

# MSFS Potential Service Scenarios

## DRAFT



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*To:* Island Institute  
*From:* KPFF Consulting Engineers  
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### MSFS Potential Service Scenarios – DRAFT

## INTRODUCTION

Island Institute, in coordination with the Maine Department of Transportation (MaineDOT), is exploring strategies to inform future operations 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 study will evaluate the operational considerations, capital needs, and operating cost impacts of potential service scenarios aimed at addressing transportation needs by island and/or improving the long-term sustainability of MSFS operations.

Long-term recommendations for MSFS operations will be evaluated through development of several service scenarios. Because of the distance between islands, varying community and economic characteristics, and differences in MSFS service levels to each island, each scenario will focus on service to one island or group of islands, rather than the MSFS system as a whole. Potential service scenarios were developed to address the key transportation needs and priorities for service improvements for each island served by the MSFS, as identified through engagement with project representatives, island representatives and the general public. The purpose of this document is to provide a summary of potential service scenario options for further evaluation, initial feedback from MaineDOT and island representatives, and review of vessel electrification considerations by route for incorporation into service scenarios.

## POTENTIAL SERVICE SCENARIOS

The following table provides an outline of potential service scenario options for each island or group of islands for evaluation in the next study phase, and identifies the transportation need that each scenario is focused on addressing. Scenario options propose to use the following strategies to address transportation needs:

- Addition of high-speed/passenger-only ferry (POF) service
- Expanding the service day by using more than one crew shift in a day, or using a split shift
- Changing the location of overnight vessel tie-up (review of the costs/benefits of vessels overnighting on the mainland, including emergency transport considerations)

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Island(s)	Priorities for Service Improvements	Specific Need	Service Scenario	Capital Needs	Operating Considerations
All islands	Emergency transport service	Increased reliability & availability of emergency service trips outside of scheduled ferry service hours	1) High-level cost/benefit assessment of vessels overnighiting on the mainland, with alternative emergency service to the islands (high speed smaller vehicle ferry, POF, or air)	<ul style="list-style-type: none"> <li>• Vessel options review</li> <li>• Review of alternate vessel or aircraft landing sites</li> <li>• Crew quarters at mainland terminals to house crew that do not live locally</li> <li>• Additional mainland vessel tie-up capacity</li> </ul>	<ul style="list-style-type: none"> <li>• Reasonable response time to islands</li> <li>• Eliminate need for on-island crew quarters</li> <li>• Funding/governance structure for other emergency transport options</li> </ul>

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Island(s)	Priorities for Service Improvements	Specific Need	Service Scenario	Capital Needs	Operating Considerations
Islesboro	Service schedule adjustment	Additional early morning capacity to support on-island construction work	1) Extended service day (including earlier morning trip) provided by use of split shift		<ul style="list-style-type: none"> <li>• Unpaid mid-day break may be undesirable for crew, and would require union approval</li> <li>• Reduction from current mid-day service levels</li> </ul>
	Service schedule adjustment	Longer service day to support 8-hour workday	2) Add second crew shift (for example: two 8-hour crews)		<ul style="list-style-type: none"> <li>• Increased labor and administrative costs for additional crew</li> <li>• Process to add crew positions involves legislative approval and coordination with the union</li> </ul>
	Additional runs	Support for commuters	3) Passenger-only ferry (POF) service (summer only)	<ul style="list-style-type: none"> <li>• POF vessel and space for tie-up</li> <li>• Expanded parking in Lincolntown</li> </ul>	<ul style="list-style-type: none"> <li>• Increased labor and administrative costs for additional crew</li> <li>• Additional training &amp; maintenance practices</li> <li>• Opportunity to provide passenger trips with lower operating cost than vehicle ferries</li> <li>• Potential other uses for POF vessel</li> </ul>

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Island(s)	Priorities for Service Improvements	Specific Need	Service Scenario	Capital Needs	Operating Considerations
North Haven & Vinalhaven	Service schedule adjustment	Longer service day to support 8-hour workday	1) Add second crew shift (for example: two 8-hour crews) on most sailings to provide earlier/later service		<ul style="list-style-type: none"> <li>Increased labor and administrative costs for additional crew</li> <li>Process to add crew positions involves legislative approval and coordination with the union</li> <li>Operating in the dark on VH route (safety, speed, tech needs)</li> </ul>
	Service schedule adjustment	Longer service day to support 8-hour workday	2) Split shift (limited mid-day service)		<ul style="list-style-type: none"> <li>Unpaid mid-day break may be undesirable for crew, and would require union approval</li> <li>Reduction from current mid-day service levels</li> <li>Operating in the dark on VH route (safety, speed, tech needs)</li> </ul>
	Additional service	Support for commuters	3) Passenger-only ferry (POF) service (summer only)	<ul style="list-style-type: none"> <li>POF vessel and space for tie-up</li> <li>Expanded parking in Rockland</li> </ul>	<ul style="list-style-type: none"> <li>Increased labor and administrative costs for additional crew</li> <li>Additional training &amp; maintenance practices</li> <li>Opportunity to provide passenger trips with lower operating cost than vehicle ferries</li> <li>Potential other uses for POF vessel (runs to Acadia, etc.)</li> </ul>
	Alternate VH terminal location	Increase operating efficiency of the VH & NH routes	4) Relocate the MSFS terminal on VH to the north end of the island (long-term project)	<ul style="list-style-type: none"> <li>Land acquisition and construction of a new terminal</li> <li>On-island roadway and parking improvements</li> </ul>	<ul style="list-style-type: none"> <li>Operating efficiency of locating NH and VH terminals close to each other (combined runs, single crew quarters for both islands)</li> <li>Inter-island connection</li> <li>Opportunity for later evening runs to VH with safer route</li> </ul>

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Island(s)	Priorities for Service Improvements	Specific Need	Service Scenario	Capital Needs	Operating Considerations
Swan's Island & Frenchboro	Service schedule adjustment	<ul style="list-style-type: none"> <li>Swan's: Later sailings to support after-school activities</li> <li>Frenchboro: Additional service needed to support on-island contractors/ service providers. Additional days with 2 RTs.</li> </ul>	1) Added crew shift (for example: 2 crews of 8-hour days) to provide additional service to both islands 2) Split shift (limited mid-day service)	<ul style="list-style-type: none"> <li>Potential double-ended vessel design to facilitate triangle route</li> </ul>	<ul style="list-style-type: none"> <li>Added crew shift:               <ul style="list-style-type: none"> <li>Increased labor and administrative costs for additional crew</li> <li>Process to add crew positions involves legislative approval and coordination with the union</li> </ul> </li> <li>Split shift:               <ul style="list-style-type: none"> <li>Unpaid mid-day break may be undesirable for crew, and would require union approval</li> <li>Reduction from current mid-day service levels</li> </ul> </li> </ul>
	Service schedule adjustment	Frenchboro: Additional service needed to support on-island contractors/ service providers. Additional days with 2 RTs. Later Sunday sailing to allow airport connection.	3) Squeeze additional Frenchboro service into existing crew schedule	<ul style="list-style-type: none"> <li>Potential double-ended vessel design to facilitate triangle route</li> </ul>	<ul style="list-style-type: none"> <li>Triangle route used on some sailings (would increase some sailing times for Swan's)</li> </ul>

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Island(s)	Priorities for Service Improvements	Specific Need	Service Scenario	Capital Needs	Operating Considerations
Matinicus	Added freight capacity	Freight needs have increased beyond the capacity provided by 36 annual trips	1) Additional crew available to provide added Matinicus runs in combination with added freight/special trips to other islands (assumes the 36 annual trip limit is removed or increased) 2) Additional MSFS Matinicus trips hired by the island outside of scheduled MSFS service	<ul style="list-style-type: none"> <li>• New vessel for Matinicus route (<i>currently in design</i>)</li> </ul>	<ul style="list-style-type: none"> <li>• Increased labor and administrative costs for additional crew</li> <li>• Legislative approval needed for added crew and change to 36 annual trip limit</li> <li>• Other revenue-generating uses for the vessel when not serving Matinicus, and how to maximize service provided by a crew shift</li> </ul>

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## INITIAL FEEDBACK ON POTENTIAL SERVICE SCENARIOS

The list of potential service scenarios above was presented to MaineDOT and a focus group of island representatives for discussion and feedback.

MaineDOT shared key considerations to be taken into account for service scenario development, including:

- Many current crew members commute long distances for shifts, so even if vessels were to overnight on the mainland, crew housing may be needed on the mainland.
- Adding crew shifts or positions would require legislative approval, and changes to crew shifts or scheduling practices would require negotiation with the union.

Island representatives were asked to prioritize the potential service scenarios based on how they would meet the transportation needs of their island. Key findings include:

- The representatives from islands which rely on MSFS for emergency service all indicated that their highest priority was assessment of alternatives for emergency transport.
- The representative from Frenchboro indicated that their highest priority would be a scenario with an additional day (or days) with return trips to allow residents to travel to the mainland and return home to Frenchboro in the same day.
- Two islands (Vinalhaven and Swan's) indicated that their second highest priority would be a scenario with expanded service days to allow residents to commute to the mainland for an 8-hour workday.

## CAPITAL PLANNING CONSIDERATIONS FOR SCENARIO DEVELOPMENT

Two considerations for planning of long-term capital needs were identified as priorities for inclusion with service scenarios for future analysis:

- Assessment of impacts to terminals from projected sea level rise
- Potential application of electric or hybrid-electric vessels on MSFS routes

The table below represents a generalization of electrification and hybridization feasibility by route developed by Elliott Bay Design Group, with routes rated on a scale from 1 to 3 stars, with 3 stars indicating the highest level of feasibility. A brief explanation for each factor is presented following the table.

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Route	Distance	Time	Energy per One Way (Estimated)	Charging Time between runs	Charging Rate	Total Electrification Feasibility	Hybridization feasibility
Lincolntonville - Isleboro	3 nm	20 min	250 kWh	15 minutes	1,000 kW	***	***
Bass Harbor - Swans	6 nm	40 min	280 kWh	15 minutes Mid day downtime	1,120 kW	**	**
Bass Harbor - Frenchboro	8.25 nm	50 min	280 kWh	15 minutes Mid day downtime	1,120 kW	**	**
Rockland - Vinalhaven	15 nm	75 min	940 kWh	45 minutes	1,253 kW	*	***
Rockland - North Haven	12.5 nm	70 min	590 kWh	60 minutes	590 kW	*	***

- Distance:** Based upon previous studies, generally speaking, as travel distance increases the feasibility of all electric operations decreases. As distance increases the battery capacity must increase as well; at some point the increased battery capacity will limit the passengers or vehicles that the vessel can carry. However, frequently, the longer distance routes are good candidates for hybridization, as the transit time can be used to level load engines to more ideal efficiencies and idling while in port can be eliminated.
- Energy Per One-Way Trip:** These values are estimated in the ShipCalc program based upon the existing vessels operating on the route.
- Charging Rate:** The charging rate is the estimated energy consumed for a one-way trip divided by the time available to charge between trips. These rates are not infeasible, but would need to be considered when developing infrastructure, particularly at the island locations. The mid-day down time for the Swan's and Frenchboro routes could allow for slower charging to recover battery capacity that might not have been recouped between the morning runs.

## PROPOSED SCENARIOS FOR FURTHER EVALUATION

Based on feedback from representatives from Island Institute, MaineDOT and the islands, the following scenarios were identified as the highest priorities for further evaluation.

## A. All Islands – Review of Emergency Transport Service Options

**Scenario for analysis:** High-level cost/benefit assessment of vessels overnighting on the mainland with alternative emergency service to the islands. Will provide discussion of current challenges including summary of current emergency transport options, MSFS role, and challenges with the current process for islanders to request emergency medical transport service.

**Analysis to include:**

- Long-term financial impacts and considerations:
  - Cost considerations of relocating crew quarters from islands to mainland
  - Summary of the suitability of each route for application of electric or hybrid electric vessels, with estimated range of potential annual fuel savings
- Capital needs:
  - High-level overview of opportunities and challenges of potential emergency service options (high speed smaller vehicle ferry, POF, or air), and associated landing site needs
  - Identification of mainland crew quarters needs
  - Identification of infrastructure improvements needed to support charging of electric of hybrid-electric vessels.
- Cost structure evaluation: Framework to support evaluation of adding municipal/community cost sharing to support emergency transport service.

## B. Islesboro

**Scenario for analysis:** Added crew shift to allow a longer service day and support an 8-hour workday on or off the island.

**Analysis to include:**

- Long-term financial impacts and considerations:
  - Cost of additional crew hours and associated administrative costs
  - Potential improvements to level of service and capacity
- Capital needs:
  - Discussion of potential improvements to support walk-on passengers

## C. North Haven & Vinalhaven

**Scenario for analysis:** Relocating the Vinalhaven terminal to the north end of the island to provide combined service to both islands.

**Analysis to include:**

- Long-term financial impacts and considerations:
  - Operating costs and sailing times of a new combined route
  - Impacts to capacity on both routes
  - Potential schedule considerations

- Capital needs:
  - New Vinalhaven terminal and parking, and potential improvements to island roadways or implementation of on-island transportation services
  - Discussion of potential improvements to support shift from vehicles to walk-ons

## D. Swan's Island and Frenchboro

**Scenario for analysis:** Expanded service for both Swan's and Frenchboro through change in crew shift schedule.

- *Swan's*: Longer service day needed to support 8-hour workday and participation in after school activities for island residents.
- *Frenchboro*: Additional days with return trips needed to support island residents and contractors/services on the island.

### Analysis to include:

- Long-term financial impacts and considerations:
  - Cost of additional crew hours and associated administrative costs
- Capital needs:
  - Review of opportunities for triangle route or reduced trip times using double-ended vessel design

## E. Matinicus

**Scenario for analysis:** Additional trips to meet increased freight needs beyond the capacity provided by 36 annual trips.

### Analysis to include:

- Long-term financial impacts and considerations:
  - Operating cost of Matinicus runs
  - Cost of additional crew hours and associated administrative costs
  - Discussion of potential revenue-generating uses for crew and vessel when not serving Matinicus
- Capital needs: Summary of new vessel (currently in design)