaskan city-pairs, then the results of the regression models indicate that passenger fares should not be increased and that vehicle fares should be reduced.

Table 20. Route Group-Based Price-Change Impacts and Optimal Strategies

Route Group	Model Specification	Passenger Fare Decrease	Passenger Fare Increase	Passenger Pricing Strategy	Vehicle Fares Decrease	Vehicle Fare Increase	Vehicle Pricing Strategy
		Revenue		Pricing	Revenue		Pricing
Mainline	All origins/destinations	Down	Up	Up	Down	Up	Up
	If runs are limited to internal Alaska routes	Down	Down	No Change	Up	Down	Down
	To/From Bellingham	Down	Up	Up	Down	Up	Up
SE Feeder	To/From Juneau	Down	Up	Up	Down	Up	Up
	To/From Sitka	Marginally Up	Marginally Down	No Change	Down	Down	No Change
Lynn Canal	To/From Juneau	Down	Up	Up	Down	Down	Down
	Between Skagway/Haines	Down	Up	Up	Down	Up	Up
PWS	Between Valdez/Whittier	Down	Up	Up	Down	Up	Up
	Between Cordova/Whittier	Down	Up	Up	Marginally Up	Down	No Change
Homer-Kodiak	Between Homer/Kodiak	Down	Up	Up	Down	Up	Up
SW	SW To/From Homer	Down	Up	Up	Down	Up	Up
	SW To/From Kodiak	Up	Down	Down	Down	Up	Up
Cross-Gulf	All routes in general	Up	Down	Down	Down	Up	Up
Metlakatla	Metlakatla	Down	Up	Up	Down	Up	Up

Decrease Prices Increase Prices

Note: Information summarized in the table was developed using regression analysis results from AMHS Ticket and Sailing Data (2019a) combined with the FY 2018 AMHS sailing schedule.

In addition to simply adjusting fares to increase revenues, AMHS could employ more "dynamic" pricing strategies that adjust prices during periods when demand is high (or low), or when ticket sales for particular sailings reach predetermined levels. Dynamic pricing methods are studied within Option 9.

3.2 Potential Cost Reduction Measures

Given that operating costs of AMHS in FY 2018 exceeded revenues by over 200 percent, reducing costs may be more important than increasing revenues if AMHS is to become less dependent on funding from the State of Alaska. Cost reductions could be realized through different strategies as described below. Note that the strategies introduced below will all be considered in more detail in subsections that follow.

Reduce the number of vessels in the AMHS Fleet

Reducing the number of vessels in the AMHS fleet would result in an immediate reduction in operating costs (routine maintenance) and a longer-term reduction in capital costs (major maintenance and overhaul). Through the reduction of service that a vessel had provided, there would also be a reduction in labor, fuel, and other costs associated with operating and docking the vessel. The sale or disposal of vessels could trigger a repayment to the federal government, but that would be a percentage of the proceeds of the sale.

Reduce the number of operating days

Reducing the number of operating days would reduce the at-sea operating costs of vessels and could reduce operating costs at shoreside facilities, though the degree of savings realized from non-operating days would depend on labor agreements.

Reduce the number of hours the vessel operates

Reducing the number of hours a vessel operates would reduce fuel consumption but could also substantially reduce labor costs by reducing the number of paid crew members or the hour crew members are paid if a vessel is converted to a 12-hour (or 14-hour) day-boat from operations as a 24-hour day-boat. It is worth noting here that usage of the term "day-boat" in this analysis varies somewhat from the AMHS usage. Please see the full discussion on day-boats following Table 21 on page 36.

Reduce the number of times ferries call at a given community

Reducing the number of ferry calls at communities would have a similar impact as reducing the number of operating days, including at-sea and shoreside operating costs, though the degree of realized savings would depend on labor agreements. Further, while reducing the number of calls could better align ferry capacity with passenger demand, reductions in service could reduce demand to the extent that schedules become less convenient to users. Therefore, some of the cost savings could potentially be offset by reduced revenues.

Eliminate ports and communities from service

Eliminating ports and communities from service would result in a reduction of both short and long-term maintenance needs at shoreside facilities, along with the labor and other costs associated with operating them. Sale or transfer of facilities could trigger the repayment of federal obligations.

Contract out passenger services to private contractors

Contracting passenger services could reduce labor costs to the extent that the private operator would have lower overall compensation and benefit rates. There could also be savings from a reduction in the number of employees from what is stipulated in the labor agreements. However, private sector labor agreements, credential requirements, and other factors could offset some of the savings. This could also be seen as a mechanism for revenue enhancement if revenues from onboard services exceed costs that a private vendor would incur, and if the vendor were willing to pay a premium for the right to provide these services.

Reduce wage rates paid to AMHS employees

Reducing the wage rates paid to AMHS employees would directly reduce labor costs, although this would require renegotiation of labor agreements. This analysis treats wage-rate reductions separately from other reductions in labor costs that result from changes in vessel operating modes or reductions in sailing days.

Reduce onboard staffing levels

Reducing AMHS staffing levels, within allowable levels under U.S. Coast Guard regulations and as needed for operations and safety, would directly reduce labor costs. This would require renegotiation of labor agreements.

Change the operating parameters of vessels

With a renegotiated labor agreement, it is possible that AMHS could temporarily reduce the number of cabins that are available for use. For example, during the winter and shoulder seasons, vessels could close off the deck space that provides access to the unused cabins. By doing so, the number of passenger crew members could be reduced. Given the relatively high cost of passenger service crews (see Table 7) this could represent a significant cost savings. It is assumed that the renegotiated labor agreements would allow each of the vessels that offer cabins to operate with either 100 percent of its cabin space or with 50 percent of its cabin space. Further, if AMHS chose to reduce cabin space during the year, it is assumed it would also be allowed to re-open that space in time for peak season operations.

It also is possible that AMHS could temporarily reconfigure vessels that have traditionally operated as 24-hour vessels with cabin space available (e.g. the *Kennicott* or *Tustumena*) to operate as day-boats without cabin space on offer. Vessels could operate as a 24-hour day-boat similar to the way the *Aurora* and *LeConte* have operated in the past, or as a 12-hour or 14-hour day-boats with reduced crew numbers for each operating day—as the *Fairweather* and *Chenega* operated. Day-boats are discussed in much greater detail with precise definitions following Table 21 on page 36.

3.2.1 Specification of Cost Reduction Assumptions

The analysis uses an array of assumptions to estimate vessel operating cost reductions. The study team believes that the cost assumptions developed and described below provide reasonable estimates of operating costs for the options considered. However, it must be noted that if any one of the options were actually implemented, it is expected that AMHS would need to use more precise data cost available to AMHS staff to assess the potential financial impacts. Key contributors to the operating costs of particular vessels are the size of the vessel and its capacity to carry passengers and vehicles. Also critical are the vessels' crew complements and their rated speed and fuel use. This information was provided in Table 3 page 4.

One of the key assumptions made by the study team is that AMHS, or the eventual owner or operator of AMHS vessels, would have the flexibility within U.S. Coast Guard (USCG) regulations and through renegotiations with unions to determine the number of hours that each vessel would operate, the number of cabins it would have on offer (if any), and the size of the crew that would be utilized. Currently numbers of crew for each vessel are determined in a three-step process:

1) AMHS indicates to the USCG the primary mode of operations planned for the vessel.
2) USCG inspects the vessel and issues a Certificate of Inspection (COI) indicating the minimum number of crew required along with stipulations that AMHS must follow USCG Work-Rest Rules.[13]
3) AMHS negotiates agreements with the three marine unions whose members make up the AMHS vessel crews.[14] Negotiated agreements may not necessarily reflect minimums required by the COI.

[13] 46 CFR § 15.111 requires: 1) a minimum of 10 hours of rest in any 24-hour period; 2) 77 hours of rest in any 7-day period; and 3) the hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length, and the intervals between consecutive periods of rest shall not exceed 14 hours.

[14] AMHS employs members of three unions for its onboard labor: International Organization of Masters, Mates, and Pilots (MM&P); the National Marine Engineers' Beneficial Association (M.E.B.A.); and the Inland Boatmen's Union (IBU).

Currently AMHS does not have the ability to utilize more than a single operating plan, COI, or negotiated manning agreement within a single year. While this analysis takes no position with respect to USCG COIs or regulations or the agreements between AMHS and the three unions, the analysis relies heavily on assumptions that alter the status quo. The analysis assumes that in the future AMHS or the eventual owners of AMHS ferries will be allowed to operate vessels under multiple operating modes during the course of a given year, and even in certain cases within a given work week. The assumption that additional flexibility will be negotiated and allowed is a cornerstone of the cost reduction scenarios developed and utilized throughout this analysis.

Labor cost reduction assumptions for Mainline vessels are shown in Table 21. The first column after the vessel names shows the estimated labor cost per operating day, as derived by the study team using data from AMHS (2019b, 2019d). These data are based primarily on data for FY 2018. For these vessels it is assumed that labor contracts would be negotiated to allow the vessels to shift between: 1) a full crew with all of the vessel's decks and cabins available for use; and 2) a reduced crew with 50 percent of the public cabin spaces temporarily closed off. Under the second configuration it is assumed that the crew size is reduced by approximately 12.5 percent[15] after rounding up to eliminate partial crew members, and that labor costs are reduced accordingly. For example, in FY 2018 the *Columbia* had labor costs of $49,659 per operating day (AMHS 2019b) and a full crew of 63 persons. With the reduced crew its crew size is assumed to be reduced to 57 and its daily labor costs to $44,930 per operating day.[16] The table also shows estimated operating costs if all passenger cabins are shuttered and the vessels operate as 24-hour day-boats. Finally, the right-most column indicates estimates of the current costs for passenger service crew that are not directly linked to cabins. Based on data from AMHS (2019c), approximately 20 percent of labor-based operating costs are for "passenger services" not related to cabins.

Table 21. Operating Crew Labor Cost Assumptions for Mainline Vessels

	Crew if Operating as a 24-hour Vessel									
	Full Crew		Cabin-Related Passenger Service Crew		Crew with 50 percent of Cabins Shuttered		Crew with All Cabins Shuttered		Passenger Services Crew Unrelated to Cabins	
Vessel	$/Day	Full Crew Count	% of Full Crew	$/Day	% of Full Crew	$/Day	% of Full Crew	$/Day	% of Full Crew	$/Day
Columbia	$49,659	63	23.8%	$11,824	88.9%	$44,142	76.2%	$37,836	17.5%	$8,671
Matanuska	$42,129	48	25.0%	$10,532	87.5%	$36,863	75.0%	$31,597	16.7%	$7,022
Malaspina	$50,991	47	23.4%	$11,934	89.4%	$45,566	76.6%	$39,057	17.0%	$8,679
Kennicott	$43,419	55	23.6%	$10,263	89.1%	$38,683	76.4%	$33,156	16.4%	$7,105
Tustumena	$36,269	38	23.7%	$8,590	89.5%	$32,451	76.3%	$27,679	18.4%	$6,681

Source: Northern Economics analysis using data from AMHS (2019b, 2019c, 2019d) and DOT&PF (2019b).

[15] Analysis of data from AMHS (2019c) by the study team indicates that cabin-related passenger service crews comprise an average of 25 percent of labor costs on vessels that offer cabins for rent. On these vessels an additional 15 percent of labor costs are related to passenger services not directly related to cabins. On vessels that do not offer cabins for rent, the study team estimates that 20 percent of daily labor costs are related to passenger services.

[16] Cost reductions for labor assume that crew counts are rounded up to the next whole person from the assumed percentage reduction. For example, the *Columbia*'s crew is reduced from 63 to 57 (a reduction of 9.5 percent)—a 10 percent reduction would have resulted in 56.7 crew members. The *Columbia*'s daily labor costs are reduced by 9.5 percent from $49,659 to $44,930. Note that the process of rounding up crew counts to whole persons causes the percentage reductions to vary by vessel, and therefore actual reductions will always be ≤ assumed percentage amounts.

This analysis assesses the cost-reduction potential of four alternative day-boat operating modes, some of which are new or relatively new concepts that have not been fully explored or utilized by AMHS in the past. The study team also notes that manning levels assumed for the different operational modes are developed explicitly for the purposes of this analysis, and that it should not be inferred that these operational modes have necessarily been approved by AMHS, USCG, or any of the three labor unions. The operational assumptions are an attempt to demonstrate potential ways to reduce costs and operating subsidies, which is considered the primary mandate of the AMHS Reshaping Project. In all cases it is assumed that current union agreements that require a minimum of 42 hours of pay per week, or 84 hours of pay per two-week assignment continue in place. The four day-boat operating modes utilized in this analysis are as follows:

- **24-hour day-boats**: These vessels have crew quarters on board which allow crew members to attain required rest during working days. For purposes of the analysis it is assumed these vessels operate between 14 and 24 hours per day. The *LeConte* and *Aurora* have operated in the past as 24-hour day-boats. In general, it is assumed that 24-hour day-boats operate seven days per week.[17]
- **12-hour day-boats**: These vessels do not require onboard crew quarters and will operate no more than 12-hours in any given day. Each operating day will include at least one hour before any scheduled departure and one hour after the last scheduled arrival. For purposes of this analysis, a 12-hour day-boat will have half the crew complement it would have had were it operating as a 24-hour day boat.[18] 12-hour day-boats will require watch-crews at night and on "off" days. Watch crews are discussed in more detail beginning on page 36.
- **14-hour day-boats**: These vessels do not require on-board crew quarters and will operate no more than 14-hours in any given day. Each operating day will include at least one hour before any scheduled departure and one hour after the last scheduled arrival. For purposes of this analysis, a 14-hour day-boat utilizes two additional crew members relative to the crew complement it would have had were it operating as a 12-hour day boat. Because of USCG work/rest rules,[19] 14-hour day-boats can operate no more than six 14-hour days per week.[20] 14-hour day-boats will require watch crews at night and on "off" days. Watch crews are discussed in more detail beginning on page 36. 14-hour day-boat operations are a relatively new concept for AMHS ferries, although the *Tazlina* has operated in this mode.
- **12-hour/14-hour day-boats**: This operational mode has not been utilized in the past by AMHS—it was developed by the study team specifically for purposes of demonstrating potential cost reductions within the AMHS Reshaping Project. Under this operating mode a vessel will operate for a minimum of two days per week as a 12-hour day-boat and a minimum of two days per week as a 14-hour day-boat. In this operating mode it is assumed that the vessel will have at least two off days per week, and that the two additional crew members required to operate as a 14-hour day-boat will work onboard the vessel on the off days as part of the day-time watch crew. Watch crews are discussed in more detail beginning on page 36.

[17] All day-boats will require watch crews when they are tied for the night or when they have an "off" day. Watch crews for each vessel assumed to operate as day-boats are discussed in more detail beginning on page 37.

[18] If the vessel operating as a 24-hour day-boat has an even number of crew then its crew as a 12-hour day-boat will be exactly half the size of the 24-hour day-boat. If the vessel operating as a 24-hour day-boat has an odd number of crew, then its 12-hour crew will round up to the next full crew number.

[19] 46 CFR § 15.111 requires: 1) a minimum of 10 hours of rest in any 24-hour period; 2) 77 hours of rest in any 7-day period; and 3) the hours of rest may be divided into no more than two periods, one of which shall be at least 6 hours in length, and the intervals between consecutive periods of rest shall not exceed 14 hours.

[20] Technically a crew could work six 14-hour days plus one 7-hour day, or five 14-hour days plus two 10.5-hour days, and still be in compliance with USCG work/rest rules.

Table 22 summarizes labor costs per day for vessels that are assumed to operate as day-boats within the analyzed options including the *Aurora*, *LeConte, Tazlina, Hubbard*. The table also includes the *Kennicott* and *Tustumena,* which, under many of the analyzed options, operate as day-boats with all of their passenger cabins shuttered. The *Lituya* is also included noting that it operates only as a 12-hour day-boat.

Table 22 is divided into three sections with the vessel names in the left-hand column. The first section shows daily operating costs if the vessel is operating as a 24-hour day-boat. For the *LeConte* and *Aurora*, the numbers shown are actual costs as reported by AMHS (2019b) for FY 2018. Costs shown for the other vessels are estimates developed by the study team. For example, if the *Kennicott* and *Tustumena* are operating as 24-hour day-boats, it is assumed their crew complements are reduced by approximately 25 percent from their full crew to 42 and 29 respectively after rounding up to whole persons. Reductions in operating costs are then computed based on the crew-size reduction percentage—i.e. to $33,155/day for the *Kennicott* and to $27,679/day for the *Tustumena*. Crew complements for the *Tazlina* and *Hubbard* when operating as 24-hour day-boat are estimated to be twice the size of the crew complement listed in the AMHS Vessel Information Table (AMHS 2019d) for the *Tazlina*.[21] Note that the *Lituya* is not included in the table—the *Lituya* operates as a 12-hour day-boat with a crew of five and a daily labor cost of $3,642; none of its crew are dedicated to passenger services, and no changes in its operational mode are considered under the options analyzed.

If the vessels shown in Table 22 operate as 12-hour day-boats, their daily labor costs while in operation are reduced by approximately 50 percent from their 24-hour day-boat labor costs—12-hour labor costs for the *Tustumena* are slightly higher as a percentage because of the practice of rounding up crew counts to whole persons. For this analysis, vessels that operate as 14-hour day-boats are assumed to require two additional crew members (relative to their 12-hour crew counts) and that labor costs increase by a variable percentage depending on the 12-hour crew size.

Table 22. Operating Crew Labor Cost Assumptions for Vessels Operating as Day-Boats under the Options

	Vessel is a 24-Hour Day-Boat				Vessel is a 12-Hour Day-Boat			Vessel is a 14-Hour Day-Boat		
			Passenger Service Crew							
Vessel	$/Day	24-Hour Crew Count	$/Day	Percent of 24-hour Crew	Count	$/Day	Percent of 24-hour Crew	Count	$/Day	Percent of 24-hour Crew
Kennicott	$33,156	42	$7,105	21.4%	21	$16,578	50.0%	23	$18,157	54.8%
Tustumena	$27,679	29	$6,681	24.1%	15	$14,317	51.7%	17	$16,226	58.6%
Aurora	$21,228	24	$4,423	20.8%	12	$10,614	50.0%	14	$12,383	58.3%
LeConte	$21,177	24	$4,412	20.8%	12	$10,589	50.0%	14	$12,354	58.3%
Tazlina	$24,767	28	$5,307	21.4%	14	$12,383	50.0%	16	$14,152	57.1%
Hubbard	$24,767	28	$5,307	21.4%	14	$12,383	50.0%	16	$14,152	57.1%
Lituya	NA	NA	NA	NA	5	$3,642	NA	NA	NA	NA

Source: Northern Economics analysis using data from AMHS (2019b, 2019c, 2019d) and DOT&PF (2019b).

As noted above, all AMHS vessels, with the exception of the *Lituya,* require watch crews when they are not operating. When vessels are tied up for periods longer than two-weeks, the study team assumes that costs are included in the "vessel leave" component of shared operating costs. In several options that are assessed

[21] The crew complements listed in the AMHS Vessel Information Table (AMHS 2019d) for the *Tazlina* are based on 12-hour day-boat operations; Given that the *Hubbard* is built to the same specifications as the *Tazlina*, their crew complements are assumed equal.

either the *LeConte* or the *Aurora* operates on a two-weeks on/two-weeks off (2-on/2-off) schedule in order to reduce costs. During these short-term lay-up periods,[22] it is assumed that the four members of the daytime watch crew and the four members of the nighttime watch crew are former members of the operating crew that would otherwise be laid off.[23] The *Kennicott* and *Tustumena* are also assumed to have day and night watch crews comprising four crew members when needed. Watch crew sizes for other day-boats can vary between four-person and two-person crews depending on whether the vessel is tied up at its home port, or if it is tied up at an away port. The home-port night crew is assumed to be a four-person crew that undertakes routine maintenance tasks as well as line-tending duties. Away-port watch crews (if required by the operating schedule) are assumed to be two-person crews whose duties are primarily line-tending.[24] Day-boats will require a daytime watch crew of at least two persons on days when the vessel is inactive during an operating week. Table 23 summarizes cost assumptions developed by the study team for watch crews on all AMHS vessels, noting that the *Columbia, Matanuska,* and *Malaspina* are included in the table even though none of the options assessed will explicitly require them to use short-term watch crews.

Table 23. Cost Assumptions for Watch Crews for AMHS Vessels

	Night-time Watch Crew				Daytime Watch Crew	
	Home Port		Away Port		Assumed for Home-base Only	
Vessel	Crew Count	$/Day	Crew Count	$/Day	Crew Count	$/Day
Columbia	4	$3,153	4	$3,153	4	$3,153
Matanuska	4	$3,511	4	$3,511	4	$3,511
Malaspina	4	$4,340	4	$4,340	4	$4,340
Tustumena	4	$3,818	4	$3,818	4	$3,818
Kennicott	4	$3,158	4	$3,158	4	$3,158
Aurora	4	$3,538	2	$1,769	2	$1,769
LeConte	4	$3,530	2	$1,765	2	$1,765
Tazlina	4	$3,538	2	$1,769	2	$1,769
Hubbard	4	$3,538	2	$1,769	2	$1,769
Lituya	NA	NA	NA	NA	NA	NA

Source: Northern Economics analysis using data from AMHS (2019b) and DOT&PF (2019b).

Lodging and per diem costs must also be paid for crew members that are asked to overnight at a location that is not their home base—this includes daytime operating crews as well as a night-watch crew. If, for example a vessel spends two nights per week at an away port, AMHS provides the operating crew $60 per diem for meals and pays for lodging. Based on information provided by DOT&PF (2019b) a $60 per diem for meals is provided. In addition, the study team assumes that from May through September hotel costs are $125 per night per crew member and from October through April they are $75 per night. Finally, it is

[22] Watch crew labor costs during longer-term lay-up periods are assumed to be included in the "vessel-leave" component of the shared-operating costs. All assumed "lay-up" periods for the *Columbia, Matanuska* and *Malaspina*, are "long term" and costs are assigned to shared costs.

[23] It is assumed that renegotiated labor contracts will allow AMHS to operate vessels using 2-on/2-off rotating shifts.

[24] For analysis purposes it is assumed that crew members are paid for a minimum of 42-hour per week (DOT&PF 2019b), and therefore in many cases the two-person away-port night-watch crew will be paid for four nights of work even if they work only two or three nights per week. The costs shown in Table 22 reflect assumed nominal costs/day and do not include additional payments that may be required to meet union rules.

assumed that away-port night crews are provided lodging and food per diem seven days per week as part of their negotiated contract.

Table 24 summarizes daily fuel costs for AMHS vessels. The first column lists each vessel while the second column shows the estimated fuel cost per operating day derived from the Alaska Marine Highway Fund Annual Financial Report for FY 2018 (AMHS 2019b). There are two exceptions as follows:

- Fuel costs for the *Lituya,* which operated as a 12-hour day-boat and had daily fuel costs of $803, as shown in the rightmost column in the bottom row.
- Fuel costs for the *Tazlina* and *Hubbard* are estimates because they did not operate in FY 2018 and have not yet been included in an AMHS Annual Financial Report. Daily fuel costs for *Tazlina* and *Hubbard* are estimated using the ratio of hourly fuel usage reported in the AMHS Vessel Information Table (2019d) for the *Tazlina,* relative to the hourly fuel usage of the *Aurora*. The *Tazlina* uses 250 gallons/hour while *Aurora* uses 190 gallons/hour and had daily fuel costs of $5,882. Therefore, the *Tazlina*'s daily fuel costs are estimated as follows: $250 \div 190 \times \$5{,}882 = \$7{,}739$. For purposes of this analysis, the *Hubbard* is assumed to have daily fuel costs identical to that of the *Tazlina*.

The middle section of Table 24 shows estimates of daily fuel costs if vessels operate as 14-hour day-boats, while the section on the right shows estimates of daily fuel costs if vessels operate as 12-hour day-boats. The study team has assumed that daily fuel costs for vessels operating as 14-hour day-boats are 70 percent of fuel costs when vessels are operating as 24-hour day-boats, and that daily fuel costs when operating as 12-hour day-boats are 60 percent of fuel costs when vessels are operating as 24-hour day-boats. The fuel reduction if vessels transition to a 12-hour operating day is not a full 50 percent because it is assumed the vessels would be running over a larger proportion of their operating day if they were operating a 24-hour day-boats.

Table 24. Estimated and Assumed Fuel Cost Per Day

	24-hour Day-Boat	14-hour Day-Boats		12-hour Day-Boats	
Vessel	$/Day	Percent of 24-hour Cost	$/Day	Percent of 24-hour Cost	$/Day
Columbia	$23,853	None of the options analyzed include scenarios in which the *Columbia*, *Matanuska*, or *Malaspina* operate as day-boats.			
Matanuska	$14,571				
Malaspina	$19,015				
Tustumena	$8,269	70%	$5,789	60%	$4,962
Kennicott	$18,023	70%	$12,616	60%	$10,814
Aurora	$5,882	70%	$4,117	60%	$3,529
LeConte	$8,127	70%	$5,689	60%	$4,876
Tazlina	$7,739	70%	$5,418	60%	$4,644
Hubbard	$7,739	70%	$5,418	60%	$4,644
Lituya	NA	NA	NA	NA	$803

Source: Northern Economics analysis using data from AMHS (2019b) and AMHS (AMHS 2019d)

3.3 Quantitative Assessments and Model Calibration Using FY 2018 Operations

The quantitative assessments utilize a three-step process to estimate the impacts of each option:

1) Develop a hypothetical sailing schedule for each vessel and route group to match the parameters specified in the option and calculate the change in number of sailings to each city pair relative to

the average from July 1, 2009 to December 31, 2018. The hypothetical sailing schedule is also used to calculate the number of operating days for each vessel utilized.

2) Estimate the change in the number of passengers, vehicles and cabins and resulting revenues using regression models developed specifically for each route group.

3) Estimate the operating costs for labor, fuel, and other expenses of each vessel utilized under the option using the cost-reduction assumptions described earlier.

The study team developed sixteen different route-specific regression models[25] explicitly for use in the AMHS Reshaping Study utilizing data from July 1, 2008 through December 31, 2018 to forecast passenger and vehicle counts and revenues under the options. Each regression model also includes two key variables of interest which serve as the basis for estimating revenue in this study's quantitative assessments: 1) the number of sailings provided; and 2) the prices for AMHS service. In the regression models, a sailing is defined as the opportunity to travel from one city to another. A route which travels through three cities (A-B-C) would be represented as three individual sailings in the regression models (A-B, A-C, B-C), and prices are modeled by dividing revenues by the volume of either passengers or the car deck. In addition, the regression models account for changes in the seasonality of service, by the recognizing the percentage of sailings in the peak season (June-August) and the percentage of sailings in the winter season (November–March). All of the regression models used in the assessment of options are specified in detail with equations and statistics in Appendix C.

Regression models provide a standardized way to estimate revenues for different combinations of assumptions. Since each model is derived from historical travel patterns, they provide a mathematical and objective basis for comparing each set of conditions. This study compares several quantitative assessments with unique AMHS schedules, levels of service, and operating parameters; however, each assessment relies on the same underlying data and model structure as the basis for revenue estimates.

Each model is specific to a particular route group and predicts the quantity for AMHS passenger and car deck service while accounting for seasonal influences like higher levels of traffic during the summer tourism months, low travel during winter months, and the effect of inflation on fares over time. Additionally, the models consider what services and infrastructure are available to AMHS travelers in both the departure and arrival city. For example, Juneau receives more AMHS traffic than many other port cities because it has an airport, retail stores, and a hospital, and serves as one of several regional hubs in Southeast Alaska. Each regression model uses variables to account for access to hospitals, jet runways, regional hubs, major metro areas (Bellingham or Anchorage), and the contiguous road system.

Separate models have been constructed for both passenger service and car deck service across each of the eight defined route groups. Models were not developed for cabins revenues—for purposes of this analysis it is assumed that cabin revenues change in proportion to changes in passenger revenues. Changes in revenue are estimated by constructing a hypothetical weekly schedule (based on the constraints of each alternative option) and applying the level of service and seasonal changes from that schedule to the

[25] Regression models are a statistical method of analyzing data that are used for predictions and forecasting in a variety of industries. Regression modeling uses actual data to create an equation which isolates the effects of variables on a specific variable of interest, the dependent variable. In the case of AMHS data, the study team estimates the number of passengers onboard a vessel or the combined length of vehicles on the car deck (dependent variables) as a function of other important independent variables including time of year, the services available at the departure and arrival ports, the number of sailings, and the fare prices. The model compares all points in the data set (July 2008 – December 2019) to estimate how much the dependent variable is affected by each independent variable. For example, the model uses the data to recognize that sailings during summer months will have more passengers and vehicles than during winter months. Similarly, the models use historical changes in key variables, like prices and the level of AMHS service, to allow the study team to make predictions based on changes to those variables.

regression model. The output of the regression models are estimates of passenger and car deck volumes and revenues. Cabin revenues are estimated as a proportion of passenger revenues.

3.3.1 Calibration of Regression Models to FY 2018 Operations

During FY 2018, AMHS collected $47.3 million in vessel-based revenue (AMHS 2019b). However, the traffic and volume data provided by AMHS indicate revenues of only $45.3 million in FY 2018—approximately $2 million less than the actual revenue. The difference is attributed to vessel-based sales of food, beverages, and other amenities. In the regression model for FY 2018, the $2 million in other revenue is distributed across route groups based on passenger and cabin revenue. In model results of change scenarios, other revenue is estimated as a proportion of passenger and cabin revenue.

The regression models used to assess revenues within the analyzed options have also been calibrated to account for natural errors in the regression analyses using FY 2018 as the baseline. To calibrate the models, the study team input schedules (service levels) and prices that mirrored actual values for FY 2018 into the regression models. The model output produced a total revenue estimate of $47.7 million after inclusion of estimates for on-board food and beverage purchases. Aggregating across all regions and revenue classes the model is very accurate, underestimating FY 2018 revenues by only $418,000 or 0.9 percent. However, the errors are not evenly distributed throughout the individual route group models and the study team does not wish to overestimate revenues or costs when examining the changes envisioned under the various options. Therefore, the revenue estimate for each quantitative assessment is modified by dividing modeled outputs for each route group by the calibrating deflators, shown as percentages in the lower portion of Table 25. As an example, the total projected revenue for FY 2018 from the regression model is $46.9 million. Dividing that result by 99.1 percent yields $47.3 million (i.e. $46,898÷ 99.1% = $47,316).

Table 25. Revenue Model Calibration by Route Group

Revenue Class	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Included Routes
FY 2018 Actual Revenue Calculated from AMHS Requested Data ($1,000s)									
Passenger Revenue	$8,127	$3,283	$989	$722	$1,750	$1,008	$252	$1,411	$17,541
Car Deck Revenue	$12,322	$2,617	$835	$444	$1,724	$1,878	$364	$2,576	$22,759
Cabin Revenue	$3,631	$106	$2	–	–	$351	$124	$773	$4,987
Other Revenue	$1,094	$315	$92	–	$163	$126	$35	$203	$2,029
Total Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
FY 2018 Revenue from Regression Model Estimates ($1,000s)									
Passenger Revenue	$8,916	$2,944	$1,039	$554	$1,991	$1,094	$355	$1,502	$18,395
Car Deck Revenue	$11,698	$1,837	$754	$381	$1,704	$1,656	$298	$2,341	$20,671
Cabin Revenue	$4,139	$127	$4	–	$0	$430	$151	$815	$5,666
Other Revenue	$1,203	$283	$96	–	$184	$140	$47	$214	$2,167
Total Revenue	$25,957	$5,191	$1,894	$936	$3,878	$3,320	$851	$4,872	$46,898
Model Calibration Percentage (%) Deflators (Model Estimates ÷ Adjusted Actual Revenue)									
Passenger Revenue	109.7%	89.7%	105.1%	76.8%	113.8%	108.5%	141.1%	106.4%	104.9%
Car Deck Revenue	94.9%	70.2%	90.3%	86.0%	98.8%	88.2%	82.1%	90.9%	90.8%
Cabin Revenue	114.0%	119.9%	185.7%	100.0%	100.0%	122.4%	121.2%	105.5%	113.6%
Other Revenue	110.0%	89.8%	104.3%	100.0%	112.7%	111.1%	133.3%	105.1%	106.8%
Total Revenue	103.1%	82.1%	98.7%	80.3%	106.6%	98.7%	109.8%	98.2%	99.1%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Actual vessel expenses in FY 2018 were $142.0 million (AMHS 2019b), compared to modeled expenses of $144.1 million as shown in Table 26. The operating cost calculator generates estimates that are approximately 1.5 percent greater than the actual vessel operating costs reported by AMHS (2019b) for FY 2018. The rows at the bottom of the Table 26 labelled "Vessel Leave" and "All Vessels" represent system-wide operating costs that are not attributed to particular vessels or route groups. Examples of these costs include routine maintenance costs for vessels and terminals as well as administrative costs to run the AMHS. Similarly, the table includes the cost of shore-based support for AMHS, which includes marine engineering, management, reservations, and marketing costs for the system at a total of $19.3 million in FY 2018. For purposes of this study it is assumed that these system-wide and shore-based shared expenses change in direct proportion to vessel operating costs. Because vessel-level costs estimated by the cost estimating model are all within 3.2 percent of FY 2018 levels, the study team has made the analytical decision not to calibrate operating cost calculator results under the options.

Table 26. Operating Cost Model Validation

Vessel	Modeled FY 2018 Expenses ($1,000s)				Actual FY18 Total ($1,000s)
	Labor	Fuel	Other	Total	
Aurora	$6,071	$1,682	$786	$8,539	$8,569
Columbia	$11,918	$5,725	$1,895	$19,538	$19,131
Hubbard	-	-	-	-	-
Kennicott	$13,448	$5,625	$2,144	$21,217	$20,549
LeConte	$6,713	$2,576	$1,183	$10,473	$10,374
Lituya	$841	$186	$155	$1,182	$1,197
Malaspina	$8,006	$2,985	$1,194	$12,185	$12,185
Matanuska	$5,308	$1,836	$838	$7,982	$7,729
Tazlina	-	-	-	-	-
Tustumena	$8,596	$1,960	$905	$11,461	$11,316
Subtotal	$60,902	$22,575	$9,100	$92,577	$91,050
Other Vessels	$2,865	$2,149	$1,445	$7,007	$6,981
Vessel Leave				$13,616	$13,478
All Vessels				$11,367	$11,252
Vessel Based Subtotal				$124,568	$122,761
Shore Based Support				$19,574	$19,251
Total				$144,142	$142,012

Note: Other Vessels include the *Fairweather* ($6.4 million) which was active in FY 2018, as well as the $0.5 million attributed to the *Chenega* and *Taku*. All three vessels have been taken out of service since FY 2018.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 27 summarizes the differences between the actual data from AMHS financial reports and the model estimates for revenues (before calibration), expenditures, and overall operating subsidy. The last column on the right shows the percentage difference between model estimates and actual data. As discussed above, revenue estimates from the model underestimate actual data by 0.9 percent while model expenditures overestimate actual expenditures by 1.5 percent. The combination of the two error percentages is additive with respect to the operating subsidy—the modeled estimate of the subsidy ($97.2 million) overstates the actual subsidy for FY 2018 by 2.7 percent. If we calibrate the revenue data to equal FY 2018 as we do throughout the estimate of impact under the options, the estimated operating subsidy would be 2.2 percent higher than the actual subsidy.

Table 27. Summary of Actual and Modeled Estimates of Revenues Costs and Operating Subsidy for FY 2018

	Actual Financial Data for FY 2018 ($1,000s)	Model Estimates for FY 2018 ($1,000s)	Difference between FY 2018 Actual and Model Data ($1,000s)	Percentage Difference between Actual and Model Data for FY 2018
Vessel Based Revenues	$47,316	$46,898	($418)	-0.9%
Operating Expenditures	$142,012	$144,142	$2,130	+1.5%
Operating Subsidy	$94,696	$97,243	$2,547	+2.7%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 28 provides an estimate of the revenues, operating expenditures, and operating subsidies on a route-by-route basis. While it is relatively straightforward to assign revenues to each route group based on origins and destinations, apportionment of operating expenditures is more difficult when a vessel operates in more than one route group on a given sailing. Mainline ferries provide a good example when their trips originate in Skagway. Revenue from passengers and vehicles boarding in Skagway destined to either Haines or Juneau is assigned to Lynn Canal, but revenue from passengers and vehicles bound for points south of Juneau (e.g. Petersburg, Ketchikan, or Prince Rupert) is assigned to the Mainline route. In fairness, some portion of the costs while the Mainline vessel is operating between Skagway and Juneau should also be allocated to Lynn Canal. AMHS does not appear to have standard cost apportionment rules so the study team assumes that 50 percent of the operating costs while the vessel is operating simultaneously in two routes will be allocated to each route group. Other examples of simultaneous operations in two route groups include the following:

- Days when the *Kennicott* is carrying both Cross-Gulf and Mainline passengers and vehicles between Juneau and Bellingham—e.g. passengers and vehicle originating in Whittier bound for Bellingham.
- Days when the *Kennicott* or *Tustumena* is carrying both SW and Homer-Kodiak passengers and vehicles between Homer and Kodiak—e.g. passengers from Unalaska bound for Homer after the vessels stop in Kodiak.

Table 28 has two sections of information. The upper portion shows allocated estimates of revenues, costs and operating subsidies by route group and also includes the estimated operating margin—calculated as Operating Subsidy ÷ Estimated Costs. The lower section shows the route percentage of the total for revenues, costs, and subsidies. While the Mainline routes generate more revenue than all other routes combined, they also generate the largest single share of the operating subsidy. None of the route groups have revenues in excess of cost, but Metlakatla has highest operating margin at -31 percent. The SE Feeder routes generate only 4 percent of total revenue but account for 13 percent of the total cost.

Table 28. Estimated Revenue, Costs, and Operating Subsidies by Route Group

	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Routes
Fully Allocated Estimates of Revenues, Expenditures and Subsidies from FY 2018 by Route Group ($1,000s)									
Adjusted Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
Estimated Costs	$68,079	$12,949	$13,843	$1,685	$15,078	$15,350	$3,084	$11,943	$142,012
Operating Subsidy	($42,906)	($6,628)	($11,924)	($520)	($11,441)	($11,987)	($2,309)	($6,980)	($94,696)
Operating Margin	-63%	-51%	-86%	-31%	-76%	-78%	-75%	-58%	-67%
Estimates of Revenues, Expenditures and Subsidies by Route as a Percent of Total									
Percent of Revenue	53%	13%	4%	2%	8%	7%	2%	10%	100%
Percent of Costs	48%	9%	10%	1%	11%	11%	2%	8%	100%
Percent of Subsidy	45%	7%	13%	1%	12%	13%	2%	7%	100%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

4 Assessment of Options to Reshape AMHS

The scope of work for this study specified 11 options, each employing a mix of the levers and tools described in Section 3. This text for each option was derived from a combination of RFP and contract language for the project and adjustments made by the study team working with contract staff from DOT&PF (2019b). The eleven options as analyzed are listed below.

1. Reshape the entire AMHS operation by selling or giving all vessels and terminals to a private entity to run whatever service they can justify economically.
2. Reshape parts of the AMHS by selling or giving some vessels and terminals for the specific purpose of providing service to certain communities, for example communities that are not on the National Highway System (NHS).
3. Transfer AMHS assets to a public corporation that would provide service based on a fixed or zero General Fund amount. The corporation board would set service levels, fares, and employee pay.
4. Lease vessels and terminals to a private entity, public corporation, or non-profit entity to run as a for-profit business with the state responsible only for vessel and terminal overhaul and refurbishment.
5. Sell or lease vessels to a private entity, public corporation, or non-profit entity while retaining the terminals as a state asset. There are examples of this in other states whereby the terminals are still eligible for federal aid.
6. AMHS continues as a state entity but is directed by the Legislature[26] to drop or reduce specific high-cost, low-volume runs on the assumption that these communities would be serviced by the private sector with its own equipment. AMHS would sell vessels not needed to provide the remaining reduced responsibility.
7. AMHS continues as a state entity but contracts out for service to lower-volume, expensive routes on the basis that a private entity would use smaller vessels and less-expensive crews. Vehicle and passenger service could be provided by different vessels. Current marine union contracts already allow this for Pelican, Gustavus, Hoonah, Angoon, Tenakee, and Kake.
8. Privatize all or some onboard passenger services: stateroom housekeeping, meal service, bars, gift shops, etc., to include consideration of novel freight delivery concepts such as small freight modules shipped aboard vessels without being loaded onto trailers or vehicles.
9. Implement further fare increases, including across-the-board increases, increases on more expensive runs, demand pricing for high-demand periods or events, demand pricing based on percent of remaining vessel capacity, etc.
10. Legislature-directed[26] renegotiation of marine union contracts to reduce vessel operation costs.
11. Evaluate any potential route changes that would reduce the operating cost, especially utilizing existing road links and potential future road links.

This study has carried out a two-tiered evaluation for each of the 11 options. After an initial review of each option, the list was pared down to a set of options that warranted further study. Through the course of the study, research and interviews with members of industry and the public informed that paring process.

[26] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

Ultimately, it was decided to address each of the 11 options, but with assumptions based on research and interviews to limit each option to the conditions that would make it most viable. Further, while this study addresses each option, less viable options and those without data to conduct a meaningful analysis are given a less rigorous examination. Where data are available, the analyses include quantitative estimates of revenue and costs, as outlined in this section.

The following sections present an analysis of each of the 11 options and their sub-options that have been proposed to reshape AMHS. The shaded text shown at the beginning of each section reflects the Option language from the contract modified by the study team for clarity.

4.1 Option 1: Sell or Give all Vessels and Terminals to a Private Entity

Option 1: Reshape the entire AMHS operation by selling or giving all vessels and terminals to a private entity to run whatever service they can justify economically.

Methodological Overview of Option 1

In order for a private entity to operate AMHS, it would need to accomplish three significant changes relative to current operations: 1) generate operating revenues in excess of operating costs; 2) generate enough excess revenues to cover long-term capital costs for vessel and terminal upgrades and replacements; and 3) generate enough additional revenue to provide owners of the entity a reasonable return on their investments and risk.

This analysis looks at AMHS' financial performance at the systemwide level to determine the change(s) to revenues and/or operating expenditures necessary to operate at break-even levels—which is viewed as an intermediate step before an entity becomes profitable. This is followed by an examination of the IFA's financial performance. IFA provides a specific example where AMHS transferred assets to another entity to provide service. If the IFA is able to break even, under favorable conditions, then a private entity could potentially do at least as well.

Assessment of Option 1

Over the last five years, AMHS revenues have been 35 to 40 percent of operating expenses (Table 29).

Table 29. AMHS Operating Income for FY 2014–2018

	Fiscal Year					
	2014	2015	2016	2017	2018	Average
	($1,000s)					
Operating Revenues	$50,877	$53,896	$47,157	$45,759	$47,316	$49,001
Operating Expenses including shore-based support services	$145,183	$140,127	$125,167	$115,916	$142,012	$49,001
Operating Income (Loss)	($94,306)	($86,231)	($78,010)	($70,157)	($94,696)	($84,680)

Source: Northern Economics analysis using data from AMHS (2019b).

Increasing fares to eliminate the operating loss using data from FY 2018 without any reduction in costs would require on average a revenue increase of 200 percent. Alternatively, operating expenses would need to be reduced by 66.7 percent if there were no changes in revenue. These required changes and several intermediate steps are shown in Table 30. The table shows the combination of cost reductions and changes in revenues that together would eliminate the subsidy. If costs could be reduced by 50 percent, and if

revenue were able to increase by 50.1 percent, then the subsidy could be eliminated. Cutting costs especially to the extent shown in the table, without also reducing revenues is probably not possible given that cutting costs would almost certainly involve reducing the number of sailings or reducing the number of ports and route groups served. If the goal is to eliminate the subsidy, it is more feasible to think of reducing costs and hoping that resulting revenues are reduced by a smaller percentage. As shown in Table 30, if costs are cut by 75 percent then the subsidy can only be eliminated if revenues fall by no more than 25 percent. Similarly, the subsidy can be eliminated if costs are reduced by 83 percent and revenues fall by no more than 50 percent.

Table 30. Revenue Increases and/or Cost Reductions to Eliminate the AMHS Subsidy

Percentage Change in Costs from FY 2018	Plus	Percentage Change in Revenue from FY 2018	Resulting Costs ($1,000s)	Resulting Revenues ($1,000s)	Resulting Subsidy ($1,000s)
No Change	+	+200.1%	$142,012	$142,012	No Subsidy
-25.0%	+	+125.1%	$106,509	$106,509	No Subsidy
-50.0%	+	+50.1%	$71,006	$71,006	No Subsidy
-66.7%	+	No Change	$47,316	$47,316	No Subsidy
-75.0%	+	-25.0%	$35,487	$35,487	No Subsidy
-83.3%	+	-50.0%	$23,658	$23,658	No Subsidy

Note: Resulting Costs = FY 2018 Costs × (1 + Percentage Change). Similarly, Resulting revenues = FY 2018 Revenues × (1 + Percentage Change)

Source: Northern Economics analysis using data from AMHS (2019b).

Even with the changes shown in Table 30 the ferry system would still be dependent on federal and state funding for refurbishment and replacement of vessels and terminals. If the ferries and terminals were given to a private entity, those capital replacement costs, along with the property taxes that would be levied locally, would result in unsustainable losses. No business owner would accept all AMHS assets with the intent to provide service as the system currently operates, since it would not be possible to do so and earn even a modest rate of return to account for the risk.

The only buyer that might be willing to accept the assets would do so with the intent of reselling them for a profit (such as for scrap) rather than providing ferry service to AMHS communities. The only individual route that appears feasible under existing conditions would be the *Lituya's* commuter operation, which would still require substantial fare increases to achieve levels of profitability acceptable to a private business.

IFA is a regional example of Option 1. It was provided access to federal funding with State of Alaska guarantees to acquire its two vessels. IFA is able to obtain federal funding (with a match) for capital replacement costs and does not pay property taxes. Its employees are not unionized, but they are part of the PERS System, so IFA does incur those costs. Even with its beneficial arrangement with the state, IFA requires a subsidy. Table 31 presents IFA's financial data as reported to the state for FY 2010–2014 and in audited financial statements for FY 2014–2017. At present, IFA officials indicate that revenues cover approximately 85 percent of annual operating expenditures, with the remainder being covered by IFA's savings fund. IFA receives an ongoing subsidy from the state of $250,000 per year—in addition to federal funds for which the state subsidy serves as matching funds—in order to cover maintenance costs. These state funds are only used for maintenance and are only accounted for in the financial statements when IFA draws on them. Without those funds IFA could not afford to cover maintenance costs with the revenues it generates. Without that capital and financial support, a private entity would not be able to break even with capital maintenance and replacement costs.

Table 31. IFA Statement of Operations, FY 2010–2017

	Inhouse	Audited Statements						
	FY 2010	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
	($1,000s)							
Revenues								
Charges for services	$3,006	$3,194	$3,141	$2,948	$2,835	$2,928	$3,014	$3,127
Operating grants and contributions	$1,625	$953	$835	$662	$785	$986	$1,868	$1,067
Total revenue	$4,632	$4,146	$3,975	$3,609	$3,620	$3,913	$4,882	$4,195
Expenses								
Ferry service								
Vessel operations	$2,333	$2,680	$2,824	$2,716	$2,941	$4,026	$5,222	$4,563
Shoreside operations	$468	$539	$375	$351	$372		$403	$419
Administration	$711	$879	$713	$679	$656	$582	$708	$756
Other expenses	$1,595	$1,231	$171	$1,192	$1,205	Included in Administration Expenses		
Total expenses	$5,107	$5,329	$4,082	$4,938	$5,173	$4,609	$6,332	$5,738
Net income	($476)	($1,182)	($107)	($1,328)	($1,553)	($695)	($1,449)	($1,544)

Notes:

1) For FY 2015 no information was available to break out vessel and shoreside operations, thus the two rows are combined.

2) Statements are reorganized to match with financial statements in FY 2016 and FY 2017. Other expenses in FY 2012 included the cancellation of $1.06 million of long-term debt. Other expenses for FY 2015 through FY 2017 are captured in ferry and administrative expenses. Approximately two-thirds of the loss in FY 2017 was due to depreciation, which is not a cash expense.

Source: Northern Economics analysis using data from DOT&PF (2019c) and IFA (2016, 2017).

Conclusions for Option 1

Given that the goal is to eliminate the subsidy while still having at least a minimum level of ferry service, the option to privatize the ferry system is not suitable because it would likely be unsustainable and result in no ferry service at all.

4.2 Option 2: AMHS Retains Selected Terminals and Vessels to Provide Service for Specific Defined Purposes

Option 2: Reshape parts of the AMHS by selling or giving some vessels and terminals for the specific purpose of providing service to certain communities, for example communities that are not on the National Highway System (NHS).

Two sub-options are discussed under Option 2. Option 2A focuses on providing service to AMHS ports on the National Highway System, while Option 2B focuses on providing services to the nearest roadhead for AMHS communities.

4.2.1 Option 2A: Provide AMHS Service to National Highway System Communities

Option 2A: AMHS would divest its terminals and no longer provide service to most communities that are not on the NHS. Vessels that would not be utilized for moving between these communities would also be divested.

4.2.1.1 Methodological Overview of Option 2A

This section provides a methodological overview and a set of assumptions that are used to assess Option 2A. Table 32 lists the NHS communities within the current AMHS.

Table 32. AMHS Ports that are also on the National Highway System

NHS Communities in Southeast Alaska						
Haines	Skagway	Auke Bay/Juneau	Sitka	Petersburg	Wrangell	Ketchikan
NHS Communities in Southcentral Alaska				NHS Communities in Washington		
Kodiak	Homer	Whittier	Valdez	Bellingham		

Other assumptions under Option 2A include:

1) A two-year transition period to the NHS-only version of AMHS would be granted. Service would be implemented on July 1, 2021 the first day of FY 2022.

2) The new AMHS-NHS service would retain ownership of the following vessels for the following routes:

   a) The *Tustumena*[27] would operate on the Kodiak-Homer route as a 12-hour/14-hour day-boat[28] based in Homer over a period of 37 weeks—the *Tustumena* would undergo maintenance and a lay-up period for the remaining weeks of the year (December 23 through April 6). All of its passenger cabins would be semi-permanently shuttered.[29] The vessel would operate five days a week, alternating each day between one-way trips east-to-west and west-to-east. Two times per week the vessel would make a port call into Seldovia on the way to and from Kodiak—on these days the vessel would operate for 14 hours (with two additional crew members), and on the remaining three days it would operate for 12 hours. The members of the operating crew would stay in hotels at contracted rates when the vessel overnighted in Kodiak. Two four-person night crews would man the vessel at night at both Homer and Kodiak. The night crews would perform routine maintenance as needed. In addition, a four-person crew composed of members of the regular operating crew would man the vessel on its "lay-up" days during each week. Because the vessel would already be operating in the area, service between Port Lions, Ouzinkie, and Seldovia would be included. The *Kennicott* would provide "relief service" in the Homer-Kodiak route group with the same operating schedule as the *Tustumena* from January 20 through March 17. The *Kennicott,* while in the Homer-Kodiak routes, will operate as a 14-hour day-boat rather than as a 12-hour/14-hour day-boat. No service would be provided in the Homer-Kodiak route group for four weeks starting December 23, and for three weeks starting March 17.

   b) The *Tazlina* would be dedicated to daily trips in Lynn Canal—Auke Bay-Haines-Skagway-Auke Bay. The vessel would operate as 14-hour day-boat, providing service five days a week. The

[27] The *Tustumena* is nearing the end of its service life and no longer operates in open waters during the winter months, Therefore, it is best to consider this a short-term option. It is also noted that the *Kennicott* is too long of a vessel for the ferry terminal in Kodiak and would operate using the Kodiak City Dock. Further, the *Kennicott* is not compatible with terminals in False Pass and Akutan and therefore service to those communities will no longer be provided.

[28] The concept of 12-hour/14-hour day-boats was introduced in Section 3.2.1. While this concept has never been tried at AMHS and may be difficult to negotiate, it appears to provide cost savings and provide service that is better suited to demand.

[29] It is assumed that AMHS is able to negotiate the conversion of the *Tustumena* to a day-boat with the unions.

vessel would take 10 weeks off for maintenance beginning in late October with no dedicated service in Lynn Canal for a two-week period from October 28 through November 10. The *Hubbard* would then provide eight weeks of relief service until the *Tazlina* returned on January 6. In addition, Mainline service would continue to run up to Haines and Skagway.

c) The *Hubbard* would be used primarily to service the NHS ports of Whittier and Valdez operating as a 14-hour day-boat. Because the vessel is already operating in the area, the option would also include limited service to Cordova and Tatitlek. Ferry service would operate seven days per week from May 26 through September 29 with three roundtrips between Whittier and Valdez each Friday, Saturday and Sunday. On Mondays it would make a one-way trip—Valdez-Cordova-Whittier and the same trip in the opposite direction on Thursdays. Tuesdays and Wednesdays the *Hubbard* would operate for 10.5 hours making a one-way trip from Whittier to Valdez and back on the next day with a stop both days in Tatitlek.[30] Crews would be based in Valdez, but two nights per week, on alternate days, would overnight in Whittier with crews staying at hotels at contracted rates.

   From September 30 to May 25, the service would be cut back to five days per week dropping the two one-way Valdez/Whittier trips that provided to service to Tatitlek. No service would be provided from January 20 to February 16. From October 21 to January 19, the *Kennicott* would provide the 14-hour day-boat service. During that period the *Hubbard* would provide relief to the *Tazlina* (in Lynn Canal) and undergo maintenance.

d) The Kennicott would operate on the Mainline between Skagway and Bellingham from June 2 through October 13 with a full crew complement. During the next week the vessel would have all of its cabins temporarily shuttered so that it could operate as a 14-hour day-boat five days per week from October 21 through March 16 on the PWS and Homer-Kodiak routes as described above. The study assumes that when the Kennicott was operating as a day-boat, the operating crews would be provided per diem and spend nights in hotels at contracted rates. From March 17 to June 1 the Kennicott would undergo maintenance. Beginning June 2, the Kennicott would again operate on the Mainline as a 24-hour vessel with two full crews on board. It is worth noting that the current USCG COIs and union agreements do not allow switching between two operational modes in a given year.

   It is also worth noting, as shown in Table 11 on page 12, that only the *Tustumena* and the *Kennicott* are compatible with the terminal in Homer and that only the *Tustumena* is compatible with the terminal in Kodiak. However, the *Kennicott* can use the Kodiak City Dock, and it is assumed for purposes of this analysis that City Dock would be made available for use by the *Kennicott* when it was providing relief service to the *Tustumena*.

e) The Columbia and the Matanuska would be utilized on the Mainline (Skagway-Bellingham) runs—no service would be provided to Prince Rupert. The Columbia would be scheduled for 12 weeks of maintenance beginning September 23. During this time, portions of the Columbia would be temporarily shuttered to reduce capacity and costs. The Columbia would come back into service on December 16 with a reduced crew and only 50 percent of its cabins available for use. The Matanuska would undergo maintenance for 11 weeks beginning December 23. It would return to service on March 10. The Kennicott would also operate on the Mainline runs when it was not providing service in the Homer-Kodiak and PWS routes. At least one vessel would be providing Mainline service all weeks of the year, and three vessels would be providing

[30] The 10.5-hour operating day utilizes the higher rated speed of the Alaska class ferries (*Tazlina* and *Hubbard*) and an assumed 20-minute turn-around time in Tatitlek to accomplish the full sailing in 10.5 hours. It is also assumed that operating crews will be paid for 14 hours on these two shortened days.

Mainline service during peak months, June–August. Under Option 2A there would be no service to Prince Rupert.

3) AMHS would no longer provide to the following routes and communities:

   a) Service to SE Feeder routes would be eliminated including service to Angoon, Gustavus, Hoonah, Pelican, and Tenakee Springs.[31]

   b) AMHS would no longer provide service to Metlakatla.

   c) AMHS would no longer provide service to SW routes on the Alaska Peninsula—routes that involve Old Harbor, Chignik, Sandpoint, King Cove, Cold Bay, False Pass, Akutan, and Unalaska.

   d) AMHS would no longer provide service on the Cross-Gulf routes. These routes provided the only service to Chenega Bay and Yakutat, and also connected the SW and Homer-Kodiak to PWS, as well as communities in those route groups to Juneau and the Mainline routes to Bellingham.

4) The following vessels would no longer be a part of AMHS under Option 2A:

   a) It is assumed that that Fairweather and Chenega would have been sold to non-Alaska buyers during FY 2020 and would not be available for service in Alaska.

   b) Aurora, LeConte, Lituya, and Malaspina would be deemed surplus vessels and could be given to community-based ferry entities that form as per the concepts described below.

5) It is assumed that during the transition period, two groups of communities would consider development and approval of (with a vote of the population) a "ferry entity" for the purpose of providing service between their communities and NHS ports. It is assumed that, with approval of the legislature, ownership of terminals that are no longer utilized by AMHS would be transferred to "ferry entities" or to communities in which they are located. It is also assumed that DOT&PF (with legislative approval) would work with the ferry entities to obtain federal funds to acquire vessels. A quantitative assessment of the feasibility of community groups forming independent entities to operate ferries is provided under Option 3B-1 in Section 4.3.2.

   a) It is assumed that Metlakatla or a combination of Metlakatla and Ketchikan would form a Ferry Entity and apply for ownership of the *Lituya*.

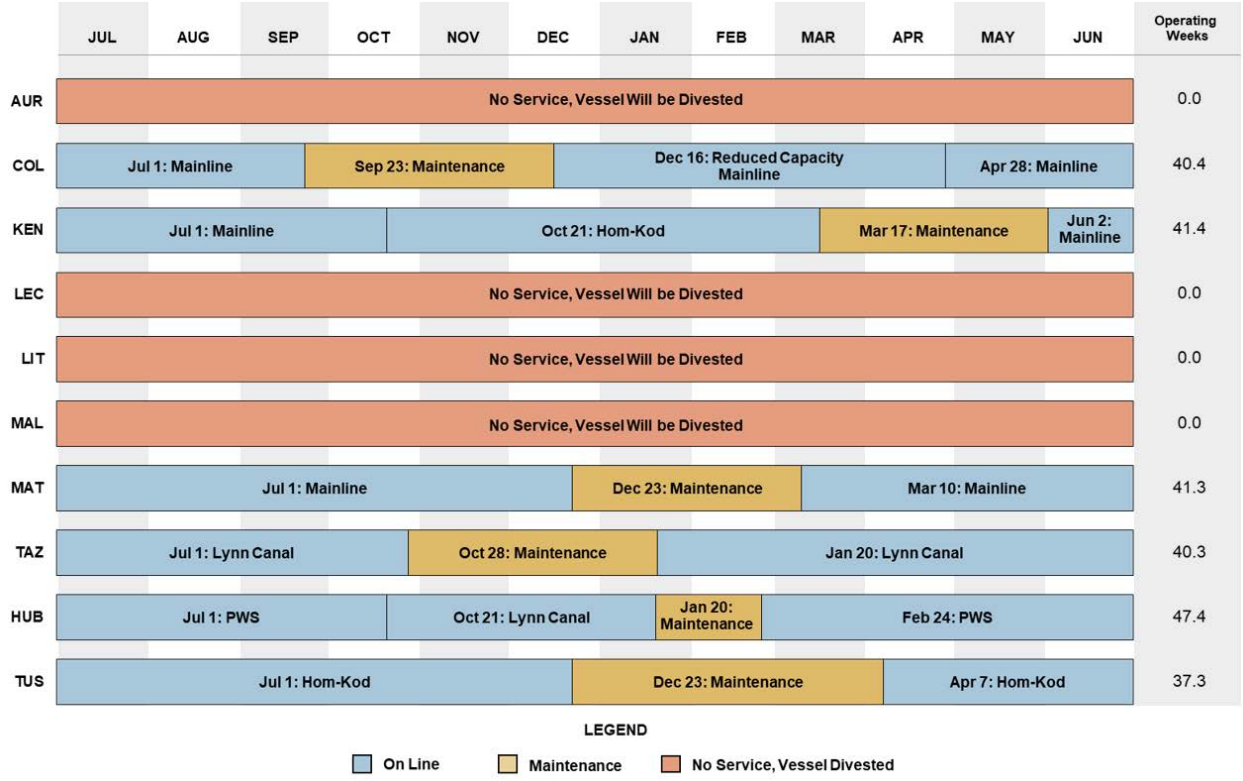
   b) It is assumed that the communities of Hoonah, Angoon, Tenakee Springs, Kake, Gustavus, and Pelican would form a Ferry Entity and apply for ownership of the *LeConte*.

   c) It is assumed the *Malaspina* would be sold at scrap value to an entity outside of Alaska.

[31] It can be argued that because the Tazlina is only operating 5 days per week in Lynn Canal Routes, that some level of service should be provided to the SE Feeder route communities on the "extra day" available to the Tazlina, even though these communities are not "NHS" communities. This would be essentially the same argument used to justify service to Tatitlek in PWS and service to Seldovia, Ouzinkie, and Port Lions in the Homer-Kodiak route group. A brief assessment of the cost and revenue impacts of providing service to SE Feeder communities is provided beginning on page 56.

Figure 7 illustrates the hypothetical operating schedule derived from the assumptions from Option 2A. This schedule is used to generate quantitative revenue and cost estimates in the following sections.

Figure 7. AMHS Reshaping Option 2A Schedule



4.2.1.2 Assessment of Option 2A

The quantitative assessment for Option 2A relies on the operational schedule developed by the study team to match the guidelines outlined in the previous section. The changes in services are then fed into regression models that in general focus on key city pairs in each route group. An exception is seen with the Mainline route where the regression model focuses on general operational levels and a model that was developed specifically for this option that included all Mainline city pairs that did not involve Prince Rupert. Any historic Mainline vessel stops that involved AMHS ports considered part of the SE Feeder route group were also excluded (e.g. Hoonah, Angoon, Pelican, etc.). The assessment assumes average fares from calendar year 2018 (the most recent data available.)

Table 33 summarizes the impacts of the changes imposed under Option 2A on service levels and revenues by route groups. The first section of the table provides an overview of service levels relative to service levels experienced in FY 2018. For example, overall service levels on the Mainline (based on the number of operational days) would be 94.6 percent of service levels experience in FY 2018. Total revenue on the Mainline route would fall from FY 2018 levels of $25.2 million to $21.7 million, a decline of 13.7 percent. Also note that because of the rounding used in this table (to the nearest $1,000) and in many of the tables that follow, the dash "–"is used to represent an actual zero value, while "$0" (as seen in PWS Cabin Revenues under the Option) is used to represent a number greater than zero but less than $500.

Lynn Canal service levels would increase by 29.5 percent relative to service provided in FY 2018, and thus revenues are expected to increase by $1.9 million relative to 2018. With the *Tustumena* and *Aurora*

transitioning to 12-hour day-boat service, there would be large reductions in service levels in both the Homer-Kodiak and PWS route groups. In the Homer-Kodiak route group, revenues would decline by $1.0 million and in PWS they would fall by $0.96 million.

Table 33. Projected Changes in Service Levels and Revenues by Route Group Under Option 2A

Revenue Class	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Included Routes
Index of Service Levels by Route Group Relative to FY 2018									
Service Level Index	94.6%	116.9%	–	–	74.8%	73.5%	–	–	NA
Actual Revenues in FY 2018 by Route Groups ($1,000s)									
Passenger Revenue	$8,127	$3,283	$989	$722	$1,750	$1,008	$252	$1,411	$17,541
Car Deck Revenue	$12,322	$2,617	$835	$444	$1,724	$1,878	$364	$2,576	$22,759
Cabin Revenue	$3,631	$106	$2	–	–	$351	$124	$773	$4,987
Other Revenue	$1,094	$315	$92	–	$163	$126	$35	$203	$2,029
Total Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
Projected Change in Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	($1,300)	$1,054	($989)	($722)	($454)	($246)	($252)	($1,411)	($4,320)
Car Deck Revenue	($1,410)	$668	($835)	($444)	($463)	($355)	($364)	($2,576)	($5,778)
Cabin Revenue	($560)	$43	($2)	–	$0	($351)	($124)	($773)	($1,768)
Other Revenue	($173)	$102	($92)	–	($42)	($56)	($35)	($203)	($499)
Total Revenue	($3,444)	$1,867	($1,919)	($1,165)	($959)	($1,007)	($775)	($4,963)	($12,366)
Projected Total Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	$6,826	$4,337	–	–	$1,296	$762	–	–	$13,221
Car Deck Revenue	$10,912	$3,285	–	–	$1,261	$1,523	–	–	$16,981
Cabin Revenue	$3,070	$148	–	–	$0	–	–	–	$3,219
Other Revenue	$921	$417	–	–	$121	$71	–	–	$1,529
Total Revenue	$21,729	$8,188	–	–	$2,678	$2,356	–	–	$34,950

Note: Assumes that 50 percent of passengers and vehicles that would have typically travelled to/from Prince Rupert on the Mainline choose to switch to take the ferry to/from Bellingham.

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Using the operating schedule described above, the operating cost calculator projects that expenditures under Option 2A would total $106.0 million, a reduction of $35.9 million from fiscal year 2018. Table 34 provides vessel-level details of the cost reductions. Shared costs for the option—including costs for "Vessel Leave", "All Vessels," and "Shore Based Support"—have all been reduced in proportion to reductions in vessel operating costs. As an example of these calculations, "Vessel Leave" costs for Option 2A are 74.7 percent of the "Vessel Leave" costs from FY 2018 ($10,066 ÷ $13,478 = 74.9 percent)—a reduction of 25.3 percent. This is exactly equal to the proportion of vessel operating expenses under the option ($73,216) relative to direct vessel operating expenses that occurred in FY 2018 ($91,050 + $6,981 = $98,031). Expenses for "All Vessels" and "Shore Based Support" are also reduced by 25.3 percent from FY 2018 levels.

Other important cost reduction results embedded Option 2A are as follows:

- The *Columbia* would operate for 133 days with a reduced crew. This would cut its daily labor costs by 11 percent during those 133 days and result in an estimated savings of $734,000 relative to costs if the full crew had been used.

- Converting the *Tustumena* to a 12/14-hour day-boat would generate significant cost savings relative to running the same schedule with a 24/7 crew as in FY 2018. The study team estimates that the cost savings on labor would be $1.9 million even if watch crews and hotel/per diem costs are included.

Table 34. Projected Cost Impacts of Option 2A

Vessel	Option Expenses ($1,000s)				FY18 Total ($1,000s)	Change from FY18 ($1,000s)	Change in Labor from FY18 ($1,000s)
	Labor	Fuel	Other	Total			
Aurora	–	–	–	–	$8,569	($8,569)	($6,093)
Columbia	$13,220	$6,703	$2,219	$22,142	$19,131	$3,011	$1,550
Hubbard	$4,475	$1,311	$884	$6,670	–	$6,670	$4,475
Kennicott	$8,314	$3,740	$2,170	$14,223	$20,549	($6,326)	($4,756)
LeConte	–	–	–	–	$10,374	($10,374)	($6,650)
Lituya	–	–	–	–	$1,197	($1,197)	($852)
Malaspina	–	–	–	–	$12,185	($12,185)	($8,006)
Matanuska	$11,986	$4,145	$1,892	$18,024	$7,729	$10,295	$6,846
Tazlina	$4,178	$1,143	$580	$5,901	–	$5,901	$4,178
Tustumena	$4,136	$979	$1,141	$6,256	$11,316	($5,060)	($4,351)
Subtotal				–	$6,981	($6,981)	($3,982)
Other Vessels				$10,066	$13,478	($3,412)	NA
Vessel Leave				$8,404	$11,252	($2,848)	NA
All Vessels				$91,686	$122,761	($31,075)	($17,639)
Vessel Based Subtotal				$14,378	$19,251	($4,873)	NA
Shore Based Support				$106,064	$142,012	($35,948)	($17,639)
Total				–	$6,981	($6,981)	($3,982)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 35 provides a summary of revenues and expenditures from FY 2018 and as projected under Option 2A. The table also shows the calculated operating subsidy as well as the projected changes under Option 2A relative to FY 2018 and compared to the AMHS Operating Budget for FY 2020. The estimated operating subsidy is projected to be reduced by $23.6 million from FY 2018 to $71.1 million, a reduction of 25 percent from the FY 2018 operating subsidy. If compared to the FY 2020 AMHS Operating Budget, Option 2A would require an additional subsidy of $23.0 million, an overrun of 48 percent.

Table 35. Summary of Revenues, Expenditures and Operating Subsidies Under Option 2A

	Actual Financial Data for FY 2018 ($1,000s)	Projections Under the Option ($1,000s)	Change from FY 2018 ($1,000s)	Percentage Change relative to FY 2018
Revenues	$47,316	$34,950	($12,366)	-26%
Expenditures	$142,012	$106,064	($35,948)	-25%
Operating Subsidy	$94,696	$71,113	($23,583)	-25%
	AMHS Operating Budget for FY 2020	Projection Under the Option ($1,000s)	Change from FY 2020 ($1,000s)	Percentage Change relative to FY 2020
Operating Subsidy	$48,108	$71,113	$23,005	+48%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Although not specifically calculated in the tables, the largest portion of the operating subsidy under Option 2A results from operations of Mainline vessels. Under Option 2A all of the operating costs (including shared costs) of the *Columbia* and *Matanuska* plus 65 percent of the operating costs of the *Kennicott* can be attributed to operations on Mainline routes between Skagway and Bellingham. In total, these costs are estimated at $64.6 million. The vessels generated $21.7 million on the Mainline, plus an estimated $2.5 million in Lynn Canal for a total of $24.3 million. Subtracting operating costs from revenues, it is estimated that the Mainline vessels account for 56.8 percent ($40.3 million) of the projected $70.98 million subsidy under Option 2A.

Estimation of Cost Savings Generated by Allowing Mainline Vessels to Reduce Passenger Cabin Availability

This option, and all others that follow, assumes that vessels that offer cabins for rent to passengers would be able to operate under at least two levels of service with respect to the number of cabins available. Changing the number of cabins available changes the number of passenger service crew that are working on the vessels. In Option 2A, the *Columbia* would operate 148 days with a full crew complement and all of its cabins available for rent. During off-peak months it would operate for 133 days with only 50 percent of its cabins available, and with a reduced crew. The ability to reduce the number of cabins available for rent along with the ability to reduce the number crew members working is estimated to generate approximately $734,000 in savings. This translates to savings of $5,518 for each day the *Columbia* operates with a reduced crew.

Estimation of Additional Subsidies Required to Provide Service to Tatitlek, Seldovia, Ouzinkie and Port Lions

Option 2A would provide limited service to several small communities that are not listed as part of the NHS, including Tatitlek in PWS and Seldovia, Ouzinkie, and Port Lions in the Homer-Kodiak route-group. The following subsection provides an estimation of costs and revenues of providing that service and the impact that serving these communities would have on the AMHS operating subsidy.

There are multiple ways to assess the impact of eliminating the scheduled stop in Tatitlek within the PWS Service under Option 2A including:

- **Drop Tatitlek Option 1**: Continue with seven days per week 14-hour day-boat service from May 26–September 29, but simply drop the stop in Tatitlek during the two short workdays that are required to comply with USCG work/rest rules. In this case, a one-way Valdez-Whittier trip would replace the Valdez-Tatitlek-Whittier trip and similarly the return trip the next would drop the stop in Whittier. Under this option there is an estimated net reduction in operating subsidy of $203,000.
- **Drop Tatitlek Option 2**: Replace the two one-way trips on consecutive days with one 14-hour Valdez-Whittier-Valdez round trip. Under this option it is estimated there would be a net reduction in the operating subsidy of $624,000. Clearly cutting the number operating days while increasing revenue as in this option yields better results than simply operating fewer hours as in Option 1.

Eliminating scheduled service to Seldovia, Ouzinkie, and Port Lions has larger ramification for AMHS than dropping service to Tatitlek. The assessment examines the potential impact in a two-step process: Step 1 estimates the impacts of dropping service to Ouzinkie, and Port Lions, and then Step 2 estimates the impacts of dropping service to Seldovia.

Step 1—drop service to Ouzinkie and Port Lions: As scheduled under Option 2A, providing service to Ouzinkie and Port Lions requires a full day of dedicated service for the *Tustumena* operating out of Kodiak, and for the *Kennicott* when it is providing relief for the *Tustumena*. If service to Ouzinkie and Port Lions is eliminated the *Tustumena* (and *Kennicott*) could cut back to four days of scheduled service. For two days it would operate as a 12-hour day-boat providing one-way trips between Homer and Kodiak with no intermediate stops. The other two days the vessel would operate as a 14-hour day-boat providing one-way trips between

Homer and Kodiak with the extra stop in Seldovia. It is estimated that dropping service to Ouzinkie and Port Lions with this change in operating schedules results in a net reduction in the operating subsidy of approximately $716,000.

Step 2—drop service to Seldovia: If service to Seldovia is eliminated, the *Tustumena* (and the *Kennicott* when it is providing relief service) can operate all four days as a 12-hour day-boat rather than with a split schedule as a 12-hour/14-hour day-boat. With this change in operating schedule it is estimated there would be an additional net reduction in the operating subsidy of $478,000.

Expansion of Service by *Tazlina* to Provide Limited Service to SE Feeder Communities.

It can be argued that because 14-hour day-boat service in Lynn Canal is only occurring five days per week, at least one day of service per week could be provided to SE Feeder Route communities on the "extra" available service day[32] even though these communities are not "NHS" communities. This is essentially the same argument used to justify service to Tatitlek in PWS, and service to Seldovia, Ouzinkie, and Port Lions in the Homer-Kodiak Route Group. Specifically, the argument to provide service is that a vessel is available and that providing additional service doesn't negatively affect service to other communities. An assessment of changes in costs and revenues and the change in operating subsides of providing 14-hour day-boat service one day per week service to SE Feeder communities is provided below.

Operating day requirements for runs involving the SE Feeder communities assuming one-hour stops in each community with one full hour before the first departure and one full hour after the last arrival are as follows:

- Juneau-Angoon-Juneau requires 11.4 total hours and is feasible in a 14-hour day.
- Juneau-Hoonah-Gustavus-Juneau requires 13.5 total hours and is feasible in a 14-hour day.
- Juneau-Tenakee Springs-Hoonah-Juneau requires 13.1 total hours and is feasible in a 14-hour day.
- Juneau-Angoon-Hoonah-Juneau requires 14.5 total hours and is not feasible in a 14-hour day.
- Juneau-Angoon-Tenakee Springs-Juneau requires 14.7 hours and is not feasible in a 14-hour day.
- Juneau-Pelican-Juneau requires 16 total hours and is not feasible in a 14-hour day.

Based on the operating hour requirements listed above, minimum levels of service could be provided between Juneau and four of the five feeder communities—Angoon, Tenakee Springs, Hoonah, Gustavus. Service could not be provided between Pelican and Juneau with a 14-hour day-boat.

Using the regression models developed for the SE Feeder communities it is estimated that one-day-per-week service to SE Feeder communities would generate an additional $93,000 in revenues for AMHS per year. If the *Tazlina* (and the *Hubbard* when it is providing relief service) operated six days per week as a 14-hour day-boat rather than five days per week, annual AMHS operating costs are estimated to increase by $1.6 million per year. The net result would be an increase of approximately $1.5 million in the AMHS operating subsidy per year.

Summary of Information for Other Communities that Would No Longer be Served by AMHS

Under this alternative, communities that are currently served exclusively by the SE Feeder routes, the Cross-Gulf routes and the SW routes would no longer be served by AMHS. Table 36 provides a summary of information about the communities that would be served by AMHS under Option 2A. These data are taken from Appendix B, which provides information about the communities directly linked to AMHS, as well as

[32] Note that because the Tazlina is assumed to be operating as 14-hour day-boat, USCG work/rest rules which constrain crews from working more than 91 hours in a seven-day period, would not allow the vessel to operate two-days per week in the SE Feeder routes and still maintain its five-days per week schedule in Lynn Canal.

several adjacent communities linked by local roads to AMHS ports. Examples of the latter include Saxman near Ketchikan, Chiniak on Kodiak Island, and Chignik Lake and Chignik Lagoon. Communities that would no longer be served under Option 2A accounted for slightly more than $4 million in AMHS revenues in 2018.

Table 36. Alaska Communities No Longer Served by AMHS Under Option 2A, including Metlakatla

				FY 2018 AMHS Service and Use					Other Transportation	
Community	2018 Pop.	2018 Public Student Enrollment	2016 Wage & Salary Workers	Port Calls	Passenger Counts	Car Deck Feet (1,000s)	Total Revenue ($1,000s)	Local Percentage (%)	Has Barge Calls?	Cost of Flights to Hub City ($)
SE Feeder Routes										
Angoon	410	85	176	214	5,681	28	437	82	NO	$154 (JNU)
Hoonah	789	113	382	253	8,268	57	597	83	YES	$94 (JNU)
Gustavus	554	76	180	194	7,889	46	596	67	NO	$119 (JNU)
Pelican	68	10	32	28	822	5	85	76	NO	$189 (JNU)
Tenakee Springs	144	None	42	188	2,731	3	127	83	YES	$154 (JNU)
Metlakatla	1,398	329	632	937	25,347	146	1,165	91	YES	$70 (KTN)
Cross-Gulf Routes										
Chenega Bay	56	21	17	70	207	2	32	22	NO	$240 (MRI)
Yakutat	523	85	276	52	323	5	186	59	YES	$161 (JNU) $164 (CDV)
SW Routes										
Old Harbor	224	29	102	4	12	0	5	74	YES*	$115 (ADQ)
Chignik	98	15	39	22	224	1	67	58	YES*	$150 (AKN)
Sandpoint	911	142	244	26	369	2	127	58	YES*	$479 (ANC)
King Cove	920	98	196	26	527	3	135	67	YES*	$50 (CDB)
Cold Bay	63	None	21	27	225	3	131	29	YES*	$479 (ANC)
False Pass	39	11	19	12	19	0	17	37	YES*	$100 (CDB)
Akutan	994	10	211	24	286	0	22	60	YES*	$100 (DUT)
Unalaska	4,333	387	1,717	14	712	1	307	26	YES	$490 (ANC)

Notes:

1) If flight prices vary by airline carrier and/or by season, the highest one-way price is reported.
2) Airport location identifiers are Juneau (JNU), Ketchikan (KTN), Merrill Field (MRI), Cordova (CDV), Kodiak (ADQ), King Salmon (AKN), Anchorage (ANC), Cold Bay (CDB), and Dutch Harbor/Unalaska (DUT).
3) *Barge calls considered irregular and scheduled on inducement only.

Data Sources: DOLWD (2019a, 2019b); AMHS (2019a); USDE (2019); Lynden (2019); Samson Tug and Barge (2019); Airfare data from various web sources, refer to Appendix B.

Before the disposal of a terminal, the state would likely try to identify a new public use it could serve. Should a terminal not be able to transition to a new public use, then the state would sell the terminal and compensate the federal government appropriately.

4.2.1.3 Conclusions for Option 2A

Limiting AMHS service to NHS ports and eliminating service on the SE Feeder routes, and on SW and Cross-Gulf routes under Option 2A is projected to reduce the AMHS operating subsidy to $70.98 million, an

amount that is 48 percent higher than FY 2020 operating budget. Additional service cuts to NHS ports would be needed to reduce subsidies to the target for this study of $24.05 million.

4.2.2 Option 2B: Focus on Providing Service to AMHS Communities that Do Not Have Direct Access to Roadheads

Option 2B: AMHS would focus on providing service to AMHS communities in Alaska that do not have direct access to roadheads. Table 37 shows the roadless communities that are currently served by AMHS.

Table 37. Roadless Communities Currently Served by AMHS

AMHS Roadless Communities in Southeast Alaska						
Yakutat	Juneau/Auke Bay		Petersburg	Wrangell	Ketchikan	Metlakatla
Kake	Angoon	Sitka	Hoonah	Gustavus	Pelican	Tenakee Springs
AMHS Roadless Communities in Southcentral Alaska						
Cordova		Tatitlek		Chenega Bay		Old Harbor
Seldovia		Kodiak		Ouzinkie		Port Lions
AMHS Roadless Communities in Southwest Alaska						
Chignik	Sand Point	King Cove	Cold Bay	False Pass	Cold Bay	Unalaska

4.2.2.1 Methodological Overview of Option 2B

In addition to the changes in ports of call, assumptions under Option 2B include:

1) A two-year transition period to the new vision for AMHS would be granted. Service would be implemented on July 1, 2021 the first day of FY 2022.
2) Whittier and Bellingham would be dropped from the list of AMHS ports of call, with the exception that Cross-Gulf service would continue to be provided by the *Kennicott* using the ports of Kodiak, Whittier, and Juneau to provide limited road access to Chenega Bay and Yakutat.
3) The *Matanuska* and *Kennicott* would service the southeast Mainline routes. The *Matanuska* would be dedicated full-time (289 days with 11 weeks off for maintenance) with service originating in Skagway but would run only to Prince Rupert in the South, including regular but limited service to Kake. Following its scheduled maintenance (October 21–December 29), the *Matanuska* would operate through May with a reduced crew and 50 percent of its cabins shuttered and unavailable. From the end of March through the first week in October, the *Kennicott* would split its time between the Mainline and Cross-Gulf routes; it would then switch to dedicated service on the Mainline to cover for the *Matanuska* while that vessel was undergoing its regular maintenance.
4) Service to Southwest Alaska from Kodiak would be cut back to three roundtrips—the last weeks in May, in mid-July, and in mid-September. Service would be provided by the *Kennicott*, noting that the *Kennicott* cannot access False Pass or Akutan as those terminals are currently configured. It is assumed that the *Tustumena* would not be available in the long run and therefore it is not included in this option and assumed to be divested.
5) The *Columbia* and *Malaspina* would be divested. Neither vessel is currently certified under U.S. Coast Guard *Safety of Life at Sea* (SOLAS) regulations required for port calls to Prince Rupert, and the *Columbia* is not physically compatible with the terminal.

6) Dedicated service in Lynn Canal would be provided by the *Tazlina* operating six days per week as a 14-hour day-boat making one roundtrip per day leaving the Auke Bay terminal in the morning to Haines, then Skagway (or Skagway, then Haines on alternating days), and returning to Juneau. No dedicated service would be provided in Lynn Canal for 10 weeks between January 20 and March 30. During this period, the *Matanuska* operating in the Mainline would provide regular runs up through Haines and Skagway.

7) The *LeConte,* operating as a 24-hour day-boat, would provide service between Gustavus, Angoon, Pelican, Hoonah and Tenakee Springs to and from Juneau with occasional trips down to Sitka. The *LeConte* would also supplement service in Lynn Canal. The *LeConte* would operate in the SE Feeder routes over a period of 260 days. During the peak travel season (June–August) the *LeConte* would operate seven days per week (with 2 days in Lynn Canal), but the during the remainder of its operating weeks it would operate five days per week (1 one of which is spent in Lynn Canal) and would be tied up in Juneau on Tuesdays and Wednesdays manned by watch crews. There is a 15-week period from December 23 through April 5 during which time there would be no service while the *LeConte* undergoes 10 weeks of maintenance and a 5-week lay-up to reduce costs.[33]

8) Metlakatla would gain road access via Ketchikan and continued service by the *Lituya* operating as a 12-hour day-boat providing two roundtrips per day, five days per week.

9) In PWS, the *Aurora* would provide five days of service per week. It would operate three days per week as a 14-hour day-boat providing roundtrip service between Cordova and Valdez. Two days of 12-hour day-boat service each—on these days the vessel would make a single one-way trip between Cordova and Valdez with a stop in Tatitlek. The vessel would be home based in Cordova and would overnight one-night per week in Valdez[34] with the operating crew staying in a hotel at contracted rates. Port calls to Whittier by the *Aurora* would be eliminated. There is a 15-week period from December 23 through April 5 during which time there is no service while the *Aurora* undergoes 10 weeks of maintenance and a 5-week lay-up to reduce costs.

10) For purposes of this assessment, the *Tustumena* would be taken out of service and divested. Service between Kodiak and Homer is assumed to be provided by the *Hubbard,* operating as a 12-hour/14-hour day-boat, with service that mirrors service provided by the *Tustumena* under Option 2A. There would be a 15-week period from December 23 through April 6 during which time there would be no service while the *Hubbard* undergoes 10 weeks of maintenance and a 5-week lay-up to reduce costs.[35] It is important to note that neither the *Hubbard* nor the *Tazlina* has been officially certified to operate in the waters between Homer and Kodiak, but according to DOT&PF officials (DOT&PF 2019b), at least some vessel engineers believe they would be able to make this run. In addition, the *Hubbard* could only be used in Homer if a vehicle elevator were installed or if floating ramps were

[33] The study team was unable to develop an operating schedule for the SE Feeder communities that could be accomplished by a 14-hour day-boat—the sailing times are too long, and the number of ports too great to feasibly operate as a 14-hour day-boat.

[34] A two-person night-crew would also need to be stationed in Valdez for the one night per week the vessel overnights in Valdez. Union rules require crew members to be paid a minimum of 42 hours per week, and the cost estimates for this option take that into account. It is also assumed that these two night-crew members stay at contracted hotels in Valdez with per diem seven days/week.

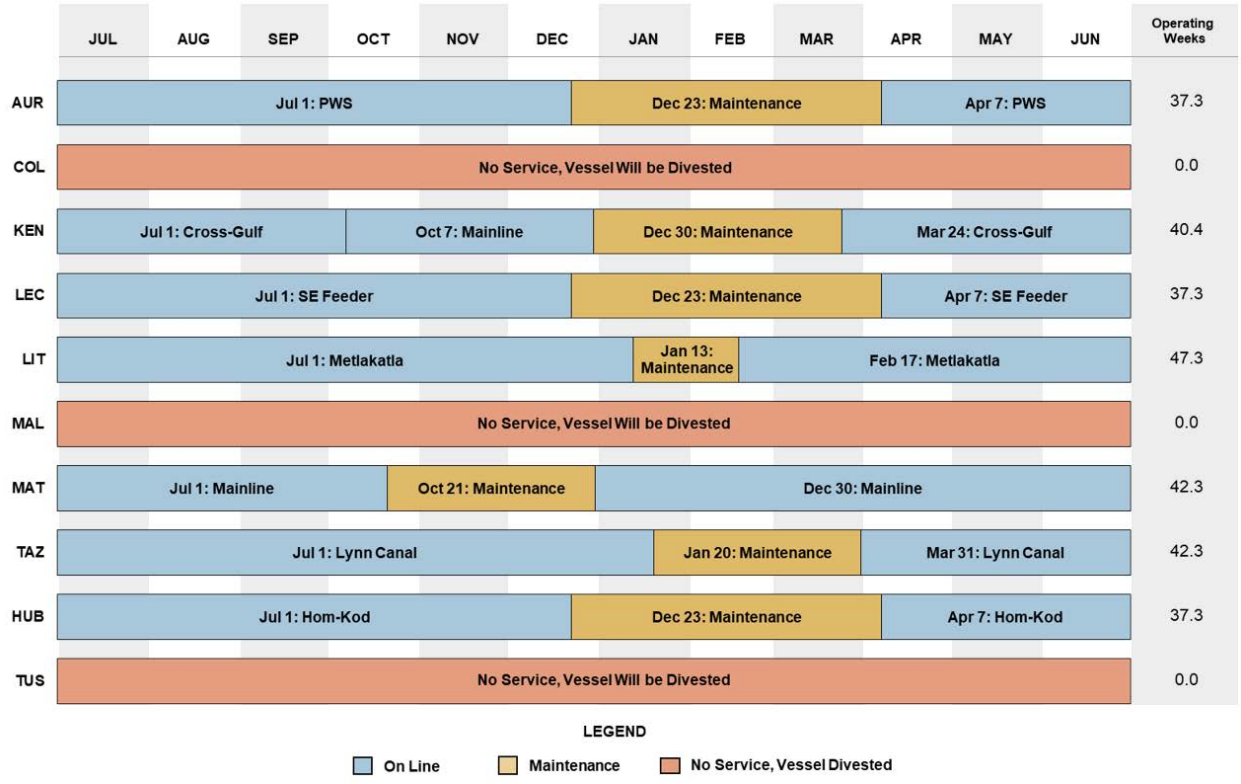
[35] The assumption that the *Hubbard* is used in the Homer-Kodiak routes rather than the *Tustumena* is in part to allow for a direct comparison of costs between the *Hubbard* and the *Tustumena* operating under identical parameters. Similarly, the timing of scheduled periods of no service for the *Hubbard*, the *LeConte* and the *Aurora*—all slightly different operating parameters but the same number of weeks in the field—allows for a reasonably equitable cost comparison of three vessels.

constructed in both Homer[36] and Kodiak. It is also worth noting that of the AMHS vessels currently operating, only the *Tustumena* and the *Kennicott* are compatible with the terminal in Homer and that only the *Tustumena* is compatible with the AMHS terminal in Kodiak.[37] The *Kennicott* would use the Kodiak City Dock because it can accommodate the vessel's length. The *Kennicott* also has a vehicle elevator, which is required to access any of the AMHS terminals west of PWS.

11) It is assumed that annual expenditures for "Vessel Leave", "All Vessels" and "Shore-based Support Services" as reported in the FY 2018 AMHS Financial Report would be reduced proportionally from FY 2018 based on vessel operating expenses.

Figure 8 illustrates an operating schedule derived from the assumptions from Option 2B and is used to generate quantitative revenue and cost estimates in the following sections.

Figure 8. AMHS Reshaping Option 2B Schedule



4.2.2.2 Assessment of Option 2B

Table 38 summarizes the revenue impacts of the changes imposed on route groups in service under Option 2B. The first section of the table summarizes changes to service levels relative to FY 2018. Service on the Mainline routes, SE Feeder routes, PWS routes, Homer-Kodiak routes, SW routes would all be significantly reduced, while service in Lynn Canal increases and service in Metlakatla would remain unchanged.

[36] The terminal in Homer is shared with the USCG and adding a floating dock at the Homer terminal to accommodate the *Hubbard* would likely conflict with USCG use of the terminal.

[37] The *Kennicott* is a significantly longer vessel than the *Tustumena* (382' vs 296')—too long for the Kodiak Terminal.

Total revenue Under Option 2B would be reduced by approximately 39 percent relative to FY 2018. Mainline routes would see the largest revenue reductions under Option 2B primarily because they no longer provide service to Bellingham, but also because the number of Mainline operating days would be cut by 35 percent. It is worth noting that the regression model used to estimate revenues on the Mainline route assumes that approximately 50 percent of the passengers and vehicles that would have traveled to/from Bellingham would travel instead to/from Prince Rupert.

The other major change under Option 2B is the elimination of Whittier as an origin or destination for travel from Cordova, Valdez or Tatitlek. The goal of this change is not intended to be punitive; rather, the intention is to provide daily roundtrip service to the nearest roadhead for residents of Cordova and Tatitlek. Based on historic data, the *Aurora* is able to make the transit between Cordova and Valdez in five hours. With a 1-hour turnaround in Valdez, the roundtrip can be completed in 11 hours. Given the need for operating crews to have a full hour for start-up and a full hour for shut-down, the trip could be completed only if the *Aurora* is operating as a 14-hour day boat (which requires two additional crew relative to a 12-hour day-boat). A roundtrip between Cordova and Valdez that includes a port call at Tatitlek is infeasible under regulations governing 14-hour day-boat operations. Therefore, in order to include stops in Tatitlek, the sailing must be reduced to a one-way trip.

Historically ridership between Cordova and Valdez has been very low relative to ridership between Cordova and Whittier. It is also true that local traffic between Valdez and Whittier is also very low (see Figure 6 on page 17). It is assumed that under Option 2B approximately 50 percent of the volume that would have traveled between Cordova and Whittier, or between Tatitlek and Whittier, would choose to take the ferry to Valdez. As shown in Table 38, estimated revenue in PWS routes is approximately 28 percent of FY 2018 revenues. The reader should note that the ability to reliably estimate outcomes when there is a major change in routing, as with the Mainline and PWS route groups, is limited.

Table 38. Projected Changes in Service Levels and Revenues by Route Group Under Option 2B

Revenue Class	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Included Routes
Index of Service Levels by Route Group Relative to FY 2018									
Service Level Index	65%	124%	50%	100%	46%	60%	35%	124%	NA
Actual Revenues in FY 2018 by Route Groups ($1,000s)									
Passenger Revenue	$8,127	$3,283	$989	$722	$1,750	$1,008	$252	$1,411	$17,541
Car Deck Revenue	$12,322	$2,617	$835	$444	$1,724	$1,878	$364	$2,576	$22,759
Cabin Revenue	$3,631	$106	$2	-	-	$351	$124	$773	$4,987
Other Revenue	$1,094	$315	$92	–	$163	$126	$35	$203	$2,029
Total Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
Projected Change in Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	($3,941)	$970	($566)	–	($1,288)	($240)	($162)	($528)	($5,755)
Car Deck Revenue	($6,771)	$738	($623)	–	($1,193)	($269)	($257)	($691)	($9,066)
Cabin Revenue	($1,910)	$40	($1)	–	$0	($351)	($86)	($298)	($2,605)
Other Revenue	($572)	$73	($55)	–	($122)	($59)	($24)	($83)	($842)
Total Revenue	($13,195)	$1,822	($1,245)	–	($2,603)	($918)	($529)	($1,600)	($18,268)
Projected Total Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	$4,185	$4,253	$423	$722	$462	$768	$89	$883	$11,786
Car Deck Revenue	$5,551	$3,355	$213	$444	$531	$1,609	$107	$1,885	$13,693
Cabin Revenue	$1,721	$146	$1	–	$0	–	$39	$475	$2,382
Other Revenue	$521	$388	$37	–	$41	$68	$11	$120	$1,187
Total Revenue	$11,979	$8,142	$674	$1,165	$1,034	$2,445	$246	$3,363	$29,048

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Option 2B would result in an operating cost of $89.4 million, a reduction of $52.6 million from fiscal year 2018. Table 39 summarizes the financial effect of these changes. Other important operating cost results are summarized in the bullets below.

- The average daily labor costs of the *Matanuska* are estimated to be 93 percent of what they would have been had the vessel not switched to reduced crew operations. The 151 days of reduced crew operations result in a savings of $795,000.
- Using the *Hubbard* rather than the *Tustumena* on the Homer-Kodiak route group results in lower costs. Costs for the *Tustumena* in Option 2A would be $6.3 million (see Table 34) and costs of the *Hubbard* under Option 2B would be $5.1 million—70 percent of the savings are due to the lower daily labor costs for the *Hubbard* relative to the *Tustumena*.
- The operating costs of the *LeConte* and the *Aurora* can also be compared. Both vessels would operate for 37 weeks—the *LeConte* as a 24-hour day-boat and the *Aurora* as a 12/14-hour day-boat. The *LeConte*'s costs would be $7.26 million, while the *Aurora*'s costs would be $2.5 million less at $4.80 million. Part of the difference is due to the fact that *LeConte* would be sailing for 212 days while the *Aurora* would be operating for 185 days. If operating days are set equal at *Aurora*'s 185 total days, *LeConte*'s costs would still exceed *Aurora*'s by $1.7 million, $0.97 million of which can be attributed to the higher labor cost of operating as a 24-hour day-boat versus operating as a 12/14-hour day-boat.

- Service to the SE Feeder routes would be provided solely by the *LeConte* under Option 2B. As shown in Table 38, the service would generate $674,000 in revenue and have a nominal cost of $5.4 million before accounting for shared expenses, but reiterating that approximately 21 percent of its operating days would be spent in Lynn Canal.

Table 39. Projected Cost Impacts of Option 2B

Vessel	Option Expenses ($1,000s)				FY18 Total ($1,000s)	Change from FY18 ($1,000s)	Change in Labor from FY18 ($1,000s)
	Labor	Fuel	Other	Total			
Aurora	$3,309	$718	$740	$4,767	$8,569	($3,802)	($2,784)
Columbia	–	–	–	–	$19,131	($19,131)	($11,670)
Hubbard	$3,307	$916	$849	$5,073	–	$5,073	$3,307
Kennicott	$12,201	$5,064	$1,918	$19,184	$20,549	($1,365)	($868)
LeConte	$4,744	$1,723	$791	$7,258	$10,374	($3,116)	($1,906)
Lituya	$841	$186	$155	$1,182	$1,197	($15)	($11)
Malaspina	–	–	–	–	$12,185	($12,185)	($8,006)
Matanuska	$11,380	$4,211	$1,922	$17,514	$7,729	$9,785	$6,240
Tazlina	$4,699	$1,371	$695	$6,764	–	$6,764	$4,699
Tustumena	–	–	–	–	$11,316	($11,316)	($8,487)
Subtotal	$40,481	$14,189	$7,071	$61,741	$91,050	($29,309)	($19,485)
Other Vessels				–	$6,981	($6,981)	($3,982)
Vessel Leave				$8,489	$13,478	($4,989)	NA
All Vessels				$7,087	$11,252	($4,165)	NA
Vessel Based Subtotal				$77,316	$122,761	($45,445)	($23,467)
Shore Based Support				$12,125	$19,251	($7,126)	NA
Total				$89,441	$142,012	($52,571)	($23,467)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 40 provides a summary of revenues and expenditures from FY 2018 and as projected under Option 2B. The table also shows the calculated operating subsidy as well as the projected changes under Option 2B. The estimated operating subsidy is projected to be reduced by $34.3 million from FY 2018, a reduction of 36 percent. The estimated subsidy under Option 2B is $12.3 million higher than the AMHS subsidy in the FY 2020 Operating Budget and $36.4 million higher than the target subsidy level of $24.05 million.

Table 40. Summary of Revenues, Expenditures and Operating Subsidies Under Option 2B

	Actual Financial Data for FY 2018 ($1,000s)	Projections Under Option ($1,000s)	Change from FY 2018 ($1,000s)	Percentage Change relative to FY 2018
Revenues	$47,316	$29,048	($18,268)	-39%
Expenditures	$142,012	$89,441	($52,571)	-37%
Operating Subsidy	$94,696	$60,393	($34,303)	-36%
	AMHS Operating Budget for FY 2020	Projections Under Option ($1,000s)	Change from FY 2020 ($1,000s)	Percentage Change relative to FY 2020
Operating Subsidy	$48,108	$60,393	$12,285	+26%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

As with Option 2A, Mainline operations account for the largest portion of the operating subsidy under Option 2B. All of the operating costs (including shared costs) of the *Matanuska* plus 59 percent of the operating costs of the *Kennicott* can be attributed to operations on Mainline routes between Skagway and Bellingham. In total, these costs are estimated at $37.8 million. The vessels generated $12.0 million on the Mainline, plus an estimated $2.4 million in Lynn Canal for a total of $14.4 million. Subtracting estimated operating costs from revenues, the Mainline vessels account for 39.8 percent ($23.4 million) of the projected $60.3 million subsidy under Option 2B. Even if 50 percent of the *Kennicott's* Mainline costs are attributed to the Cross-Gulf route, Mainline operations are estimated to have generated an operating subsidy of $15.98 million.

The operating subsidy generated on SE Feeder routes is the second largest component of the overall operating subsidy. The *LeConte* spent 79 of its operating days in the SE Feeder routes—the remainder was spent in Lynn Canal service. After accounting for shared costs, total operation expenditures for service on SE Feeder routes was estimated at $7.5 million. With a total revenue of just $674,000, the estimated subsidy for operation on SE Feeder routes is estimated at $6.85 million.

Estimation of Cost Savings Generated with the Use of 12-hour/14-hour Day-Boats

Under Option 2B both the *Hubbard* and the *Aurora* would operate as combination 12-hour/14-hour day-boats. The *Hubbard* would have labor expenditures $3.31 million and operate a total of 185 days—111 as a 12-hour vessel and 74 as a 14-hour vessel. If the *Hubbard* operated all 185 days as a 14-hour day-boat, its labor costs would increase by $196,000 to $3.5 million.

The *Aurora* would have estimated labor costs of million $3.31 in PWS where it would operate a total of 185 days—111 days as a 14-hour day-boat, and 74 days as a 12-hour day-boat. If the *Aurora* operated all 185 days as a 14-hour day-boat, its labor costs would increase by $131,000 to 3.44 million.

Overall, the study team estimates that labor costs would be reduced by $327,000 for the two vessels as a result of operating as 12-hour/14-hour day-boats rather than strictly as 14-hour day-boats. While costs are reduced, the savings may not be worth the additional administrative burden of operating in multiple modes.

4.2.2.3 Conclusions for Option 2B

While Option 2B reduces the AMHS operating subsidy to a greater extent than Option 2A, it is still well above the study's target subsidy of $24.05 million. Other findings comparing Options 2A and 2B are as follows:

- Using the *Hubbard* rather than the *Tustumena* has the effect of reducing the operating subsidy by 1.2 million. However, additional capital investments in the form of a vehicle elevator for the *Hubbard* would be necessary to make vessel compatible with the terminal in Homer. In addition, it is not certain that the *Hubbard* can operate in the ocean conditions between Homer and Kodiak.
- Eliminating service to Bellingham results—along with other changes to mainline service under Option 2B—reduces the subsidy attributable to Mainline service from $40.3 million under Option 2A to $23.4 million under Option 2B.

4.3 Option 3: Transfer AMHS Assets to One or More Public Corporations or Port Authorities

Option 3: Transfer AMHS assets to a public corporation that would provide service based on a fixed or zero General Fund amount. The corporation board would set service levels, fares and employee pay.

Two sub-options are assessed under Option 3 as follows:

- Option 3A examines outcomes if a single public corporation/port authority operates AMHS assets.
- Option 3B examines outcomes if multiple public entities operate AMHS assets.

The two separate sub-options have been developed under the umbrella of Option 3 as a means to address public comments and inquiries from several regionally based entities that have expressed interest in operating one or more vessels in regional operations. Managing a system of multiple ferries and multiple route groups that provides service to both large and small communities is quite different than managing and operating a smaller number of vessels serving a more homogenous set of communities.

4.3.1 Option 3A: A Single Public Corporation or Port Authority Takes Control of AMHS Assets

Under this sub-option it is assumed that the State of Alaska makes the decision to transfer all state-owned ferry-related assets to a single public corporation. The analysis of this sub-option has two main components:

1) A qualitative assessment that reviews the key findings of the AMHS Reform Project and provides an independent assessment of key assumptions made. The assessment also documents the key measures suggested by the AMHS Reform Project and assesses whether the state could realistically accomplish the same changes without going through the process of creating a separate authority.
2) A quantitative assessment integrates key cost-saving features described in Option 2 into a system-wide approach that would provide at least some level of service to all of the route groups currently serviced by AMHS. Specifically, the quantitative assessment integrates the concept of switching the *Tustumena*, *Aurora,* and *LeConte* to 12-hour day-boats. The *Kennicott,* rather than the *Tustumena,* would provide service to the SW route group. Additionally, the *Kennicott's* Cross-Gulf sailings would end at Juneau rather than continuing on to Bellingham—passengers and vehicle travelling to Bellingham from Kodiak, Homer, Whittier, and Yakutat would transfer to Mainline vessels at Juneau.

4.3.1.1 The AMHS Reform Project—a Qualitative Assessment

The AMHS Reform Project is an initiative led by the Southeast Conference to provide recommendations on a new governance structure for AMHS. A two-part report, prepared by McDowell Group and Elliot Bay Design Group (2016), reviewed a variety of alternative structures to determine which is best suited for AMHS. The following section summarizes the primary concepts developed within the AMHS reform project, as reported by McDowell Group (2016).

Key Elements of the AMHS Reform Project

A public corporation, similar in structure to the Alaska Railroad Corporation, emerged as the preferred new method of governance for AMHS under the Reform Project. One of the preeminent arguments of the Reform Project is that a system shielded from periodic political changes would have greater stability and therefore efficiency. McDowell Group (2016) contrasts the existing AMHS structure with the proposed public governance model:

> *AMHS is operated as a line agency in the Alaska Department Transportation and Public Facilities (ADOTPF). A General Manager directs day-to-day operations and a Deputy Commissioner serves as a liaison with the legislature, the public, and other transportation modes within the department. Both positions are appointed and serve at the pleasure of the Governor (the Deputy Commissioner's position was vacant and responsibilities were being restructured at the time of this report). Labor relations are led by the Department of Administration.*
>
> *The existing governance model has several strengths including intradepartmental coordination with other public transportation modes and a commitment to safe and affordable transportation.*
>
> *Limitations include funding uncertainty and resulting schedule instability, lack of a unified management authority, frequent turnover in senior leadership positions, indirect labor negotiations, short-term planning horizon, cumbersome procurement processes, and exposure to political influence over operational decisions.*

Under the proposed structure, the public corporation would be insulated from political influence through the creation of a quasi-independent board of directors. Elliot Bay Design Group and McDowell Group (2016) also estimated that expenses for a seven-member board would be about $25,000 per year, which could be offset by eliminating the Marine Transportation Advisory Board, which costs $30,000 per year on average. Although the board positions would still be appointed by the governor, they would serve fixed terms with staggered appointments to reduce turnover in senior management, and to limit the influence[38] that any single political administration could have.

The public corporation would also be exempt from the State Personnel Act, which would allow the corporation to negotiate directly with labor unions (McDowell Group [2016]):

> *The most significant benefit of transitioning to a public corporation is the opportunity to align labor and management interests and reduce labor costs strategically – goals articulated by both management and labor.*
>
> *Personal Services (labor) represents approximately 80 percent of recent marine vessel operations budgets ($81.6 million in FY2017 Governor's Operating Budget). Savings are anticipated through development of new contracts, although specific terms are subject to negotiations. Additionally, efficiencies are anticipated from operational changes and, over the long term, fleet standardization. Reducing labor costs by 5 to 10 percent results in $4 million to $10 million in annual savings, based on recent budget levels.*

Furthermore, the corporation would be exempt from the State Procurement Act, allowing for expedited purchases of equipment and services that better serve the needs of the transportation system. An example cited in the AMHS Reform Report are the AMHS' fast ferries, the *Fairweather* and the *Chenega* (commissioned in 2004 and 2005 respectively). The fast ferries were able to make two Lynn Canal roundtrips per day, compared to a single roundtrip per day for vessels like the *Tazlina*. Because of this, the fast ferries could be more conveniently operated as 12-hour day-boats avoiding labor costs relative to vessels that cannot complete their daily operation within a 12-hour period. However, the vessels remained considerably more expensive to operate (McDowell Group [2016]):

> *The increased costs for operating the Fast Vehicle Ferries are primarily driven by the High Speed Craft (HSC) Code which outlines additional training requirements. There is additional overhead cost to maintaining the required number of qualified crew members and more limited options for dispatching… In general, Fast Vehicle Ferry crew positions, which earn*

[38] An acting governor could only remove board members for "cause" and not for political expedience.

> *only slightly higher per hour rates, required more than double the total crew costs than other vessels*.

The fast ferries' vessel length and displacement also created issues with respect to the seaworthiness of the vessels, particularly in the winter months. Based on information in the Vessel information table (AMHS 2019d), it is expected that operating the *Tazlina* in place of the *Fairweather* could result in meaningful fuel savings—the *Tazlina* burns 250 gallons per hour with a rated speed of 16 knots while the *Fairweather* had a rated speed of 32 knots and burned 600 gallons per hour (AMHS 2019d). Proponents of the AMHS Reform Project argue that these types of oversight issues would be avoided with the public corporation since mandated board members with private industry expertise, like marine engineers or architects, would advise and support the new system.

The authors of the Reform Project have provided similar plans for improvements to shore-based facilities (McDowell Group [2016]):

> *As a public corporation, the agency has an opportunity to restructure service levels, rates, and labor costs to reflect true transportation needs. Over time, the fleet and shore side infrastructure can be standardized as well. The corporation will be better poised to capture efficiencies and opportunities resulting from technology and public-private partnerships. Without significant change, the system is at risk of becoming balkanized into a suite of small, independently run authorities that will serve the most profitable routes and disconnect many Alaskans from transportation linkages, service centers, and economic opportunity*.

These benefits could create greater flexibility in service routes, scheduling of maintenance activities, and better allow commercial users of AMHS to plan their transportation activities. The public corporation could forge new partnerships that would increase revenues and provide better service to rural communities.

Ultimately, the public corporation would still be subject to funding through the Alaska Legislature,[39] but would have greater latitude in instituting changes in the system. The Governor would still be responsible for appointing board members and could likely influence management decisions indirectly through approval and/or veto of AMHS budgets through the legislature. Elliot Bay Design Group and McDowell Group (2016) also concluded that "regardless of the fleet size and governance structure, the AMHS will always require some level of general fund support" from the State of Alaska.

Another likely advantage of AMHS operated as a public corporation would be its ability to maintain stability in the system. The authors of the Reform Project argue that there is a great deal of uncertainty as to the true mission of AMHS and that the public corporation would be better suited to develop a long-term vision with a unified mission for the system. This would allow development of a long-term strategic plan for AMHS that allows individuals, communities, and companies to better plan for their transportation needs. Over time the public corporation could reduce operating costs and increase revenue while also providing an appropriate level of service to Alaskan communities lacking access to the contiguous road system.

Can Reforms Be Accomplished without Development of a Public Corporation?

The study team believes there are many valuable concepts developed in the AMHS Reform Project. The vastly different experiences over the last two Administrations demonstrate the vulnerability that AMHS faces as a transportation system. There appear to be significant issues that have not been fully addressed within AMHS Reform. Primary among these is the fact that the public corporation would still require an annual subsidy for its ongoing operations, and that it would not be financially insulated from politically based

[39] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

changes. The Alaska Legislature[40] would still need to approve the public corporation's operating budget, knowing that the Governor has the power of a line-item veto. In order to limit this particular political influence, AMHS must either become profitable, at least from an operational perspective, or it must obtain additional funding, perhaps through taxes, regional access fees, or some type of operational endowment or permanent fund, from which it can draw funds to cover operational cost overruns.

Labor costs are currently a key issue for AMHS and would continue to be a key issue for the public corporation. It does appear reasonable that, in forming the public corporation, the Alaska Legislature[40] would be able to direct it and the labor unions to renegotiate contracts. However, it is not clear that the Alaska Legislature could not also direct AMHS (as it currently exists) and the labor unions to renegotiate contracts, particularly if it demonstrated that in the absence of a renegotiation, the Legislature and the Administration would impose significant cuts or eliminate the system completely. The recent strike by Inland Boatmen's Union (IBU) and the Administration's apparent willingness to allow IBU to strike appears to be an indication that the current administration is willing to push hard to gain bargaining power. It is unclear how empowered a newly formed public corporation would be, particularly in its initial years.

The study team agrees with the AMHS Reform Project leaders' statement indicating that the AMHS Mission does not necessarily align with recent political directives. AMHS' stated mission (below) does communicate a long-term vision and strategy; however, it is not action-oriented and doesn't provide clear indications of the way that AMHS should go about its business:

> *AMHS Mission: To provide safe, reliable, and efficient transportation of people, goods, and vehicles among Alaska communities, Canada, and the "Lower 48," while providing opportunities to develop and maintain a reasonable standard of living and high quality of life, including social, educational, and health needs.*

Furthermore, the AMHS Mission is vulnerable to both political climate and availability of funding. AMHS Reform argues that a public corporation with a board of directors that is not forced to reorganize with each administration could ensure that the AMHS Mission had real meaning and stability that would allow a long-term vision and strategic plan to develop. It is true however, that even if AMHS remains as a division of DOT&PF, there is nothing that would prevent it from developing a refined long-term vision and strategy. And if AMHS remains part of DOT&PF, then the costs of transitioning to a public corporation would be avoided.

4.3.1.2 Quantitative Assessment of Potential Cost Savings and Revenue Enhancement Measures

The quantitative assessment of Option 3A does not directly follow the specific plans developed in the AMHS Reform Project. Instead, the quantitative assessment assumes that a single public corporation is formed with the mission to provide consistent, reliable, and affordable marine transportation to AMHS communities while limiting general fund operating subsidies.

Methodology and Overview for Option 3A

For purposes of this analysis it is assumed that the public corporation's service plans that eliminate service to an existing AMHS community—particularly roadless communities—would be avoided. Similarly, service plans that do not provide scheduled service over a period of more than four months would be deemed as unacceptable, unless that has been the norm in recent years. Further, systems that raise vehicle and passenger fares by more than 25 percent across the board to Alaska communities would be discouraged.

[40] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

Finally, an operating plan and tariff schedule that does not reduce the general fund operating subsidy to 50 percent of the FY 2020 subsidy (i.e. to $24.05 million or less) is considered not to meet the target reduction called for by DOT&PF for the current analysis.[41]

An important element of the AMHS reform project that is carried forward in this quantitative assessment is the assumption that with the change in ownership of the vessels and terminals, the public corporation would be able to renegotiate labor agreements with the three unions that supply vessel-based labor. The fact that the legislature[42] approved large budget cuts for AMHS for FY 2020 would likely be seen as an indication that future union negotiations would need to enable cost-cutting measures.

It is assumed that the public corporation would be able to maintain the ability to adjust vessel manning levels at least once per year, as was assumed under Option 2A and Option 2B. This assumption allows the Mainline vessels to reduce the number of available cabins during the off-peak season and to reduce crew accordingly. This assumption would also allow the *Tustumena*, *Kennicott, Aurora, and LeConte* to switch between operations as 24-hour vessels and 12-hour or 14-hour day-boat operations. Further it would allow the *Hubbard* and *Tazlina* to switch operating modes within the year.

While it is possible that with a full renegotiation of union contracts the public corporation would be able to reduce baseline wage rates below the wage rate in place in FY 2018, the quantitative assessment of Option 3A assumes that wage rates will be unchanged from FY 2018. As indicated above, all reductions in labor costs would be the result of reductions in the number of operating hours of active vessels, and changes in manning levels as a result of reduction in available cabins. While it is assumed that wage rates are unchanged, the quantitative assessment for Option 3A contains a sensitivity analysis of changes in both wage rates and fares for passengers and vehicles.

In addition to the systematic assumptions described above, other operational assumptions for Option 3A[43] are as follows:

1) The public corporation would systematically impose a general 25 percent fare increase using the information provided by the study team in Table 20. Based on that guidance, a 25 percent increase to vehicle, passenger, and cabin fares would be imposed with the following route-based exceptions:
    - Passenger fares between Kodiak and SW communities would be reduced by 25 percent.
    - Vehicle fares in Lynn Canal between Juneau-Haines and Juneau-Skagway would be reduced by 25 percent.
    - Passenger fares in Cross-Gulf routes would be reduced by 25 percent.
    - Passenger and vehicle fares on SE Feeder runs involving Sitka would remain unchanged.
    - Vehicle fares would be unchanged on Cordova-Whittier runs in PWS.
2) *Hubbard* would serve in the PWS route group 41 weeks through the end of December but undergo maintenance and an extended lay-up through March 16. PWS would go without service for a period of 11 weeks. From May through September the *Hubbard* would operate six days per week. On

[41] The assumed constraints on the operating plan, price increases, and maximum subsidy levels were developed by the study team to comply in part with the primary objectives of the current study—specifically to look at ways to significantly reduce the AMHS operating subsidy provided in the General Budget. These objectives and constraints have not been reviewed or vetted by AMHS Reform Project leaders.

[42] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

[43] The number of vessels assumed in operation under Option 3A exceeds the number of vessels that have been in operation during FY 2020.

Saturdays and Sundays, it would operate as a 14-hour day-boat providing a roundtrip between Whittier and Valdez. During the week it would operate as a 12-hour day-boat and provide one-way trips between Whittier and Cordova with stops in Tatitlek on Mondays and Thursdays—the stop in Tatitlek adds four hours to what would otherwise be a 7.75-hour operating day. From October through December and during the month of April the *Hubbard* would operate four days per week as a 12-hour day-boat providing one-way trips to and from Cordova and Whittier with stops in Tatitlek two days per week. Service to Valdez would be dropped during the off-peak months when, as shown in Figure 6, demand for travel to Valdez is minimal.[44] Overall service levels in PWS would be 40 percent of levels experienced in FY 2018. The vessel would be based in Cordova, and operating crews would overnight in hotels four nights per week in Whittier during the peak months and two nights per week during off-peak months. Two night-watch crews would be established, one in Whittier and one in Cordova, both paid for at least 42 hours per week, and the night crew in Whittier would be provided lodging and per diem seven days per week. During the peak season the night crews in both Whittier and Cordova would provide maintenance as well as line tending duties. During off-peak months the night-crew in Whittier would be reduced and would focus on tending lines.[45]

3) *Tustumena* would provide 12-hour or 14-hour day-boat service in the Homer-Kodiak route group five days per week from March through October. On Tuesdays and Wednesdays, it would make one-way trips between Homer and Kodiak and operate as a 12-hour day-boat. On Saturdays and Sundays, it would add a stop in Seldovia and operate as a 14-hour day-boat. On its fifth day of service the *Tustumena* would make a circuit between Kodiak, Ouzinkie, and Port Lions. While the *Tustumena* was in lay-up, the *Kennicott* would provide 11 weeks of similar service from December 30 through March 9. The Homer-Kodiak route group would go without service from November through December 30. Overall service levels on the Homer-Kodiak route would be 98 percent of service levels in FY 2018.

4) *Kennicott* would provide 12-hour or 14-hour day-boat service in the Homer-Kodiak route group five days per week from December 30 through March 9. During its operations in Homer-Kodiak it is assumed the crew would stay in hotels and be provided per diem. Further it is assumed that night crews working on the *Kennicott* would be the same personnel that work as night crews on the *Tustumena*. For 13 weeks from October through December 29, the *Kennicott* would undergo maintenance and a lay-up period during which time its cabins would be sealed from use. After its service as a day-boat, its cabins would be re-opened and after an additional lay-up period, it would begin 24-hour service on May 12 in the Cross-Gulf and SW routes with a full-crew complement. The Cross-Gulf Service would run from Kodiak through Homer, Chenega Bay, Whittier, and Yakutat to Juneau. At Juneau, passengers and vehicles continuing south to Bellingham would transfer to one of the Mainline ferries. By foregoing runs between Juneau and Bellingham, the *Kennicott* would be able to augment its Cross-Gulf port calls and also ensure that Mainline vessels are running at greater capacity. The *Kennicott* would also make four runs in the SW out to Unalaska, the first beginning the last week of May, the second during the first week in July, the third in the middle of August, and the last at the end of September.[46] Service levels in the SW would be 47 percent of FY 2018 levels while service on the Cross-Gulf route would be 110 percent of FY 2018 levels.

[44] It presumed that this is not a violation of the assumed minimum operational constraint imposed by the study team.

[45] The decision to base the crew in Cordova rather than in Whittier nominally adds an estimated $185,000 in labor, lodging and per diem costs. It is presumed that basing the crews in Whittier is not feasible due to a general shortage in available housing and skilled labor.

[46] The *Kennicott* cannot access the AMHS ports of Akutan and False Pass, and thus AMHS service to these communities would be eliminated.

5) The new public corporation would determine that changes are needed in its service in the SE Feeder routes. It would recognize that it isn't feasible to service all of the ports in the route group with 14-hour days boats. Instead it would choose to continue to operate vessels in the region as 24-hour day-boats but on a 2-on/2-off rotational schedule. In effect, the 2-on/2-off schedule would reduce the size of the operating crew by 50 percent. Service in the SE Feeder route would be shared by the *Aurora* (April 7–October 6) and the *LeConte* (October 21–March 23). Overall service levels for the SE Feeder routes are estimated at 52 percent of FY 2018 levels, but service would be provided year-round within the 2-on/2-off schedule. Operations for both vessels would be based in Juneau.

6) *Tazlina* would operate five days per week in Lynn Canal out of the Auke Bay terminal making a Juneau–Haines-Skagway-Juneau loop and going the other direction on alternating days. On Tuesdays and Wednesdays, the vessel would be tied up to reduce costs. Each loop can be undertaken in a 14-hour operating day including a full hour provided for startup and shutdown. The *Aurora,* with slightly lower operating expenses, would provide relief service with the same schedule for 13 weeks from October 21 through January 19. Direct service in Lynn Canal would be provided every week of the year and complemented by service provided by the Mainline vessels which would continue to run up to Haines and Skagway.

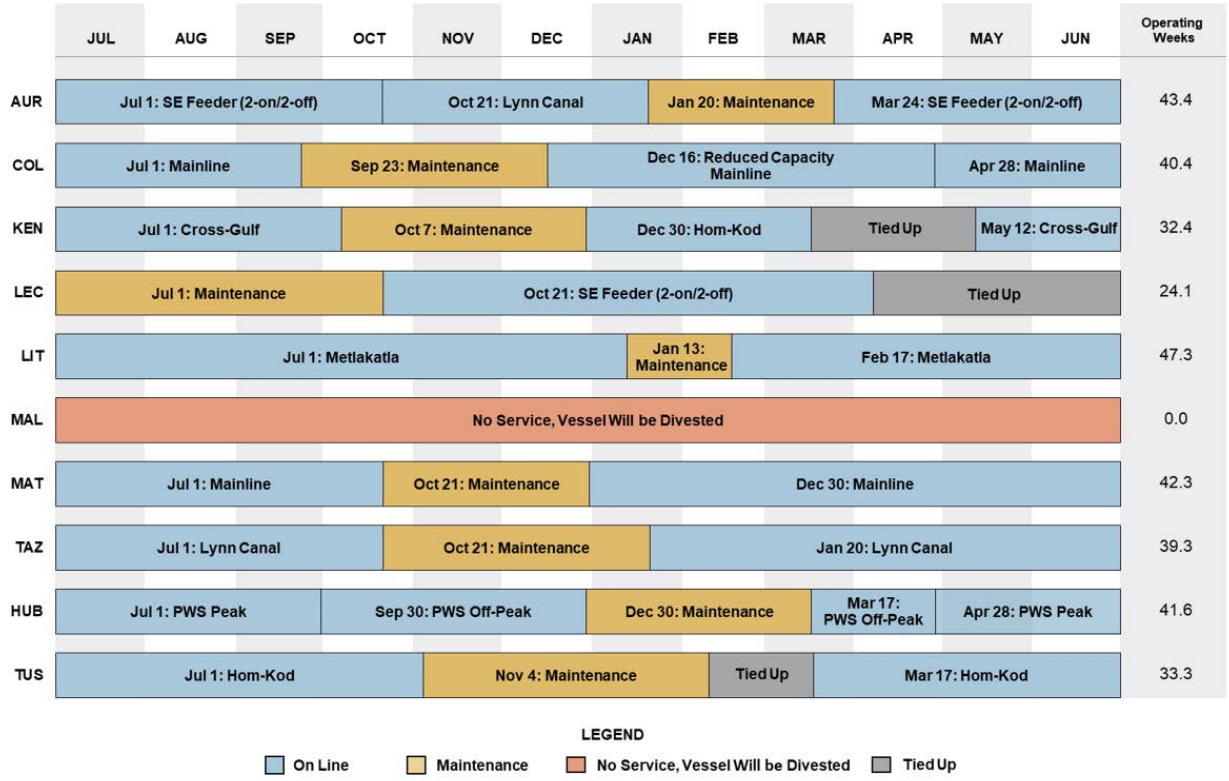
7) *Lituya* would operate on the same five-days-per-week schedule it has utilized for the last several years, making two roundtrips per day between Ketchikan and Metlakatla.

8) Service on the Mainline routes would be provided by the *Columbia* and the *Matanuska*. *Columbia* would operate on the Mainline routes between Skagway and Bellingham with a full crew from April 28 through September 22. It then would be in lay-up or undergoing annual maintenance through December 15. During this period, half of its cabins would be sealed. When it returns to service it would operate with a reduced crew. *Matanuska* would operate on the Mainline routes between Skagway and Prince Rupert with a full crew from June through mid-October. It then would undergo maintenance and a lay-up period before returning to service on December 30 with a reduced crew and only 50 percent of its cabins available. Overall service on Mainline routes would be reduced to 79 percent of FY 2018 levels.

9) The *Malaspina* would be divested.

Figure 9 illustrates the operating schedule derived from the assumptions from Option 3A that is used to generate quantitative revenue and cost estimates in the following sections.

Figure 9. AMHS Reshaping Option 3A Schedule



Assessment of Option 3A

Table 41 summarizes the revenue impacts of the changes imposed on route groups in service under Option 3A assuming a 25 percent general increase in fares modified as noted in Table 20. With the schedule and price changes described above, overall revenues would decrease by $2.1 million relative to FY 2018. Price increases and increases in overall service levels in Lynn Canal would result in an overall increase of revenue of 40 percent. Revenue increases due to price increases would also be seen in Metlakatla, Homer-Kodiak, and Cross-Gulf routes. The largest revenue decreases by magnitude would be on the Mainline (a 9.2 percent reduction), and the largest revenue reductions on a percentage basis would be in SE Feeder routes where revenue would fall by 60 percent.

Table 41. Projected Changes in Revenue by Route Group Under Option 3A

Revenue Class	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Included Routes
Index of Service Levels by Route Group Relative to FY 2018									
Service Level Index	78%	110%	52%	100%	40%	98%	47%	110%	NA
Actual Revenues in FY 2018 by Route Groups ($1,000s)									
Passenger Revenue	$8,127	$3,283	$989	$722	$1,750	$1,008	$252	$1,411	$17,541
Car Deck Revenue	$12,322	$2,617	$835	$444	$1,724	$1,878	$364	$2,576	$22,759
Cabin Revenue	$3,631	$106	$2	–	–	$351	$124	$773	$4,987
Other Revenue	$1,094	$315	$92	–	$163	$126	$35	$203	$2,029
Total Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
Projected Change in Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	($861)	$1,146	($546)	$53	($772)	$315	($108)	$109	($664)
Car Deck Revenue	($711)	$1,254	($552)	($16)	($845)	$314	($156)	$155	($557)
Cabin Revenue	($385)	$44	($1)	–	$0	($351)	($63)	$60	($696)
Other Revenue	($152)	$95	($52)	–	($75)	($8)	($17)	$8	($201)
Total Revenue	($2,108)	$2,539	($1,151)	$37	($1,693)	$270	($343)	$331	($2,118)
Projected Total Revenues in Route Groups Included with Option ($1,000s)									
Passenger Revenue	$7,266	$4,429	$443	$775	$978	$1,323	$143	$1,520	$16,876
Car Deck Revenue	$11,610	$3,871	$284	$428	$879	$2,191	$208	$2,731	$22,202
Cabin Revenue	$3,246	$150	$1	–	$0	–	$62	$833	$4,292
Other Revenue	$942	$410	$40	–	$88	$119	$18	$211	$1,828
Total Revenue	$23,065	$8,860	$767	$1,202	$1,944	$3,633	$431	$5,295	$45,198

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Using the assumptions described earlier, Option 3A would result in operating costs of $113.7 million, a reduction of $28.3 million from FY 2018. Table 42 summarizes the financial effect of these changes. It is assumed that annual expenditures for "Vessel Leave", "All Vessels", and "Shore-based Support Services" as reported in the FY 2018 AMHS Financial Report are adjusted proportionally from fiscal year 2018 based on vessel operating expenses.

Table 42. Projected Cost Impacts of Option 3A

Vessel	Option Expenses ($1,000s) Labor	Fuel	Other	Total	FY18 Total ($1,000s)	Change from FY18 ($1,000s)	Change in Labor from FY18 ($1,000s)
Aurora	$3,720	$850	$450	$5,021	$8,569	($3,548)	($2,372)
Columbia	$13,518	$6,846	$2,266	$22,630	$19,131	$3,499	$1,848
Hubbard	$3,883	$1,022	$1,048	$5,953	–	$5,953	$3,883
Kennicott	$7,002	$3,302	$1,652	$11,955	$20,549	($8,594)	($6,068)
LeConte	$2,150	$683	$314	$3,146	$10,374	($7,228)	($4,500)
Lituya	$841	$186	$155	$1,182	$1,197	($15)	($11)
Malaspina	–	–	–	–	$12,185	($12,185)	($8,006)
Matanuska	$11,380	$4,211	$1,922	$17,514	$7,729	$9,785	$6,240
Tazlina	$3,881	$1,062	$538	$5,481	–	$5,481	$3,881
Tustumena	$3,689	$873	$1,023	$5,585	$11,316	($5,731)	($4,798)
Subtotal	$50,064	$19,034	$9,369	$78,467	$91,050	($12,583)	($9,901)
Other Vessels				–	$6,981	($6,981)	($3,982)
Vessel Leave				$10,788	$13,478	($2,690)	NA
All Vessels				$9,006	$11,252	($2,246)	NA
Vessel Based Subtotal				$98,262	$122,761	($24,499)	($13,884)
Shore Based Support				$15,409	$19,251	($3,842)	NA
Total				$113,671	$142,012	($28,341)	($13,884)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 43 provides a summary of revenues and expenditures from FY 2018 and as projected under Option 3A with a 25 percent general increase in fares. The table also shows the calculated operating subsidy as well as the projected changes under Option 3A. The estimated operating subsidy is projected to be reduced by $26.2 million from FY 2018, a reduction of 28 percent. The estimated subsidy exceeds the $48.1 million subsidy in the FY 2020 budget by $20.4 million and falls well short of the target subsidy of $24.05 million.

Table 43. Summary of Revenues, Expenditures, and Operating Subsidies Under Option 3A

	Actual Financial Data for FY 2018 ($1,000s)	Projections Under Option ($1,000s)	Change from FY 2018 ($1,000s)	Percentage Change relative to FY 2018
Revenues	$47,316	$45,198	($2,118)	-4%
Expenditures	$142,012	$113,671	($28,341)	-20%
Operating Subsidy	$94,696	$68,473	($26,223)	-28%
	AMHS Operating Budget for FY 2020	Projections Under Option ($1,000s)	Change from FY 2020 ($1,000s)	Percentage Change relative to FY 2020
Operating Subsidy	$48,108	$68,473	$20,365	+42%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Sensitivity of Results to Wage-Rate Reductions and Price Increases

In the sensitivity analysis that follows the study team estimates the impact of reductions in daily wage rates from no change as assessed in the quantitative results summarized in Table 43 to a 5 percent or alternatively

to a 10 percent reduction of the wage rates relative to FY 2018.[47] Also included in the sensitivity analysis is an examination of the impact on revenues from alternative levels of fare increases: 1) no change in fare; 2) a 10 percent general increase; and 3) a 25 percent general increase as modeled above.

Table 44 summarizes the sensitivity of outcomes (revenue, expenditures, and operating subsidies) to changes in fares and changes in daily vessel-based wage rates for Option 3A. In the table passenger and vehicle fares can take on three values (0%, +10%, and +25%), and wage rates can also take on three values (0%, -5%, and -10%), which yields a total of nine combinations. The two columns on the left of Table 44 indicate the percentage changes in fare and wage rates summarized in that row. The first row shows the outcomes when there are no changes in fares or wage rates, relative to FY 2018. The shaded row shows the outcomes using the baseline assumptions for Option 3A.

Table 44. Sensitivity of Outcomes to Changes in Fares and Wage Rates under Option 3A

Fares	Wage Rates	Estimated Revenues		Estimated Expenditures		Estimated Subsidy	
Percent Change v. FY 2018		$1,000s	Percent Change v. FY 2018	$1,000s	Percent Change v. FY 2018	$1,000s	Percent Change v. FY 2018
0%	0%	$38,964	-17.7%	$113,671	-20.0%	$74,707	-21.1%
+10%	0%	$41,751	-11.8%	$113,671	-20.0%	$71,921	-24.1%
+25%	0%	$45,198	-4.5%	$113,671	-20.0%	$68,473	-27.7%
0%	-5%	$38,964	-17.7%	$110,045	-22.5%	$71,080	-24.9%
+10%	-5%	$41,751	-11.8%	$110,045	-22.5%	$68,294	-27.9%
+25%	-5%	$45,198	-4.5%	$110,045	-22.5%	$64,847	-31.5%
0%	-10%	$38,964	-17.7%	$106,419	-25.1%	$67,454	-28.8%
+10%	-10%	$41,751	-11.8%	$106,419	-25.1%	$64,668	-31.7%
+25%	-10%	$45,198	-4.5%	$106,419	-25.1%	$61,221	-35.4%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

One of the key findings of the sensitivity assessment is if that the operational parameters (e.g. the number of operating days and port call for each vessels) used Option 3A are held constant, then each 5 percentage-point reduction in wage rates reduces total estimated expenditures by $3.63 million—in other words, total expenditures are linear with respect to wage rate reductions. Because they are linear, readers could estimate the projected outcomes for wage rate reductions that are not shown in the table. If for example, a reader wished to project the operating expenditures and the resulting subsidy if there were a 15 percent reduction in vessel-based wage rates, they would subtract $3.63 million from both the expenditures and the estimated subsidy from the bottom row of Table 44. Under Option 3A expenditures would be reduced to $102.8 million and the operating subsidy would be reduced to $57.6 million. Using this same basic process, a reader could calculate the wage rate reduction that would be necessary to reduce the subsidy under the operating parameters of Option 3A with the assumed fares to reach the target subsidy of $24.0 million—vessel-based wage rates would need to be reduced by 61 percent from FY 2018 levels.

Unlike expenditures and wage rate reductions, total revenues are not linear with respect to increases in passenger and vehicle fares. This can be observed by looking at outcomes in the first three rows of Table 44. If fares from FY 2018 are assumed (as in the first row), revenues are $38.94 million. If there is a general fare increase of 10 percent relative to FY 2018, then estimated total revenues increase by $2.79 million to $41.71 million, an average increase of $279,000 for each 1 percent increase in fares. If there is a general

[47] Because it is assumed that costs for shared expenditures change in proportion to changes in vessel operating costs, we also assume that changes in wage rates generate proportional changes in both categories of shared expenditures.

fare increase of 25 percent (as assumed under Option 3A) then revenues increase by an additional $3.47 million to $45.2 million—on average each 1 percent between 10 percent and 25 percent generates only $230,000 in additional revenue.[48] Finally, it must be stated that results based on the regression models, and in general all types of models, become less and less reliable with greater changes relative to the data on which the models were built. Thus, the revenue estimates assuming a 10 percent general fare increase are more reliable than revenue estimates assuming a 25 percent increase. The study team would not recommend using the model results with fare increases in excess of 25 percent.

Conclusions for Option 3A

The quantitative assessment of Option 3A demonstrates that service could be provided to all existing AMHS communities and at the same time subsidies could be reduced relative to FY 2018 levels. The operating subsidy estimated for Option 3A is $68,473. This is $26.2 million less than the subsidy from FY 2018, but $20.4 million greater than the operating budget for FY2020.

It is worth restating here that the subsidy estimated in this quantitative assessment reflects the particular operating parameters assumed. Whether or not a public corporation could operate with this level of subsidy would depend on decisions made by that corporation's board of directors and its ability to negotiate labor agreements with unions. Similarly, all of the assumed operating parameters used in this assessment could presumably be adopted by AMHS. One of the main arguments of the Reform Project is that a system shielded from periodic political changes would have greater stability and therefore efficiency. Ultimately the public corporation would still be subject to funding through the Alaska Legislature,[49] but would have greater latitude in instituting changes in the system. Conclusions from the qualitative assessment of Option 3A are that most, if not all, of the changes suggested in the AMHS Reform Project could be undertaken by AMHS, particularly with legislative direction, including the concept of an empowered Board of Directors. If these changes were undertaken by AMHS as a state agency, many of the costs of transitioning to a public corporation would be avoided.

4.3.2 Option 3B: Multiple Public Corporations and Port Authorities Take Control of AMHS Assets

Option 3B involves formation of multiple regional public corporations and/or port authorities that take ownership of AMHS assets—both vessels and terminals—with the goal of providing at least minimal levels of ferry service to communities that are currently part of AMHS.[50] One of the primary reasons behind the inclusion of this option is that with the current cost-cutting trends statewide, several regional entities have expressed interest in acquiring AMHS assets and operating independent ferry regional systems, particularly if future service cuts result in complete elimination of service to specific regions.

This section contains assessments of two sub-options:

- Section 4.3.2.1 assesses Option 3B-1, which assumes that six public corporations form—one for each route group in Southeast Alaska, one in PWS, and one multi-regional corporation that

[48] The study team notes that the relative sensitivity to changes will vary across options. For example, changes in total expenditures will be linear with changes in wage rates but within a given set of operating parameters.

[49] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

[50] In order for these corporations/port authorities to continue to be eligible for federal aid, the State of Alaska will retain some level of responsibility for their operations and financial stability.

comprises the communities currently served by the *Kennicott* and *Tustumena* including the Cross-Gulf routes, the Homer-Kodiak routes and the SW routes.

- Section 4.3.2.2 assesses Option 3B-2, which assumes that two regional corporations form: one in Southeast Alaska and one in Southcentral Alaska.

The quantitative assessment of Option 3B-1 focuses on the technical issues of interactions between multiple public entities with a particular focus on issues surrounding the determination of the allocation of shared revenues, costs, and operating subsidies for each. As a means to focus the assessment on revenue and cost allocation issues, the operating parameters—schedules, vessels, and operating modes, etc.—assumed for Option 3A are identical to assumptions under Option 3B-2. As with Option 3A, Option 3B-1 would provide regular service to current AMHS ports.

Option 3B-2, in contrast, emphasizes cost reduction and includes operating plans that would reduce the total operating subsidy to the target level of $24.05 million, while still providing some service to nearly all existing AMHS ports.

As noted above, both Option 3B-1 and Option 3B-2 assume that multiple public corporations will run the entire ferry system in the state. The options do not explicitly examine the situation in which AMHS continues to operate the majority of ferries, while one or more regional entity takes control of specific operations or route groups that could otherwise face elimination or significant reductions to service. It is intended that the issues brought forward in the assessment below can be applied to these hybrid situations. The following discussion examines issues that would face multiple public corporations that would not be present if a single public corporation controlled and operated AMHS assets. The discussion is followed by more specific assessments for Option 3B-1 and 3B-2.

Issues that are Likely to Face Multiple Independent Public Ferry Corporations

It can be argued that multiple independent public ferry corporation would be able to focus on providing service to their region and their constituents with less regard to systemwide issues. Problems that might arise for one entity would be less likely to negatively impact other entity. Conversely if an entity was successful, then that entity wouldn't have to share its successes with other entities.

While the above argument may have merit, the study team believes other issues may offset those benefits. Perhaps the largest issue that multiple regional ferry associations would have to overcome is asset and resource sharing. As an example, the current AMHS reservation system is a system-wide asset. Under a system with multiple independent corporations, how would such a system-wide asset be funded? For purposes of this analysis, it is assumed that each regional corporation would contribute to the reservation system cost in proportion the revenue it generates. Unfortunately, that means that each corporation would be dependent on all the other corporations to maintain their share of revenues, or funding to support the reservation system would suffer shortfalls. If one entity succeeded in raising its revenues, would that mean it had to then contribute a greater share to the support of the system?

A similar issue would arise with regular maintenance of vessels. There are only two shipyards in Alaska with the capacity to take AMHS vessels out of the water to provide maintenance: 1) the Vigor facility in Ketchikan and 2) the JAG Alaska facility in Seward. The latter can handle vessels as large as the *Tustumena,* but the Mainline vessels and the *Kennicott* must be serviced at the facility in Ketchikan. Given the very seasonal demand for ferry services in Alaska, each of the individual corporations would want to have their vessel(s) serviced at the lowest point in the demand cycle. But given the availability of dry dock space, not all vessels could undergo maintenance at the same time. Currently, state employees at AMHS determine the system-wide priorities for maintenance, but that system-wide approach would not be available for independent public corporations. The race for maintenance reservations would have the potential to evolve into a political battlefield.

The same type of political battle would likely develop in the determination of subsidy levels for each of the independent corporations. Public corporations with a smaller base of political support would undoubtedly face more challenges and likely receive lower levels of budgetary support than corporations with a larger base.

The issue of resource sharing would also arise when two independent corporations shared terminals or route segments. An example of the former is the Auke Bay Terminal, which would by definition be shared by four different entities formed around Mainline routes, Lynn Canal routes, SE Feeder routes, and Cross-Gulf routes. Agreements would need to be developed regarding use priorities and cost sharing. Similarly, as routes currently exist, the Mainline shares service though Juneau to Haines and Skagway with Lynn Canal ferries, and the *Kennicott* shares the run between Juneau and Bellingham with Mainline ferries. Determining how revenues and/or costs would be shared would be a major issue with multiple corporations.

In addition to resource sharing issues, each corporation would need to have its own administrative staff; compared to a single public entity or even to AMHS, this would almost certainly result in more positions and would likely result in duplication of administrative costs overall that would be borne by the public corporations.[51] Multiple corporations would also mean that positive redundancies (e.g. available vessels and crew members) would likely be eliminated or reduced. Under a single owner/operator that utilizes multiple vessels, resource sharing is enhanced. If one vessel is down for extended maintenance, a single corporation will be more likely to have another vessel step in and provide relief services. If multiple corporations were to operate the system, it is much less likely that this type of relief service would be available.

Another major issue concerns capital funding for vessel overhauls and replacement. While it is very likely that with State of Alaska assistance, independent publicly owned corporations would be eligible for federal matching funds for capital improvement and vessel replacement. However, obtaining those funds and even conducting the necessary interactions with state and federal officials would require significant levels of expertise and labor hours.[52] In the absence of a holdover set of state employees to undertake this effort, each public corporation would need to develop its own expertise or pay for an independent contractor to facilitate these interactions.

Finally, and perhaps most importantly, there is the question of the level of state support (i.e. subsidies) to which each independent corporation could be entitled. The allocation of costs and revenues to individual route groups was introduced in Section 3.3 in Table 28. The discussion in the earlier section described some of the difficulties of estimating operating subsidies attributable to individual route groups and looked at the Lynn Canal and Mainline routes as an example. In FY 2018, approximately 48 percent of the revenue generated exclusively in Lynn Canal (i.e. travel that both originated and ended in Juneau, Haines or Skagway) was from passengers and vehicles sailing aboard Mainline ferries. Thus, that revenue could legitimately be credited to Mainline ferries. In addition, the *Kennicott* spent approximately 67 percent of its operating days running between Juneau and Bellingham and legitimately those costs could be assigned to the Mainline. However, if a portion of the *Kennicott*'s costs were assigned to the Mainline, it could be argued that some portion of the *Kennicott*'s revenues should also be assigned to Mainline routes. In the discussion preceding Table 28, the study team assumes that 50 percent of the operating costs while the vessel is operating simultaneously in two routes would be allocated to each route group. Under both Options 3B-1 and 3B-2, it is assumed that the public corporations would negotiate specific revenue and cost sharing agreements.

[51] These additional costs have not been estimated or included within the quantitative assessment for Option 3B.

[52] It is likely that both the public corporations and DOT&PF would have to maintain staff to work with federal funding agencies. Staff from DOT&PF would likely serve as liaisons between the public corporation and the federal agency, similar to the current situation with IFA.

4.3.2.1 Option 3B-1: Multiple Public Corporations Form—Four in Southeast Alaska and Two in Southcentral Alaska.

Under this sub-option, it is assumed that the state would announce the decision to transfer assets to potentially several regional corporations, if these regional corporations were first approved by the majority of voters in the region, and if the approved charter gave the regional corporation the ability to tax its residents. The regional corporations would be provided one year to form and a second year for planning and development before assets were finally transferred. It is also assumed that because these corporations would take ownership of vessels and terminals, all labor contracts would be renegotiated.

It is worth noting that the IFA—which has relatively low-cost operations with a single origin-destination pair providing one roundtrip per day—does not currently break even and receives an operating subsidy from the State of Alaska. The study team believes it is likely that the public corporations that are described below would also need continued state support.

Methodological Overview of Option 3B-1

In general, Option 3B-1 would have the same operating parameters developed and assumed under Option 3A and would result in similar levels of revenues, expenditures and operating subsidies. The quantitative assessment focuses on the allocation of revenues and expenditures to individual regional corporations and provides a more robust indication of net operating income (or operating subsidy) on each route. For purposes of this assessment it is assumed that the following independent public corporations would form:

1) Lynn Canal Corporation (LCC) would take ownership of the *Tazlina* and terminals in Haines and Skagway. The terminal at Auke Bay would be jointly owned and operated by other corporations that make port calls in Juneau. LCC would also negotiate with other Southeast-based corporations to allow them to either gain access to their terminals or to provide vessels to cover periods when the *Tazlina* is down for maintenance.

2) Mainline Incorporated (Mainline, Inc.) would take ownership of AMHS terminals at Sitka, Kake, Petersburg, Wrangell, and Ketchikan, and would share ownership of the terminal at Auke Bay and take control of the lease-based use agreements at terminals in Prince Rupert and Bellingham. It would also take ownership of the *Columbia* and the *Matanuska*. It is assumed that Mainline, Inc. and LCC would work out a resource and revenue sharing agreement in which Mainline, Inc. agrees to pay 25 percent of all passenger and vehicle revenues from Mainline traffic that both begins and ends in the Lynn Canal service area (i.e. passenger/vehicles from Juneau going to Haines or Skagway and the reverse or on the Haines-Skagway run.). In exchange, Mainline, Inc. would be able to use the terminals in Haines and Skagway to drop off and pick up passengers and vehicles to and from points south of Juneau.

3) Feeder Routes, Inc. would form with the *Aurora* and *LeConte* as well as the terminals in Hoonah, Angoon, Gustavus, Pelican, and Tenakee Springs. It is also assumed that Feeder Routes, Inc. would share ownership of the Auke Bay terminal. The *Aurora* would operate as a 24-hour day-boat based in Juneau and the *LeConte* would operate as a relief vessel. Feeder Routes, Inc. would not make ports call to Sitka or Kake as those terminals and ports of call would be considered solely for the use of Mainline, Inc. Feeder Routes, Inc. and LCC would negotiate an agreement whereby the *Aurora* would provide 13 weeks of service in Lynn Canal while the *Tazlina* was down for maintenance. Feeder Routes, Inc. would be allowed to keep all proceeds.

4) Metlakatla Corporation (MetCorp) would form, taking ownership of the *Lituya* and the AMHS terminal at Annette Bay. MetCorp would also obtain use privileges for Berth 3 at Ketchikan.

5) PWSCorp would form in Prince William Sound, taking ownership of the *Hubbard* along with terminals at Cordova, Whittier, and Valdez; it would also obtain use-rights for the terminal at Tatitlek from the North Pacific Rim Housing Authority. It is assumed the ferry's crew would be based in Cordova and that it would operate as a 14-hour day-boat from four to seven days a week depending on the season. Crews would overnight at hotels when they were unable to return to their home port.

6) The Kennicott-Tustumena Corporation (K-TCorp) would form, comprising Kodiak Island Borough, Yakutat Borough, Aleutians East Borough, and the communities of Homer, Seldovia, Whittier, Chenega, the three Chignik communities, and Unalaska. K-TCorp would take ownership of the *Kennicott* and the *Tustumena*.[53] K-TCorp would also secure use rights for terminals within its service area, as well as use-rights to the terminals at Whittier and Auke Bay in Juneau. K-TCorp would be formed on the premise that it would provide at least 18 roundtrips per year between Juneau-Yakutat-Whittier-Homer and 4 roundtrips per year between Homer and Unalaska with stops in Kodiak, Old Harbor, and communities along the Alaska Peninsula. K-TCorp would also provide at least 240 one-way trips between Kodiak and Homer and include service to Port Lions, Ouzinkie, and Seldovia. While much of K-TCorp's revenue stream would depend on travelers moving between Whittier and Bellingham, it would depend on Mainline, Inc. to move passengers and vehicles between Juneau and Bellingham with a revenue-sharing agreement in which K-TCorp would agree to provide 33.3 percent of its Bellingham and other SE revenue to Mainline, Inc. in exchange for the Mainline ferries taking on the *Kennicott*'s southbound patrons. K-TCorp would not be able to provide service to False Pass or Akutan because the *Kennicott* is not compatible with the terminals in those communities. Further, since the *Tustumena* is nearing the end of its service life, it would only be used during the months of May–October, and then only on the runs between Homer and Kodiak.

7) The *Malaspina* would be divested.

In addition to operational assumptions described above, the study makes the following assumptions:

1) It is assumed that multiple public corporations would maintain the ability to adjust vessel manning levels at least once per year as has been assumed under Option 2A, Option 2B, and Option 3A. This assumption would allow the Mainline vessels to reduce the number of available cabins during off-peak season and to reduce crew accordingly. This assumption would also allow vessels such as the *Tustumena* and *Kennicott* to switch between operations as 24-hour vessels with cabins to 12-hour or 14-hour day-boat operations.

2) For purposes of analysis it is assumed that vessel-based wage rates would be reduced by 5 percent from FY 2018 levels. This wage rate reduction is included to document the cost savings that could be realized with wage-rates reductions relative option 3A, in which no wage rate reductions were assumed. The study team assumes that the vessels would remain unionized under the publicly owned corporations. It is also worth noting that multiple independent public corporations or port authorities might not have the same collective bargaining power as the State of Alaska or as a single system-wide public corporation as envisioned under Option 3A.

3) It is assumed that all of the public corporations would enact general fare increases of 25 percent in line with the guidance provided in Table 20 on page 31.

[53] The *Tustumena* is nearing the end of its service life, Therefore, it is best to consider this a short-term option. It is also noted that *Kennicott* is too long a vessel for the ferry terminal in Kodiak and will operate using the Kodiak City Dock. Further the *Kennicott* is not compatible with terminals in False Pass and Akutan and therefore service to those communities will no longer be provided.

4) It is assumed that annual expenditures for Vessel Leave and All Vessels and Shore-based Support Services as reported in the FY 2018 AMHS Financial Report would be adjusted proportionally from FY 2018 based on vessel operating expenses.

All other operating parameters including vessel schedules, number of port calls, and hours of operation are assumed identical to Option 3A.

Assessment of Option 3B-1

Table 45 summarizes revenues for each of the public corporations before and after adjustments are made as a result of resource sharing agreements described in the methodology discussion above. The top portion of Table 45 shows the unadjusted revenues accruing to each corporation by route group—these revenues are identical to revenues summarized in Table 41 under Option 3A. Metlakatla Corp. and PWS Corp. would be unaffected by the assumed resource sharing agreements. Mainline Inc. would have a net gain in revenues after providing $571,000 to LCC for access to terminals in Skagway and Haines and receiving $1.36 million to provide service to KT Corp.'s Cross-Gulf passengers that are destined to or originating from points south of Juneau. Feeder Routes, Inc. would gain nearly $1.3 million in revenues for providing 13 weeks of service in Lynn Canal with the *Aurora*. LCC would end with a net decrease of $700,000 relative to its unadjusted revenue.

Table 45. Revenue Under Option 3B-1 Before and After Adjustments for Resource Sharing Agreements

	Mainline Inc.	LCC	Feeder Routes, Inc.	Metlakatla Corp.	PWS Corp.	K-TCorp.			All Public Entities
Revenue Class	Mainline Routes	Lynn Canal Routes	SE Feeder Routes	Metlakatla Routes	PWS Routes	Homer-Kodiak Routes	SW Routes	Cross-Gulf Routes	All Route Groups
Unadjusted Revenues by Route Group Corporations ($1,000s)									
Passenger Revenue	$7,266	$4,429	$443	$775	$978	$1,323	$143	$1,520	$16,876
Car Deck Revenue	$11,610	$3,871	$284	$428	$879	$2,191	$208	$2,731	$22,202
Cabin Revenue	$3,246	$150	$1	–	$0	–	$62	$833	$4,292
Other Revenue	$942	$410	$40	–	$88	$119	$18	$211	$1,828
Total Revenue	$23,065	$8,860	$767	$1,202	$1,944	$3,633	$431	$5,295	$45,198
						$9,359			
Revenues After Adjustments from Resource Sharing Agreements by Route Group Corporations ($1,000s)									
Total Revenue (Adjusted)	$23,853	$8,160	$2,038	$1,202	$1,944	$3,633	$431	$3,936	$45,198
						$8,000			

Source: Northern Economics analysis using data from AMHS (2019a, 2019b).

Table 46 summarizes the operating costs for each corporation including apportionments of shared operating costs. Mainline Inc. as modeled accounts for 51 percent of the total costs while K-T Corp. accounts for 22

percent of the total. Note that with the assumed 5 percent reduction in wage rates, total operating costs over all route groups are reduced by $3.6 million relative to operating costs estimated under Option 3A.

Table 46. Projected Cost Impacts of Option 3B-1

	Mainline Inc.	LCC	Feeder Routes, Inc.	Metlakatla Corp.	PWS Corp.	K-TCorp.			All Public Entities
Cost Categories	Mainline Routes	Lynn Canal Routes	SE Feeder Routes	Metlakatla Routes	PWS Routes	Homer-Kodiak Routes	SW Routes	Cross-Gulf Routes	All Route Groups
Operating Costs of Route Group Corporations ($1,000s)									
Vessel-Based Costs	$38,899	$5,287	$7,873	$1,140	$5,759	$7,889	$1,478	$7,638	$75,964
Vessel Leave	$5,348	$727	$1,082	$157	$792	$1,085	$203	$1,050	$10,444
All Vessels	$4,465	$607	$904	$131	$661	$906	$170	$877	$8,719
Shore-Based Support	$7,639	$1,038	$1,546	$224	$1,131	$1,549	$290	$1,500	$14,918
Total Cost	$56,351	$7,660	$11,405	$1,651	$8,343	$11,429	$2,142	$11,065	$110,045
						$24,635			

Note: Assumes a 5 percent reduction in vessel-based wage rates.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 47 summarizes the adjusted revenues, operating costs and operating subsidies for each public corporation under Option 3B-1. After all of the adjustments the study team estimates that the LCC would generate a net operating profit of $500,000. Mainline Inc. and K-T Corp. would be the largest contributors to the operating subsidy in terms of magnitude, but SE Feeder Inc. would continue to have the worst operating margin at -82 percent.

Table 47. Adjusted Revenues, Operating Costs and Subsidies by Corporation after Accounting for Route Sharing

	Mainline Corp.	LCC	SE Feeders Inc.	Metlakatla Corp.	PWS Corp.	K-T Corp.	All Route Groups
Fully Allocated Revenues, Operating Costs, and Subsidies from FY 2018 by Route Groups ($1,000s)							
Adjusted Revenue	$23,853	$8,160	$2,038	$1,202	$1,944	$8,000	$45,198
Estimated Costs including Shared Costs	$56,351	$7,660	$11,405	$1,651	$8,343	$24,635	$110,045
Operating Income / (Subsidy)	($32,498)	$500	($9,367)	($449)	($6,399)	($16,635)	($64,847)
Estimated Operating Margins by Route Group (Calculated as Operating Subsidy ÷ Operating Cost)							
Operating Margin	-58%	+7%	-82%	-27%	-77%	-68%	-59%
Percent of Apportioned Revenues, Operating Costs and Subsidies Attributable to Each Route Group							
Percent of Revenue	53%	18%	5%	3%	4%	18%	100%
Percent of Costs	51%	7%	10%	2%	8%	22%	100%
Percent of Subsidy	50%	-1%	14%	1%	10%	26%	100%

Note: Assumes a 5 percent reduction in wage rates and a 25 percent increase in fares relative to FY 2018.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Conclusions for Option 3B-1

The study team believes that multiple public corporations would not provide any substantive benefit relative to what AMHS or a single public corporation could accomplish. It is unlikely that multiple corporations would be able provide the full spectrum of services that could be provided by AMHS as efficiently or cost effectively as could be accomplished by AMHS. If, however, AMHS chose to eliminate service to one or more regions or route groups, then one or more regionally based entities could potentially gain access to vessels and terminals no longer in use and operate them with the goal to provide the service that would otherwise have been cut.

While multiple public corporations may be able to have a more singular focus on their local region and constituents, the assessment of Option 3B-1 highlights the issues with resource sharing that would likely be encountered if multiple public corporations took control of all of AMHS assets. Determination of the level of operating subsidy available for each of the public entities could likely become an intractable political battle. The quantitative assessment assumes the same operating parameters assumed under Option 3A, and that mutually beneficial route-sharing agreements are established among the various entities. After the reapportionment of costs and revenues based on these hypothetical agreements, the mainline routes would continue to account for the largest single component of the operating subsidy.

4.3.2.2 Option 3B-2 Two Public Corporations Form—One in Southeast Alaska and One in Southcentral Alaska

Under this sub-option it is assumed that two public corporations would form—one in Southeast Alaska (Southeast Ferries, Inc. or SEFC), and one in Southwest/Southcentral Alaska (Southcentral Ferries, Inc. or SCFC). The corporations would form with the knowledge that unless they were able to reduce overall subsidy levels to $24.05 million—25 percent of FY 2018 levels and half of the operating budget appropriated to AMHS in FY 2019—all of the ferries would be sold or leased to private entities that do not have a vested interest in providing acceptable but minimal levels of service.

Methodological Overview of Option 3B-2

SEFC would take ownership of the *Aurora, Tazlina,* and *Lituya* but would come to the conclusion based on historic data that it could not afford to operate the large mainline ferries and achieve target subsidy levels. The corporation would also recognize that in order to reach its target subsidy it would also have to significantly scale back operations in the SE Feeder routes. In order to continue to provide service to larger SE Alaska communities, Southeast Ferries, Inc. would choose to operate the *Aurora* as if it were a cabinless Mainline vessel operating only in SE Alaska for 42 weeks. For five days per week the *Aurora* would run loops starting in Skagway with stops in Haines, Juneau, Wrangell, Petersburg, Ketchikan, Kake, and Sitka and back to Juneau and Skagway. For two days each week the *Aurora* would provide roundtrips on SE Feeder routes on a rotating basis so that all of the SE Feeder route communities receive at least minimum levels of service.[54] The *Tazlina* would be dedicated to service in Lynn Canal but would operate as a 12-hour day-boat with daily roundtrips from Auke Bay to Haines and on to Skagway and returning to Auke Bay via Haines. The *Lituya* would continue to operate as it has on the Metlakatla–Ketchikan route.

SCFC would take ownership of the *Tustumena, Hubbard,* and *Kennicott* to serve PWS routes, Homer-Kodiak routes, SW routes, and the Cross-Gulf routes. SCFC would recognize the value of versatility of the *Kennicott* and arrange with SEFC to use the *Kennicott* to replace the *Columbia* and *Matanuska* on limited external Mainline/Cross-Gulf runs during the peak travel seasons. The *Kennicott* runs would originate in Whittier and include stops in Chenega, Yakutat, Juneau, Haines, Skagway, Sitka, Wrangell, Petersburg, Ketchikan and

[54] The study team assumes that the *Aurora* would operate on a 24/7 basis and recognizes that operating costs as a 24/7 vessel are likely to be higher than operating costs as a 24-hour day-boat. The quantitative assessment adds ten percent to the *Aurora's* operating costs.

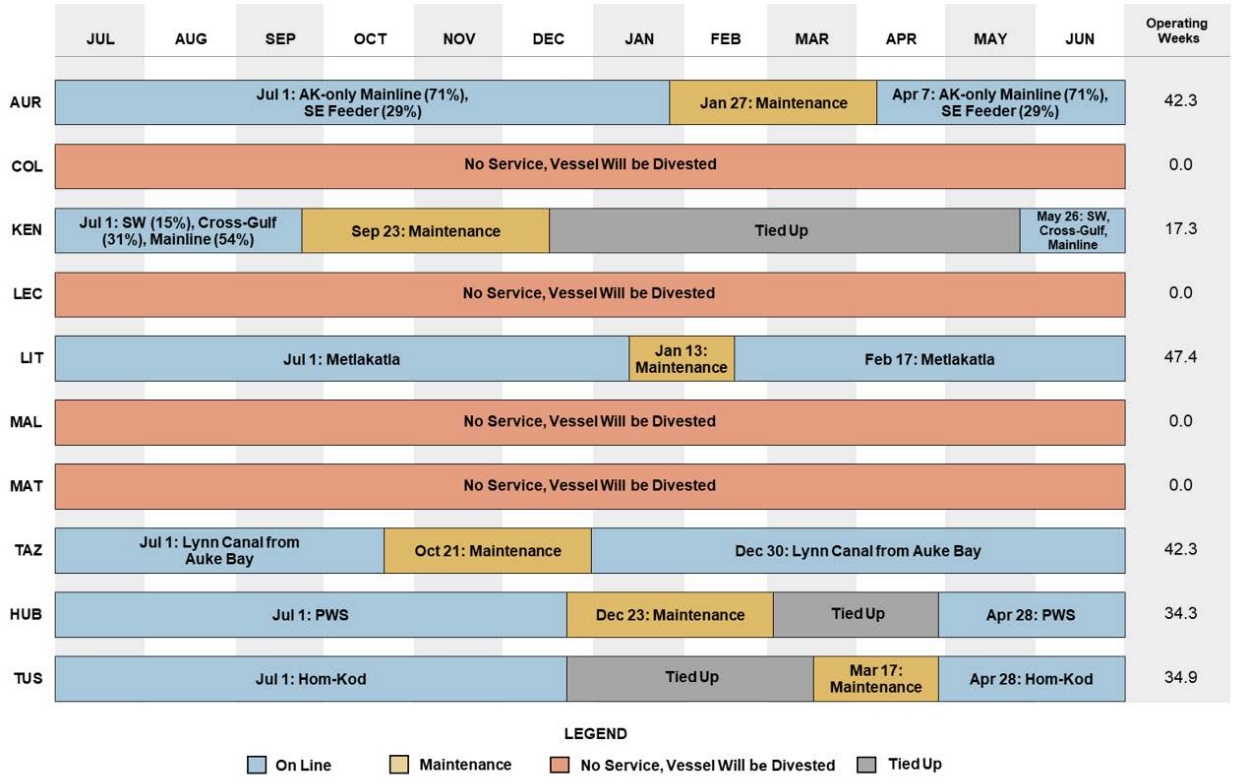
Bellingham. Based on historic operating schedules, each one-way trip could be completed in less than seven days. The *Kennicott* would also provide two annual trips (in late May and early September) to Southwest Alaska starting in Whittier and running out to Unalaska and back. The *Kennicott* would begin its service on May 26 and end its service on September 22.

SCFC would also operate the *Hubbard* in PWS and the *Tustumena* on the Homer-Kodiak routes. The *Tustumena* would operate four days per week as a 12-hour day-boat and would begin operations on April 28 and continue through December 22. Alternatively (in order to limit sailing during inclement weather) the *Tustumena*'s operating schedule could be shifted to begin in March and run through November. As described in a sensitivity assessment provided with Option 2A, the *Tustumena* would no longer make stops in Seldovia or provide service to Ouzinkie and Port Lions.

The *Hubbard* would be based in Whittier in order to reduce expenditures and hotels, and it is assumed that SCFC, working closely with community and economic development groups, would be able to secure housing for the *Hubbard*'s crew members in Whittier. In addition, to reduce costs and enhance revenues, the *Hubbard* would not provide service to Tatitlek. From April 28 through September 29 the *Hubbard* would operate six days per week as a 14-hour day-boat and provide two roundtrips between Whittier and Valdez each week. During the remaining four days the vessel would provide four one-way trips between Whittier and Cordova with a stop in Valdez. The *Hubbard* would reduce its operations to four days per week beginning on September 30 through December 22. No service would be provided in PWS from December 23 through April 27.

Figure 10 illustrates the operating schedule described above.

Figure 10. AMHS Reshaping Option 3B-2 Schedule



Assessment of Option 3B-2

With these schedule changes the study team estimates that the two public corporations could operate within the $24.05 million subsidy target assuming a general fare increase of 25 percent and a wage rate reduction of 8.7 percent relative to wage rates in FY 2018.[55] Without the wage rate reductions, the operating subsidy under Option 3B-2 would be $27.1 million, an amount that is still $21.1 million less than the FY 2019 operating budget.

Table 48 summarizes service levels and revenue changes by route group and the two public corporations under Option 3B-2. As shown in the table, nominal revenues for SEFC are estimated at $14.1 million before accounting for the $2.4 million mainline revenue owed to SCFC. After this adjustment, estimated revenues for SEFC are $11.70 million, and adjusted revenues for SCFC are $11.66 million.

Table 48. Projected Changes in Revenue Under Option 3B-2

Revenue Class	Mainline Routes	Lynn Canal Routes	SE Feeder Routes	Metlakatla Route	PWS Routes	Homer-Kodiak Routes	SW Routes	Cross-Gulf Routes	All Included Routes
	Southeast Ferries, Inc. (SEFC)				Southcentral Ferries, Inc. (SCFC)				
Service Level Index	NA	106%	36%	100%	72%	60%	24%	47%	NA
	Actual Revenues in FY 2018 by Route Groups ($1,000s)								
Passenger Revenue	$8,127	$3,283	$989	$722	$1,750	$1,008	$252	$1,411	$17,541
Car Deck Revenue	$12,322	$2,617	$835	$444	$1,724	$1,878	$364	$2,576	$22,759
Cabin Revenue	$3,631	$106	$2	–	–	$351	$124	$773	$4,987
Other Revenue	$1,094	$315	$92	–	$163	$126	$35	$203	$2,029
Total Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
	Projected Change in Revenues in Route Groups Included with Option ($1,000s)								
Passenger Revenue	($7,228)	$1,131	($779)	–	($423)	($264)	($197)	($273)	($8,032)
Car Deck Revenue	($9,323)	$1,296	($678)	–	($481)	($395)	($269)	($764)	($10,615)
Cabin Revenue	($3,356)	$42	($1)	–	$0	($351)	($101)	($150)	($3,917)
Other Revenue	($992)	$80	($74)	–	($48)	($62)	($28)	($50)	($1,174)
Total Revenue	($20,900)	$2,550	($1,531)	–	($952)	($1,072)	($595)	($1,237)	($23,738)
	Projected Total Revenues in Route Groups Included with Option ($1,000s)								
Passenger Revenue	$898	$4,414	$210	$722	$1,327	$744	$55	$1,138	$9,508
Car Deck Revenue	$2,998	$3,913	$158	$444	$1,243	$1,483	$94	$1,812	$12,144
Cabin Revenue	$275	$147	$1	–	$0	–	$24	$624	$1,071
Other Revenue	$102	$395	$18	–	$115	$64	$7	$153	$854
Total by Route	$4,273	$8,870	$388	$1,165	$2,685	$2,291	$180	$3,726	$23,578
Corporate Level Revenues Before Revenue Sharing	SEFC ($1,000s)				SCFC ($1,000s)				
	$14,697				$8,881				$23,578
After Revenue Sharing	$12,329				$11,249				$23,578

Note: It is estimated that the *Kennicott* generates $2.4 million in Mainline operations which is assigned over to SCFC.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

[55] The study team reemphasizes here that wage rate reductions reduce the amount paid to crew and staff without changing the hours worked. Wage rate reductions could only be accomplished through negotiations with unions. Wage rate reductions are inherently different from changes in labor cost through reductions in the number of hours worked. The latter are created by changes in operational parameters of the vessels.

Using the assumptions described above, Option 3B-2 would result in a total operating cost of $47.6 million, a reduction of $94.3 million from fiscal year 2018. Table 49 summarizes operating costs under the Option. Operating costs for each corporation are shown noting that as developed there would be no additional cost-sharing adjustments required. Operating costs for SEFC are estimated at $22.8 million, while costs for SCFC are estimated at $24.9 million.

Table 49. Projected Cost Impacts of Option 3B-2

Vessel	Option Expenses ($1,000s) Labor	Fuel	Other	Total	FY18 Total ($1,000s)
Operating Costs of Vessels Operated by Southeast Ferries, Inc.					
Aurora	$6,271	$1,902	$888	$9,062	$8,569
Lituya	$769	$186	$155	$1,109	$1,197
Tazlina	$3,817	$1,143	$580	$5,539	–
All Shared Costs				$7,048	NA
All Costs of SEFC	$10,856	$3,231	$1,623	$22,758	NA
Operating Costs of Vessels Operated by Southcentral Ferries, Inc.					
Hubbard	$3,086	$943	$752	$4,782	–
Kennicott	$4,759	$2,163	$819	$7,741	$20,549
Tustumena	$3,146	$675	$827	$4,647	$11,316
All Shared Costs				$7,704	NA
All Costs of SCFC	$10,991	$3,781	$2,398	$24,874	NA
Total of Both Entities	$21,848	$7,012	$4,021	$47,632	$142,012

Note: Assumes an 8.7 percent reduction in vessel-based wage rates.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 50 provides a summary of revenues, expenditures and operating subsidies from FY 2018 and as projected under Option 3B-2. The estimated operating subsidy is projected to be $24.05 million a reduction of $70.6 million from the FY 2018 operating subsidy. As shown in the table, the $24.05 million operating subsidy under Option 3B-2 cuts the subsidy FY 2020 operating budget by 50 percent. and attains the target set for this study.

Table 50. Summary of Revenues, Expenditures and Operating Subsidies Under Option 3B-2

	Actual Financial Data for FY 2018 ($1,000s)	Projections Under Option ($1,000s)	Change from FY 2018 ($1,000s)	Percentage Change relative to FY 2018
Revenues	$47,316	$23,578	($23,738)	-50%
Expenditures	$142,012	$47,632	($94,380)	-66%
Operating Subsidy	$94,696	$24,054	($70,642)	-75%
	AMHS Operating Budget for FY 2020	Projections Under Option ($1,000s)	Change from FY 2020 ($1,000s)	Percentage Change relative to FY 2020
Operating Subsidy	$48,108	$24,054	($24,054)	-50%

Note: Assumes an 8.7 percent reduction in vessel-based wage rates and 25 percent general increase in fares.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

It is estimated that under Option 3B-2, SEFC would require 69 percent of the operating subsidy or $16.5 million and SCFC would require the remaining 31 percent or $7.6 million.

Conclusions for Option 3B-2

The study team notes that there is nothing in the operational plans assumed under Option 3B-2 that could not also be accomplished by a single public corporation or by AMHS as a division of DOT&PF. Under assumed operating parameters for Option 3B-2, the total operating subsidy would be reduced to $24.05 million—the target subsidy established for this analysis. Under the option a 25 percent general rate increase is assumed as well as an 8.7 percent reduction in wage-rates paid to crew and management.

A key feature of Option 3B-2 is the major cuts to Mainline sailings to Bellingham and elimination of all trips to Prince Rupert. Service to Bellingham would only be provided from June through August by the *Kennicott,* which would also provide Cross-Gulf service to Whittier as well as two trips out to Unalaska at the beginning and end of its service period—one in May and one in September. Lynn Canal service originating in Auke Bay would be provided by the *Tazlina,* and service to Metlakatla by the *Lituya* would continue. Service to Southeast Alaska communities including SE Feeder communities as well as Juneau, Kake, Sitka, Petersburg, Wrangell, and Ketchikan, would be provided by the *Aurora*. The *Aurora* would operate as a 24-hour vessel with crew quarters and would run routes similar to those run by Mainline vessels within Southeast Alaska. There would be a 10-week period beginning in late January with no service by the *Aurora*. In the PWS and Homer-Kodiak route groups, day-boat service would be provided by the *Hubbard* and the *Tustumena* with 14-week gaps in service from late December through late April.

While the assumed level of service would be much reduced for all communities, the operating subsidy would be reduced to the target level.

4.4 Option 4: Lease Vessels and Terminals to a Private Entity

Option 4: Lease vessels and terminals to a private entity, public corporation or non-profit entity to run as a for-profit business with the state responsible only for vessel and terminal overhaul and refurbishment.

Methodological Overview of Option 4

This option differs from Option 1 in that the costs of maintenance and capital replacement for vessels and terminals would be paid by the State of Alaska and property taxes would not need to be paid to local governments. Because all AMHS assets are leased to the private entity, it is assumed for purposes of the analysis that unions are no longer operating on the vessels or on shoreside facilities. With these cost savings, the analysis initially assumes there would be a lessee willing to run an operation that continues to provide ferry services to all current AMHS ports.

This option assumes that the State of Alaska issues an RFP at least one full year in advance to facilitate an orderly transition between AMHS and the new private, for-profit corporation. [56] In addition, the study team makes the following assumptions**:**

1) It is assumed that the lessee would be a private, non-governmental entity and (for analytical purposes) it is assumed that the lessee would pay $1 annually to the state for the leases.
2) In accepting leases from the state for use of terminals owned by other entities, the lessee would agree to the terms of the terminals' leases as they currently exist.
3) While service to all current AMHS communities is assumed, there are no pre-determined minimum levels of service to any community.

[56] Only "for-profit" operations are assessed under this option; for the purposes of this analysis non-profit entities and public corporations are treated the same and are covered in Option 3.

The analysis also makes the following technical assumptions in determining whether any particular route and/or vessel would be operated or idled.

1) It is assumed that the baseline schedule of vessels and routes for initial analysis would mirror that used under option 3A. Subsequent iterations impose cuts to service and increases in fares until routes and schedules that can be operated with positive returns are found, or until all routes are eliminated.
2) It is assumed that passenger and vehicle traffic would change in response to price changes and operational frequency at rates based on historical data as shown in Table 20.
3) It is assumed that the lessee could choose to idle any vessel indefinitely, and that the terms of the lease would stipulate that if the lessee chose to idle a vessel for an entire fiscal year, the state would cover storage costs of the vessel.
4) The base-case analysis assumes the same cost of fuel as reported in the 2018 Financial Report.
5) The base-case analysis assumes that because unions would no longer be operating, wage rates would be reduced by 10 percent from wage rates in FY 2018.

Assessment of Option 4

As described above, Option 4 attempts to simulate the decision process that would potentially be used by a private entity conducting its due diligence before making an offer to AMHS to lease its vessels and terminals. The process relies on an iterative approach to search for operating parameters that would enable the private company to operate AMHS vessels and terminals at a reasonable rate of return relative to its operating costs. The iterative process is arranged in a logical sequence based not only on the relative costs and revenues of the component that is cut, but also on the presumed levels of controversy. Please note that while the process summarized below could be used by AMHS in its decision-making process, the iterative steps shown are not intended to simulate the steps that AMHS has taken in FY 2020 to remain within its operating budget. Table 51 summarizes the iterative steps taken beginning with the actual operating results of FY 2018 as Iteration 1. The table shows (from left to right) the iteration steps including a description of the actions, the private entity's assumptions regarding price and wage rate changes, estimated revenues and operating expenditures, the required subsidy, and change in the subsidy as a percentage of the actual FY 2020 subsidy. If or when the system achieves profitability, the subsidy is a positive value. The iterative steps are described in greater detail in the bullets following the table.

Table 51. Option 4 Simulated Iterative Approach to Achieve System Profitability

Iteration	Operational Scenario	Price Change Relative to FY 2018	Wage Rate Change Relative to FY 2018	Vessel Based Revenues ($1,000s)	Operating Expenditures ($1,000s)	Operating Profit (or Subsidy) ($1,000s)	Change in Subsidy Relative to FY 2020 Budget
0	FY 2018 Operations Actual Reported Values	–	–	$47,316	$142,012	($94,696)	+97%
1	FY 2018 Operations as Modeled	–	–	$46,898	$144,142	($97,243)	+102%
2	Operate *Tustumena & Hubbard* as 12-hour/ 14-hour day-boats; introduce 2-on/2-off for SE Feeder routes; utilize full & reduced crews in Mainline operations	–	–	$38,964	$113,671	($74,707)	+55%
3	Increase Prices by 25 Percent	+25%	–	$45,198	$113,671	($68,473)	+42%
4	Cut Vessel-Based Wages by 5 Percent	+25%	-5%	$45,198	$110,045	($64,847)	+35%
5	Cut Vessel-Based Wages by 10 Percent; Divest *Malaspina*	+25%	-10%	$45,198	$106,419	($61,221)	+27%
6	Cut service to Tatitlek, Seldovia, Ouzinkie, Port Lions	+25%	-10%	$46,076	$105,119	($59,042)	+23%
7	Eliminate SE Feeder runs; *LeConte* is idled	+25%	-10%	$45,307	$96,314	($51,007)	+6%
8	Reduce Cross-Gulf / SW to June–August	+25%	-10%	$44,09	$92,079	($48,050)	-0%
	All iterations starting with Iteration 9 reduce the operating subsidy below the FY 2020 operating budget						
9	Reduce Service in PWS & Homer-Kodiak to May–Sep only	+25%	-10%	$43,270	$86,881	($43,610)	-9%
10	*Columbia* is idled; *Matanuska* only on mainline; No Service 10/20 – 12/29	+25%	-10%	$29,664	$56,056	($26,391)	-45%
11	Reduce *Matanuska* to Jun-Aug; *Aurora* to internal AK mainline (Sep–May)	+25%	-10%	$26,734	$48,594	($21,860)	-55%
12	*Matanuska* is idled; Mainline is internal AK only; No mainline service Jan 27–Apr 6	+25%	-10%	$24,208	$41,685	($17,476)	-64%
13	Eliminate SW and Cross-Gulf runs; *Kennicott* is idled	+25%	-10%	$18,792	$33,128	($14,335)	-70%
14	Eliminate PWS runs; *Hubbard* is idled.	+25%	-10%	$16,335	$26,909	($10,574)	-78%
15	Eliminate Homer-Kodiak runs; *Tustumena* is idled	+25%	-10%	$14,306	$22,571	($8,265)	-83%
16	Eliminate internal mainline; *Aurora* is idled.	+25%	-10%	$6,260	$9,533	($3,274)	-93%
17	Reduce Lynn Canal to May-September; Replace *Tazlina* with *Aurora*	+25%	-10%	$3,957	$5,302	($1,345)	-97%
18	Eliminate Metlakatla runs; *Lituya* is idled	+25%	-10%	$2,802	$3,712	($910)	-98%
19	Eliminate Lynn Canal runs; Restart Metlakatla run with *Lituya*; *Aurora* is idled	+25%	-10%	$1,202	$1,590	($388)	-99%
20	Reduce Subsidy with Optimal Fare Change	+16.2%	-10%	$1,218	$1,590	($372)	-99%
21	Reduce Subsidy to Zero with Additional Wage Rate Cuts	+16.2%	-41%	$1,218	$1,218	–	-100%

Note: Iteration 2 would mirror the operational plan assumed under Option 3A.

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

It should be noted that the steps taken are cumulative, meaning that each iteration is an additional change to the model and the conditions of previous iterations still apply. For example, iteration 3 imposes a general price increase of 25 percent, and that price increase is carried forward to all later iterations unless otherwise specified. Similarly, Iterations 4 and 5 assume a 5 and 10 percent reductions in wage rates, and the 10 percent wage rate is carried forward through until the last iteration. Through Iteration 5 the operating

subsidy has been reduced to $61.2 million—27 percent higher than the FY 2020 budget simply through changes in fares and changes in wage-rates relative to FY 2018 wage rates.

Iterations 6 through 19 represent potential changes to the operating schedule, vessels, and route groups that are presumed to be considered by the private entity in its search for a profitable operating plan, with each step further reducing the operating subsidy. The steps are intended to be demonstrative of the successive changes in ferry operations that minimize the operating subsidy. As a matter of fact, many of the steps in this simulation are similar to steps that AMHS has taken since January 2019, in its attempts to increase revenues and to reduce costs and subsidies.

After Iteration 19, no more reductions are possible without eliminating all ferry service. Iterations 20 & 21 change fares and ultimately show the reduction in wage rates necessary for the remaining runs to operate at break-even levels.

- Iteration 6 eliminates service to Tatitlek, Seldovia, Ouzinkie and Port Lions (as discussed under Option 2A and assumed under Option 3B-2) and reduces the subsidy by $2.1 million.
- Iteration 7 eliminates SE Feeder service, idles the *LeConte* and reduces the subsidy by $8.0 million.
- Iteration 8 reduces SW and Cross-Gulf to June–August operations only; the subsidy is reduced by $2.96 million. The study team notes that AMHS has taken a similar action by assigning the *Kennicott* to "lay-up" mode or maintenance from October 2019 through mid-April 2020.
- Iteration 9 reduces service in PWS and Homer-Kodiak to May–September only; the subsidy is reduced by $4.4 million. Beginning with this iteration subsidies are reduced below FY 2020 budget. The study team notes that AMHS has not provided service in PWS since October 2019 and, based on its Winter 2019–2020 operating plan, does not intend to restart service through at least mid-April 2020.
- Iteration 10 idles the *Columbia*; There is no Mainline service from October 20 to December 29; the subsidy is reduced by $17.2 million. The study team notes that AMHS has also idled the *Columbia* beginning October 2019 through at least April 2020.
- Iteration 11 reduces *Matanuska*'s Mainline service to June–August; converts the *Aurora* to operate 24/7 in a September–May internal Alaska Mainline service; the subsidy is reduced by $4.3 million.
- Iteration 12 idles the *Matanuska* and internal Alaska Mainline service is cut from January 27 through April 6; the subsidy is reduced by $4.4 million.
- Iteration 13 eliminates the SW and Cross-Gulf service and the *Kennicott* is idled; the subsidy is reduced by $3.1 million.
- Iteration 14 eliminates service in PWS and idles the *Hubbard*; the subsidy is reduced by $3.7 million.
- Iteration 15 eliminates Homer-Kodiak service and idles the *Tustumena*; the subsidy is reduced by $2.3 million to $8.3 million
- Iteration 16 eliminates the internal Alaska Mainline service; Metlakatla and Lynn Canal are the only services that remain; the subsidy is reduced by $4.99 million.
- Iteration 17 replaces the *Tazlina* with the less expensive *Aurora* and eliminates all service in Lynn Canal from October through April; a $1.3 million subsidy is still required.
- Iteration 18 eliminates service to Metlakatla and *Lituya* is idled*;* the subsidy is reduced to $910,000.

- Iteration 19 restores Metlakatla service and instead eliminates all service in Lynn Canal; the subsidy is reduced to $388,000.
- Iteration 20 tests various fare changes and finds that reducing the fare change from 25 percent to16.2 percent actually reduces the subsidy to $372,000.
- Iteration 21 calculates the additional reduction in wage rates that would be necessary to eliminate the subsidy completely; a reduction of wage rates by 41 percent from FY 2018 levels would allow the *Lituya* to break even financially.

Table 52 provides an alternate version of the iterative process that might be used by a private entity conducting due diligence on whether to bid on a contract to lease AMHS vessels and terminals. In this case, the business owner takes a more conservative approach and does not presume that fare increases will successfully increase revenues. Similarly, the owner does not presume that negotiations with unions will result in reduced wage rates. The first iteration shown is iteration 2, which assumes the same operating parameters as in Option 3A. The next iteration shown is #6 which cuts service to Tatitlek, Seldovia, Ouzinkie, and Port Lions. This conservative approach may more closely resemble outcomes that might be achieved by AMHS, or that might already be occurring given the ongoing emphasis cost-reductions.

The bottom line of both iterative approaches indicates that it would be very difficult for a private entity to provide customary levels of service and still break even financially.

Table 52. A More Conservative Simulated Iterative Approach to Achieve System Profitability

Iteration	Operational Scenario	Price Change Relative to FY 2018	Wage Rate Change Relative to FY 2018	Vessel Based Revenues ($1,000s)	Operating Expenditures ($1,000s)	Operating Profit (or Subsidy) ($1,000s)	Change in Subsidy Relative to FY 2020 Budget
2	Operate *Tustumena & Hubbard* as 12-hour/ 14-hour day-boats; introduce 2-on/2-off for SE Feeder routes; utilize full & reduced crews in Mainline operations	–	–	$38,964	$113,671	($74,707)	+55%
6	Cut service to Tatitlek, Seldovia, Ouzinkie, Port Lions	–	–	$39,690	$112,326	($72,636)	+51%
7	Eliminate SE Feeder runs; *LeConte* is idled	–	–	$39,035	$102,841	($63,806)	+33%
8	Reduce Cross-Gulf / SW to June–August	–	–	$37,843	$98,331	($60,488)	+26%
9	Reduce Service in PWS & Homer-Kodiak to May–Sep only	–	–	$36,787	$90,584	($53,797)	+12%
	All iterations starting with Iteration 10 reduce the operating subsidy below the FY 2020 operating budget						
10	*Columbia* is idled; *Matanuska* only on mainline; No Service 10/20 – 12/29	–	–	$25,526	$57,800	($32,274)	-33%
11	Reduce *Matanuska* to Jun-Aug; *Aurora* to internal AK mainline (Sep–May)	–	–	$24,450	$52,124	($27,674)	-42%
12	*Matanuska* is idled; Mainline is internal AK only; No mainline service Jan 27–Apr 6	–	–	$22,037	$44,727	($22,691)	-53%
13	Eliminate SW and Cross-Gulf runs; *Kennicott* is idled	–	–	$16,736	$35,616	($18,880)	-61%
14	Eliminate PWS runs; *Hubbard* is idled.	–	–	$14,651	$28,957	($14,306)	-70%
15	Eliminate Homer-Kodiak runs; *Tustumena* is idled	–	–	$12,898	$24,296	($11,397)	-76%
16	Eliminate internal mainline; *Aurora* is idled.	–	–	$5,457	$10,260	($4,804)	-90%
17	Reduce Lynn Canal to May-September; Replace *Tazlina* with *Aurora*	–	–	$3,528	$5,714	($2,186)	-95%
18	Eliminate Metlakatla runs; *Lituya* is idled	–	–	$2,406	$4,002	($1,596)	-97%
19	Eliminate Lynn Canal runs; Restart Metlakatla run with *Lituya*; *Aurora* is idled	–	–	$1,165	$1,712	($546)	-99%
20	Reduce Subsidy with Optimal Fare Change	+16.2%	–	$1,218	$1,712	($494)	-99%
21	Reduce Subsidy to Zero with Additional Wage Rate Cuts	+16.2%	-41%	$1,218	$1,218	–	-100%

Note: Iteration 2 would mirror the operational plan assumed under Option 3A.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Table 53 provides estimates of the wage-rate reductions necessary to eliminate the subsidy for each of the iterations summarized under Table 51 for Option 4 in which a 25 percent overall change in fares is assumed. While privatizing ferry operations as in Option 4 may mean a reduction in the influence that unions have on labor costs, the table clearly demonstrates that cutting wages rates to eliminate the subsidy is not viable under most of the iterations examined under Option 4.

Table 53. Wage-rate Reductions Needed to Eliminate the Subsidy for Each Option 4 Iteration

Wage-rate reduction percentage (relative to FY 2018 wage rates) needed to eliminate the operating subsidy														
Iteration Number														
3-5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
-94.4%	-91.9%	-88.2%	-86.9%	-82.3%	-74.3%	-71.9%	-67.4%	-67.6%	-61.6%	-57.9%	-55.0%	-42.7%	-41.4%	-41.8%

Note: Assumes a 25 percent change in fares based on results summarized in Table 20.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Conclusions for Option 4

The assessment of Option 4 leads to the conclusion that even if vessels and terminals are leased to private entities, and the entire capital burden is covered by the State of Alaska, it is unlikely that a private for-profit entity would accept the responsibility of running all or any portion of the AMHS using current vessels and terminals. The two routes that come closest to breaking even (Metlakatla-Ketchikan and Lynn Canal) would not be able to break even unless wages were reduced to levels that may not be realistic, even with the elimination of unions.

The above conclusion is based on the premise that the state would be looking for a private entity to operate all the AMHS assets without any additional monetary support. The state should consider the possibility that a private entity could operate all or part of the system at a reduced cost. For example, a private entity could potentially obtain greater reductions in wages and benefits; the state would still provide a subsidy to the private entity to cover costs and profit, and the result would be an overall cost reduction to the state.

4.5 Option 5: Lease Vessels but not Terminals to a Private Entity

Option 5: Sell or lease vessels to a private entity, public corporation or non-profit entity while retaining the terminals as a state asset. There are examples of this in other states whereby the terminals are still eligible for federal aid.

Methodological Overview of Option 5

Option 5 is similar to Option 4 and is considered as a special case of Option 4. Under Option 4 the private entities must absorb the cost of operating and maintaining the terminals—the lease of the terminal to a private for-profit entity means the terminals would not be eligible for federal aid. Under Option 5 the terminals are considered eligible for federal aid, but this also means that additional state employees will be required and costs to the state will be higher than under Option 4.

Assessment of Option 5

As shown under Option 4, nearly all routes would need to be cut to eliminate the operating subsidy. As each route is cut, the unused terminals would revert to the State of Alaska. Therefore, most if not all terminals would ultimately remain state assets with the possible exceptions of terminals needed to serve the Lynn Canal and Metlakatla routes.

Conclusions for Option 5

If there were additional uses for the state-owned terminals that would result in a meaningful impact to revenues and costs, the market would have already indicated demand for that activity in the past. Given that this is not the case, it does not appear that retaining ownership of the state terminals would result in any different outcome from that shown in Option 4.

4.6 Option 6: The Legislature Directs[57] AMHS to Drop or Reduce Service to High-Cost, Low-Volume Ports

Option 6: AMHS continues as a state entity but is directed by the Legislature[57] to drop or reduce specific high-cost, low-volume runs on the assumption that these communities would be serviced by the private sector with its own equipment. AMHS would sell vessels not needed to provide the remaining reduced responsibility.

Methodological Overview of Option 6

Under this option the state would make a determination and publicly announce that it will discontinue ferry service to selected communities at a specified date in the future. It is assumed that the end date would be no less than one full fiscal year from the announcement. This one-year transition period would allow private service providers to form in the communities where service has been discontinued.

The review of historical data and the assessments of Options 2 through 4 have led the study team to conclude none of the route groups defined in the analysis are likely to be able operate at a profit. The study team uses the assessment of route-based subsidies developed in Section 3.3 and specifically in Table 28, to assess the amounts that each route group contributes to the operating subsidy. In addition, the quantitative assessment of Option 6 examines individual communities that are particularly expensive to serve.

If it is assumed that at least some level of service should continue to all of the route groups currently served by AMHS, then there are some individual communities that stand out as being particularly costly to serve given the revenues they generate. The following list of those communities has been generated based on the situation where providing service to the particular community means that vessels cannot operate in a more cost-effective mode. As an example, if providing service to a given community forces the vessel to switch from a 12-hour operation to 14-hour operation or from a 14-hour to a 24-hour operation, then the community could be included in the list. Note that the number of hours shown are based on average AMHS scheduled sailing times between ports with one hour added at the end of the trip.[58]

- Pelican: a roundtrip from Pelican to Gustavus requires 8.6 hours.
- Tatitlek: adding a stop in Tatitlek adds 2.5 hours to a one-way between Whittier and Valdez.
- Port Lions and Ouzinkie: Adding a stop in Port Lions adds four hours to a one-way trip between Homer and Kodiak. Adding an additional stop in Ouzinkie adds less than an hour.
- Seldovia: Adding a stop in Seldovia has historically added four hours to a one-way trip between Homer and Kodiak.
- Old Harbor: Adding a stop in Old Harbor en route from Kodiak to Sand Point in the SW route adds seven hours to the sailing time.

Assessment of Option 6

Elimination of Individual Route Groups to Reduce the Operating Subsidy

While Option 6 specifically calls out high-cost, low-volume runs, the study team has found that none of the route groups defined in the analysis has revenues that exceed its nominal operating costs let alone its fully loaded operating costs once shared costs are included.

[57] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

[58] Trips involving the fast ferries (*Fairweather* and *Chenega*) have been excluded from sailing times listed.

Table 54 is a copy of Table 28 and shows the estimated revenue, costs, and operating subsidies by route group for FY 2018. Estimated costs included shared costs and have been adjusted to account for time when a single vessel is operating simultaneously in two route groups.[59] The table has two sections of information—the upper portion shows allocated estimates of revenues, costs and operating subsidies by route group and also includes the estimated operating margin—calculated as Operating Subsidy ÷ Estimated Costs. The lower section shows the route percentage of the total for revenues, costs, and subsidies.

Table 54. Estimated Revenue, Costs, and Operating Subsidies by Route Group for FY 2018

	Mainline	Lynn Canal	SE Feeder	Metlakatla	PWS	Homer-Kodiak	SW	Cross-Gulf	All Routes
Fully Allocated Estimates of Revenues, Expenditures and Subsidies from FY 2018 by Route Group ($1,000s)									
Adjusted Revenue	$25,173	$6,321	$1,919	$1,165	$3,637	$3,363	$775	$4,963	$47,316
Estimated Costs	$68,079	$12,949	$13,843	$1,685	$15,078	$15,350	$3,084	$11,943	$142,012
Operating Subsidy	($42,906)	($6,628)	($11,924)	($520)	($11,441)	($11,987)	($2,309)	($6,980)	($94,696)
Operating Margin	-63%	-51%	-86%	-31%	-76%	-78%	-75%	-58%	-67%
Estimates of Revenues, Expenditures and Subsidies by Route as a Percent of Total									
Percent of Revenue	53%	13%	4%	2%	8%	7%	2%	10%	100%
Percent of Costs	48%	9%	10%	1%	11%	11%	2%	8%	100%
Percent of Subsidy	45%	7%	13%	1%	12%	13%	2%	7%	100%

Note: Estimated costs include share costs and have been adjusted to account for route sharing when vessels are operating in more than one route group at the same time.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

From Table 54 the following findings can be derived:

- Eliminating the Mainline routes would reduce the operating subsidy by $42.6 million
- Eliminating the Homer-Kodiak routes would reduce the operating subsidy by $12.0 million
- Eliminating the SE Feeder routes would reduce the operating subsidy by $11.9 million
- Eliminating the PWS routes would reduce the operating subsidy by $11.4 million
- Eliminating the Cross-Gulf routes would reduce the operating subsidy by $7.0 million
- Eliminating the Lynn Canal routes would reduce the operating subsidy by $6.6 million
- Eliminating the SW routes would reduce the operating subsidy by $2.3 million
- Eliminating the Metlakatla routes would reduce the operating subsidy by $0.5 million

Obviously, eliminating any of these routes would be highly unpopular among populations that depend on ferry service in particular route groups. In some cases, eliminating one route group would have implications for other route groups. For example, eliminating all ferry service between Homer and Kodiak would have

[59] An example of "route sharing" is when Mainline vessels heading south to Bellingham are operating in Lynn Canal. Revenues from passengers/vehicles where both the origin and destination are Juneau, Haines, or Skagway are assigned to Lynn Canal as well as half of the estimated operating costs while the vessel operates between Skagway and Juneau. Route sharing can also occur at both ends of Cross-Gulf sailings. If the *Kennicott* begins a sailing in Homer then travels to Kodiak before heading to Whittier, it is operating in both the Homer-Kodiak and the Cross-Gulf route groups. When the *Kennicott* heads south after stopping in Juneau, it is then operating in both the Cross-Gulf and Mainline route groups.

the effect of also eliminating ferry service to SW Alaska. Similarly, eliminating the Mainline ferries would significantly reduce demand for travel on the Cross-Gulf routes.

Elimination of Service to Selected Communities

As an alternative to eliminating route groups, selected high-cost, low-volume communities could be removed from AMHS routes and served by private entities. Private operators could use smaller vessels to better fit with the level of service needed in these communities and focus service on connecting them with higher-volume communities along AMHS routes. The financial impact of serving these communities varies based on the operational mode of the vessel and the sailing schedule within which the port falls. The additional operating hours to serve these communities were developed from actual AMHS historical schedules and include a one-hour stopover at each port. Historical revenues (the FY 2015–2018 average of total embarking and disembarking passengers and vehicles) and port calls were taken from Table 15 through Table 17 on pages 19–21. Savings in operating cost for labor and fuel rely on numbers in Table 21 through Table 24 on pages 34–38.

Eliminate Trips to Tenakee Springs: In FY 2018 Tenakee Springs was the twenty-sixth ranked AMHS port in terms of total revenue with $63,000, but it was the thirty-third ranked port in terms of revenue per port call, generating an average of just $680 per call in its 94 port calls. Tenakee Spring is typically served during sailings to/from Angoon and based on historical AMHS sailing data, the stop in Tenakee Springs adds approximately 2.1 hours to the roundtrip between Angoon and Juneau, pushing the total operational time for the roundtrip from Juneau to Angoon to over 15.2 hours if start-up and shut -down times are included. Eliminating trips to Tenakee Springs by the *Aurora* and *LeConte* based on FY 2018 schedules would generate a nominal estimated savings of $304,000 in labor and $113,000 in fuel. Perhaps more importantly eliminating trips to Tenakee Springs would allow round trips between Juneau and Angoon to be completed by a 14-hour day-boat rather than a 24-hour day-boat, making it much more likely that cost savings could be realized.

Eliminate Trips to Pelican: A roundtrip from Pelican to Gustavus requires 8.6 hours on the *LeConte*, and the average revenue per port call to/from Pelican was under $2,500. Eliminating AMHS service to Pelican and encouraging private shuttle service to connect Pelican with AMHS service to Gustavus would reduce AMHS revenue by approximately $35,000 per year based on revenues for FY 2015–2018. If the 14 trips (the FY 2015–2018 average count) were merged with existing trips to Gustavus, AMHS would save an estimated 120 hours of operating time and an estimated $252,000 in fuel and labor.

Perhaps more importantly, eliminating the trips to both Pelican and Tenakee Springs means that the *Aurora* and *LeConte* could make regular roundtrips from Juneau to Gustavus via Hoonah and regular roundtrips between Juneau and Angoon as 14-hour day-boats.

Eliminate Trips to Tatitlek: Stopping in Tatitlek adds 2.5 hours to one-way trips between Whittier and Cordova and between Whittier and Valdez. A stop in Tatitlek adds 2.1 hours to one-way trips between Valdez and Cordova. In FY 2018 there 25 port calls at Tatitlek en route to/from Whittier and three Tatitlek calls en route between Valdez and Cordova. Eliminating these port calls (all made by the *Aurora* in FY 2018) would have saved 69 hours of operating time during that year and an estimated $133,000. A total of $5,900 in revenues was attributed to Tatitlek in FY 2018 (Table 15). In addition to the nominal cost savings estimated here, the study team developed a more detailed assessment of eliminating stops in Tatitlek within Option 2A beginning on page 53. In that discussion it was noted that if stops in Tatitlek were eliminated, additional port calls to Valdez or Cordova could be added to the operating schedule with the potential to enhance revenues as well as reduce costs. The assessment within Option 2A found that dropping service to Tatitlek under operational parameters assumed for that option would have reduced the operating subsidy by $144,000.

Eliminate Stops in Port Lions and Ouzinkie: In FY 2018 stops at Port Lions and Ouzinkie were estimated to have generated $149,000 in revenue. (See Table 15.) Adding a stop in Port Lions adds 3.9 hours to a one-way trip between Homer and Kodiak. Scheduled sailing times with an additional stop in Ouzinkie were an average of 0.6 hours longer than Homer–Port Lions–Kodiak trips. In FY 2018, there were 111 trips between Homer and Kodiak that added stops in both Port Lions and Ouzinkie; there were also 4 trips that added a single stop in Port Lions. All trips were made by the *Tustumena* while operating in the Homer-Kodiak route group.[60] If the 115 stops had been eliminated, operating hours would have been reduced by 521.5 hours. Based on estimates of operating costs for labor and fuel for the *Tustumena,* eliminating the stops in Port Lions and Ouzinkie would have saved an estimated $1.1 million in operating expenditures in FY 2018—81 percent of these estimated savings are savings in labor costs and 19 percent are savings from reduced fuel usage. It must be noted however, that unless renegotiated union agreements allow the operating parameters of both the *Tustumena* and *Kennicott* to be changed so that these vessels could operate as day-boats, the labor cost savings could not be realized.

In addition to the nominal cost savings estimated here, the study team developed an assessment of eliminating stops in Port Lion and Ouzinkie within the context of Option 2A beginning on page 53. In Option 2A the *Tustumena* is assumed to have been operating as 12-hour/14-hour day-boat making four one-way sailings between Homer/Kodiak and operation one day per week in a 7.5-hour circuit as follows: Kodiak–Port Lions–Ouzinkie–Kodiak. Eliminating service to Port Lions and Ouzinkie under that option would enable the *Tustumena* to shift from a five-day operating week to a four-day operating week.

Eliminate trips to Seldovia: As shown in Table 15, Seldovia generated $131,000 in revenue in FY 2018. Based on FY 2009–2018 AMHS schedules, adding a stop in Seldovia added 3.7 hours to a one-way trip between Homer and Kodiak. More often, however, AMHS provides dedicated roundtrips between Homer and Seldovia, which have been scheduled as 7-hour trips including an extra hour for unloading at the end of the round trip. In FY 2018, all 100 AMHS trips involving Seldovia were dedicated roundtrips—the *Tustumena* made 86 of the trips, while the *Kennicott* made 14. Eliminating these trips would save 700 operating hours and nominally generate $1.3 million in savings from reduced labor and $300,000 in savings from reduced fuel. The labor savings could only be realized if the vessels are able to switch to operating as day-boats from vessels in which crew are paid 24/7 regardless of operating hours.

In addition to the nominal cost savings estimated here, the study team developed a more detailed assessment of eliminating stops in Seldovia within Option 2A beginning on page 53. In Option 2A the *Tustumena* is assumed to have been operating as a 14-hour day-boat on the two days per week it makes stops in Seldovia and as a 12-hour day-boat during its three remaining operating days. Eliminating the stop in Seldovia allows the vessel to operate as 12-hour day-boat during all of its operating days. The switch from a 14-hour day-boat to a 12-hour day-boat is estimated to save $2,980 for each shortened operating day.

Eliminate Stops in Old Harbor on SW Sailings: In FY 2019 the two stops made by the *Tustumena* in Old Harbor generated $3,150 in revenue. In FY 2018 the *Tustumena* made one outbound stop in Old Harbor from Kodiak en route to Sand Point and on out to Unalaska. The *Tustumena* also made one inbound stop en route to Kodiak from Sand Point. If these stops had been eliminated, the total one-way sailing times would have been reduced by 7.2 hours (14.4 hours in total) and would have generated a nominal labor savings of $26,000 and a nominal fuel savings of $6,000. These savings would only be realized in the vessel did not have to pay its crew or run the engines for those14.4 hours.

Eliminate Stops in Chenega Bay: In FY 2019 the 35 stops made by the *Kennicott* and *Aurora* in Chenega Bay generated $16,000 in revenue. In FY 2018 the *Kennicott* made 13 outbound stops in Chenega Bay from Whittier en route to Kodiak on Cross-Gulf Trips and 12 inbound trips to Whittier. The *Aurora* made five inbound stops en route to Whittier from Cordova and five outbound stops. If stops by the *Aurora* had been

[60] Two trips made by the *Kennicott* originating in Homer out to Unalaska also made stops in Port Lions. These trips were not included in the savings estimates.

eliminated, 5 hours of sailing time could have been realized on each trip, for a total of 25 hours. Actual scheduled sailing times for the *Kennicott* were no longer regardless of stops in Chenega Bay. If the stops in Chenega Bay by the *Aurora* were eliminated, 50 hours of operating time could be eliminated, which would nominally save $76,000 in labor and $21,000 in fuel.

As is discussed in more detail under Option 11, the runs by the *Kennicott* to Homer and Kodiak, as part of the *Kennicott*'s Cross-Gulf runs do not appear to be needed, since passengers and vehicles destined to (or travelling from) Homer and Kodiak can use the road system to travel between Whittier and Homer—spending less money and using less time. If Cross-Gulf runs the between Whitter and Homer/Kodiak are eliminated, then the only available AMHS service to/from Chenega Bay to Whittier would be trips on sailings by the *Aurora* as describe above. The number of passenger and vehicles moving in and out of Chenega Bay could very likely be transported to either Seward (61 nautical miles) or to Whittier (67 nautical miles) more cost effectively via a private shuttle service/landing craft.

Conclusions for Option 6

Eliminating AMHS stops to the communities examined under this option could undoubtedly generate cost savings for AMHS or other operators of the ferry system. However, savings could only be realized if more cost-effective sailings replace those that are dropped, or if union agreements are renegotiated that allow operations managers to take advantage of the potential cost savings.

As an example, eliminating both Pelican and Tenakee Springs drops relatively low revenue trips and would enable the remaining SE Feeder route communities (Angoon, Hoonah and Gustavus) to be serviced using 14-hour day-boats rather than 24-hour day boats.

Private entities interviewed during this study have indicated a willingness to provide alternative transportation services, particularly transportation of passengers only (in passenger-only ferries) or transportation of cargo and vehicles without passengers (using barges). Combining passengers with cargo and vehicles is problematic from a regulatory standpoint, however, and changing from the combined service provided by AMHS ferries to passenger-only and cargo or vehicle-only service could impact ridership patterns. In the SE Feeder routes specifically, demand for passenger service is driven to some extent by the ability to also take a vehicle for use in the destination community to address multiple needs during a single trip (e.g., adding a shopping trip to appointments or other personal matters, using one's own vehicle). If only passenger service were available along these routes, water-based options would compete with much faster—and likely competitively priced—air travel.

4.7 Option 7: Contracted Vessel Service Routes

Option 7: AMHS continues as a state entity but contracts out for service to lower volume expensive routes on the basis that a private entity would use smaller vessels and less expensive crews. Vehicle and passenger service could be provided by different vessels. Current marine union contracts already allow this for Pelican, Gustavus, Hoonah, Angoon, Tenakee, and Kake.

Methodological Overview of Option 7

Option 7 is similar to Option 6 except that under Option 7 the state would explicitly award contracts to private sector entities to provide additional transportation services to the communities for which AMHS service is discontinued. It is assumed that the state would award contracts to bidders that provide what is deemed by reviewers as the greatest level of service at the lowest cost to the state.

The concepts developed below incorporate suggestions voiced during interviews with community representatives and during interviews with private sector transportation providers. Multiple private

transportation providers indicated that under certain conditions they believed they could provide services less expensively than AMHS, particularly if long-term contracts were offered that would justify the construction of vessels designed to meet the needs and operating parameters of particular communities and routes. In some instances, it may be that the most effective way to provide service would involve separate vessels for passengers and vehicles/freight, noting that transportation services for passengers only could very likely be provided at significantly lower cost than transportation of vehicles and freight.

Assessment of Option 7

Based on information developed in Option 6, it appears that there are several opportunities for private operators to work with AMHS to provide contracted services at a lower cost than AMHS expends. If private contractors take over these high-cost, low-revenue routes—even if the contracted costs are equal to expenditures of AMHS for service to these communities—AMHS vessels could likely provide higher levels of service at lower costs for the remaining AMHS communities and subsidies could be reduced.

The communities and sailings that may be well-suited to private contracted services are discussed below:

- Under the right conditions, a private entity could likely provide service between Juneau and Pelican at lower costs than AMHS. Given the number of passengers and the amount of freight that moves between Pelican and Juneau, it is expected that by utilizing smaller vessels that better match demand, a private operator with a long-term contract would be more cost effective than AMHS. It is also possible that the private entity with a long-term contract would be able to provide services to other communities in the northern Southeast Region that are not currently served by AMHS, potentially including Elfin Cove and Excursion Inlet.
    - It is also possible (if there is demand) that private entities would develop service that connects passengers and freight from remote locations to communities that would continue to be served by AMHS. For example, service between Pelican and Gustavus or Hoonah that would link up with regular AMHS service. The study team notes that one of the difficulties with shuttle/link service is the possibility that the connection to or from Juneau fails, in which case passengers and freight could be "stranded" at the link community where visitor and storage services may be limited.
- Service between Tenakee Springs and Angoon or Hoonah. A shuttle between Hoonah and Tenakee Springs would mean shorter travel times en route to Juneau. With long term contracts, private entities would likely be able to develop appropriately sized vessels that are better matched to the demand for services to/from smaller communities. It is also possible that operators providing services between other smaller communities in the region (e.g. providers of service to/from Pelican) would be able to provide services to Tenakee Springs utilizing that same vessels.
- Service between Tatitlek and Valdez. A private service operating out of Valdez could provide service between Tatitlek and Valdez and could possibly also develop a Cordova-Valdez service to augment service provided by AMHS.
- Service between Chenega Bay and Whittier or Seward. A private entity operating out of Seward or Whittier could provide service to Chenega Bay and possibly service to other islands and roadless areas on the west side of PWS.
- Service between Seldovia and Homer. A private entity service could provide service to roadless communities on the south side of Kachemak Bay including not only Seldovia, but could potentially also provide service to Port Graham, and Nanwalek.
- Service between Port Lions, Ouzinkie, and Kodiak. A private entity located in Kodiak may be able to operate a small shuttle ferry providing service to roadless communities on adjacent islands or on

Kodiak Island itself. Potential communities include: Ouzinkie, Port Lions, Old Harbor, Afognak, and possibly others

In the list above there are two general types of service that will affect the ability of the private entity to operate successfully:

1) The private entity provides service to and from an intermediate hub that is unlikely to be the destination of travelers. Examples are service for Pelican and Tenakee Springs to intermediate hubs of Gustavus or Hoonah. Unless there are frequently scheduled links to/from the intermediate hub to the "destination" (i.e. Juneau) it may less likely that service will be fully utilized. Shuttle patrons could end up "stranded" at the intermediate hub.
2) The private entity provides service to a roadhead or a major hub community. In these cases, travelers on the shuttle do not need to arrive at any given time in order to accomplish the purpose of their trip. Shuttle service to larger hub communities or to a roadhead appear to have a greater chance of success.

An additional determinant in the success of private services is the level of competition from AMHS or other services. If AMHS provides occasional service to a community then it appears less likely that a private entity would be able to successfully compete. This is particularly true if AMHS prices are lower than what the private entity can charge.

Finally, if AMHS works with private entities on a long-term contractual basis that allows AMHS to reduce costs, and that provides the private entity with some level of stable funding, the private entity is more likely to succeed.

Conclusions for Option 7

If contracts with private operators cost the state no more than the nominal expenditures of AMHS in providing services to these communities, then—assuming that AMHS provides additional and more effective service to its remaining communities—it is likely that operational subsidies will be reduced.

4.8 Option 8: Privatize Onboard Passenger Services

Option 8: Privatize all or some onboard passenger services: stateroom housekeeping, meal service, bars, gift shops, etc., to include consideration of novel freight delivery concepts such as small freight modules shipped aboard vessels without being loaded onto trailers or vehicles.

Methodological Overview of Option 8

For this option we provide a high-level quantitative assessment of the cost savings that could be generated by privatizing onboard services. The state is working to address the issue of manning requirements with the unions, which is a key prerequisite for contracting out passenger services. While the current marine union agreements do not allow the state to contract out onboard passenger services to private contractors, it is reasonable to assume a scenario similar to Washington State Ferries, wherein the employees would still be IBU members even though they were employed by a private contractor.

Assessment of Option 8

AMHS (2019c) provided an estimate of the weekly labor cost savings of moving to privatized onboard services. Those savings are shown on a daily basis in Table 55, alongside the total daily labor costs (from Table 6). The potential cost reduction for privatizing onboard services averages 20 percent for day boats and 40 percent for 24-hour ferries.

Table 55. Potential Labor Savings from Privatization of Onboard Services

Vessel	Potential Labor Cost Savings ($/day)	Total Labor Cost ($/day)	Potential Privatization Savings (%)
Day Boats			
Aurora	$5,771	$21,228	27%
Hubbard	$4,329	$21,228	20%
LeConte	$3,314	$21,177	16%
Lituya	$0	$3,642	0%
Tazlina	$4,329	$21,228	20%
Total for Day Boats	$17,743	$88,505	20%
24-hour Ferries			
Columbia	$25,686	$49,659	52%
Kennicott	$20,657	$43,419	48%
Malaspina	$13,771	$50,991	27%
Matanuska	$19,757	$42,129	47%
Tustumena	$9,557	$36,269	26%
Total for 24-hour Ferries	$89,429	$222,468	40%

Source: Northern Economics analysis using data from AMHS (2019b, 2019c).

Allocating those potential cost savings to each vessel results in the new estimated passenger service costs by route shown in Table 56. As shown in the table, those costs are partially offset by passenger service revenues estimated by the model. Even with these potential labor cost savings, it is estimated that passenger services on all routes required a subsidy of $14.6 million in FY 2018. Because it appears that passenger revenues do not fully offset passenger service labor costs, private contractors bidding for the right to provide those services would likely be asking for payment from the state rather than providing a payment to the state.

Prospective bidders would need to determine whether they believe they can negotiate a better labor agreement than the state and whether there are opportunities to increase net revenues after the cost of goods sold. Assume, for example, that the private contractor believed they could reduce labor costs to $15 million including their own hiring costs, and that the cost of goods sold was $1 million. This would be a fairly risky endeavor given that union negotiations would occur after the contract was awarded and could affect the contractor's ability to scale labor to changing demand; therefore, the bidder would likely require a relatively high markup on costs. Assuming the markup is 20 percent ($3.2 million), the contractor would proffer a bid of $12.2 million. This would yield a net savings to the state of $2.4 million.

Table 56. Estimated Operating Subsidy by Route Group with Privatization of Onboard Services in FY 2018

	Mainline	Lynn Canal	SE Feeder	PWS	Homer-Kodiak	SW	Cross-Gulf	All Included
	($1,000s)							
Cabin Revenue	$4,923	$104	$4	$0	$430	$151	$815	$4,988
Other Revenue (Food Services, etc.)	$1,094	$315	$92	$163	$126	$35	$203	$2,029
Passenger Service Revenue	$6,017	$419	$96	$163	$556	$186	$1,019	$7,016
Passenger Service Labor Cost with Privatization	$12,644	$1,180	$1,500	$1,195	$3,046	$757	$1,355	$21,676
Operating Subsidy	($6,627)	($760)	($1,403)	($1,032)	($2,490)	($571)	($336)	($14,660)

Note: The Metlakatla route is omitted because the *Lituya* is not expected to realize any savings under this option.
Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

The preceding assessment assumes that the private entities would be contracted to provide the same level of service as is being provided by AMHS. It is also possible that AMHS contracts would authorize alternative/lower service levels. Examples might include the replacement of restaurants and cafeterias with vending machines. In these cases, it may be more likely that cost savings for AMHS could be realized. At the same time, it could also be argued that if lower levels of service are acceptable, then it may be possible for AMHS to reduce costs without privatization.

Privatizing Night Watch Crew Services

While Option 8 was meant to focus onboard services, the study team proposed several operational plans for AMHS that take advantage of increased use of 12-hour and 14-hour day-boats. Utilization of 12-hour and 14-hour day-boats requires night watch crews for line tending and for general cleaning and minor maintenance work. It is likely that utilizing private contractors to provide night watch crews, particularly for cleaning and line tending duties, would result in cost savings to AMHS.

Conclusions for Option 8

The assessment of privatization of passenger services under Option 8 indicates that while it may be possible to reduce AMHS costs through privatization, the private contractors that take over these services are likely to require continued subsidized support from the state.

4.9 Option 9: Fare Increases

Option 9: Implement further fare increases, including across-the-board increases, increases on more expensive runs, demand pricing for high demand periods or events, demand pricing based on percent of remaining vessel capacity, etc.

Methodological Overview of Option 9

This option comprises several independent assessments of pricing strategies. The impacts of pricing strategies are assessed using AMHS volume and revenue data for 2008–2018 provided for this analysis. The data obtained from AMHS include ticket purchaser data that show place of residence as reported by the ticket purchaser (for January 2008 through April 2016) as well as the date the ticket was purchased for all years. These details provide the ability to comment on pricing strategies that recognize Alaska residents relative to non-residents while remaining within federal guidelines that preclude setting higher prices for non-residents.

The analysis of Option 9 documents the effects of fare increases that have been implemented over the last several years with the goal of determining whether fare increases have resulted in higher revenues overall (i.e. demand is inelastic as had been predicted in previous price elasticity studies). As was shown in Section 3.1 and Table 20, tariffs are, in general, inelastic and for most routes future price increases are likely to further increase total revenue.

In addition to demand elasticity, the assessment of Option 9 examines several other pricing strategies that would increase prices on selected routes and time periods that are more heavily used by non-residents. The assessment also examines the potential effectiveness of capacity-based and date-based pricing strategies that result in higher prices when capacity becomes limited or when tickets are purchased closer to departure dates.

It is important to note that AMHS has modified tariffs in response to a 2015 Northern Economics report on tariffs (Northern Economics 2015). A primary purpose of the 2015 study was the development of a system of equitable tariffs where patrons would be charged similar prices for similar levels of service, regardless of the relative demand for the service, or the cost to provide the service. As a result, travelers to/from small

communities with low levels of demand and relatively high levels of cost will have fares that are approximately equal (on a price-per-mile basis) to travelers to/from communities that have high levels of demand and may have relatively low costs.

Under the current drive to reduce operating subsidies, the focus of tariff setting policies is shifting to set prices that will result in higher revenues, and which may not be as equitable on a price-per-mile basis.

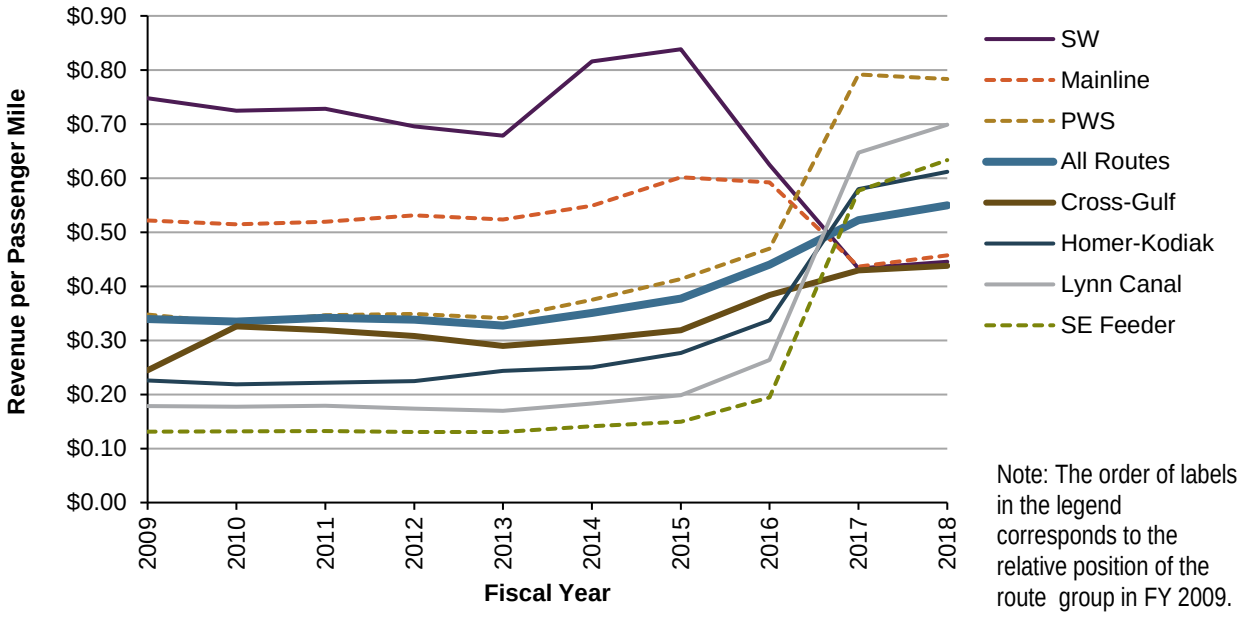
Assessment of Option 9

Figure 11 and Figure 12 illustrate historic changes to passenger and car deck fares from FY 2009 to FY 2018. These prices are derived from AMHS (2019a) and are calculated by dividing revenues by the mileage of the sailing, and then dividing by either the number of passengers or the combined length of the car deck. The appropriate fare price units are labeled in the figure and in the note below the figure.

From FY 2013 to FY 2016 we observe gradual increases in most passenger and some car deck fares. In FY 2017, there were dramatic changes in the pricing structure. Passenger fares decreased in the SW and Mainline routes but increased in each of the other routes. The range of passenger fare prices is much smaller following the change, with prices ranging from 43 to 80 cents per passenger-mile.

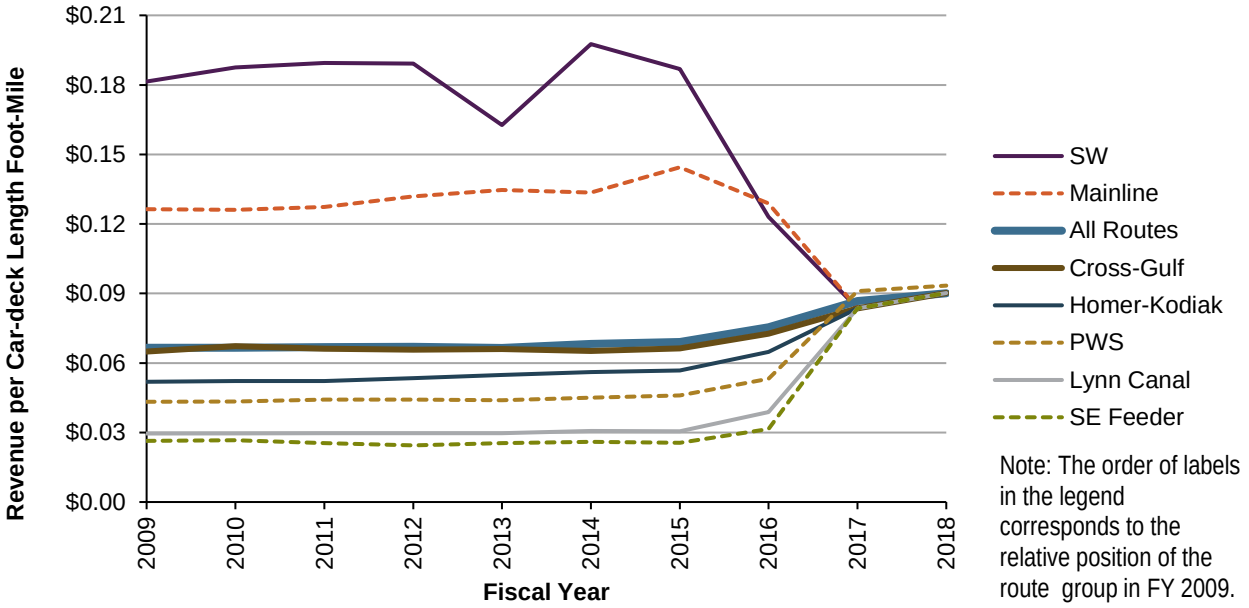
In FY 2017, AMHS car deck fares were altered, indicating a standardization of rates in the AMHS based on recommendations in Northern Economics' Tariff Analysis (2015). Prior to FY 2017, car deck rates per mile and foot of length varied across each route group, with longer sailings representing the highest prices per mile. After the pricing change in FY 2017, the range of fares is small and most are approximately 9 cents per foot-mile.

Figure 11. Summary of Passenger Fare Increases by Route Group FY 2009–2018



Note: Fares are shown on a $ per mile basis.
Source: Northern Economics analysis using data from AMHS (2019a)

Figure 12. Summary of Vehicle Fare Increases by Route Group FY 2009–2018



Note: Fares are shown on a $ per car-deck foot-mile basis.
Source: Northern Economics analysis using data from AMHS (2019a)

The study team also empirically tested AMHS' online booking portal to understand the underlying vehicle pricing scheme for "passenger" vehicles 23 feet or less and found that the current pricing structure creates an incentive for passengers to travel with larger vehicles since they are proportionally less expensive. The pricing structure for passenger vehicles comprise two components: 1) a fixed cost per vehicle, plus a variable-cost premium based on the length of the vehicle on a standard length-based boarding fee, and 2) a mileage-based price/mile regardless of vehicle length. For example, sailing from Bellingham to Juneau with a 13-foot vehicle costs $1,106, equivalent to $85.08 per foot of length. The same sailing for a 23-foot vehicle costs only $100 more in additional variable-costs, at $1,206, equivalent to $52.43 per foot of length. Bayliss et al. (2019) developed a dynamic pricing model to optimize revenue for vehicle ferries, whose primary focus was simulating space constraints on the vehicle deck and "ensuring that customers pay a fare for their vehicle that better reflects the capacity that it uses." The existing literature on pricing strategies suggests that space constraints are the primary limitation in revenue optimization, despite higher administrative and labor costs that come from having a larger number of vehicles on the ferry. Current AMHS vehicle pricing structures are inefficient because longer vehicles devalue the space that is consumed.

Table 57 has been reproduced from Table 20 on page 31, and summarizes the revenue impacts of changes in fares for passengers and vehicles on a route-group basis. The table summarizes the effect of price changes on estimated revenue for each route group. If a 10 percent increase in fares generated greater overall revenue within the route group, then price increases are assumed. Alternatively, if a 10 percent price increase results in revenue declines, then price increases are deemed inappropriate for that route-group or route-group market segment. Further testing was undertaken to determine whether prices for the market segment should remain unchanged or if price reductions would be more appropriate.

In general, the study team found that price increases resulted in higher revenues with the following exceptions:

1) If Mainline runs are limited to internal Alaska service only, then fare increases do not change passenger revenue and reduce vehicle revenues; vehicle fare reductions increase revenue.
2) Passenger and vehicle fare increases or decreases have no meaningful impact on revenue in SE Feeder routes to/from Sitka.
3) Vehicle fare increases between Juneau-Haines and Juneau-Skagway reduce revenues, while vehicle fare reductions increase revenues.
4) Vehicle fare increases or decreases have no meaningful impact on revenue between Cordova-Whittier.
5) Passenger fare increases on SW routes to/from Kodiak reduce revenues while fare reductions increase revenues.
6) Passenger fare increases on Cross-Gulf routes in general reduce revenues while fare reductions increase revenues.

Table 57. Route-Group Based Price-Change Impacts and Optimal Strategies

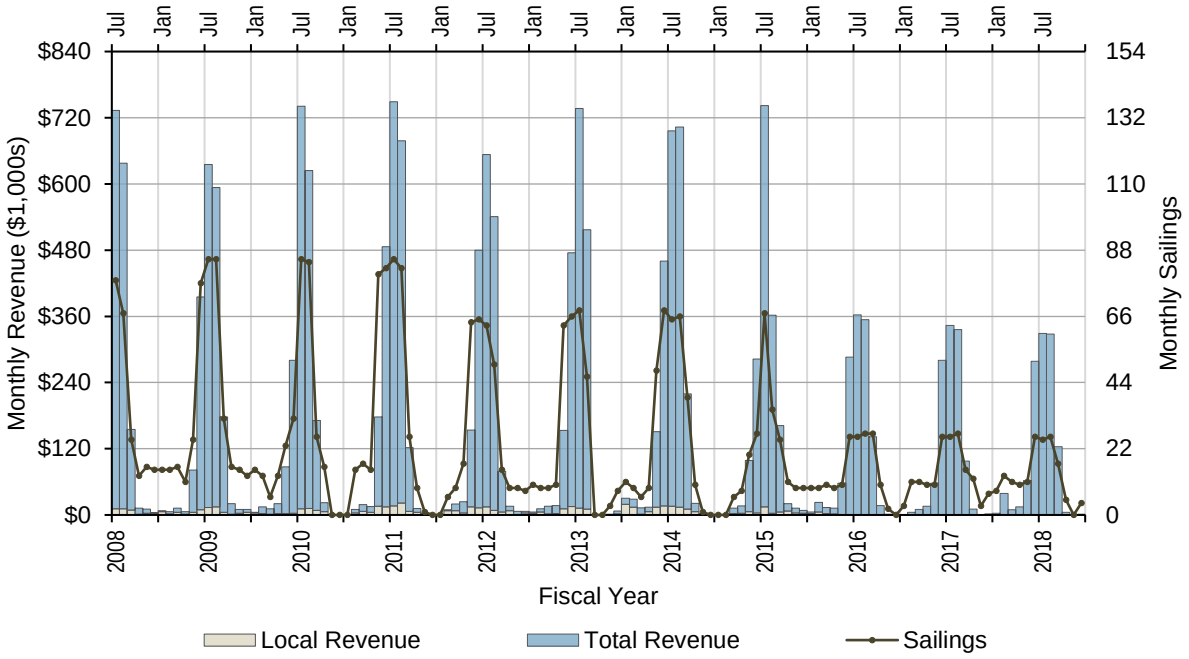
Route Group	Model Specification	Passenger Fare Decrease	Passenger Fare Increase	Passenger Pricing Strategy	Vehicle Fares Decrease	Vehicle Fare Increase	Vehicle Pricing Strategy
		Revenue		Pricing	Revenue		Pricing
Mainline	All origins/destinations	Down	Up	Up	Down	Up	Up
	If runs are limited to internal Alaska routes	Down	Down	No Change	Up	Down	Down
	To/From Bellingham	Down	Up	Up	Down	Up	Up
SE Feeder	To/From Juneau	Down	Up	Up	Down	Up	Up
	To/From Sitka	Marginally Up	Marginally Down	No Change	Down	Down	No Change
Lynn Canal	To/From Juneau	Down	Up	Up	Down	Down	Down
	Between Skagway/Haines	Down	Up	Up	Down	Up	Up
PWS	Between Valdez/Whittier	Down	Up	Up	Down	Up	Up
	Between Cordova/Whittier	Down	Up	Up	Marginally Up	Down	No Change
Homer-Kodiak	Between Homer/Kodiak	Down	Up	Up	Down	Up	Up
SW	SW To/From Homer	Down	Up	Up	Down	Up	Up
	SW To/From Kodiak	Up	Down	Down	Down	Up	Up
Cross-Gulf	All routes in general	Up	Down	Down	Down	Up	Up
Metlakatla	Metlakatla	Down	Up	Up	Down	Up	Up

Decrease Prices Increase Prices

Source: Northern Economics analysis using data from AMHS (2019a).

Figure 13, which is a copy of Figure 6 from page 17, presents local and non-local revenue on the Valdez-Whitter ferry. On this particular route, local traffic is extremely low relative to non-local. In addition, the spike in revenue during the peak season is also very significant. This would be an ideal route on which to raise prices if the goal is to increase revenues with minimal impacts to residents.

Figure 13. Monthly Local Resident and Total Valdez-Whittier Revenues and Sailings, by Fiscal Year

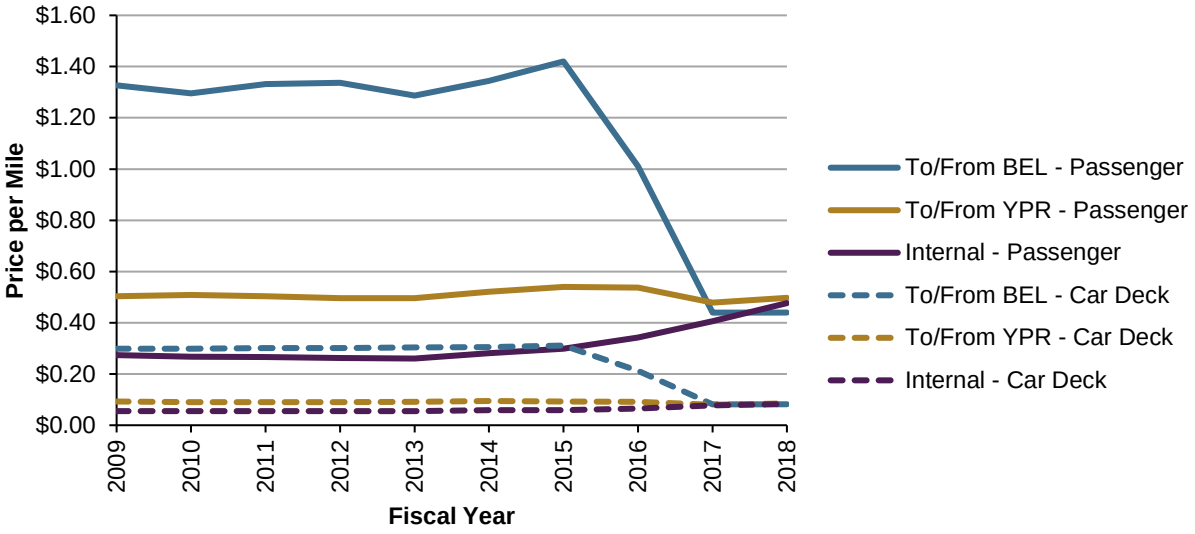


Notes: 1) Total revenues for each month are represented by the blue vertical bars, with the portion of those revenues attributable to local buyers indicated by the tan portion of each bar. The local revenue component has not been reported by AMHS since the implementation of its new ticketing system in May 2016. 2) Monthly City-Pair Sailings (the dark olive line) is the count of all combinations of origin/destination city-pairs in each vessel sailing.

Source: Northern Economics analysis using data from AMHS (2019a).

Recent revenue changes in the Mainline routes are also likely due to changes in fare structure. Figure 14 shows passenger and car deck prices for sailings between Bellingham, Prince Rupert, and all other internal Mainline sailings. Both the passenger and car deck prices for sailings to and from Bellingham decreased in FY 2016 and FY 2017. Prices in other parts of the Mainline routes generally stayed the same during that period, and passenger fare prices for internal Mainline sailings increased slightly.

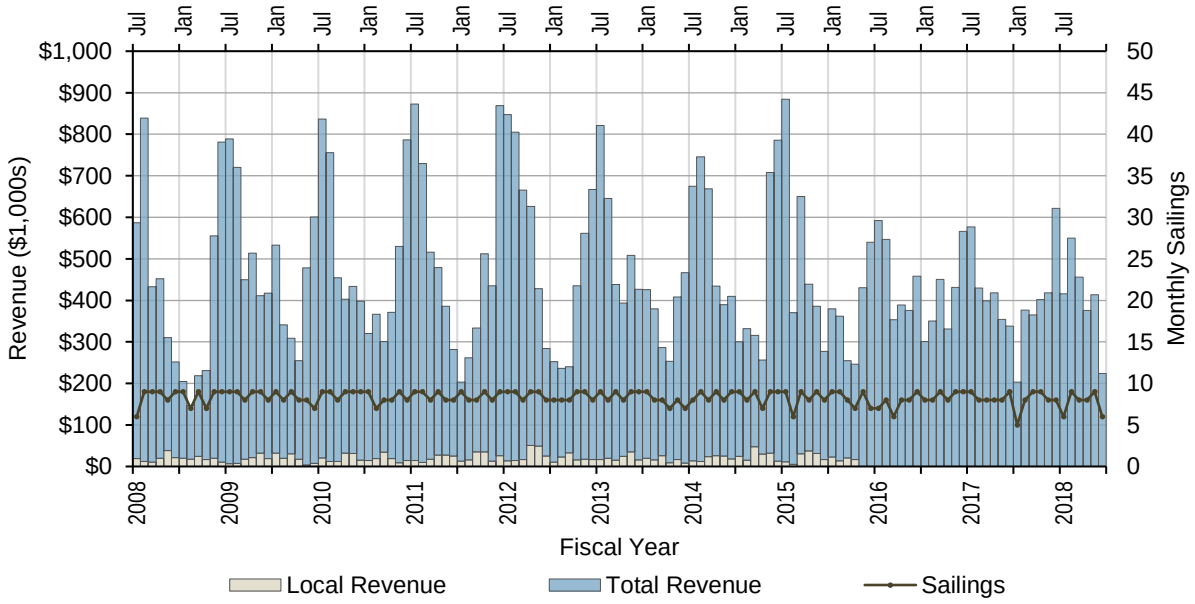
Figure 14. Mainline Fare Increases, FY 2009–2018



Source: Northern Economics analysis using data from AMHS (2019a).

Figure 15 shows monthly revenue and sailings for a single Mainline route (traffic between Haines and Bellingham) and illustrates some dramatic changes in revenues, starting in the summer of 2016. These revenue decreases are closely correlated with the fare decreases previously shown in Figure 14.

Figure 15. Monthly Local Resident and Total Bellingham-Haines Revenues and Sailings, by Fiscal Year



Notes: 1) Total revenues for each month are represented by the blue vertical bars, with the portion of those revenues attributable to local buyers indicated by the tan portion of each bar. The local revenue component has not been reported by AMHS since the implementation of its new ticketing system in May 2016. 2) Monthly City-Pair Sailings (the dark olive line) is the count of all combinations of origin/destination city-pairs in each vessel sailing.

Source: Northern Economics analysis using data from AMHS (2019a).

Mainline routes such as this are another example of where AMHS could benefit from fare increases. However, it is difficult to generalize about which route groups better serve Alaskans vs. nonresidents and how fare prices could specifically target nonresidents. Figure 16 illustrates differences between the Bellingham to Haines sailings and the Haines to Bellingham sailings. The figure shows percentage shares of monthly revenue for all Alaska residents compared to all other ticket buyers. The sailings originating in Bellingham (top) have a much lower portion of Alaska resident revenues than sailings originating in Haines (bottom). This example demonstrates that there can be substantial differences in sailings between pairs of AMHS ports. In this case, AMHS could increase fares only for the sailings originating in Bellingham, which would have a smaller effect on revenue but would limit negative impacts to Alaskans. Changes to fare pricing throughout the system may have disproportionate effects on Alaskans depending on the specific route and time of year. Additional monthly revenue charts for each route group and specific sailings can be found in Appendix A.

Figure 16. Percentages of Revenue by Ticket Buyer Residency, by Fiscal Year

Source: Northern Economics analysis using data from AMHS (2019a).

Conclusions for Option 9

Based on the information presented in Table 57, AMHS data indicate that increasing prices would result in higher overall revenues for most of the route groups while decreasing prices would result in lower overall revenues. These results agree with the findings of previous studies; demand for ferry service is generally inelastic and additional increases are likely to further increase total revenue.

The study team notes that the current AMHS schedule for passenger vehicles that are 23 feet or less runs contrary to recommendations from published literature for revenue maximization. Bayliss et al. (2019) suggests that space constraints are the primary limitation in revenue optimization for vehicle ferries.

If the state wishes to strategically increase prices so that the negative consequences to Alaska residents are minimized, then we would recommend raising prices on routes or seasons in which local resident traffic is relatively low. The analysis indicates that Alaska residents' utilization of AMHS service also varies significantly for northbound and southbound mainline trips between the same cities. For example, Alaska residents make up a much larger share of revenues on sailings from Haines to Bellingham than from Bellingham to Haines. If minimizing negative consequences to Alaska residents is important, pricing strategies should be tailored to individual route groups and seasons.

4.10 Option 10: Renegotiation of Marine Union Contracts

Option 10: Legislature-directed[61] renegotiation of marine union contracts to reduce vessel operation costs.

Methodological Overview of Option 10

Most of the options that have been assessed would require renegotiation of marine union contracts. Almost all of the changes proposed assume that additional flexibility with respect to manning would be provided to AMHS allowing within-year changes to operational parameters that change the number of crew and the number of hours worked.

The study team believes that the state's negotiating position would be much stronger if it were specifically directed by the Legislature.[61] The assessment of impacts of Option 10 contains a summary of the potential actions contemplated within the earlier options that would require renegotiation of marine union contracts. At the end of the inventory of changes the study team provides an indication of which types of negotiated changes are likely to generate that highest levels of savings.

Assessment of Option 10

Option 2A, in which AMHS focuses on providing service to NHS ports, assumes the following vessel-based operational changes that would likely require a renegotiation with unions.

- *Tustumena* would convert from a 24-hour vessel with cabins to 12-hour/14-hour day-boat operations.
- *Hubbard* would operate part of the year as a 14-hour day-boat, six days per week from May through September then shift to five days per week for the rest of the year.
- *Columbia* would shutter 50 percent of its cabins and operate during the winter and spring with a reduced crew. From May through September it would operate at full capacity with a full crew.
- *Kennicott* would operate as a full-crew vessel with cabins from June through October but would then convert to a 14-hour day-boat working five days per week from January 20 to May 25.

Option 2B, in which AMHS provides service to roadheads for roadless communities, assumes the following vessel-based operational changes that are likely to require a renegotiation with unions.

- *Aurora* would operate as 12-hour/14-hour day-boat five days a week.
- *Hubbard would* operate as 12-hour/14-hour day-boat five days a week.

[61] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

- *Matanuska* would shutter 50 percent of its cabins and operate during the winter and spring with a reduced crew. From June through October it would operate at full capacity with a full crew.

Option 3A in which AMHS assets are provided to a single public corporation, assumes the following vessel-based operational changes that would likely require a renegotiation with unions:

- *Tustumena* would convert from a 24-hour vessel with cabins to 12-hour/14-hour day-boat operations.
- *Kennicott* would operate as a reduced-crew 24-hour vessel with cabins from May through September but would then convert to a 12-hour/14-hour day-boat working five days per week from January to mid-March.
- *Hubbard* would operate as 12-hour/14-hour day-boat 6 days per week from May through September; then operate four days per week as a 12-hour day-boat the remainder of the year.
- *Aurora* would operate as a 24-hour day-boat on a 2-on/2-off schedule from April 7 through October 6. It would then switch to a 5-days per week schedule as a 14-hour day-boat providing relief to the *Tazlina* from October 21 through January 19.
- *LeConte* would operate as a 24-hour day-boat on a 2-on/2-off schedule from October 21 through March 23.
- *Columbia* and *Matanuska* would shutter 50 percent of their cabins and operate during the winter and spring with a reduced crew. From May through September they would operate at full capacity with a full crew.

Option 3B-1 utilizes the same operating modes as used in Option 3A, noting that under Option 3B-1 six different public entities would be negotiating with the unions.

Option 3B-2, which is projected to operate with a subsidy of $24.05 million, assumes that the two separate public entities negotiate with the unions.

- *Hubbard* would operate as a 14-hour day-boat seven days per week from May through September then four days per week as a 12-hour day-boat for the remainder of the year.
- *Aurora* would operate as a 24-hour vessel with all crew living on board. This is the same type of arrangement that is used on mainline vessels.
- *Tustumena* would operate May–November as a 12-hour day-boat four days per week.
- *Kennicott* would operate as a full-crew 24-hour boat, but only from late May to late September.

Option 8 examines privatization of on-board passenger services. This will certainly require renegotiations of union contracts.

Changes in Wage Rates: In addition to the negotiations with unions to allow vessels to utilize multiple operational modes during a given year, renegotiation with unions could also involve a change in the wage rates. Changes in wage rates will change the labor cost per operating day even if the operating mode is unchanged. Under Option 2A (which provided service to NHS communities and had an operating subsidy of $70.98 million), a 1 percent change in the wage rate would have reduced operating expenses by $670,000. Under Option 3B, which achieved the target subsidy of $24.05 million, a 5.1 percent cut in wage rates was assumed. If instead a 4.1 percent cut in wage rates had been assumed, the operating subsidy would have been $24.39 million an increase of $337,000. In general, the relative importance of changes in wage rates increases with larger reductions in labor costs due to operational changes.

Relative Importance of the Type of Negotiated Change

Based on estimates developed throughout the assessment of options, the study team has developed a ranking of the relative importance of each type of negotiated change in the list below. In general, changes that affect the operating costs of larger/higher cost vessels are deemed more important that changes that only affect smaller/lower cost vessels. In addition, changes that provide greater flexibility are deemed more important than changes that provide incrementally smaller amounts of flexibility. Though not given a qualitative ranking, negotiations to reduce general wage rates will be required if operating subsidies are to be reduced to target levels of $24.05 million.

1) Negotiate to allow the *Kennicott* to switch between operations as a 24-hour vessel with cabins and operations as a 14-hour day-boat. The *Kennicott* is the most flexible of all the AMHS vessels. It can operate on Mainline routes, Cross-Gulf routes, PWS routes, Homer-Kodiak routes, and SW routes. It is also one of the more expensive vessels to operate. If the *Kennicott* can operate as a 14-hour day-boat, its relative value increases significantly.

2) Negotiate to allow the *Tustumena* to operate as a 14-hour day-boat. Even though the *Tustumena* is an aging vessel, it is the only vessel in the fleet that is fully compatible with the AMHS terminal in Kodiak. If the *Tustumena* operates as a day-boat, costs to provide service on the Homer-Kodiak routes can be cut significantly. Given that the *Tustumena* is no longer making long ocean voyages, none of the options examined utilize its passenger cabin space.

3) Negotiate with unions to allow the *Columbia, Matanuska*, and *Kennicott* to switch between operations with a full-crew and all cabins available to a reduced crew with only 50 percent of cabins available at least once per year.

4) Negotiate to allow the *Aurora* to operate as a 24-hour vessel[62] with all crew living on board in crew quarters. This is a key element of Option 3B-2 and is only used in that option.

5) Negotiate to allow 12-hour/14-hour day-boats, noting that the additional crew used during 14-hour operations would also be assigned to work as daytime watch crews. Under the various options, the *Tustumena, Hubbard*, *Kennicott*, are all assumed to operate as 12-hour/14-hour day-boats.

6) Negotiate to allow the *Aurora* and *LeConte* to operate 2-on/2-off schedules as 24-hour day-boats in the SE Feeder routes. Further, negotiate to allow the *Aurora* to switch to 14-hour day-boat operation for a 12-week period during the winter in order to provide relief to the *Tazlina* in Lynn Canal operations.

Conclusions for Option 10

In order significantly reduce operating costs AMHS or the entities that operate AMHS assets would need the flexibility to operate vessels under operational parameters that match seasonality and demand. This flexibility would require renegotiation of union contracts. If the Alaska Legislature[63] directed those negotiations it appears more likely that AMHS or the entities that operate AMHS vessels would gain the additional flexibility needed.

[62] In this assessment a "24-hour vessel" differs from a 24-hour day-boat. The 24-hour day-boat returns to port every day, while a "24-hour vessel" can feed and house all crew members for an extended period.

[63] The legislature sets policy in two ways: it passes laws/statutes and it passes a budget. The amount of funding the legislature provides determines what an agency can do. Also, the legislature can indicate how a specific appropriation is used by including intent language in the budget.

4.11 Option 11: Potential Route Changes Taking Advantage of Existing or Future Land-based Infrastructure

Option 11: Evaluate any potential route changes that would reduce the operating cost, especially utilizing existing road links and potential future road links.

There are many potential AMHS routes changes that would rely new or existing infrastructure. Option 11 includes assessments of five potential route changes that would reduce the operating cost for AMHS. Four of the options assessed rely on infrastructure development to enable the change, while the last utilizes existing roads and ferry service. In any case investments of State of Alaska funds in road and ferry infrastructure projects typically leverage much larger levels of federal funding. Included in the assessment are the following:

- Option 11A: Development of a ferry terminal at Cascade Point on Berners Bay at the northern end of the Glacier Highway approximately 30 miles north of the current Auke Bay Terminal in Juneau. The Cascade Point terminal would serve are the base for dedicated ferry runs in Lynn Canal and reduce Juneau–Haines and Juneau–Skagway one-way sailing times by approximately 2.1 hours.
- Option 11B: Development of a road to Warm Springs Bay from Sitka with development of a terminal at Warm Springs Bay. The terminal at Warm Springs Bay would reduce one-way sailing times to/from Juneau by approximately 2.9 hours and one-way sailing times to/from Petersburg by 6.1 hours.
- Option 11C: Development of a road from Kake to the north end of Wrangell Narrows across from Petersburg. A shuttle ferry similar to that used to access the Ketchikan Airport would move travelers in and out of Petersburg.
- Option 11D: Development of a road from Tenakee Springs to Hoonah. This would eliminate the additional stop in Tenakee in the SE Feeder routes reducing costs to service these smaller SE Communities and would save two hours of operating time on one-way sails for ferries in the SE Feeder routes.
- Option 11E: Dropping Homer and Kodiak from Cross-Gulf sailings and utilizing the existing Homer-Kodiak ferry service and the road from Homer to Whitter to provide access to Cross-Gulf routes. Including Homer, Kodiak, and Chenega Bay in Cross-Gulf sailings adds approximately 36 hours to Cross-Gulf sailings and adds at least $574 to the cost of tickets for two adults with a full-size SUV. Dropping the Homer–Whittier portion of the Cross-Gulf sailings would also mean the elimination of regular sailings to Chenega Bay.

4.11.1 Option 11A: Develop a Lynn Canal Terminal at Cascade Point in Berners Bay

In this sub-option we assess the impact on ferry costs and revenues of developing the Terminal at Cascade Point in Berners Bay. Development of the terminal would reduce the length of the ferry run to Haines and Skagway from Juneau by 30 nautical miles and cut the run time by approximately two hours.

Methodological Overview of Option 11A

To assess the impacts of development of a terminal at Cascade Point, we compare revenues, expenditures, and operating subsidies of operating the dedicated runs in Lynn Canal from Cascade Point relative to Auke Bay.

Moving the terminal to Cascade point makes it possible to complete a Juneau-Haines-Skagway-Haines-Juneau roundtrip in less than 12 hours including startup and shutdown time, enabling the use of a 12-hour day-boat. This same roundtrip originating from the main Juneau Terminal in Auke Bay would require over 15 hours and would require a 24-hour day-boat to complete. Under Option 3A Lynn Canal operations would be provided by the *Tazlina* (with relief provided by the *Aurora*) and would originate from Auke Bay. The vessels would be able to make a daily Juneau-Haines-Skagway-Juneau run in a 14-hour operating day. This makes option 3A a good vehicle for comparison of savings that could be generated. Operating from Cascade Point would enable both the *Tazlina* and *Aurora* to convert to 12-hour operations from 14-hour operation (reducing costs) and allow the additional leg between Haines and Skagway to be added (enhancing revenues).

Assessment of Option 11A

Table 58 summarizes the revenue impacts of the changes under Option 11A relative to revenue estimates developed under Option 3A. The two sections of the table show: 1) a 25 percent fare increase relative to FY 2018 levels—as assumed in Option 3A, and 2) No change in fares. Notwithstanding the general price increase, fares originating in Cascade Point would be reduced relative to Lynn Canal fares originating in Auke Bay. AMHS uses a two-part formula in establishing fares—a fixed base charge plus a mileage-based charge. Since AMHS would be moving passengers and vehicles 30 fewer miles for trips originating at Cascade Point, fares would be reduced. Based on data from FY 2018, the study team estimates that the average passenger fare between Cascade Point and Haines or Skagway would be 20 percent lower than fares on the Mainline ferries which would continue to use Auke Bay as their starting point into Lynn Canal.[64] Average vehicle fares are expected to be 26 percent less. Because of the reductions in fares in dedicated Lynn Canal runs, total revenue is projected to decrease by more than $805,000 relative to Option 3A with the overall fare change. If no change in fares is assumed revenues are projected to decrease by $688,000 with Option 11 relative to Option 3A.

It is important to note that this assessment does not assume any increases or decreases in passenger or vehicle volumes as a result of moving the Lynn Canal Terminal to Cascade Point. Given that overall travel times on dedicated Lynn Canal ferries would be reduced, it may be reasonable to assume the overall volumes on Lynn Canal ferries would also increase. From this perspective, the revenues estimates shown in Table 58 are conservative.

Table 58. Projected Changes in Lynn Canal Revenue Under Option 11A Relative to Option 3A

	Passenger	Car Deck	Cabin	Other	Total
	Estimated Revenue ($1,000s) with 25 Percent Fare Increase				
Revenue Under Option 11A	$4,025	$3,530	$128	$372	$8,055
Revenue Under Option 3A	$4,429	$3,871	$150	$410	$8,860
Difference Between 11A & 3A	($403)	($341)	($22)	($38)	($805)
	Estimated Revenue ($1,000s) with No Fare Increase				
Revenue Under Option 11A	$3,636	$2,759	$117	$335	$6,847
Revenue Under Option 3A	$4,021	$3,005	$137	$372	$7,535
Difference Between 11A & 3A	($385)	($246)	($20)	($37)	($688)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

[64] Fares on the Haines-Skagway run would not change, nor would fares on trips originating from the Auke Bay terminal.

Table 59 summarizes the changes in operating costs under Option 11A assuming no reduction in vessel-based wage rates. The reductions in operating costs result from the change to 12-hour operations from 14-hour operations as well as an additional reduction in fuel expenditures. Total operating costs are estimated at $112.1 million, a reduction of $29.9 million from FY 2018 and a $1.56 million reduction in operating costs for Option 3A.

Table 59. Projected Cost Impacts of Option 11A Relative to Option 3A

	Option 11A (With Cascade Point)				Change under Option 11A from Option 3A			
Vessel	Labor	Fuel	Other	Total	Labor	Fuel	Other	Total
Aurora	$3,605	$727	$450	$4,783	($115)	($123)	–	($238)
Tazlina	$3,535	$573	$538	$4,646	($347)	($489)	–	($836)
All Other Vessels	$42,463	$17,122	$8,380	$67,965	–	–	–	–
Subtotal	$49,603	$18,422	$9,369	$77,394	($462)	($612)	–	($1,074)
All Shared Expenses				$34,722				($482)
Total Operating Expenses				$112,116				($1,555)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Conclusions for Option 11A

The reduction in operating expenditures under Option 11A would exceed the reduction in revenues by $750,000 assuming a 25 percent change in fares based on strategies described in Table 20.[65] If no fare changes are assumed, the difference between expenditures and revenues would be larger, increasing to $866,000. Thus, it is estimated that moving Lynn Canal operations out to Cascade Point would reduce the operating subsidy by $750,000 to $866,000 per year.

Table 60 summarizes the changes in revenues, expenditures, and operating subsidies estimated as a result of development of the terminal at Cascade Point with and without the overall change in fares.

Table 60. Summary of Potential Benefits to Ferry Operations of a Terminal at Cascade Point

Comparison	System-wide Revenues ($1,000s)	System-wide Expenditures ($1,000s)	System-wide Subsidies ($1,000s)	Change in Subsidy Relative to Option 3A with assumed wage rates ($1,000s)
		Assumes a 25% Change in Fares and No Change in Wages		
Option 3A using Auke Bay	$45,198	$113,671	$68,473	–
Option 11A using Cascade Point	$44,392	$112,116	$67,724	($750)
		Assumes No Change in Fares and No Change in Wages		
Option 3A using Auke Bay	$38,964	$113,671	$74,707	
Option 11A using Cascade Point	$38,275	$112,116	$73,840	($866)

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

[65] Table 20 shows price change strategies for each route group that are applied throughout the analysis. In Lynn Canal, a 25 percent price change results in a 25 percent increase in passenger fares for all routes combined with a 25 percent decrease in vehicle fares for travel to/from Juneau and a 25 percent increase in vehicle fares between Haines and Skagway.

4.11.2 Option 11B: Warm Springs Bay Road and Terminal

Development of the Warm Springs Bay (WSB) road and terminal would shorten the sailing mileage between Juneau and a terminal with road access to Sitka. The Southeast Area Transportation Plan (SATP) (DOT&PF 2014) describes the project thusly:

> The Warm Spring Bay road and ferry terminal will save approximately 120 nautical miles and 12-hours (round trip) of ferry travel [to/from Petersburg] and by allowing the ferries to serve Sitka from Chatham Strait instead of transiting through the serpentine Peril, Olga, and Neva Straits to Sitka. Additionally, there are no tide or current constraints as there are with transiting all the way to Sitka…Sitka would no longer have direct ferry service "into town"; travelers would travel to the Warm Spring Bay ferry terminal to catch the ferry. The additional driving time will be easily offset by the savings (hours) in time aboard the ferry to points north or south. Upon completion the Warm Bay Spring road should be designated as an NHS route due to its significance in connecting a major airport with a major ferry route.

Methodological Overview of Option 11B

Based on mileage estimates and historical sailing times it is estimated that utilization of a road to WSB with an associated terminal would reduce one-way sailing times by approximately 2.9 hours to/from ports north of Sitka (i.e. Angoon, Juneau, etc.). The terminal at WSB would reduce one-way sailing times by 6.1 hours to/from ports south of Sitka (i.e. Kake, Petersburg, etc.). Historically, most port calls to Sitka were made as part of Mainline sailings. However, development of the WSB road and terminal would also make it possible to complete a round-trip from Juneau with a stop in Angoon in 18 hours, making it feasible for a 24-hour day-boat such as the *Aurora* or *LeConte* to provide regular service to Sitka.[66] Under existing conditions, a similar round trip to Sitka requires a full 24 hours.

The assessment that follows utilizes estimates of operating cost per hour for labor and fuel of vessels that made port calls to Sitka in FY 2018 based on information developed in Section 3.2.1, along with the total number of port calls and the total hours that would be saved to generate a high-level overview of potential cost savings for AMHS of utilizing a ferry terminal at WSB. Although not part of the assessment, it is likely that reducing the sailing time necessary to provide service to Sitka would also allow operations managers to re-optimize sailings schedules and possibly increase the number of port calls and revenues at other ports in the region.

Assessment of Option 11B

In FY 2018 there were a total of 93 port calls at Sitka involving ports to the north. At 2.9 hours per port call, moving the terminal to WSB would generate a savings of 270 ferry operating hours. There were also 118 port call involving ports to the South of Sitka. At 6.1 hours per port call, moving the terminal to WSB would generate a savings of 720 ferry operating hours. Five different vessels made a total of 211 port calls to Sitka in FY 2018 (*Columbia*–66, *Matanuska*–40*, Malaspina*–45*, Kennicott*–56*,* and *LeConte*–4*)*. Based on cost data and assumptions summarized in Section 3.2.1, these vessels had an estimated weighted average hourly cost for fuel and labor of $3,271/hour. Given the estimated 990 total hours of savings, developing the road and terminal in WSB would have generated $3.2 million in cost savings for AMHS in FY 2018, some of which would undoubtedly be passed on to ferry patrons in the form of lower fares.

The savings estimates described above represent a first order approximation. AMHS would very likely be able to realize additional savings as well as additional revenues by optimizing its sailing schedules and vessel

[66] Accessing WSB/Sitka with a 24-hour day-boat would enhance the ability to travel to Sitka and make its SEARHC Medical Facility available to many additional residents of SE Alaska.

operating parameters. It is also worth noting that based on Table 15 through Table 17, the 121 total port calls in Sitka generated revenue of $1.3 million and approximately $12,400 per port call if revenue from both embarking and disembarking passengers and vehicles is included. As shown in Table 15, Sitka has been ranked 10th in revenue among AMHS ports.

If the terminal at WSB were developed, it is possible that Sitka-based ferry revenue would decline. This is due to the presumption that fares for travel to/from Sitka, which are mileage based, would be reduced. While the fare reduction could induce some additional traffic, it is uncertain that any additional traffic would offset the reduction in ticket prices.

Conclusions for Option 11B

Based on the estimates presented above, development of a road to WSB with an associated ferry terminal would result in meaningful cost savings for AMHS.

4.11.3 Option 11C: Kake to Petersburg Road and Shuttle Ferry

Option 11C examines potential savings of operational expenditures for AMHS with the development of a road from Kake to the north end of Wrangell Narrows across from Petersburg. For AMHS this would eliminate the need to stop at Kake and would reduce sailing times for mainline ferries moving between Petersburg and Juneau. The SATP (DOT&PF 2014) includes the following description:

> *[The project involves] 22 miles of new single lane unpaved roadway and bridges and improves approximately 23 miles of existing logging roads. The connection across Wrangell Narrows to Petersburg requires a small shuttle ferry. The small shuttle ferry would operate in a manner similar to the Ketchikan airport ferry with multiple trips back and forth throughout the day. Upon completion this segment should be designated as an Alaska Highway System (AHS) route due to its significance in connecting two Southeast communities.*

Methodological Overview of Option 11C

This assessment estimates the number of operating hours that would be saved by ferries if they no longer needed to stop at Kake. Although not part of the assessment it is likely that the elimination of Kake would also allow operations managers to re-optimize sailing schedules and possibly increase the number of port calls and revenues at other ports in the region. Time savings are calculated using actual schedule times and vessels from FY 2018 and cost savings are estimated using daily operating costs developed in in Section 3.2.1.

Assessment of Option 11C

In FY 2018 there were a total of 75 port calls to Kake generating $361,000 in revenue if both embarking and disembarking traffic is included (Table 15). The bulleted list below describes the four types of trips that involved port calls to Kake in 2018 along with the vessel that made the trips. Using the 2018 data as a basis, the bullets estimate the time savings that could be realized under the same conditions if the stop in Kake were eliminated.

- There were two roundtrips by the *LeConte* between Juneau and Kake in 2018 with no other stops. These 15.8 hours trips would not be made under the option.
- There were 14 trips in 2018 in which Kake was the southern terminus of roundtrips from Juneau that also made stops Angoon and other SE Feeder communities (Tenakee Springs and Hoonah). Under the option Angoon would be the southern terminus, saving 4.7 hours of sailing time per trip by the *LeConte* (11 trips) or *Aurora* (3 trips).

- There were 28 stops in Kake in 2018 made by Mainline vessels in transit between Petersburg and Sitka via Chatham Strait—9 by the *Malaspina* and 19 by the *Matanuska*. Eliminating the stop in Kake would save an estimated 2.2 hours per trip.
- There were 31 stops in Kake made by Mainline vessels in transit between Petersburg and Juneau via Stephens Passage in 2018—10 by the *Malaspina* and 21 by the *Matanuska*. Eliminating the stop in Kake would save an estimated 3.7 hours per trip.

Assuming the same number of trips by the same vessels as in FY 2018, eliminating the stops in Kake would save a total of 277 hours of operating time by the four vessels that make calls to Kake and approximately $745,000 in operating costs:

- *LeConte* would save 87 hours and approximately $188,000 in labor and fuel.
- *Aurora* would save 14 hours and approximately $38,000 in labor and fuel.
- *Malaspina* would save 57 hours and approximately $198,000 in labor and fuel.
- *Matanuska* would save 119 hours and approximately $337,000 in labor and fuel.

If the road to Kake were developed it appears likely that demand for ferry services from residents of Kake would decline from the FY 2018 levels for two reasons:

1) Fares for two adults with a 19-foot vehicle to Juneau (which is by far the most common destination for Kake traffic)[67] are approximately $20 higher from Petersburg than they are from Kake. Higher prices generally result in lower levels of traffic if all other factors are held constant.
2) The population of Petersburg is roughly six times the population of Kake and there is naturally a much larger amount of commerce in Petersburg than in Kake. If residents of Kake were able to obtain needed supplies and services in Petersburg the need to travel farther might be reduced.

Conclusions for Option 11C

Development of a road and shuttle ferry between Kake and Petersburg would generate an estimated cost savings $745,000 based on FY 2018 operating schedules. It is also likely that demand for ferry services originating from or destined to Kake would be reduced.

4.11.4 Option 11D: Tenakee Springs to Hoonah Road

Option 11D examines potential savings of operational expenditures for AMHS with the development of a road from Tenakee Springs to Hoonah. For AMHS this would eliminate the need to stop at Tenakee Springs and would reduce sailing times in the SE Feeder routes. While a road between Hoonah and Tenakee Springs is mentioned in the SATP document (DOT&PF) it was not included as part of the plan.

Methodological Overview of Option 11D

This assessment estimates the number of operating hours that would be saved by ferries if they no longer needed to stop at Tenakee Springs. Although not part of the assessment, it is likely that the elimination of Tenakee Springs would also allow operations managers to re-optimize sailing schedules and possibly increase the number of port calls and revenues at other ports in the region. Time savings are calculated using actual schedule times and vessels from FY 2018 and cost savings are estimated using daily operating costs developed in in Section 3.2.1.

Assessment of Option 11D

[67] See Table 32 in Appendix B.

In FY 2018 there were a total of 94 port calls to Tenakee Springs generating $127,000 in revenue if both embarking and disembarking traffic is included (Table 15). All of the port calls were made en route to/from Angoon to/from Hoonah or Juneau. All of the trips were made by either the *LeConte* or *Aurora*.

Eliminating the stops in Tenakee Springs in FY 2018 would have saved approximately 2.1 hours of operating time per sailing for a total of 201 hours. Based on operating costs of the *LeConte* and *Aurora*, eliminating these stops would have saved approximately $417,000 in expenditures.

If the road to Hoonah were developed, travelers from Tenakee Springs would pay less to ride the ferry to Juneau, although they would have to incur the additional cost of travel from Tenakee to Hoonah, which would tend to limit increases.

In addition to the actual time savings as estimated above, eliminating the stop in Tenakee Springs would enable roundtrips between Angoon and Juneau to be completed by 14-hour day-boats—the entire trip with an hour for start-up and an hour for shut-down could be completed in less than 14 hours. With the stop in Tenakee Springs, the entire trip requires over 15 hours (with start-up and shut-down times) and thus a 24-hour day-boat crew is required.

Conclusions for Option 11D

Development of a road between Tenakee Springs and Hoonah would generate an estimated cost savings of $417,000 based on FY 2018 operating schedules.

4.11.5 Option 11E: Terminate Cross-Gulf Sailings at Whittier Rather than at Kodiak

Option 11E examines potential savings of operational expenditures for AMHS if Cross-Gulf sailings were terminated at Whittier rather than at Kodiak. This action would also have the effect of eliminating service to/from Chenega Bay. Assuming there is continued service between Kodiak and Homer, the run between Whittier and Kodiak (which also includes a stop at Homer) can be considered a redundant and unnecessary service. Travelers wishing to move between Whittier and Kodiak can take the road from Whittier to Homer, and then the ferry from Homer to Kodiak.

The study team notes that personnel and families moving in and out of the Coast Guard station at Womens Bay on Kodiak Island are one of the major components of travel on Cross-Gulf service beyond Whittier to the west. While elimination of that service could make it more difficult for these families to make their move, the study team believes that nearly all of the Coast Guard personnel and families that choose to utilize the ferry for their move would continue to use the ferry if sailings terminate in Whittier.

Methodological Overview of Option 11E

The assessment of Option 11E estimates the total operating costs in extending Cross-Gulf Sailings beyond Whittier to Kodiak. The assessment also examines the potential foregone revenues.

Assessment of Option 11E

The standard northbound/westbound run for AMHS Cross-Gulf originates in Bellingham and has seven stops: 1) Ketchikan, 2) Juneau, 3) Yakutat, 4) Whittier, 5) Chenega Bay, 6) Kodiak, and 7) Homer. Occasionally stops in Port Lions and/or Seldovia may be added. In FY 2018 the *Kennicott* made this 36-hour (1.5 days) run or its eastbound/southbound counterpart 26 times (including variations). While two of these runs preceded (or followed) a sailing from Homer out to Unalaska and back, the remaining 24 trips between Whittier and Kodiak are considered part of the standard Cross-Gulf schedule. These 24 trips accounted for a total of 36 operating days for the *Kennicott*. Assuming a nominal daily operating cost of $68,269, these 36 operating days cost approximately $2.46 million in FY 2018. If shared costs are added, the fully loaded cost for these 36 days is estimated at $3.56 million. In FY 2018 AMHS generated

$1.3 million from Cross-Gulf travelers going to or coming from Kodiak, Homer, or Chenega Bay. Thus, the nominal net increase in the operating subsidy of terminating Cross-Gulf sailings in Kodiak is $2.25 million.

The calculations above assume that 100 percent of the revenue generated by Cross-Gulf travel linked to Kodiak, Homer, or Chenega Bay would be lost. With the exception of $32,000 in Chenega Bay-based revenue, it is expected that almost all of that travelers would use a combination of the road and ferry to and from Whittier to meet their travel demands. Noting that the cost of Cross-Gulf travel for two with a vehicle from Whittier to Bellingham is approximately 85 percent of the cost of Homer-Bellingham travel, it is expected that revenue reductions as a result of terminating the service at Whittier would be less than $300,000. If the latter presumption holds, then the net reduction in operating subsidy of terminating Cross-Gulf sailing at Whitter is estimated at $3.26 million.

Finally, it must be noted that terminating Cross-Gulf service at Whittier rather than Kodiak enable the *Kennicott* to increase the number of Cross-Gulf sailings between Whittier and Bellingham and/or increase the number of communities that have access to the service. For example, the *Kennicott* could take advantage of the time savings by adding stops in Cordova, Sitka, Petersburg, etc. This would enhance the potential for increases in Cross-Gulf revenue relative to existing service.

Conclusions for Option 11E

Terminating Cross-Gulf service in Whittier rather than in Kodiak is expected have a positive impact on the AMHS operating subsidy. The extent of the impact would depend on how AMHS chooses to utilize the time savings afforded by eliminating additional travel to Kodiak.

5 Conclusions and Recommendations

In general, the study team concludes that reducing the AMHS operating subsidy to $24.0 million will be extremely difficult if there is also a desire to provide minimum levels of service to existing AMHS communities.

Option 3B-2 was the only studied option that achieved the target subsidy level and also provided minimum levels to most (but not all) communities currently served by AMHS. That option required a 8.7 percent reduction of vessel-based wage rates and 25 percent general increase in fares and other major vessel operation changes that would require renegotiation of union labor agreements. Under Option 3B-2, several route groups would go without any service for extended periods of time, and service would be cut to Tatitlek, Seldovia, Ouzinkie, and Port Lions. External service on the Mainline runs to Bellingham and Prince Rupert would be severely curtailed with service provided only during the summer by the *Kennicott* in conjunction with its Cross-Gulf service. Other larger SE communities would be limited to service within Alaska, and service to SE Feeder communities would be reduced to a very limited number of trips each year. PWS and Homer-Kodiak would be without service from December 22 through April 27, and there would only be two trips scheduled to SW Alaska.

The study team found that selling or leasing the AMHS assets to private entities is not feasible if minimum levels of service are also stipulated. Even without the stipulation of minimum service levels, Option 4 makes the determination that private companies would likely not be able to operate any of the existing routes at break-even levels. The Metlakatla run with the *Lituya* comes the closest to breaking even but would require a subsidy of more than approximately $370,000.

Table 61. Results of Options for which Full Quantitative Assessments were Developed

Option	Operational Scenario	Fare Changes Relative to FY 2018	Wage Rate Change Relative to FY 2018	Vessel Based Revenues ($1,000s)	Operating Expenditures ($1,000s)	Operating Profit (or Subsidy) ($1,000s)	Change in Subsidy Relative to FY 2020 Budget
2A	Provide service to National Highway System ports. Drop service to Prince Rupert, SE Feeder routes, SW Alaska and Cross-Gulf routes	–	–	$34,950	$106,072	($71,121)	+48%
2B	Provide service to nearest road head. Drop service to Bellingham, and Whittier except in Cross-Gulf routes. *Hubbard* replaces the *Tustumena*.	–	–	$29,048	$89,441	($60,393)	+26%
3A	A single public corporation runs the ferries and provides service to existing AMHS communities. Cost reduction measures include use of day-boats and 2-on/2-off service to SE Feeder Routes.	+25%	–	$45,198	$113,671	($68,473)	+42%
3B-1	Multiple public corporations run the ferries. Service same as Options 3A, but with a 5 percent reduction in wage rates relative to FY 2018.	+25%	(-5.0%)	$45,198	$110,045	($64,847)	+35%
3B-2	Two public corporations run the ferries & reduce subsidy to target of $24.05 million with 8.7 percent wage-rate reduction. Service continues to most AMHS ports.	+25%	(-8.7%)	$23,578	$47,632	($24,054)	(-50%)
4 with Subsidy	Private company leases vessels; minimizes subsidy while cutting wage-rates no more than 10% from FY 2018 levels. All service is cut except between Metlakatla/Ketchikan	+16%	(-10%)	$1,218	$1,590	($372)	(-99%)
11A	AMHS operates ferries with same parameters from Option 3A except a new terminal at Cascade Point is used for Lynn Canal service.	+25%	–	$44,392	$112,116	($67,724)	+41%

Source: Northern Economics analysis using data from AMHS (2019a, 2019b, 2019c).

Based on the assessment conducted the study team provides the following recommendations:

1) Increase prices. The regression models developed by the study team indicate that revenues would increase if prices were strategically increased. Use the available data, as the study team has done, to determine which routes are likely to benefit from price increases and which are not. See the assessment of Option 9 for additional information on fare increases, with particular attention to Table 57.

    a. If revenues do not increase as a result of the price change, do not hesitate to change prices back.

    b. Reverse the price cuts that were made in FY 2016 and FY 2017 on the SW and Mainline ferries. The price cuts that were enacted on these routes resulted in reduced revenues overall.

    c. Change the pricing incentives for vehicles 23 feet or less in length (i.e. passenger vehicles, pick-up trucks and SUVs) so that longer vehicles pay a proportionally higher price. Currently longer vehicles pay less per vehicle length than smaller vehicles.

    d. Institute dynamic pricing and study the outcomes of price changes. If strategies don't work, change them.

2) When making changes to service levels, schedules, or prices, study the results with a focus on the impacts on the operating subsidy. The results of schedule changes and service level changes may be surprising. As an example, using the FY 2009–2018 data provided by AMHS (2019a), the study team has found that increasing the number of sailings in Lynn Canal appears to increase revenue more than it increases costs. We would recommend, however, that AMHS test this recommendation first over a short period before implementing permanent changes that can't easily be reversed.

3) When reducing service, look for ways to reduce the number of sailings and operating costs while trying to provide some regular level of service to each region if possible.

    a. Reduce the number of operating days per week from seven down to as low as four on a route-by-route basis.

    b. Putting vessels onto a 2-on/2-off schedule could significantly reduce costs and still provide regular and consistent levels of service that would not erode the AMHS customer base.

4) Operate vessels as 12-hour or 14-hour day-boats whenever and wherever the sailing times and regulations will allow, even if this means moving from daily roundtrips to daily one-way trips. In general, it appears that total costs would be reduced more than revenues, even if costs of watch crews, lodging and per diem are included.

5) If port calls to individual communities are to be eliminated, look to cut communities that make it difficult to offer 12-hour or 14-hour day-boat service to higher volume routes. Consider whether communities that are dropped might be potential candidates for service from private operators. Example communities are Ouzinkie, Port Lions, Old Harbor, Seldovia, Tatitlek, Chenega Bay, Pelican and Tenakee Springs.

6) Provide long-term contracts to private operators that will service certain difficult-to-serve communities such as those listed above. With a stable operating environment, private operators may be able to develop profitable services to these, as well as potentially other unserved communities. Even if these services were partially subsidized by the state, the overall subsidy provided for ferry services could likely be reduced.

    a. A private service located in Kodiak might be able to operate a small shuttle ferry providing service to roadless communities on the island an on adjacent islands. Potential communities include Ouzinkie, Port Lions, Old Harbor, Afognak, and possibly others.

    b. A private service could provide service to roadless communities on the south side of Kachemak Bay including not only Seldovia, but potentially also Port Graham and Nanwalek.

    c. A private service operating out of Seward or Whittier could provide service to Chenega Bay and possibly other islands and roadless areas on the west side of PWS.

    d. A private service operating out of Valdez could provide service between Tatitlek and Valdez and could possibly also develop a Cordova-Valdez service to augment service provided by AMHS.

    e. A private service operating out of Gustavus or Hoonah could potentially provide service linking Pelican to Juneau. This private operation could potentially also provide service to other small isolated communities in the northern Southeast Region, potentially including Elfin Cove and Excursion Inlet.

7) Consider additional infrastructure to reduce operational costs. State investments in infrastructure are typically able to leverage much larger levels of federal funding. Examples include a) development of the terminal at Cascade Point; b) development of the road to Warm Spring Bay with a terminal; c) development of the road between Kake and Wrangell Narrows.

8) Look for ways to cut Cross-Gulf and Mainline costs, increase Cross-Gulf/Mainline utilization, or increase Cross-Gulf/Mainline revenues. While Cross-Gulf/Mainline routes generate by far the largest proportion of revenues (53 percent of FY 2018 revenue), the vessels on Mainline routes (*Columbia*, *Malaspina* and *Matanuska* and 67 percent of the *Kennicott*'s operating days) are also estimated to have accounted for $41.6 million (44 percent) of the FY 2018 operating subsidy. The following are our top suggestions:

   a. Terminate Cross-Gulf service at Whittier. Running the *Kennicott* down from Whittier to Kodiak, Homer, and back is costly and redundant with the Kenai road system and existing Homer-Kodiak service.

   b. Transfer patrons between Cross-Gulf routes and Mainline runs. This would eliminate the cost of running the *Kennicott* southbound from Juneau and would tend to even out the northbound/ southbound traffic discrepancies. (Historically traffic on Cross-Gulf runs to Bellingham exceeds traffic on Cross-Gulf Runs from Bellingham by about 12 percent; On the Mainline runs, revenues from Bellingham exceed revenues to Bellingham by about 20 percent).

   c. An across-the-board fare increase of 25 percent for all Mainline city pairs was projected to increase revenues (and reduce the operating subsidy) in the study team's Mainline Regression Model by $4.1 million. More discriminating price changes would likely be able to approach the same level of revenue increases and could reduce negative impacts to Alaskans. Points d, e, and f below are examples of more discriminating price changes.

   d. Increase northbound prices from Bellingham to a greater extent than increases on southbound prices.

      i. Historically northbound traffic exceeds southbound traffic by about 20 percent and raising northbound prices would tend to even out traffic and reduce northbound capacity constraints.

      ii. A much higher percentage of southbound passengers are Alaska residents (71 percent), while Alaska residents comprise a much lower proportion of northbound traffic (34 percent). See Figure 16 on page 102.

   e. Increase the fare between Ketchikan and Bellingham, particularly during peak travel periods. Between 2009 and 2015, the average revenue split between purchasers reporting Alaska residence and non-residents was approximately even during the peak season (June-August), but skewed heavily to Alaska residents during off-peak periods.

   f. Decrease the fares between Ketchikan and Prince Rupert. Between 2009 and 2015, the average revenue split between purchasers reporting Alaska residence and non-residents was skewed heavily to Alaska residents—Alaska residents accounted for 61 percent of the revenue generated.

9) The study team believes that Southwest communities would be adequately served by AMHS if there were two trips out to Unalaska per year. Once in late May before the fishing season, and again in mid-September. Since car-deck capacity is a limiting factor on these runs, raising the car-deck prices would generate more revenue and help offset costs. This route would undoubtedly be a good one to use dynamic pricing. Start with relatively high rates and increase rates as space fills.

10) Work with communities and/or regional economic development associations to help reduce food and lodging costs of AMHS crews when schedule and cost constraints dictate that day-boat vessels overnight

in communities that are not considered their home port. Since the AMHS ferries are facilitating commerce that is needed for these communities to survive, it seems that the communities could work with AMHS to develop lodging options that make continued service to the community feasible. This is particularly true in the winter when 24/7 vessels could be converted to day-boats to save money.

11) Consider the privatization of night crews and lay-up crews. This would be similar to the concept of privatizing passenger staff.

12) Work to add flexibility to union agreements that would allow AMHS vessels to operate with smaller crews and fewer days in order to align operational capacity with demand. Overtly recognize in the union agreements that demand for ferry services is highly seasonal and that in order for AMHS to minimize its operational subsidies and to continue to operate, vessels need to have the flexibility to change operating parameters during the course of the year.

13) Look to incorporate concepts developed in the AMHS Reform Project that aim to promote and implement a long-term vision and strategy for AMHS while limiting the influence of short-term changes in the pollical or fiscal climate.

    a. Develop an action-forcing Mission Statement that clarifies the purposes, goals, and values of AMHS.

    b. Create a public process to determine the long-term vision and strategy of AMHS

    c. Create a public process to approve significant changes to operational plans and capital decisions.

14) Consider creation of an appointed board of directors for AMHS that it is empowered to approve operating plans and capital initiatives. The board should have staggered terms, which would promote long-term stability.

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Table 62. Key Informant Interview Contacts

Company/Organization	Contact
Matson, Inc.	Bal Dreyfus, Vice President
Southeast Alaska Lighterage	John Gitkov
Lynden Transport, Inc.	Jim Jansen
Four Seasons Marine	Tom Tougas, Owner
Allen Marine Tours	Jamey Cagle
Icicle Seafoods	John Woodruff, CEO
Inter-Island Ferry Authority	Dennis Watson, CEO
Southeast Conference	Robert Venables, Executive Director
Alaska Division of Economic Development	Wanetta Ayers, Director

Table 63. Survey and Interview Respondents

Community	Respondent	Survey	Interview
Lynn Canal			
Haines	Wilmer Beetus, Mayor	✓	
Juneau	Rorie Watts, City Manager	✓	
	Mila Cosgrove, Deputy City Manager		✓
Skagway	Andrew Cremata, Mayor	✓	✓

Community	Respondent	Survey	Interview
Mainline			
Kake	Rudy Bean, City Administrator	✓	✓
Ketchikan (City)	Bob Sivertson, Mayor	✓	✓
Petersburg	Steven Giesbrecht, Borough Manager	✓	✓
Sitka	Keith Brady, City Administrator	✓	
	Gary Paxton, Mayor		✓
Wrangell	Kim Lane, City Clerk	✓	
Metlakatla			
Metlakatla	Albert Smith, Mayor	✓	
	Gavin Hudson, Metlakatla Indian Community Tribal Council member		✓
Cross-Gulf			
Yakutat	Jon Erickson, City and Borough Manager	✓	
Southeast Feeder			
Angoon	Joshua Bowen, Mayor	✓	✓
Gustavus	Calvin Casipit, Mayor	✓	✓
Hoonah	Gerald Byers, Mayor	✓	✓
Pelican	Walt Weller, Mayor	✓	✓
	Seth Stewart owner of Yakobi Fisheries		✓
Tenakee Springs	Dan Kennedy, Mayor	✓	
Prince William Sound			
Chenega Bay	Buell Russell, General Manager, Native Village of Chenega	✓	
Cordova	Clay Koplin, Mayor	✓	✓
Tatitlek	Nanci Robart, Indian Reorganization Act Council President	✓	
Whittier	Jim Hunt, City Manager	✓	
	Dan Blair, Mayor		✓
Homer-Kodiak			
Homer	Ken Castner, Mayor	✓	
City of Kodiak	Pat Branson, Mayor	✓	✓
Kodiak Island Borough	Dan Rohrer, Borough Mayor	✓	✓
Ouzinkie	Teressa Muller, City Clerk	✓	
Port Lions	Dorinda Kewan, Mayor	✓	✓
Seldovia	Cassidi Cameron, City Manager	✓	✓
Southwest			
Akutan	Joseph Bereskin, Mayor	✓	
Cold Bay	Dailey Schaack, Mayor	✓	
King Cove	Henry Mack, Mayor	✓	
Old Harbor	Rick Berns, Mayor	✓	
Sand Point	Jordan Keeler, Administrator	✓	✓
Unalaska/Dutch Harbor	Frank Kelty, Mayor	✓	✓