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On the Costs of Freight to Martha's Vineyard from Woods Hole vs. New Bedford

This is a review of some of the various costs associated with freight transport from the two ports from studies over the past 20+ years.

The full studies are available at the SMART website: https://smartcitizenstaskforce.org/page/

A. The MMA Studies (2008)

1. "New Bedford-Woods Hole Freight Study" by Adam Isherwood, Kaitlyn Butler, Nick Stoica and Matthew Brakebill 2008 (**IBSB**)

2. "New Bedford-Martha's Vineyard Freight Study" by Matthew Brakebill, Robert Burke, Alexander Koehler. 2008 (**BBK**)

3. "New Bedford to Martha's Vineyard Freight Study Fall 2008" by Global Logistics: Adam Isherwood, Kaitlyn Butler and Nick Stoica. (**IBS**)

These three Student-Faculty efforts measured fuel and time costs and described benefits associated with alternately shipping goods from New Bedford (or nearby) to the Vineyard or from Woods Hole. Very brief summaries of their findings focusing on the comparison of costs they identified follow. Freetown is used as a starting point in two studies because freight going to the Cape and Islands from most off- Cape suppliers is regularly aggregated there or nearby.

1.

IBSB compared distance and time costs for one truck traveling to Martha's Vineyard via

New Bedford and Woods Hole. Round-trip fuel costs between routes were calculated and compared.

Total Miles (1 way): Freetown – NB - MV: 21 Road + 20 nm Sea = 44.2 land miles Freetown - WH - MV: 59 Road + 5.2 nm Sea = 65.7 land miles

Peak season time (1 way): Via NB 25 min Road + 0 min Delay + 120 min Sea = 145 min

Via WH 71 min Road + 45 min Delay + 45 min Sea = 161 min

Trucker road fuel costs (round trip at 4.5 mpg and $2.70/gal): From Freetown Via NB $25
Via WH $71

Comments: No differences in ferry fares are presented between alternatives. Assumed State Pier in operation. This suggests shippers to the northwest and west of New Bedford would choose to use NB given seasonal congestion - ***all else being equal****. Truck fuel efficiency increases will favor the WH route but not decisively.*

2.

BBK examined truck fuel costs plus ferry fuel costs from Freetown to Martha's Vineyard via New Bedford or Woods Hole. The study incorporated ferry fuel costs by comparing ferry loads of trucks between alternative ports. Assumes ferry fuel consumption of 10 g/nm at $2.79/g, and truck consumption of 4.5 mpg at $2.59/g.

Expressed as a ferry-load of trucks (10), the **Total Fuel Cost per Trip: Freetown – MV**

Via NB: $112 (truck) + $656 (ferry) = $768
Via WH: $291 (truck) + $44 (ferry) = $738

Comments: Unusual analytic perspective: fuel costs to shippers and the SSA. Of value with regard to environmental concerns, if not shipper decision making. At full fare, for example, 10 trucks through WH would cost $291 (truck fuel only) + 10 x $106 (fare) = $1,351; 10 trucks through NB would cost*
$112 (fuel only) + 10 x $283 = $ 2,939. (* =2008 estimate)*

3.

IBS examined time and fuel costs to shippers and to private autos going to Vineyard Haven from New Bedford or Woods Hole on- and off-season. For trucks, a per-mile "trucking cost" was added. Delays were recognized for the "on" or high season. The delays were reflected as additional fuel consumed during Bourne Bridge and Falmouth congestion.

Assumptions: From a starting point of Exit 18 and I 195: Distance to WH 45 mi. Off season time is 55 min. Auto mpg 21.0, Truck mpg 10. Trucking expenses $2.00/mi. Various delays are assumed for on- season.

On-High Season Cost per Auto driving round trip NB – WH is 4.65 gal x $3.96/gal. = $17.80
Truck driving round trip is $180 + 10.5 gal x $4.90/gal = $231.50

Auto and truck costs at NB in this comparison are zero. Auto "parking and ferry shuttle" is assigned 15 min.

Given high season congestion the total estimated time for trucks to Vineyard Haven from New Bedford via Woods Hole is given as 50 min drive + 45 min delay + 45 min ferry = 140 min. New Bedford direct is 120 min ferry = 120 min.

Comments: Trucking Labor Costs are roughly equal under either option - if truckers are required to stay with their rigs and delays are as calculated. Shipping from New Bedford saves $51.50 plus some notion of "wear and tear." Maintenance and Repair costs per mile plus insurance costs per mile are estimated by the American Transportation Research Institute to be about 30 cents/mile.[1] *Total marginal costs exclusive of labor are estimated to be about $1.00 /m. Thus round trip savings would be under $140 vs the suggested $230.*[2]

[1, 2] *ATRI. "An Analysis of the Operational Costs of Trucking: 2018 Update." At full fare, the tradeoff is between a savings of 20 minutes plus $140 versus twice the 2008 fare differential ($283 - $106) x 2= $354.*

B. FXM Associates & KJS Associates Inc. New Bedford Freight Ferry Project
Technical Memorandum: ***Regional Market Analysis and Draft Operating Plan*** ***(1999)***

The FXM memorandum selectively summarizes work done by and for the SSA and the New Bedford Harbor Development Commission during the late 1990s focusing on the feasibility of using the then operational State Pier for enhanced freight service to the Islands as an initial part of a much larger NB Intermodal Transportation Center project.

Some of the studies they cited include:

1. KJS Associates, Inc. and FSM Associates, *SSA Freight Survey Final Report*, July 1997.
2. Cambridge Systematics, Inc., *New Bedford Freight Economic Impact Study*, January 1999.
3. The Steamship Authority, "Freight Survey Interim Report and Recommendations," 5/1997.
4. The Steamship Authority, "Freight Survey Summary Report," 6/1997.
5. The Steamship Authority, "Mainland Freight Facility Analysis and Report," 11/1997.

The 17 page Memorandum includes: An **Introduction -** A justification for focusing on the "quick start" to address the "logic and historical context for state, local and public purpose objectives and concerns that can be served by such a facility....that can reasonably respond to the objectives and concerns of the communities of New Bedford/Fairhaven (to stimulate opportunities for capturing off- Cape purchases of goods): Barnstable and Falmouth (to limit truck movements, without adversely affecting existing jobs): as well as Nantucket and Martha's Vineyard (to have no adverse effects on the costs of goods sold, nor to impose deficits on SSA operations);" a **Goals and Objectives** section - listing relevant highlights of studies done 1996 through 1999); A section entitled "Freight Ferry Service to the Islands" - which looks at key findings of the research related to demand for freight services and how this might be accomplished; a **Demand Analysis –** which uses a "freight diversion model … and estimates " from the Cambridge Systematics work; and an **Operating Scenario** which lays out a short run plan. Freight diversion refers to what and how much shipping would seek to use New Bedford based on its origin.

Study #1 above revealed that the vast majority of commodities coming to the islands originate off-Cape with roughly 30% of island bound trucks passing by New Bedford on the way. Further, the cost of using an off-Cape port would amount to about 1% of the wholesale value of these commodities.

Study #2 indicated that the increase in retail prices on the islands to be expected from diverting a third of the freight through New Bedford would be under .35 percent. *(Comment: On a $100.00 item, this would amount to 35 cents.)* The additional cost to shippers (not consumers) could be 12 – 40%. The small impact on consumer prices given the much larger impact on shipper costs is because the ferry transportation costs constitutes less than 1% of retail prices: "...while the marginal change in the cost of this last leg of the trip is significant to the shipper, it results in very small change in the ultimate retail price of products sold on the islands." As wholesale prices in the New Bedford area were found to be below the MA overall average, savings to shippers to cover some of these added costs might be found under conditions of greater competition among suppliers.

The 1999 New Bedford Freight Economic Impact Study by CSI used shipper-supplied data

on which to base a cost model of their operations in order to develop an estimate of "freight diversion." With fares equalized across ports, New Bedford could attract 38% of year-round Vineyard bound trucks and 58% of year-round Nantucket bound shipping.

In an earlier study for the SSA, "Fare Elasticities and Policy Study," 1997, KJS and FXM associates recognized, that in peak season New Bedford – Woods Hole road congestion exceed the additional ferry time NB – MV.

The memorandum highlights the results of several detailed analyses and proposed operating plans and concludes with a few suggestions that the SSA could more than offset the additional operating costs of a subsidized freight service out of New Bedford to both Islands by gaining revenue from the new service opportunities which were not available to them then, given the capacity constraints they faced.

Comments: These are constrained to the issue of relative costs only, in an otherwise greatly detailed set of practical feasibility recommendations. Data are old with projections ceasing past 2005. Growth in freight now far exceeds what concerned participants in the late 1990s. The pressure to seek alternatives should have increased! Nevertheless, this review of professional research on the topic was prescient. Of importance is the identification of longer-term economic effects that would accompany a policy change encouraging off-Cape shipping. Sourcing and wholesaling competition from west and northwest of New Bedford can create competitive conditions to ***reduce*** *consumer prices. These opportunities await.*

C. Non-Market Costs, Social Costs, Spillovers, Public Purposes

"Carbon Footprint of Different Transport Modes for Freight between New Bedford and Martha's Vineyard," Hernandez and Trumbull, July 2019 (pp. 153-159 of *Martha's Vineyard Regional Transportation Plan 2020-2040*).

This study looks at the greenhouse gas emissions of car, truck, freight ferry and barge travel between New Bedford and Martha's Vineyard expressed as kg of CO_2.

Distance, time fuel costs and fuel consumption area are given for each mode (some with two different routes and speeds).

A discussion of time sensitivity of different freight and the CO2 and financial cost per ton to transport that freight are presented. Trade-offs such as that between fuel consumption and labor costs of slower travel are recognized.

Some examples:

--*Sankaty*: full speed: NB-MV via Quicks Hole: 320 tons capacity: 7.18 kg CO2/ton.
--*Sankaty*: half speed: NB-MV via Quicks Hole: 320 tons capacity: 3.6 kg/ton.
--8 Semi-trailers: road to WH then *Sankaty* full speed to VH: 320 tons capacity: 3.91 kg/ton.
--Catamaran Fast Ferry: full speed: NB-MV via Quicks Hole: 480 tons capacity: 11.96 kg/ton.
--Barge: NB-MV via WH passage: 480 tons capacity: 1.79 kg/ton.