



Date: March 3, 2023
To: Island Institute
From: KPFF Consulting Engineers
Subject: Strategies to Enhance the Sustainability of Year-round Transportation to Maine's Islands Served by the Maine State Ferry Service

Summary of Existing Transportation Service

INTRODUCTION

Island Institute, in coordination with the Maine Department of Transportation (MaineDOT), is exploring strategies to enhance the sustainability of year-round transportation to the six islands served by the Maine State Ferry Service (MSFS): Frenchboro, Islesboro, Matinicus, North Haven, Swan's Island, and Vinalhaven.

The first phase of the study includes review of the existing transportation system, as well as options for island emergency transport services and ferry system funding options. Review completed in Phase 1 will serve as a basis for Phase 2, assessment of transportation needs, and Phase 3, development of service scenarios and recommendations for ferry service options and system improvements.

This memo provides a summary of the existing transportation system, including:

- Overview of the islands served by the MSFS
- Summary of current transportation options to and from the islands
- MSFS overview, including vessels, terminals, fare policy, ridership, and operating costs

ISLAND OVERVIEW

The six island communities served by MSFS, located in mid-coast and Down East Maine, are unbridged and rely on ferry or air connections for pedestrian and vehicle access to the mainland, to transport goods and access services, and for emergency transport. The islands are rural and have varying population levels, numbers of visitors, and freight and transportation needs. Island populations fluctuate by season, increasing during the summer months with seasonal residents and visitors.

Each island community is served by its own local government, and the islands are located in three different counties. Table 1 provides a summary of island characteristics.

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Table 1: Island Summary

Island	Form of Local Government	Population			On-Island Services		
		Year-round ¹	Summer (approx.)	Seasonal Housing Units ²	Grocery	Medical	School
Frenchboro	Town	61	80	16	N	N	(K - 8)
Islesboro	Town	600	2,195	551	Y	Y	(K - 12)
Matinicus	Plantation	53	<i>Data not available</i>	99	N	N	(K - 8)
North Haven	Town	400	1,000	333	Y	Y	(K - 12)
Swan's Island	Town	400	1,085	304	Y	Y	(K - 8)
Vinalhaven	Town	1,165	4,000	685	Y	Y	(K - 12)

¹<https://www.islandinstitute.org/community-profiles/>

² <https://www.islandinstitute.org/community-profiles/> (Islesboro, Matinicus, and Vinalhaven); Frenchboro 2016 Comprehensive Plan; 2022 Comprehensive Plan,

As shown in Table 1, all of the islands experience seasonal population growth due to the influx of visitors and residents during the summer months of June, July, and August. Seasonal housing units are assumed to be mostly unoccupied during non-summer months. Islesboro and Vinalhaven see the largest summer growth, with populations roughly quadrupling, while populations on North Haven and Swan's Island more than double 200%. Frenchboro and Matinicus experience the least amount of seasonal growth, and they are the most rural and have the fewest on-island services.

While four of the islands have at least one grocery store and medical facility, residents of Frenchboro and Matinicus are completely reliant on access to the mainland for deliveries and shopping. Schools on Swan's Island and Frenchboro are members of the Mount Desert Island Regional School System. While elementary and middle school education opportunities can be found on-island, high school students from Frenchboro and Swan's Island attend high school at Mount Desert Island High School, 22 minutes from the mainland Bass Harbor Terminal, and rely on MSFS for transportation to and from the mainland. Matinicus families often opt to live off-island for their children's high school years at least September-June, as there are no feasible transportation options that allow high school students to live on-island. Select Vinalhaven and North Haven High Schoolers attend the Midcoast School of Technology located 4 minutes from the Rockland terminal. High school students from the mainland who opt to attend Islesboro's magnet school, Islesboro Central School, rely on MSFS daily.

Regional Population Outlook

Maine is among the states with the lowest rates of population growth in the U.S. The state's total population was projected to increase 2.1% for the decade between 2018 and 2028.¹

Table 2 shows the 5-year population forecasts for the three counties in which islands served by the MSFS are located, as projected in the April 2021 Maine Population Outlook published by Maine Department of Administrative and Financial Services.

¹ *Maine Population Outlook 2018 to 2028*, Office of the State Economist, Maine Department of Administrative and Financial Services. April 2021.

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Table 2: Population Outlook by County*

County	Total Population			5 Year Percent Change		
	2018	2023	2028	2018-2023	2023-2028	2018-2028
Hancock County – <i>Swan’s Island, Frenchboro</i>	54,911	54,852	54,613	-0.1%	-0.4%	-0.5%
Knox County – <i>Vinalhaven, North Haven, Matinicus</i>	39,936	40,682	41,297	2.1%	1.5%	3.7%
Waldo County – <i>Islesboro</i>	39,867	41,313	42,595	3.6%	3.1%	6.8%

* Projections are based on pre-COVID-19 data

Future population levels for each island may not necessarily be in line with county and regional forecasts. For example, the 2016 Frenchboro, Maine Comprehensive Plan predicts that island population and demand for services will remain generally the same over the next few decades, while the 2022 Swan’s Island and 2018 Islesboro comprehensive plans noted that their year-round island populations are aging and likely to decrease over the next few decades.²

Several of Maine’s unbridged islands have seen population growth over the past decade, including an increase in residents associated with domestic migration since the COVID-19 pandemic and opportunities for remote work.³ A correlation can be observed between the increased broadband internet access on Maine’s rural islands and the general uptick in remote workers. Islesboro has a world-class fiber on the premises network, North Haven and Vinalhaven have some degree of cable service, and both Matinicus and Frenchboro have received system upgrades in the last 5 years. Swan’s Island has put in a proposal to fund an upgraded network for its residents. With this trend, more remote workers have chosen to remain on the islands year-round. While these trends toward population growth on the islands should be noted, the lasting impact of COVID-19 on the population of MSFS-served islands is currently unknown.

TRANSPORTATION TO AND FROM THE ISLANDS

The MSFS provides the primary link for passengers and vehicles between the islands and mainland. MSFS service levels vary by island, from 36 round trips per year to Matinicus to multiple trips every day of the year to Islesboro. Four of the MSFS routes operate additional trips during the peak summer season as demand increases. In addition to the scheduled, publicly-operated ferry service provided by the MSFS, the island transportation network includes privately operated plane and water taxi connections.

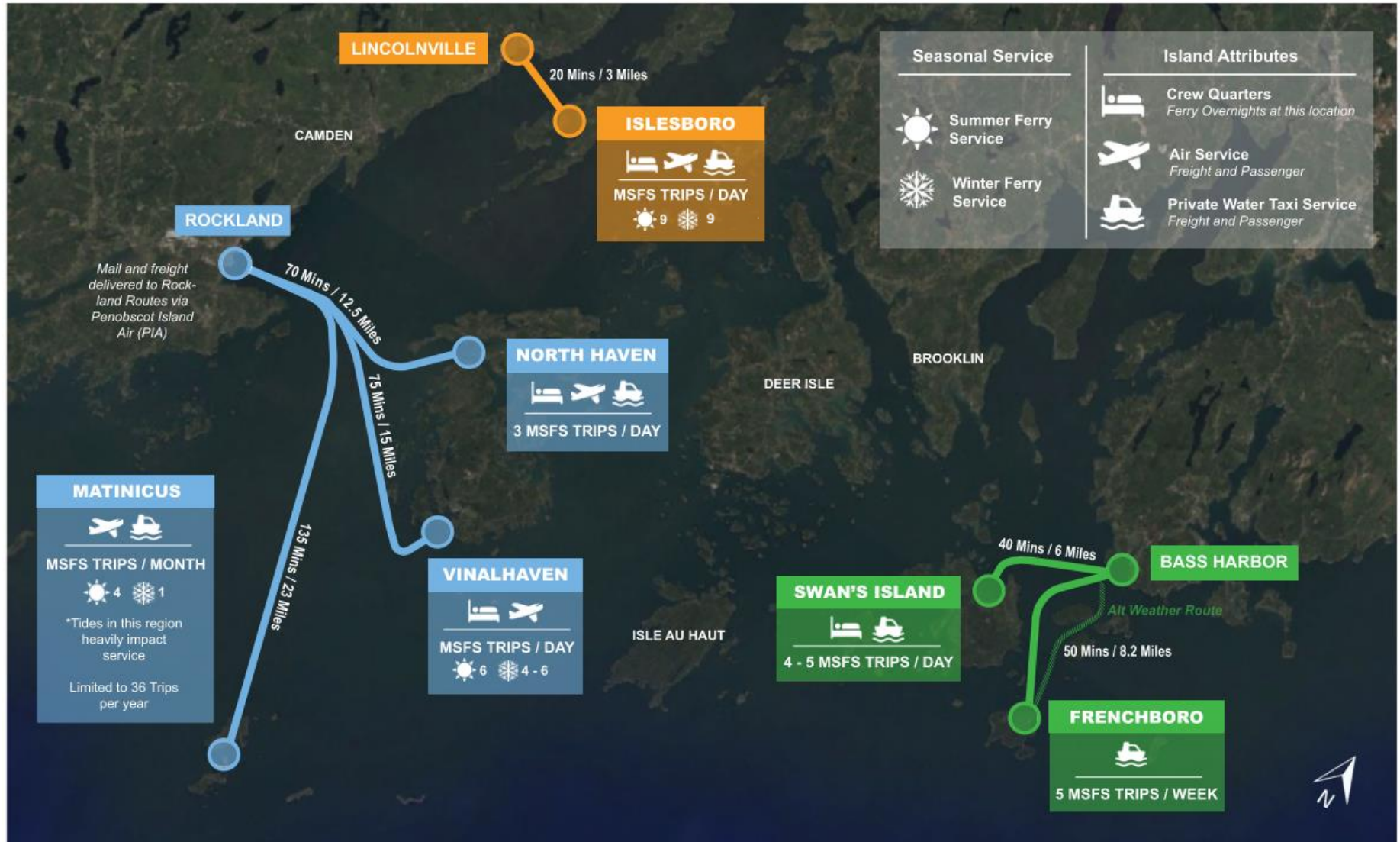
The frequency of trips and route characteristics of MSFS routes, along with additional transportation options available to each island, are summarized in Figure 1 and discussed in more detail in the following sections.

² https://www.maine.gov/dacf/municipalplanning/comp_plans/Frenchboro_2016.pdf

³ <https://www.bangordailynews.com/2021/08/20/news/the-maine-islands-you-can-only-access-by-boat-or-plane-grew-8-percent-in-the-last-decade/>

Summary of Existing Transportation Service

Figure 1: Maine State Ferry Service Island Access Map



Summary of Existing Transportation Service

FERRY – MSFS provides scheduled public ferry service for both passengers and vehicles to six islands from three mainland terminals, Rockland, Lincolnville, and Bass Harbor. Ridership and service levels vary greatly by route, as shown on the MSFS Island Access Map. Due to fluctuating year-round and seasonal island populations and visitor levels, all MSFS routes except Frenchboro and North Haven have increased frequency of service during the summer months. MSFS serves as a vital link for the island communities and provides the only means of moving vehicles on and off the islands. More detail on MSFS operations and service characteristics is provided in the next section.

Other factors that impact transportation to each island include:

- MSFS crew quarters are located on Vinalhaven, North Haven, Islesboro, and Swan’s Island. Crew quarters provide lodging and amenities for crews when off-duty or on-call, allowing the ferry to serve as an emergency transport option outside of service hours for those islands.
- Air strips are located on Matinicus, Vinalhaven, North Haven, and Islesboro. These islands can accommodate passenger and/or freight air service.
- The MSFS to Matinicus is limited by the legislature to 36 trips per year. In addition, the shallow water depths in the harbor limit ferry access to the island, and trips must be planned to avoid low tides. Additional service to Matinicus is provided by private water taxi and Penobscot Island Air (PIA) to accommodate passenger and freight travel to and from the island.
- To supplement vehicle ferry service to Frenchboro, MSFS contracts with a water taxi operator to provide two round trips to the island on Fridays, April through November. This Friday service provides the only option that allows island residents to travel to the mainland and return the same day.

WATER TAXI – Several private water taxi operators provide passenger service to and from the islands. Water taxis often provide faster and more frequent service than the regularly scheduled ferries, notably for early morning and late evening trips. Fares for water taxi trips are typically more expensive and have less passenger capacity than the MSFS ferries. Water taxi services include:

- Quicksilver water taxi provides scheduled passenger trips between Lincolnville and Islesboro to supplement MSFS service, including early morning and late evening trips, medical emergency trips, and when the Margaret Chase Smith vessel is out of service.
- Equinox Island Transport, based in Rockland, offers chartered passenger trips to North Haven, including early morning and late afternoon trips which allow an almost full day on the island for commuters.
- Swan’s Island Charters offers chartered trips connecting passengers between Swan’s Island and Frenchboro, and from the islands to Bass Harbor.

Summary of Existing Transportation Service

- Bass Harbor Island Cruises is contracted by the MSFS to provide a morning and afternoon round trip on Fridays from April through November, providing the only weekly opportunity to travel between Frenchboro and the mainland and return in the same day.⁴
- Matinicus Excursions provides scheduled passenger service between Rockland and Matinicus (seasonal only).

PLANE – Penobscot Island Air (PIA) has provided plane service to and from the islands since 2004, carrying over 10,000 passengers each year (pre-COVID-19).⁵ PIA is headquartered at Knox County Regional Airport, located in Owls Head, approximately 3.5 miles from Rockland. PIA serves Vinalhaven, North Haven, Matinicus, and Islesboro. Plane service provides more options for travel times, especially for early morning or late evening trips, and for Vinalhaven, North Haven and Matinicus, plane service provides a faster trip than ferry. Matinicus notably relies on plane service, since the MSFS vessel that serves the island is limited to 36 trips per year; and PIA service reduces the trip length to 10 minutes, as compared to the ferry trip time of 2 hours and 15 minutes.

With the exception of Islesboro, the island airfields used by PIA are privately-owned, short dirt strips which require specialized aircraft, increase aircraft maintenance, and require specially-trained operators. Use of the privately-owned strips requires negotiation of use agreements and compliance with owner-imposed restrictions and costs. Plane service in Penobscot Bay, as well as nationwide, currently faces operating challenges due to increasing costs of fuel, government regulations, insurance, and parts, and the availability of trained employees. Additionally, the availability of plane service is dependent on weather conditions.

FREIGHT – Freight delivery to the islands arrives by MSFS, Penobscot Island Air (PIA), or private water taxi. Penobscot Island Air has contracts with FedEx, UPS, and US Mail to deliver mail and packages to North Haven, Vinalhaven, and Matinicus. Deliveries are also carried by truck on MSFS ferries. Larger freight is delivered to Vinalhaven by truck on the Rockland ferry. Islesboro receives deliveries and freight by ferry. Freight to Frenchboro and Swan’s Island is exclusively delivered by ferry and private water taxi service, as neither island has a maintained airstrip.

The ferries are key in supporting the lobster industry on the islands, as lobster is a live, perishable product that may be transported off the islands to the mainland on refrigerated trucks carried on the ferries, notably from Vinalhaven where more than 20% of residents have a lobster license.

⁴ The MSFS operates two runs to Frenchboro on the first and third Wednesdays of each month which would allow around 3 hours on the mainland.

⁵ https://www.knoxcountymaine.gov/vertical/sites/%7BE350B1EF-00F9-4556-86A6-16B2CB50F02D%7D/uploads/Chapter_2_-_Inventory.pdf

Summary of Existing Transportation Service

MAINE STATE FERRY SERVICE

Operation and Governance

The MSFS was established by the state in 1960 and is currently operated by the Maine Department of Transportation (MaineDOT). MaineDOT owns, operates, and maintains the vessels and associated infrastructure including terminal buildings, facilities, and crew quarters located on some of the islands. MaineDOT also employs all MSFS staff and crew. MSFS is advised by the Maine State Ferry Service Advisory Board, an entity that has dedicated representation from each island and provides advice and perspective to the MSFS.

Vessel Crewing

The current MSFS schedule requires approximately 54 scheduled and relief crew members. Each vessel has two alternating crews that are scheduled for seven-day rotations. The U.S. Coast Guard (USCG) Certificate of Inspection stipulates the minimum crewing level for each vessel, and without the minimum required crew the vessel cannot operate service.

MSFS staff and crew are state employees, and crew schedules must adhere to the rules outlined in the agreement between the State of Maine and Maine Service Employees Association SEIU Local 1989, including but not limited to hours and work schedules, employment, overtime pay, and paid leave. Crew schedules must also adhere to USCG regulations such as the 12-hour rule, which means that crew members may not work in excess of 12 hours in any consecutive 24-hour period.

Crew quarters are located on Islesboro, Swan's Island, North Haven and Vinalhaven to house crew and allow the vessel to overnight on the island in order to provide emergency response transport. When an emergency trip is needed from the island outside of scheduled ferry service hours, protocol requires that requests for transport are first made to LifeFlight (emergency air ambulance service) and the USCG before a MSFS vessel can be used. When the ferry provides an emergency trip outside of scheduled service hours, service cancellations often occur the following day as vessel crew members must adhere to the USCG 12-hour rule and are unavailable to crew the vessel.

Fleet

Service for the six routes is currently provided using six vessels, with one backup vessel, that carry both passengers and vehicles. Swan's Island and Frenchboro share a vessel and Vinalhaven has two-vessel service. The current MSFS fleet is summarized in Table 3.

Table 3: MSFS Vessels

Vessel	Route Assignment	Year Built	Capacity	
			Passengers	Vehicles
Everett Libby	Matinicus	1960	175	12
Margaret Chase Smith	Islesboro	1987	221	30
Henry Lee	Swan's / Frenchboro	1992	221	17
Neal Burgess	North Haven	1993	221	17
Charles Philbrook	Spare	1993	221	17
E. Frank Thompson	Vinalhaven	2012	250	23
Richard G. Spear	Vinalhaven	2022	250	23

Summary of Existing Transportation Service

Planned Vessel Projects

MaineDOT plans to complete several vessel construction projects in the coming years to replace aging vessels and maintain a state of good repair for the MSFS fleet. Upcoming planned vessel projects include:

- *Captain Almer Dinsmore* - MaineDOT selected a shipyard in June 2022 to complete construction of a new hybrid-electric vessel, anticipated to be in service in 2024. The new vessel will be 154-foot passenger-vehicle ferry, which will serve the Vinalhaven route, shifting the *Captain Richard G. Spear* to the Swan's Island route.
- Replacement of the *Everett Libby* – The *Everett Libby*, the oldest vessel in the fleet, is anticipated to be replaced by a new vessel in 2024. A shipyard was selected for vessel construction in August 2022. The replacement vessel will be designed to serve Matinicus with a likely operating speed of 14 knots, with consideration to the 105-foot length limitation at the island dock and the depth limitations of the harbor. The replacement vessel will be designed to accommodate cargo and serve special trips to other islands in addition to the limited number of annual trips to Matinicus.
- Replacement of the *Margaret Chase Smith* – In August 2022, MaineDOT issued a RFP for vessel design of a vessel to replace the *Margaret Chase Smith*, which currently serves Islesboro. The new ferry will be a hybrid-electric vessel designed to operate with low to zero emissions. The vessel's propulsion and on-board battery storage system will be designed for full electric ferry operation in anticipation that the required shoreside electrical charging infrastructure system will be technically and financially viable.

Mainland Terminals

MaineDOT owns and operates the three mainland terminals in Rockland, Lincolnville, and Bass Harbor, discussed in the following sections. Figures 2 through 7 provide an overview of the ferry terminal buildings, parking, and vessel infrastructure, as well as approximate drive times to surrounding amenities such as grocery stores, hospitals, and the Bangor International Airport (BGR).

Rockland

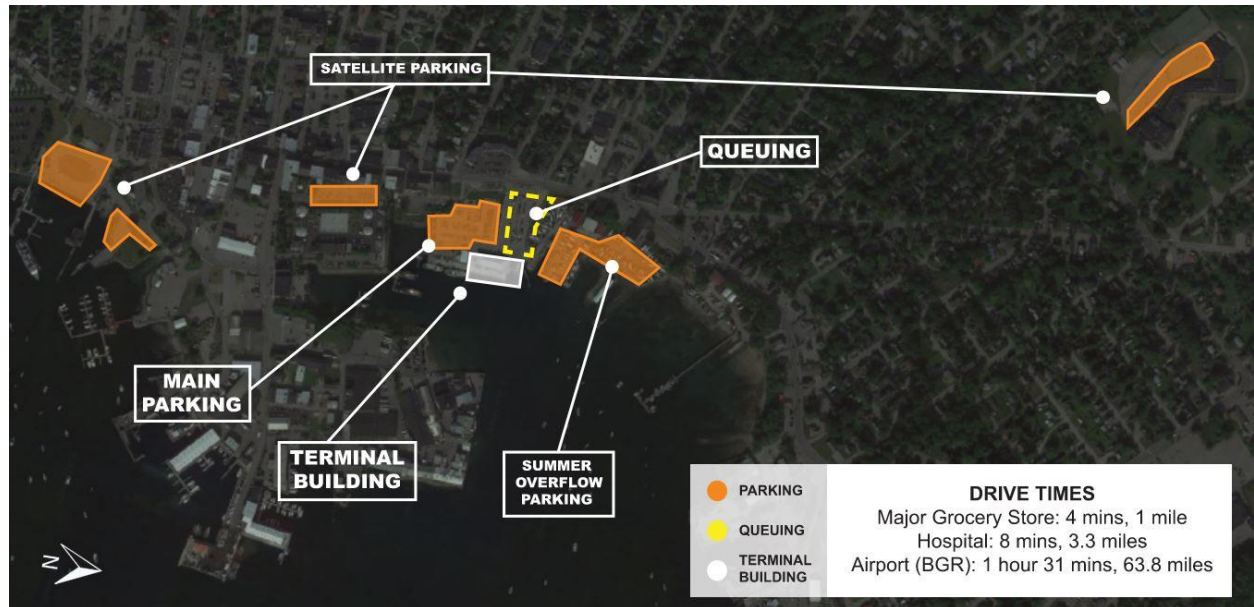
The Rockland terminal serves the Matinicus, North Haven, and Vinalhaven routes. The City of Rockland is the county seat with a population of over 7,200 year-round residents, and offers services such as medical and grocery, although not in the immediate area of the terminal.

Vehicle reservations at the Rockland terminal can be made in-person or over the phone. For trips to Vinalhaven and North Haven from Rockland, vehicle reservations can be made 1 month in advance and up to two hours before the scheduled departure. For trips to Matinicus, reservations may be made up to three months in advance. Vehicles without a reservation must line up on a first come first served basis.

MaineDOT operates year-round parking (242 spaces) next to the terminal building, with spaces available for ferry customers including overnight and long-term use. Additional, primarily day use public parking is available on streets and in overflow lots owned by the City of Rockland. No reserved parking is available. While MaineDOT has operated a shuttle to provide access between the terminal and off-site parking, it was not widely used and was discontinued.

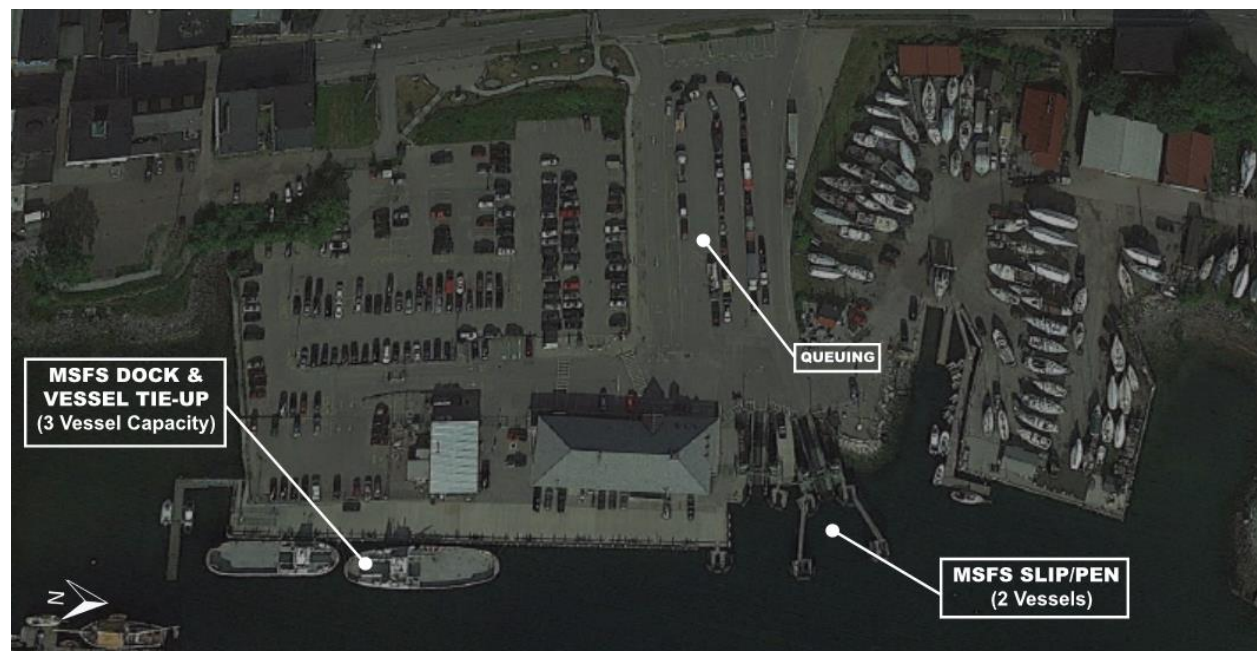
Summary of Existing Transportation Service

Figure 2: Rockland Terminal and Parking Infrastructure



As shown in Figure 3, the Rockland terminal features two vessel pens (slips), which can be used simultaneously for loading/unloading, as well as tie-up space for three vessels along the dock in front of the terminal building.

Figure 3: Rockland Slip and Vessel Infrastructure



Summary of Existing Transportation Service

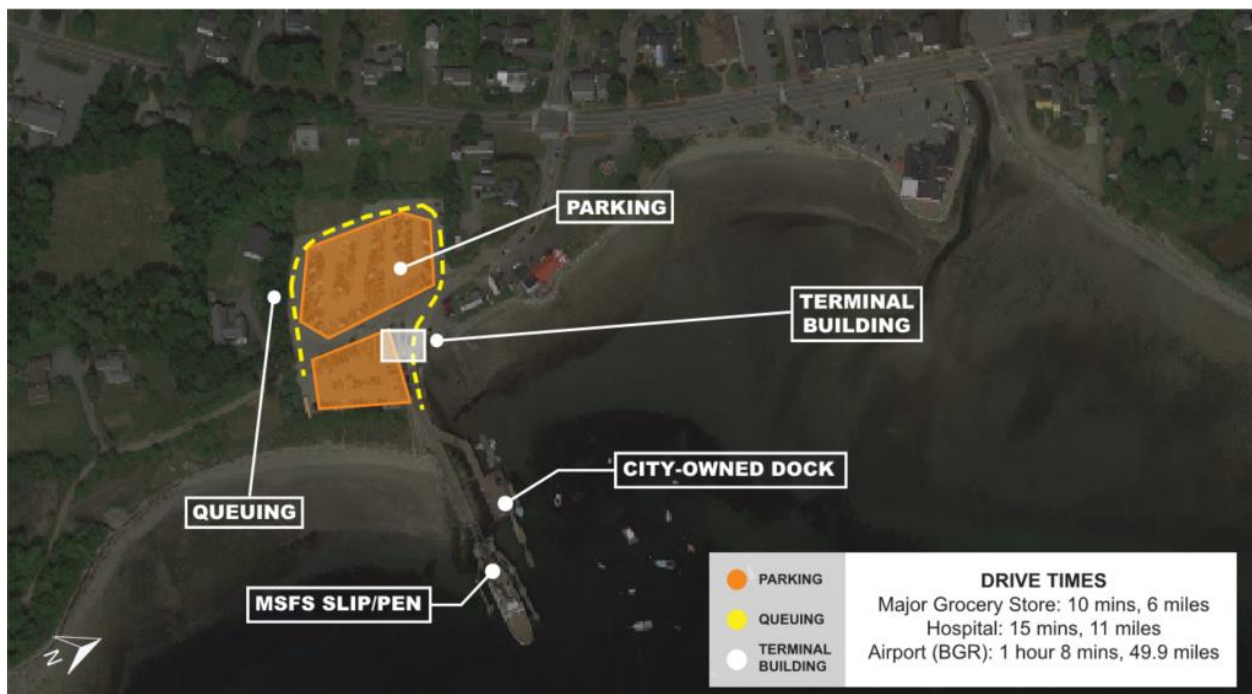
Lincolnville

The Lincolnville terminal serves the Islesboro route. Services in Lincolnville are limited, and Islesboro residents typically drive from the terminal to another location for services and shopping.

At the Lincolnville Terminal, vehicle reservations can be made by phone or in person, within one month of the anticipated sailing date. Vehicles without a reservation travel on a first come first served basis, and queue in a separate line.

MaineDOT operates year-round parking (130 spaces) next to the terminal building. Parking is charged at daily, weekly, monthly, or seasonal rates during the summer (June through September) and is free during the rest of the year. No reserved parking is available.

Figure 4: Lincolnville Terminal



Summary of Existing Transportation Service

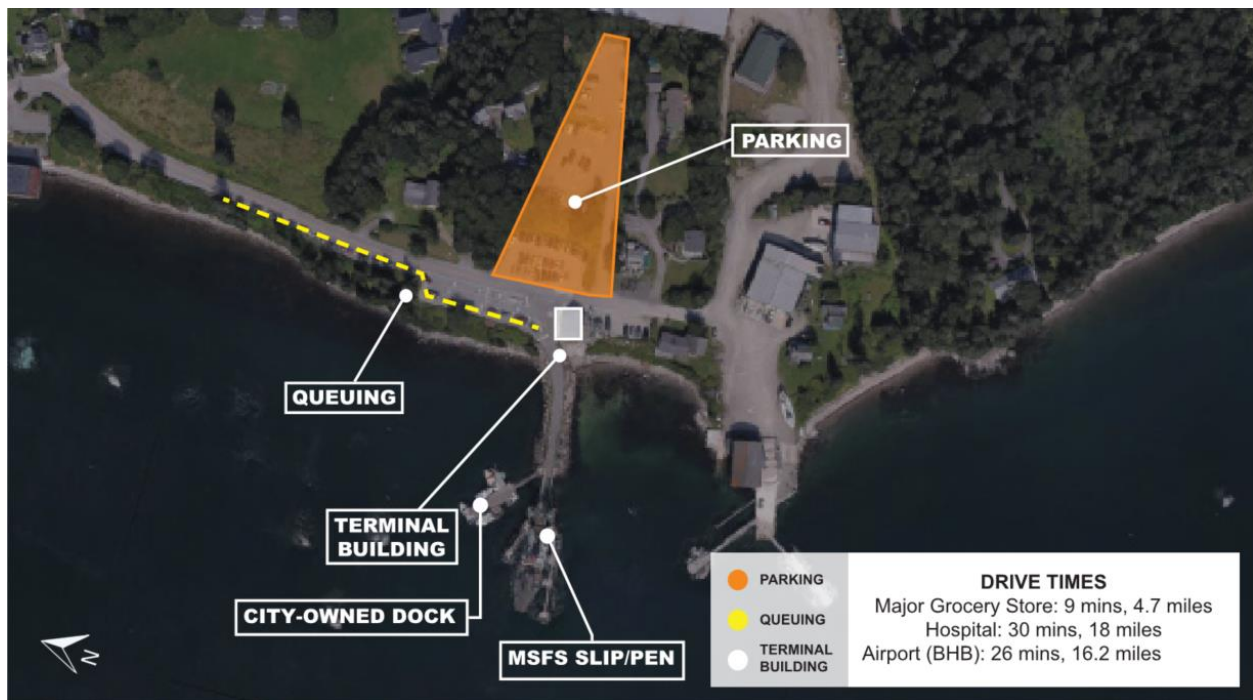
Bass Harbor

The Bass Harbor terminal serves the Swan's Island and Frenchboro routes. Services in the town of Bass Harbor are limited, and Swan's Island and Frenchboro residents typically drive from the terminal to another location for services and shopping.

At Bass Harbor, vehicle reservations can be made 1 month in advance and up to two hours before scheduled departure, either by phone or in person. Signs along the road designate where vehicles are to line up.

MaineDOT operates year-round parking (roughly 70 spaces) next to the terminal building. Parking is charged at daily, weekly, monthly, or seasonal rates during the summer (June through September) and is free during the rest of the year. No reserved parking is available.

Figure 5: Bass Harbor Terminal



Summary of Existing Transportation Service

Fare Policy and Structure

State law requires that 50% of all MSFS operating costs are recovered from user fees. Current fares are established in Tariff 9, effective since January 9, 2020. Users can purchase tickets at the terminal, as well as through a new online system launched in July 2022. Procedures for queuing and day-of reservations vary by terminal. Fare types and considerations are summarized below:

- **Fare Types:** Fares are round trip for all routes
- **Seasonal Pricing:** Off-Peak season rates apply between October 1st and May 31st. Peak season rates apply between June 1st and September 30th. Peak versus Off-Peak rates apply to all routes except for Matinicus.
- **Walk-ons:** Passenger and Walk-On tickets are available for single trips to all islands. Passenger fares differ depending on route, age of the passenger, and season, ranging from \$4.00 to \$17.50. Children 0-5 always ride for free.
- **Bicycles:** Bicycle tickets are available for all routes and include passenger ticket fare. Two ticket types, Adult Bike and Minor Bike, are available.
- **Vehicles:** Fare is dependent on classification and size of the vehicle (Vehicle, Motorcycle, and Truck), as well as whether the trip is scheduled during Peak or Off-Peak season. Except for the Matinicus route, the cost of a vehicle reservation is not included in the ticket price and must be purchased separately.
- **Commuters:** Commuter passes are available for all routes except for the Matinicus route. Five commuter tickets can be purchased for the price of four regular priced tickets, and must be used within 7 days after the first ticket is used. These passes range from \$32 to \$70 depending on route and season.
- **Students and School Employees:** MSFS provides free transportation for staff and students from island schools for school-related events, as well as transportation for students who live on the mainland but attend Islesboro Central School.

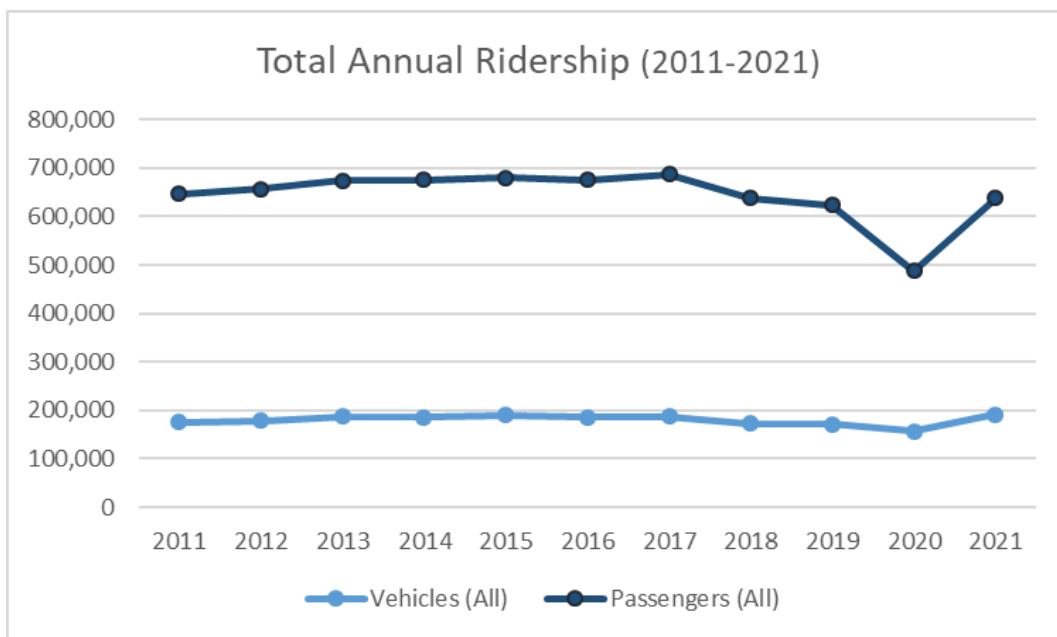
Summary of Existing Transportation Service

Ridership

MSFS total system ridership is fairly consistent year to year, with varying demand by season and large differences in ridership numbers by route. The following section provides a summary of MSFS ridership, for passengers (including both walk-ons and passengers/drivers in vehicles) and vehicles (all types).

As shown in Figure 6, total MSFS ridership demand across all routes has been relatively consistent over the past decade, with the exception of the lower ridership in 2020 due to COVID-19.

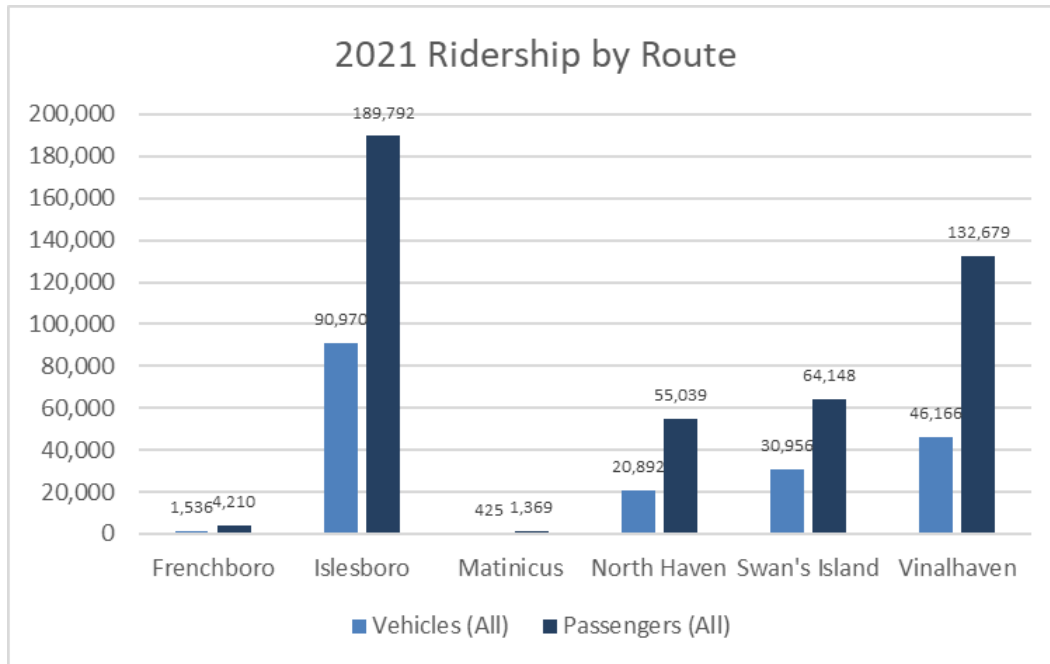
Figure 6: 2011-2021 Combined Ridership



Summary of Existing Transportation Service

Figure 7 shows the 2021 ridership levels for vehicles and passengers by route. Islesboro and Vinalhaven are the two busiest routes, followed by North Haven and Swan's Island.

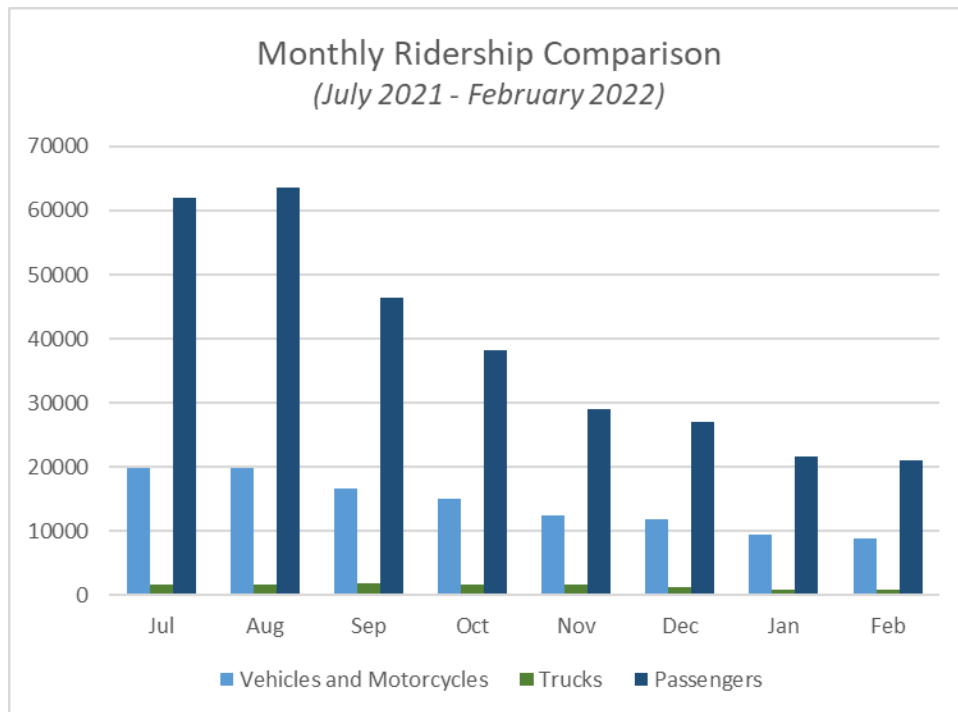
Figure 7 Annual Ridership by Route



Summary of Existing Transportation Service

MSFS ridership increases during the summer months due to seasonal residents and tourism, with roughly double the vehicles and more than double the passengers. Vehicle capacity constraints are regularly experienced during peak periods, especially during the months of July and August, when ridership totals don't reflect potential unmet demand. Figure 8 shows the combined ridership across all routes by month.

Figure 8: Ridership on all Routes per Month

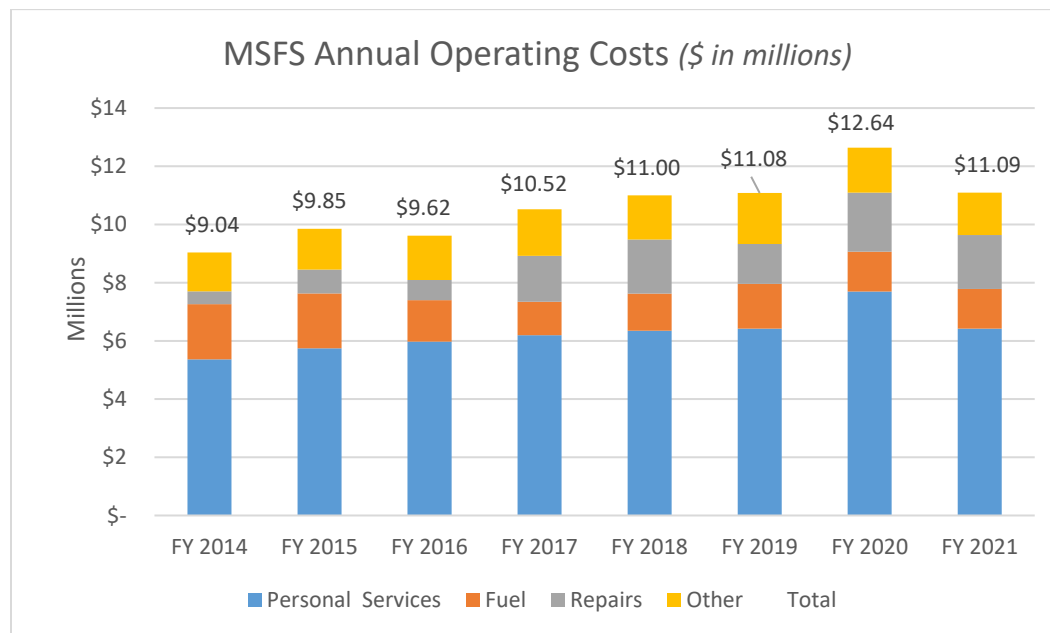


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MSFS OPERATING COSTS

The costs of operating the MSFS have increased over recent years due to higher costs of fuel and staffing, as well as increased maintenance and repair needs for the aging fleet. Figure 9 shows the annual operating costs (in millions) for the MSFS for FY 2014 through FY 2021, broken out by type of expense including personal services, fuel, repairs, and other.

Figure 9: MSFS Average Annual Operating Costs



MaineDOT is in the early stages of fleet electrification, which will reduce the fleets reliance on fuel, estimated in the baseline cost model (described below) to be around 600,000 gallons annually across all routes.

Operating costs are covered by fare revenue, parking fees, and contributions from Maine’s Highway Fund. MaineDOT is actively pursuing future grant funding opportunities for assistance with ferry operating expenses.

Baseline Cost Model

In order to support evaluation of potential service scenarios and strategies to enhance the sustainability of year-round transportation to the MSFS-served islands, the project team developed a model to estimate the costs of vessel operations. The baseline cost model was developed based on annual MSFS financial data provided by MaineDOT. Attachment 1, *Maine State Ferry System Operations Baseline Cost Memo*, provides detail on the inputs and assumptions used to support development of the baseline cost model. Estimated fleet cost data is based on 2022 dollars.

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Attachment 1

Maine State Ferry System Operations Baseline Cost